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May 14, 2024
Project No. M0615.17.004

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

Re: Groundwater Monitoring Report
Former Cascade Timber No. 3 Log Sort Yard Site
Consent Decree No. 94-2-03590-3
Facility Site ID: 1206
Monitoring Date: February 17, 2024

Dear Scott Hooton:

On February 17, 2024, Maul Foster & Alongi, Inc. (MFA), conducted a groundwater monitoring event on behalf of the Port of Tacoma (the Port) at the former Cascade Timber Company (Cascade Timber) No. 3 Log Sort Yard Site, located along Maxwell Way between Port of Tacoma Road and Thorne Road in Tacoma, Washington (the Site) (Figure 1). Groundwater monitoring activities were conducted consistent with the requirements set forth in Consent Decree No. 94-2-03590-3 (CD), dated April 1994, between the Port and the Washington State Department of Ecology (Ecology) and the compliance monitoring plan for the Site (HLA 1994). The field activities and the analytical results of the monitoring event are discussed below.

Site Background

The Site is located on the former Cascade Timber No. 3 Log Sort Yard Site and encompasses approximately 10.7 acres (Ecology 2017). The Site was leased to the Cascade Timber Company and operated as a log sort yard from 1978 to 1984. In 1982, approximately 500 tons of slag generated by the Asarco Smelter was placed onsite as ballast material. The Port currently operates the Site as a truck queuing area for Husky and Washington United Terminals.

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. In October 1991, Ecology and the Port entered an agreed order (no. DE 91-S199) to complete a remedial investigation/feasibility study (RI/FS). An RI/FS report was submitted to Ecology in June 1993 and an engineering design report was submitted to Ecology in 1994 (HLA 1993, HLA 1994). Construction of a low-permeability asphalt cap and stormwater drainage system was completed in 1994 (Ecology 2017). A restrictive covenant (no. 9408020435) was recorded for the Site in 1994, 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 1994).

In January 2017, 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).

Periodic groundwater monitoring and cap inspections are performed to evaluate the long-term effectiveness and performance of the cleanup action at the Site. Groundwater monitoring has been conducted at monitoring wells MW-1 and MW-2 since 1994 to monitor groundwater quality on the Site (Figure 2). Groundwater monitoring is conducted every 18 months consistent with a 2011 memorandum of understanding (MOU) between Ecology and the Port (Ecology 2011).

During the February 2021 groundwater monitoring event, dissolved arsenic was detected in MW-1 at a concentration of 283 micrograms per liter (ug/L), above the Site cleanup level (CUL) of 36 ug/L and elevated relative to historical trends on the Site. The Port presumed that elevated arsenic concentrations were the result of surface water infiltration that occurred during construction of a new remote truck gate and utilities in May and June 2020 (Port 2021). Following Ecology-approved repair activities (Ecology 2019), a groundwater monitoring event was conducted in August 2022; arsenic concentrations were below the cleanup level in all three wells (MFA 2022b).

According to the MOU schedule, the next groundwater monitoring event will occur in August 2025, 18 months following the previous event. The next cap inspection event will occur in August 2024, 30 months following the previous event.

Groundwater Monitoring Field Procedures

On February 17, 2024, groundwater samples were collected from monitoring wells MW-1 and MW-2 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. A field duplicate sample was collected from MW-2. Groundwater samples were field filtered with a 0.45-micron filter and preserved with nitric acid during sample collection. The samples were submitted to Apex Laboratories in Tigard, Oregon, under standard chain-of-custody procedures for analysis of dissolved copper, lead, and arsenic by EPA Method 6020B.

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:

- Dissolved arsenic was detected at a concentration of 41.7 ug/L from MW-1 and 36.3 ug/L from MW-2. Both values exceed the Site CUL of 36 ug/L for dissolved arsenic.
- Dissolved copper was not detected in MW-1 at a reporting limit of 0.360 ug/L. Dissolved copper was detected at a concentration of 1.22 ug/L from MW-2. Both values are below the Site CUL of 2.9 ug/L for dissolved copper.

- Dissolved lead was not detected in either MW-1 or MW-2 (both at a reporting limit of 0.180 ug/L). Both values are below the Site CUL of 8.5 ug/L for dissolved lead.

Plots depicting MW-1 and MW-2 dissolved arsenic, copper, and lead concentrations since 1998 are presented in Figures 3 through 5, respectively. Groundwater monitoring results from this event will be submitted to Ecology's Environmental Information Management database within 45 days after completion of data validation.

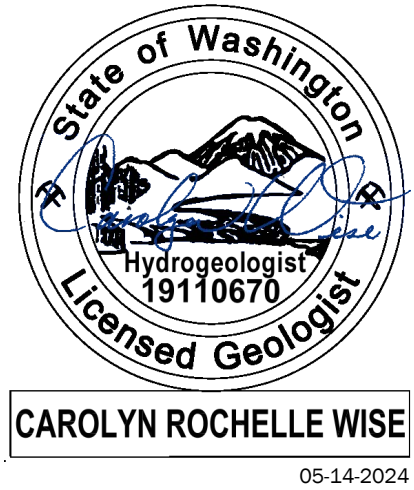
MFA completed a cap inspection in February 2022 (MFA 2022a) and recommended cap repairs be performed to maintain the integrity of the cap. Cap repairs were completed in October and November of 2022. The Port conducted additional crack sealing and repaving at the Site in August 2023. Additional cap repairs, including asphalt, rutting, and pothole repairs, were completed in April 2024. The next cap inspection is scheduled for August 2024. Cap conditions and recommendations will be provided in the forthcoming August 2024 cap inspection report.

Closing

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

Sincerely,

Maul Foster & Alongi, Inc.



Audrey Hackett
Senior Environmental Scientist

Carolyn R. Wise, LHG
Project Hydrogeologist

Attachments

References

Limitations

Figures

Tables

A—Water Field Sampling Data Sheets

B—Analytical Laboratory Reports

C—Data Validation Memorandum

References

Ecology. 2011. Washington State Department of Ecology. *Memorandum of Understanding, Former Log Yard Groundwater Monitoring and Cap Inspection.* Memorandum to Port of Tacoma. September 12.

Ecology. 2017. *Second Periodic Review Report Final, Cascade Timber 3 POT.* Washington State Department of Ecology, Toxics Cleanup Program: Olympia, WA. January.

Ecology. 2019. P. Balaraju, Washington State Department of Ecology. *Cascade Timber No. 3 – construction in January 2020.* Email to S. Weeks, Port of Tacoma. December 31.

HLA. 1993. *Remedial Investigation/Feasibility Study, Cascade Timber No. 3 Log Sort Yard, Tacoma Washington.* Harding Lawson Associates. March.

HLA. 1994. *Engineering Design Report, Remedial Action, Former Cascade Timber No. 3 Log Sort Yard, Port of Tacoma, Tacoma Washington. Appendix C, Compliance Monitoring Plan.* Harding Lawson Associates. April 29.

MFA. 2022a. *Environmental Cap and Drainage System Inspection Report, Former Cascade Timber No. 3 Log Sort Yard Site.* Prepared for Port of Tacoma. Maul Foster & Alongi, Inc. June 17.

MFA. 2022b. Audrey Hackett and Carolyn Wise, LHG, Maul Foster & Alongi, Inc. *Re: Groundwater Monitoring Report, Former Cascade Timber No. 3 Log Sort Yard Site, Consent Decree No. 94-2-03590-3, Facility Site ID 1206, Monitoring Date August 21, 2022.* Letter to Scott Hooton, Port of Tacoma. September 22.

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.

Port. 1994. *Declaration of restrictive covenant (no. 9408020435).* Port of Tacoma. August 2.

Port. 2021. S. Weeks, Port of Tacoma. *Cascade Timber 2020 Cap Repairs.* Interoffice Memorandum to Project File. April 22.

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.

Figures

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Notes:
U.S. Geological Survey 7.5-minute topographic quadrangle: Tacoma North; Township 21 north, range 3 east, section 34.
Cascade Timber = Cascade Timber Company.

Legend

Site Boundary

Figure 1
Site Location

Former Cascade Timber No. 3 Log Sort Yard Site
Tacoma, WA

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Data Source:
Site boundary is approximated from 1994 environmental covenant, Exhibit A: Site Diagram.

0 1,000 2,000
Feet

Figure 2
Site Features

Former Cascade Timber
No. 3 Log Sort Yard Site
Tacoma, WA

Legend

- Monitoring Well
- Site Boundary
- Tax Lot

Notes:
Cascade Timber = Cascade Timber Company.

0 100
Feet

Data Source:
Aerial photograph obtained from Bing; tax lot data obtained from Pierce County.

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Path: X:\0615.17\004\Pro\M0615_17_004_003.aprx
Print Date: 4/25/2024
Reviewed By: ahackett
Produced By: sturner
Project: M0615.17.004

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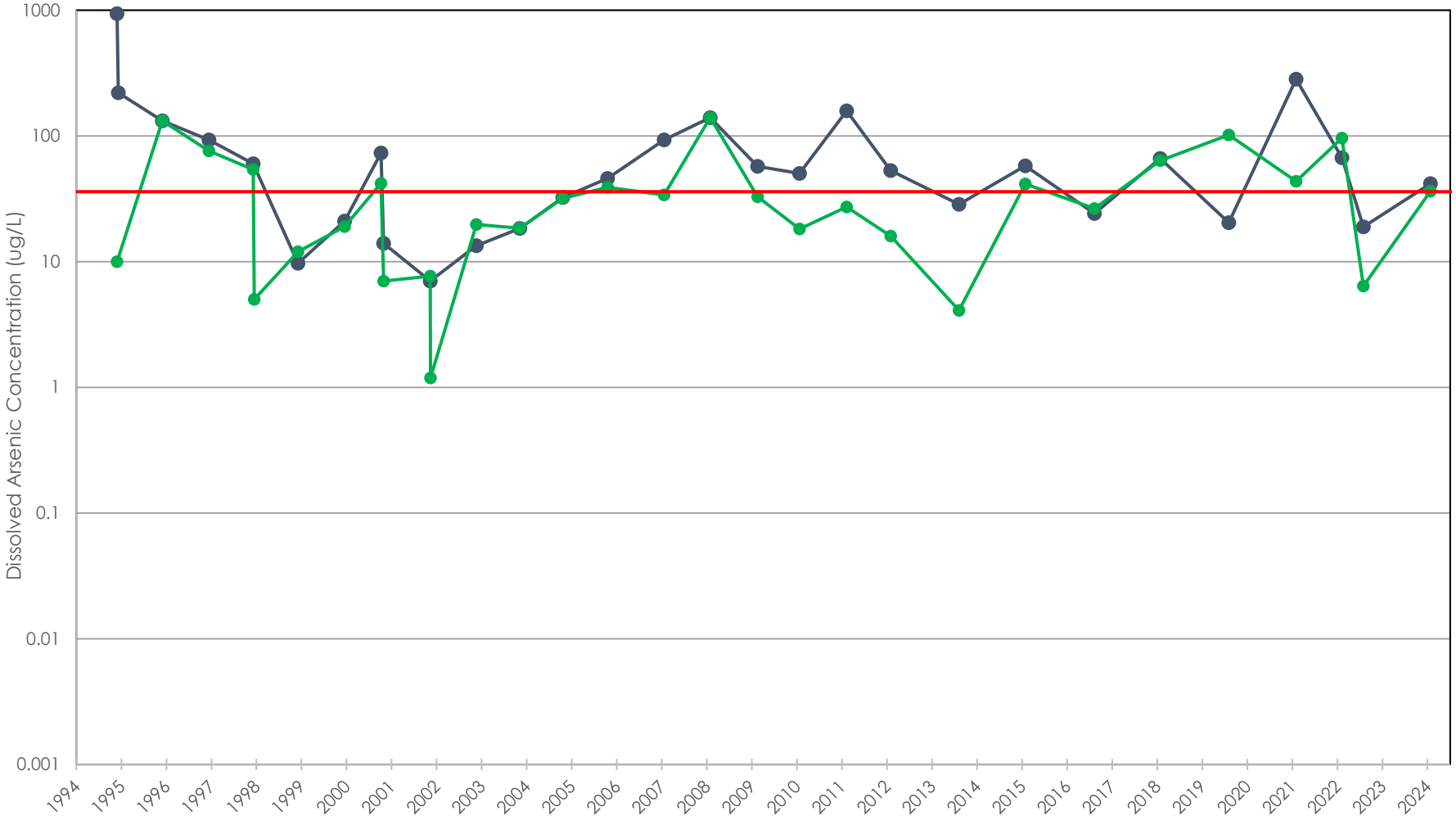
Figure 3
Dissolved Arsenic Trend Plot
Former Cascade Timber No. 3 Log Sort Yard Site
Tacoma, Washington



Notes
Cascade Timber = Cascade Timber Company.
See Table 2 for analytical data.
Non-detect results are plotted at the detection limit or reporting limit.
Concentrations plotted on a logarithmic scale.
ug/L = micrograms per liter.

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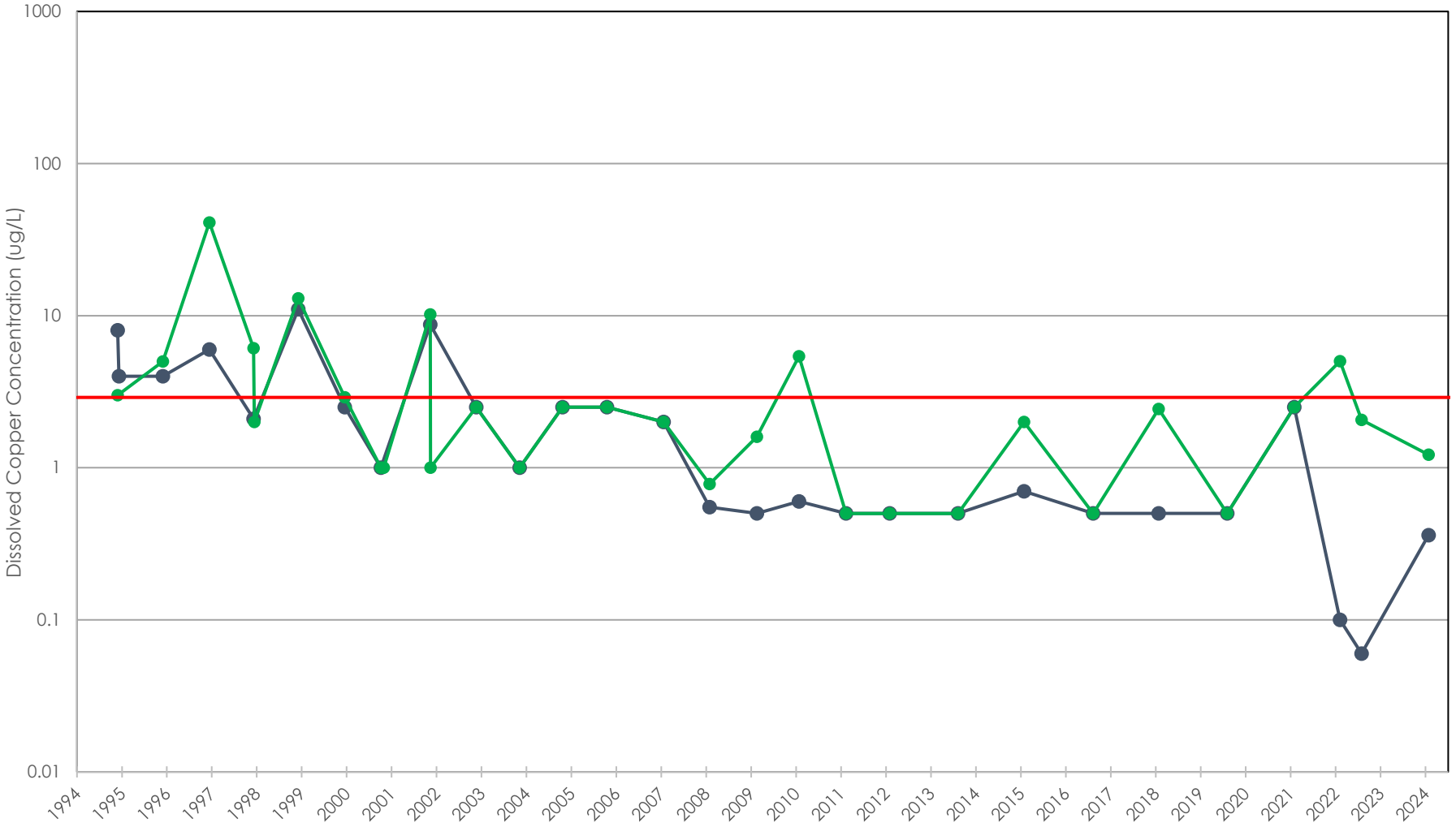
Figure 4
Dissolved Copper Trend Plot
Former Cascade Timber No. 3 Log Sort Yard Site
Tacoma, Washington



Notes
Cascade Timber = Cascade Timber Company.
See Table 2 for analytical data.
Non-detect results are plotted at the detection limit or reporting limit.
Concentrations plotted on a logarithmic scale.
ug/L = micrograms per liter.

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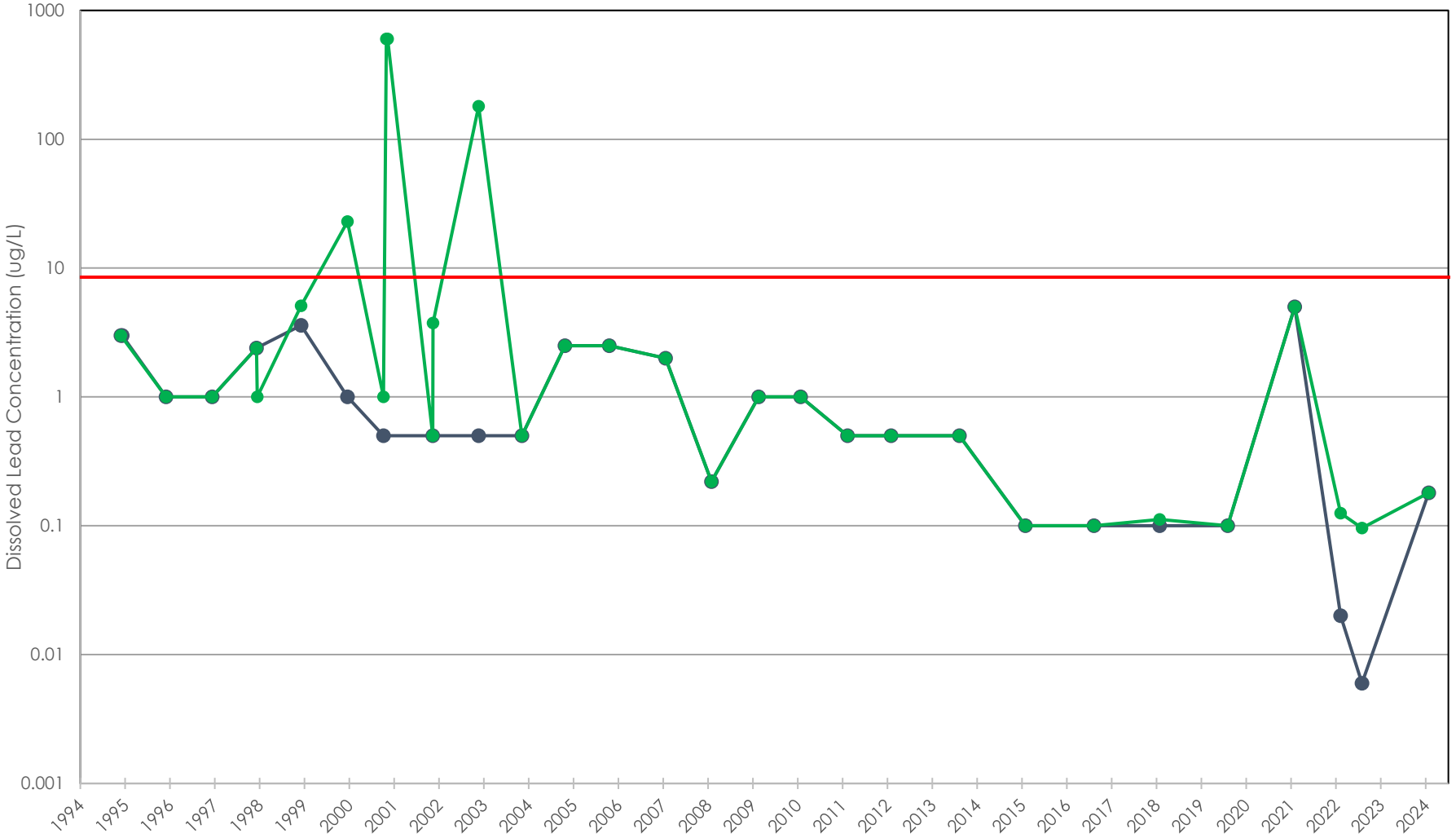
Figure 5
Dissolved Lead Trend Plot
Former Cascade Timber No. 3 Log Sort Yard Site
Tacoma, Washington



Notes
Cascade Timber = Cascade Timber Company.
See Table 2 for analytical data.
Non-detect results are plotted at the detection limit or reporting limit.
Concentrations plotted on a logarithmic scale.
ug/L = micrograms per liter.

Tables

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Table 1
Water Level Data
Former Cascade Timber No. 3 Log Sort Yard Site
Tacoma, Washington

Location	Date	Top of Casing Elevation (feet)	Depth of Water below Top of Casing (feet)	Water Level Elevation (feet)
MW-1	12/28/1994	--	--	--
	12/09/1994	--	--	--
	12/01/1995	20.00	3.68	16.32
	12/13/1996	20.00	3.98	16.02
	12/09/1997	20.00	5.26	14.74
	12/07/1998	20.00	4.71	15.29
	12/22/1999	20.00	4.47	15.53
	10/11/2000	20.00	6.58	13.42
	11/03/2000	20.00	--	--
	11/16/2001	20.00	4.35	15.65
	11/19/2001	20.00	--	--
	11/26/2002	20.00	6.58	13.42
	11/14/2003	20.98	12.22	8.76
	10/29/2004	20.98	12.31	8.67
	10/26/2005	20.98	12.71	8.27
	01/29/2007	20.98	11.83	9.15
	02/08/2008	20.98	12.45	8.53
	02/27/2009	20.98	12.18	8.80
	02/04/2010	20.98	11.13	9.85
	02/22/2011	20.98	11.54	9.44
	02/13/2012	20.98	12.24	8.74
	09/23/2013	20.98	12.23	8.75
	02/12/2015	20.98	10.90	10.08
	08/26/2016	20.98	12.35	8.63
	02/12/2018	20.98	10.74	10.24
	08/23/2019	20.98	13.59	7.39
	02/19/2021	20.98	11.34	9.64
	02/27/2022	20.98	12.46	8.52
	08/21/2022	20.98	12.13	8.85
	02/17/2024	20.98	11.14	9.84

Table 1
Water Level Data
Former Cascade Timber No. 3 Log Sort Yard Site
Tacoma, Washington

Location	Date	Top of Casing Elevation (feet)	Depth of Water below Top of Casing (feet)	Water Level Elevation (feet)
MW-2	12/28/1994	--	--	--
	12/09/1994	--	--	--
	12/01/1995	18.12	4.60	13.52
	12/13/1996	18.12	7.35	10.77
	12/09/1997	18.12	13.66	4.46
	12/07/1998	18.12	5.82	12.30
	12/22/1999	18.12	7.21	10.91
	10/11/2000	18.12	12.60	5.52
	11/03/2000	18.12	--	--
	11/16/2001	18.12	13.55	4.57
	11/19/2001	18.12	6.32	11.80
	11/26/2002	18.12	8.91	9.21
	11/14/2003	19.91	10.02	9.89
	10/29/2004	19.91	9.10	10.81
	10/26/2005	19.91	9.74	10.17
	01/29/2007	19.91	5.43	14.48
	02/08/2008	19.91	10.10	9.81
	02/27/2009	19.91	8.77	11.14
	02/04/2010	19.91	12.19	7.72
	02/22/2011	19.91	5.23	14.68
	02/13/2012	19.91	6.23	13.68
	09/23/2013	19.91	7.98	11.93
	02/12/2015	19.91	4.76	15.15
	08/26/2016	19.91	8.37	11.54
	02/12/2018	19.91	4.77	15.14
	08/23/2019	19.91	8.55	11.36
	02/19/2021	19.91	5.40	14.51
	02/27/2022	19.91	5.58	14.33
	08/21/2022	19.91	7.74	12.17
	02/17/2024	19.91	5.18	14.73

Notes

Top of casing elevations based on information provided by the Port of Tacoma.

Depth to water meaurements collected before February 2021 collected by others.

-- = not measured.

Table 2
Groundwater Analytical Data
Former Cascade Timber No. 3 Log Sort Yard
Tacoma, Washington

Location	Sample Type	Collection Date	Dissolved Arsenic	Dissolved Copper	Dissolved Lead	Dissolved Zinc
		Units:	ug/L	ug/L	ug/L	ug/L
		Groundwater Cleanup Levels[(a)]:	36	2.9	8.5	86
MW-1	N	11/28/1994	**940**	**8**	<3	<20
	N	12/09/1994	**220**	**4**	<3	<20
	N	12/01/1995	**132**	**4**	<1	53
	N	12/13/1996	**93**	**6**	<1	9
	N	12/09/1997	**60**	2.1	2.4	12
	N	12/07/1998	9.7	**11**	3.6	**510**
	N	12/22/1999	21.0	2.5	<1	**99**
	N	10/11/2000	**73**	<1	<0.5	4.7
	N	11/03/2000	14.0	--	--	--
	N	11/16/2001	7.02	**8.73**	<0.5	<4
	N	11/26/2002	13.4	<2.5	<0.5	<2.5
	N	11/14/2003	18.4	<1.0	<0.5	5.2
	N	10/29/2004	32.4	<2.5	<2.5	12.2
	N	10/26/2005	**46**	<2.5	<2.5	<2.5
	N	01/29/2007	**93**	<2.0	<2.0	<5.0
	N	02/08/2008	**140**	<0.55	<0.22	5.2 J
	N	02/27/2009	**57.2**	<0.5	<1	6
	N	02/04/2010	**50.3**	0.6	<1	<4
	N	02/22/2011	**158**	<0.5	<0.5	0.8
	N	02/13/2012	**53**	<0.5	<0.5	--
	N	08/23/2013	28.6	<0.5	<0.5	--
	N	02/12/2015	**57.7**	0.7	<0.1	--
	N	08/26/2016	24.2	<0.5	<0.1	--
	N	02/12/2018	**66**	<0.5	<0.1	--
	N	08/23/2019	20	<0.5	<0.1	--
	FD	08/23/2019	20.4	<0.5	<0.1	--
	N	02/19/2021	**283**	<2.5	<5.0	<25
	N	02/27/2022	**67.0**	<0.10	<0.020	--
	FD	02/27/2022	**63.5**	<0.10	<0.020	--
	N	08/21/2022	18.9	0.06 J	< 0.006	--
	N	02/17/2024	**41.7**	<0.360	<0.180	--
MW-2	N	11/28/1994	10	**3**	<3	<20
	N	12/01/1995	--	--	--	--
	FD	12/01/1995	**132**	**5**	<1	53
	N	12/13/1996	3	**5**	<1	<83
	FD	12/13/1996	**76**	**41**	1	18
	FD	12/09/1997	**54**	**6.1**	2.4	43

Table 2
Groundwater Analytical Data
Former Cascade Timber No. 3 Log Sort Yard
Tacoma, Washington

Location	Sample Type	Collection Date	Dissolved Arsenic	Dissolved Copper	Dissolved Lead	Dissolved Zinc
		Units:	ug/L	ug/L	ug/L	ug/L
		Groundwater Cleanup Levels[a]:	36	2.9	8.5	86
MW-2 (continued)	N	12/16/1997	5	<2	<1	6
	N	12/07/1998	2.3	1.8	5.1	**360**
	FD	12/07/1998	12	**13**	1.2	**600**
	N	12/22/1999	4.4	<2	**23**	6.9
	FD	12/22/1999	19	**2.9**	<1	38
	N	10/11/2000	<1	<1	<1	**99**
	FD	10/11/2000	**42**	<1	<0.5	6.5
	N	11/03/2000	2	<1	**600**	8.3
	FD	11/03/2000	7	--	--	--
	N	11/13/2000	--	--	**600**	--
	FD	11/16/2001	7.69	**10.2**	<0.5	<4
	N	11/19/2001	1.19	<1	3.74	38.6
	N	11/26/2002	<2.5	<2.5	**180**	3.36
	FD	11/26/2002	19.7	<2.5	<0.5	<2.5
	N	11/14/2003	8.91	<1.0	<0.5	4.64
	FD	11/14/2003	18.5	<1.0	<0.5	3.97
	N	10/29/2004	25.4	<2.5	<2.5	<5
	FD	10/29/2004	31.9	<2.5	<2.5	7.15
	N	10/26/2005	**39**	<2.5	<2.5	<2.5
	FD	10/26/2005	32	<2.5	<2.5	<2.5
	N	01/29/2007	34	<2.0	<2.0	<5.0
	FD	01/29/2007	35	<2.0	<2.0	<5.0
	N	02/08/2008	24	0.78 J	<0.22	5.1 J
	FD	02/08/2008	**140**	<0.55	<0.22	6.0 J
	N	02/27/2009	32.6	1.6	<1	6
	FD	02/27/2009	32.9	1.5	<1	<4
	N	02/04/2010	8.1	**4.1**	<1	<4
	FD	02/04/2010	18.2	5.4	<1	<4
	N	02/22/2011	27.2	<0.5	<0.5	0.8
	FD	02/22/2011	26.9	0.5	<0.5	1.1
	N	02/13/2012	16	0.5	<0.5	--
	FD	02/13/2012	16	0.6	<0.5	--
	N	08/23/2013	4.1	<0.5	<0.5	--
	FD	08/23/2013	4.0	<0.5	<0.5	--
	N	02/12/2015	**41.6**	2.0	0.1	--
	FD	02/12/2015	**40.7**	1.8	0.1	--
	N	08/26/2016	23.6	<0.5	<0.1	--

Table 2
Groundwater Analytical Data
Former Cascade Timber No. 3 Log Sort Yard
Tacoma, Washington

Location	Sample Type	Collection Date	Dissolved Arsenic	Dissolved Copper	Dissolved Lead	Dissolved Zinc
		Units:	ug/L	ug/L	ug/L	ug/L
		Groundwater Cleanup Levels[(a)]:	36	2.9	8.5	86
MW-2 (continued)	FD	08/26/2016	26.5	<0.5	<0.1	--
	N	02/12/2018	**63.6**	1.96	0.092 J	--
	FD	02/12/2018	**60**	2.43	0.112	--
	N	08/23/2019	**102**	<0.5	<0.1	--
	N	02/19/2021	**42.0**	<2.5	<5.0	<25
	FD	02/19/2021	**43.6**	<2.5	<5.0	<25
	N	02/27/2022	**96.2**	**5.01**	0.125	--
	N	08/21/2022	6.36	2.06 J	0.096 J	--
	FD	08/21/2022	6.40	0.19 J	<0.020	--
	N	02/17/2024	35.6	1.22	<0.180	--
	FD	02/17/2024	**36.3**	1.17	<0.180	--
MW-3S	N	11/28/1994	25	**28**	<3	<20
	N	12/01/1995	**54**	**3**	2	65
	N	12/13/1996	**190**	<2	3	9
	N	12/09/1997	**63**	2	4.2	**330**
	N	12/07/1998	**50**	**2.9**	2.2	<5
MW-3D	N	11/28/1994	20	**7**	<3	<20
	N	12/01/1995	3	**4**	<1	35
	N	12/13/1996	4	**14**	<5	18
	N	12/09/1997	27	2.2	2	17
	N	12/07/1998	3	<2	<1	7.8

Notes

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

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

Samples collected in 2019–2021 and 2024 were analyzed by EPA Method 6020B. All remaining samples were analyzed by EPA Method 200.8.

Zinc analysis was discontinued in 2011 with Ecology approval dated June 28, 2011.

-- = 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.

N = normal environmental sample.

ug/L = micrograms per liter.

WAC = Washington Administrative Code.

[(a)]Groundwater cleanup levels are based on EPA chronic marine water quality criteria (WAC 173-201A).

Attachment A

Water Field Sampling Data Sheets

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Water Field Sampling Data Sheet

Client Name	Port of Tacoma	**Sample Location**	MW-1
Project #	M0615.17.004	**Sampler**	C. Sifford
Project Name	Cascade Timber GW Monitoring	**Sampling Date**	2/17/2024
Sampling Event	February 2024	**Sample Name**	MW-1-GW-13.5
Sub Area		**Sample Depth (ft)**	13.5
FSDS QA:	J. Wetmore	**Easting**	**Northing**	**TOC**

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/17/2024	16:37	16.13		11.14		4.99	0.81

(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**	**Water Level**
(2) Peristaltic Pump	4:42:00 PM	0.2	0.22						1.26	11.16
	4:45:00 PM	0.4	0.22	6.28	10.3	641.5	0.83	-11.4	1.18	11.17
	4:48:00 PM	0.5	0.22	6.35	10.3	645.3	0.26	-36.1	0.94	11.17
	4:51:00 PM	0.7	0.22	6.37	10.3	646.7	0.14	-50.3	1.05	11.17
	4:54:00 PM	0.9	0.22	6.39	10.3	646.8	0.12	-54.3	0.87	11.17
Final Parameters	4:57:00 PM	1.1	0.22	6.4	10.3	646.7	0.1	-58.1	0.92	11.17

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; colorless; moderate sulfur-like odor; no sheen.

Sample Information

Sampling Method	**Sample Type**	**Sampling Time**	**Container Code/Preservative**	**#**	**Filtered**
(2) Peristaltic Pump	Groundwater	5:00:00 PM	VOA-Glass		
			Amber Glass		
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly	1	Yes
			Total Bottles	1	

General Sampling Comments

Began purging at 16:38.

Signature _____

MAUL FOSTER ALONGI

(360) 694-2691 www.maulfoster.com

Water Field Sampling Data Sheet

Client Name	Port of Tacoma	**Sample Location**	MW-2
Project #	M0615.17.004	**Sampler**	C. Sifford
Project Name	Cascade Timber GW Monitoring	**Sampling Date**	2/17/2024
Sampling Event	February 2024	**Sample Name**	MW-2-GW-12.5
Sub Area		**Sample Depth (ft)**	12.5
FSDS QA:	J. Wetmore	**Easting**	**Northing**	**TOC**

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
2/17/2024	15:36	17.87		5.18		12.69	2.07

(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**	**Water Level**
(2) Peristaltic Pump	3:43:00 PM	0.2	0.23						5.13	5.42
	3:48:00 PM	0.5	0.23	6.55	11.9	470.3	0.31	-56.2	4.61	5.46
	3:55:00 PM	0.9	0.23	6.34	11.7	366	0.13	-48.8	4.79	5.48
	4:01:00 PM	1.2	0.23	6.32	11.7	362.1	0.09	-48.5	4.98	5.49
	4:05:00 PM	1.5	0.23	6.36	11.7	361	0.07	-48.9	5.26	5.49
	4:08:00 PM	1.8	0.23	6.31	11.7	360.4	0.07	-49.2	5.04	5.49
Final Parameters	4:12:00 PM	2.1	0.23	6.33	11.8	361.1	0.07	-50.3	4.77	5.5

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; yellow-brown tint; sulfur and organic-like 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	1	Yes
			Total Bottles	1	

General Sampling Comments

Began purging at 15:38.
MW-DUP-GW-12.5 collected at this location.

Signature _____

Attachment B

Analytical Laboratory Reports

MAUL FOSTER ALONGI

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Wednesday, March 6, 2024

Audrey Hackett
Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

RE: A4B1319 - Cascade Timber - M0615.17.004

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A4B1319, which was received by the laboratory on 2/20/2024 at 10:57:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information
Acceptable Receipt Temperature is less than, or equal to, 6 degC (not frozen), or received on ice the same day as sampling.
(See Cooler Receipt Form for details)
Default Cooler 0.9 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **Cascade Timber**	
3140 NE Broadway Street	Project Number: **M0615.17.004**	**Report ID:**
Portland, OR 97232	Project Manager: **Audrey Hackett**	**A4B1319 - 03 06 24 1714**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1-GW-13.5	A4B1319-01	Water	02/17/24 17:00	02/20/24 10:57
MW-2-GW-12.5	A4B1319-02	Water	02/17/24 16:15	02/20/24 10:57
MW-DUP-GW-12.5	A4B1319-03	Water	02/17/24 16:15	02/20/24 10:57

Apex Laboratories

Philip Nerenberg, Lab Director

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **Cascade Timber**	
3140 NE Broadway Street	Project Number: **M0615.17.004**	**Report ID:**
Portland, OR 97232	Project Manager: **Audrey Hackett**	**A4B1319 - 03 06 24 1714**

ANALYTICAL SAMPLE RESULTS

Dissolved Metals by EPA 200.8 (ICPMS)

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-1-GW-13.5 (A4B1319-01)				**Matrix: Water**				
Batch: 24C0058								
Copper	ND	---	0.360	ug/L	1	03/03/24 20:44	EPA 200.8 (Diss)	A-01
Lead	ND	---	0.180	ug/L	1	03/03/24 20:44	EPA 200.8 (Diss)	A-01
MW-1-GW-13.5 (A4B1319-01RE1)				**Matrix: Water**				
Batch: 24C0058								
Arsenic	**41.7**	---	0.360	ug/L	1	03/04/24 16:44	EPA 200.8 (Diss)	**A-01**
MW-2-GW-12.5 (A4B1319-02)				**Matrix: Water**				
Batch: 24C0058								
Copper	**1.22**	---	0.360	ug/L	1	03/03/24 21:19	EPA 200.8 (Diss)	**A-01**
Lead	ND	---	0.180	ug/L	1	03/03/24 21:19	EPA 200.8 (Diss)	A-01
MW-2-GW-12.5 (A4B1319-02RE1)				**Matrix: Water**				
Batch: 24C0058								
Arsenic	**35.6**	---	0.360	ug/L	1	03/04/24 17:02	EPA 200.8 (Diss)	**A-01**
MW-DUP-GW-12.5 (A4B1319-03)				**Matrix: Water**				
Batch: 24C0058								
Copper	**1.17**	---	0.360	ug/L	1	03/03/24 21:24	EPA 200.8 (Diss)	**A-01**
Lead	ND	---	0.180	ug/L	1	03/03/24 21:24	EPA 200.8 (Diss)	A-01
MW-DUP-GW-12.5 (A4B1319-03RE1)				**Matrix: Water**				
Batch: 24C0058								
Arsenic	**36.3**	---	0.360	ug/L	1	03/04/24 17:04	EPA 200.8 (Diss)	**A-01**

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **Cascade Timber**	
3140 NE Broadway Street	Project Number: **M0615.17.004**	**Report ID:**
Portland, OR 97232	Project Manager: **Audrey Hackett**	**A4B1319 - 03 06 24 1714**

QUALITY CONTROL (QC) SAMPLE RESULTS

Dissolved Metals by EPA 200.8 (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24C0058 - Matrix Matched Direct Inject								**Water**				
Blank (24C0058-BLK1)			Prepared: 03/01/24 18:11		Analyzed: 03/03/24 20:35							
EPA 200.8 (Diss)												
Copper	ND	---	0.360	ug/L	1	---	---	---	---	---	---	A-01
Lead	ND	---	0.180	ug/L	1	---	---	---	---	---	---	A-01
Blank (24C0058-BLK3)			Prepared: 03/01/24 18:11		Analyzed: 03/04/24 16:38							
EPA 200.8 (Diss)												
Arsenic	ND	---	0.360	ug/L	1	---	---	---	---	---	---	A-01
LCS (24C0058-BS1)			Prepared: 03/01/24 18:11		Analyzed: 03/03/24 20:39							
EPA 200.8 (Diss)												
Copper	4.64	---	0.378	ug/L	1	5.00	---	93	85-115%	---	---	A-01
Lead	4.82	---	0.189	ug/L	1	5.00	---	96	85-115%	---	---	A-01
LCS (24C0058-BS3)			Prepared: 03/01/24 18:11		Analyzed: 03/04/24 16:41							
EPA 200.8 (Diss)												
Arsenic	4.91	---	0.378	ug/L	1	5.00	---	98	85-115%	---	---	A-01
Duplicate (24C0058-DUP1)			Prepared: 03/01/24 18:11		Analyzed: 03/03/24 20:48							
QC Source Sample: MW-1-GW-13.5 (A4B1319-01)												
EPA 200.8 (Diss)												
Copper	ND	---	0.360	ug/L	1	---	ND	---	---	---	20%	A-01
Lead	ND	---	0.180	ug/L	1	---	ND	---	---	---	20%	A-01
Duplicate (24C0058-DUP3)			Prepared: 03/01/24 18:11		Analyzed: 03/04/24 16:47							
QC Source Sample: MW-1-GW-13.5 (A4B1319-01RE1)												
EPA 200.8 (Diss)												
Arsenic	**42.2**	---	0.360	ug/L	1	---	41.7	---	---	1	20%	A-01
Matrix Spike (24C0058-MS1)			Prepared: 03/01/24 18:11		Analyzed: 03/03/24 20:52							
QC Source Sample: MW-1-GW-13.5 (A4B1319-01)												
EPA 200.8 (Diss)												
Copper	4.55	---	0.378	ug/L	1	5.00	ND	91	70-130%	---	---	A-01
Lead	4.76	---	0.189	ug/L	1	5.00	ND	95	70-130%	---	---	A-01

Apex Laboratories

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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3140 NE Broadway Street	Project Number: **M0615.17.004**	**Report ID:**
Portland, OR 97232	Project Manager: **Audrey Hackett**	**A4B1319 - 03 06 24 1714**

QUALITY CONTROL (QC) SAMPLE RESULTS

Dissolved Metals by EPA 200.8 (ICPMS)

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 24C0058 - Matrix Matched Direct Inject												**Water**
Matrix Spike (24C0058-MS3)					Prepared: 03/01/24 18:11		Analyzed: 03/04/24 16:50					
QC Source Sample: MW-1-GW-13.5 (A4B1319-01RE1)												
EPA 200.8 (Diss)												
Arsenic	47.3	---	0.378	ug/L	1	5.00	41.7	111	70-130%	---	---	A-01

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **Cascade Timber**	
3140 NE Broadway Street	Project Number: **M0615.17.004**	**Report ID:**
Portland, OR 97232	Project Manager: **Audrey Hackett**	**A4B1319 - 03 06 24 1714**

SAMPLE PREPARATION INFORMATION

Dissolved Metals by EPA 200.8 (ICPMS)

Prep: Matrix Matched Direct Inject

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 24C0058							
A4B1319-01	Water	EPA 200.8 (Diss)	02/17/24 17:00	03/01/24 18:11	10mL/20mL	45mL/50mL	1.80
A4B1319-01RE1	Water	EPA 200.8 (Diss)	02/17/24 17:00	03/01/24 18:11	10mL/20mL	45mL/50mL	1.80
A4B1319-02	Water	EPA 200.8 (Diss)	02/17/24 16:15	03/01/24 18:11	10mL/20mL	45mL/50mL	1.80
A4B1319-02RE1	Water	EPA 200.8 (Diss)	02/17/24 16:15	03/01/24 18:11	10mL/20mL	45mL/50mL	1.80
A4B1319-03	Water	EPA 200.8 (Diss)	02/17/24 16:15	03/01/24 18:11	10mL/20mL	45mL/50mL	1.80
A4B1319-03RE1	Water	EPA 200.8 (Diss)	02/17/24 16:15	03/01/24 18:11	10mL/20mL	45mL/50mL	1.80

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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ANALYTICAL REPORT

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3140 NE Broadway Street	Project Number: **M0615.17.004**	**Report ID:**
Portland, OR 97232	Project Manager: **Audrey Hackett**	**A4B1319 - 03 06 24 1714**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

A-01 Direct analyis perfromed by EPA 6020B.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
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ANALYTICAL REPORT

Maul Foster & Alongi, INC.	Project: **Cascade Timber**	
3140 NE Broadway Street	Project Number: **M0615.17.004**	**Report ID:**
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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

Results for Volatiles analyses on soils and sediments that are reported on a “dry weight” basis include the water miscible solvent (WMS) correction referenced in the EPA 8000 Method guidance documents. Solid and Liquid samples reported on an “As Received” basis do not have the WMS correction applied, as dry weight was not performed.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Apex Laboratories

Philip Nerenberg, Lab Director

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Maul Foster & Alongi, INC.	Project: **Cascade Timber**	
3140 NE Broadway Street	Project Number: **M0615.17.004**	**Report ID:**
Portland, OR 97232	Project Manager: **Audrey Hackett**	**A4B1319 - 03 06 24 1714**

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).

-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.

-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

-Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level, if results are not reported to the MDL.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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503-718-2323
ORELAP ID: **OR100062**

Maul Foster & Alongi, INC.	Project: **Cascade Timber**	
3140 NE Broadway Street	Project Number: **M0615.17.004**	**Report ID:**
Portland, OR 97232	Project Manager: **Audrey Hackett**	**A4B1319 - 03 06 24 1714**

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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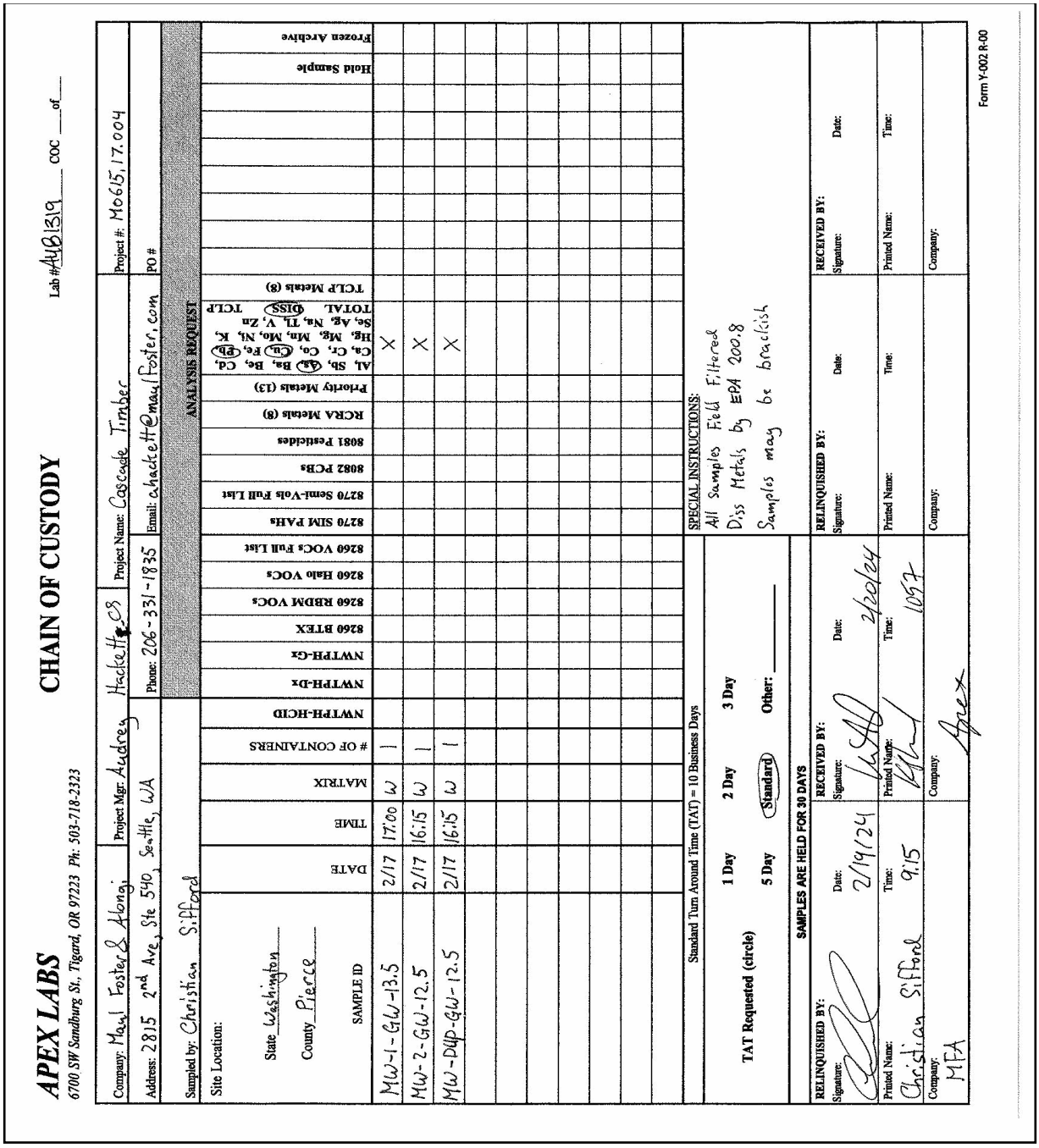
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Maul Foster & Alongi, INC.
3140 NE Broadway Street
Portland, OR 97232

Project: **Cascade Timber**
Project Number: **M0615.17.004**
Project Manager: **Audrey Hackett**

Report ID:
A4B1319 - 03 06 24 1714



APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # A4B1319 COC ___ of ___

Company: Maul Foster & Alongi | Project Mgr: Audrey Hackett | Project Name: Cascade Timber | Project #: M0615.17.004
Address: 2815 2nd Ave, Ste 540, Seattle, WA | Phone: 206-331-1835 | Email: ahackett@maulfoster.com | PO #
Sampled by: Christian Sifford

ANALYSIS REQUEST

Site Location: State Washington, County Pierce

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pesticides	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS TCLP	TCLP Metals (8)	Hold Sample	Frozen Archive
MW-1-GW-13.5	2/17	17:00	W	1														X			
MW-2-GW-12.5	2/17	16:15	W	1														X			
MW-DUP-GW-12.5	2/17	16:15	W	1														X			

Standard Turn Around Time (TAT) = 10 Business Days
TAT Requested (circle): 1 Day | 2 Day | 3 Day | 5 Day | Standard | Other: ____

SPECIAL INSTRUCTIONS:
All Samples Field Filtered
Diss Metals by EPA 200.8
Samples may be brackish

SAMPLES ARE HELD FOR 30 DAYS

	RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:
Signature:		2/19/24			2/20/24	
Printed Name:			9:15			1057
Company:						

	RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:
Signature:						
Printed Name:						
Company:						

	RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:
Signature:						
Printed Name:						
Company:						

Form Y-002 R-00

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document(s) and updated by any subsequent written communications. This analytical report must be reproduced in its entirety.

Philip Nerenberg, Lab Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

Maul Foster & Alongi, INC.	Project: **Cascade Timber**	
3140 NE Broadway Street	Project Number: **M0615.17.004**	**Report ID:**
Portland, OR 97232	Project Manager: **Audrey Hackett**	**A4B1319 - 03 06 24 1714**

APEX LABS COOLER RECEIPT FORM

Client: Maul Foster Alongi Element WO#: A4B1319

Project/Project #: Cascade Timber M0615.17.004 axx for KB 2/20/24

Delivery Info:

Date/time received: 2/20/24 @ 1057 By: KMS

Delivered by: Apex__Client__ESS__FedEx X UPS__Radio__Morgan__SDS__Evergreen__Other__

Cooler Inspection Date/time inspected: 2/20/24 @ 1057 By: KMS

Chain of Custody included? Yes X No ___

Signed/dated by client? Yes X No ___

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	0.9						
Custody seals? (Y/N)	N						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	Y						
Ice type: (Gel/Real/Other)	Real						
Condition (In/Out):	In						

Cooler out of temp? (Y/(N)) Possible reason why: ___

Green dots applied to out of temperature samples? Yes/(No)

Out of temperature samples form initiated? Yes/(No)

Sample Inspection: Date/time inspected: 2/20/24 @ 1357 By: KAB

All samples intact? Yes X No ___ Comments: ___

Bottle labels/COCs agree? Yes X No ___ Comments: T not listed on container MW-1-GW-13.5, COC reads 1700

COC/container discrepancies form initiated? Yes ___ No X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments: ___

Do VOA vials have visible headspace? Yes ___ No ___ NA X

Comments ___

Water samples: pH checked: Yes X No___NA___ pH appropriate? Yes X No___NA___ pH ID: A23I172

Comments: ___

Additional information: 1711 4046 7873

Labeled by: KAB Witness: AW Cooler Inspected by: KAB

Form Y-003 R-01

Attachment C

Data Validation Memorandum

MAUL
FOSTER
ALONGI

Data Quality Assurance/Quality Control Review

Project No. M0615.17.004 | March 18, 2024 | Port of Tacoma

Maul Foster & Alongi, Inc. (MFA), conducted an independent Stage 2A review of the quality of analytical results for groundwater and associated quality control samples collected on February 17, 2024, at the former Cascade Timber Company No. 3 Log Sort Yard Site, located along Maxwell Way between Port of Tacoma Road and Thorne Road in Tacoma, Washington.

Apex Laboratories, LLC (Apex), performed the analyses. MFA reviewed Apex report number A4B1319. The analyses performed and the samples analyzed are listed in the following tables.

Analysis	Reference
Dissolved metals	EPA 6020B

Notes
EPA = U.S. Environmental Protection Agency.

Samples Analyzed	
Report A4B1319	
MW-1-GW-13.5	MW-DUP-GW-12.5
MW-2-GW-12.5	--

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 (Apex 2023, EPA 1986).

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

Final data qualifier:

- U = result is non-detect at the method reporting limit (MRL).

According to qualifiers provided with all sample results, the project samples were not digested for the EPA Method 6020B analysis, and instead were directly injected onto the instrument. The reviewer confirmed by separate communication with Apex that sample turbidity was evaluated prior to injection and was acceptable. No qualification was required.

Sample Conditions

Sample Custody

Sample custody was appropriately documented on the chain-of-custody (COC) form accompanying the report. The reviewer confirmed that the gap in custody on the COC form accompanying report A4B1319 is due to shipment via a third-party service.

Holding Times

Analyses were performed within the recommended holding times.

Preservation and Sample Storage

The samples were preserved and stored appropriately.

Reporting Limits

The laboratory evaluated results to MRLs.

Blanks

Method Blanks

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

All laboratory method blank results were non-detect to MRLs.

Equipment Rinsate Blanks

Equipment rinsate 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.

Trip Blanks

Trip blanks are used to evaluate whether volatile organic compound contamination was introduced during sample storage and during shipment between the sampling location and the laboratory. Trip blank samples were not required for this sampling event because samples were not analyzed for volatile organic compounds.

Laboratory Control Sample and 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. The LCSs were prepared and analyzed at the required frequency. LCSDs were not reported; batch precision was evaluated with laboratory duplicate sample results.

All LCS results were within acceptance limits for percent recovery.

Laboratory Duplicate Results

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

Laboratory duplicate results greater than five times the MRL were evaluated using laboratory relative percent difference (RPD) control limits. Laboratory duplicate results less than five times the MRL, including non-detects, were evaluated using a control limit of the MRL of the parent sample; the absolute difference of the laboratory duplicate sample result and the parent sample result, or the MRL for non-detects, was compared to the MRL of the parent sample.

All laboratory duplicate results met the acceptance criteria.

Matrix Spike and Matrix Spike Duplicate Results

Matrix spike (MS) and matrix spike duplicate (MSD) results are used to evaluate laboratory precision, accuracy, and the effect of the sample matrix on sample preparation and analysis. All MS samples were prepared and analyzed at the required frequency.

When MSs were prepared from samples with high concentrations of target analytes, associated MS percent recovery exceedances did not require qualification because spike concentrations could not be accurately quantified. High concentrations of target analytes are defined as four times the spike amount for all analyses.

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
A4B1319	MW-2-GW-12.5	MW-DUP-GW-12.5

MFA uses acceptance criteria of 100 percent RPD for results that are less than five times the MRL or 50 percent RPD for results that are greater than five times the MRL. RPD was not evaluated when both results in the sample pair were non-detect. When one result in the sample pair was non-detect, RPD was evaluated using the MRL of the non-detect result. All field duplicate results met the RPD acceptance criteria.

Data Package

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

According to the cooler receipt form provided with report A4B1319, sample collection time was not recorded on the sample container provided for sample MW-1-GW-13.5. Apex noted that the sample collection time from the COC form was used. No additional action was required.

According to the COC form provided with report A4B1319, EPA Method 200.8 was requested in the specialized instructions section; however, EPA Method 6020B was performed. The reviewer confirmed that the EPA Method 6020B was performed because of a quality control issue for the requested method, and that equivalent method reporting limits were attained. No qualification was required.

No additional issues were found.

References

Apex. 2023. *Quality Systems Manual*. Rev. 11. Apex Laboratories, LLC: Tigard, OR. June 20.

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.