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Memorandum

To: Mr. Ron Timm, Washington State Department of Ecology

CC: Carol Wiseman, Weyerhaeuser, and Sandy Forman, Pacific Topsoil

From: Lynn Grochala, Floyd|Snider

Date: November 8, 2018

Project No: Weyer-Mill E, Task 1

Re: **Former Mill E/Koppers Site 2018 Annual Performance and Compliance Monitoring Report**

Floyd|Snider performed the annual performance and compliance monitoring for the Former Mill E/Koppers Facility in Everett, Washington (the Site) on September 24, 2018, in accordance with the *Performance and Compliance Monitoring Plan* (PCMP; EMCON 1998) and the *Performance and Compliance Monitoring Plan Addendum* (PCMP Addendum; Floyd|Snider 2017). The PCMP Addendum was approved by the Washington State Department of Ecology (Ecology) in a correspondence dated August 23, 2017. The geographic location of the Site is shown on Figure 1. Pertinent Site features, including piezometers and monitoring wells, are shown on Figure 2.

Monitoring activities completed by Floyd|Snider during this annual reporting period (October 2017 through September 2018) included annual groundwater quality monitoring, quarterly groundwater level monitoring, and annual asphalt and soil cap inspection. The following sections present the results of this monitoring event.

GROUNDWATER LEVEL MONITORING

Groundwater level monitoring was completed on a quarterly basis during this annual reporting period in accordance with Section 3.2 of the PCMP Addendum. Monitoring events were conducted on December 28, 2017, and March 21, June 15, and September 24, 2018. Depth to groundwater was measured with an electronic water level meter at three piezometers inside the barrier wall screened in the Upper Sand Aquifer (PZ-1A, PZ-2A, and PZ-3A), three piezometers outside the barrier wall screened in the Upper Sand Aquifer (PZ-1B, PZ-2B, and PZ-3B), and three wells/piezometers outside of the barrier wall screened in the Lower Sand Aquifer (LLWM-19D, PZ-2D, and LLMW-20D). Piezometer and well locations with measured groundwater elevations during this reporting period are shown on Figures 3a, 3b, 3c, and 3d.

Elevations for the top of well casings for piezometers in the Upper Sand Aquifer (inside and outside the barrier wall) were referenced from the *2003 Annual Groundwater Compliance Monitoring and Five-Year Data Review Report* (Shaw 2003). Top of well casing elevations for the two Lower Sand Aquifer wells were documented in the Everett Smelter Lowland Area *Final Supplemental Remedial Investigation Report* (GeoEngineers 2016). The top of well casing elevation for piezometer PZ-2D (installed in September 2017) and piezometer PZ-1B (repaired in September 2017) were surveyed by Floyd|Snider on September 22, 2017, using a level-loop survey.

During the December 2017 quarterly monitoring event, piezometer PZ-3B could not be located and was presumed to have been disturbed during construction activities on the adjacent property. In January 2018, PZ-3B was located, exposed, and inspected by Landau Associates, on behalf of the Port of Everett, and determined not to be damaged. On January 18, 2018, Landau Associates redeveloped the piezometer to remove any potential material that may have entered the well while it was covered. The bottom depth of the well was 4.71 feet from the top of casing at the start of development and 5.40 feet after development. Groundwater elevations for piezometers PZ-3A and PZ-3B and well LLMW-20D were measured by Floyd|Snider on January 23, 2018.

A 2-inch polyvinyl chloride riser and metal casing were installed on PZ-3B by the Port of Everett sometime after the June 2018 quarterly monitoring event to protect the piezometer. The piezometer elevation was resurveyed by the Port of Everett using a level-loop survey with the top of casing for monitoring well LLMW-20D as the reference elevation. The new elevation for PZ-3B is 14.49 feet (North American Vertical Datum 1988) or 10.80 feet above mean sea level (MSL).

Tide cycle elevations used in coordination of the groundwater level monitoring events are based on the National Oceanic and Atmospheric Administration tide predictions for Everett, Washington, converted to MSL. Measured groundwater elevations are presented in Table 1 and are compared to the 24-hour tidal cycle in Figures 3a though 3d.

Piezometer PZ-3B was determined to be dry during the September 24, 2018, monitoring event; therefore, a groundwater level elevation could not be recorded. This indicates the surrounding water table is at abnormally low levels due to low rainfall during the 2018 dry season. PZ-3B has been noted as dry on a few occasions in the past, in 1999, 2002, and 2009.

Comparison of the groundwater elevations for each set of piezometers in the Upper Sand Aquifer (inside and outside barrier wall) from 2007 to 2018 are presented in Figure 4. Groundwater elevations inside the barrier wall have consistently been lower than outside the barrier wall for all three pair locations during each monitoring event.

HYDRAULIC HEAD DIFFERENCE COMPARISON

The vertical and horizontal head differences between inside and outside the barrier wall are used as the primary indicator of the barrier wall's performance to control the hydraulic movement of contaminants. The hydraulic head differences were calculated using the approach outlined in the PCMP Addendum. The results for the horizontal hydraulic head differences are included in Table 2 below, and the results for the vertical hydraulic head differences are included in attached Table 3.

Table 2
Horizontal Hydraulic Head Difference Comparisons(1)

Piezometer Pair(2)	Monitoring Event	"B" Piezometer Upper Sand Aquifer Elevation	"A" Piezometer Upper Sand Aquifer Elevation	Horizontal Head Difference
PZ-1A/PZ-1B	December	5.72	3.50	2.22
	March	5.53	4.29	1.24
	June	4.89	3.71	1.18
	September	4.09	3.30	0.79
PZ-2A/PZ-2B	December	5.80	4.04	1.76
	March	5.44	4.34	1.10
	June	4.89	4.20	0.69
	September	4.39	3.61	0.78
PZ-3A/PZ-3B	January(3)	4.81	3.46	1.35
	March	4.53	3.48	1.04
	June	3.24	3.16	0.08
	September	Dry	2.57	--

Notes:
-- Not applicable, well was dry during monitoring event.
1 Groundwater elevations are presented in feet above or below MSL.
2 "A" wells are located inside the barrier wall in the Upper Sand Aquifer; "B" wells are located outside the barrier wall in the Upper Sand Aquifer.
3 PZ-3A and PZ-3Bwere measured in January 2018 due to PZ-3B being inaccessible during the December 2017 monitoring event.

As shown in Table 2, the groundwater elevation of the Upper Sand Aquifer inside the barrier wall was consistently lower than outside the barrier wall for all three piezometer pair locations. This indicates a positive horizontal head difference with groundwater fluxing inward through the barrier wall. In addition, as shown on Table 3, the vertical head difference inside the barrier wall

was lower than the vertical head difference outside the barrier wall at all three piezometer pair locations. These results show that the hydraulic head inside the barrier wall was consistently lower than outside the barrier wall, indicating the barrier wall and asphalt cap are functioning as intended by limiting the downward flux of groundwater inside the barrier wall through the Upper Silt Aquitard.

GROUNDWATER QUALITY MONITORING

On September 24, 2018, a groundwater sample was collected from piezometer PZ-3A inside the barrier wall using low-flow sampling methods. Field measurements and depth to groundwater measurements were recorded at consistent intervals during purging. The sample was analyzed for total arsenic by USEPA Method 200.8, pentachlorophenol (PCP) by USEPA Method 8270, and total petroleum hydrocarbons (TPH) by NWTPH-Gx and NWTPH-Dx. Sample containers were transported in a cooler with ice to Fremont Analytical, Inc., under the standard chain-of-custody procedures.

Groundwater analytical results are presented in Table 4 and a copy of the analytical report is included in Attachment 1. The results are compared to the Model Toxics Control Act (MTCA) cleanup levels for the Site established in the 1998 Consent Decree. The concentration of diesel-range TPH was less than its respective cleanup level. PCP and gasoline- and motor oil-range TPH were not detected at concentrations greater than laboratory reporting limits. Arsenic was detected at a concentration of 551 micrograms per liter (µg/L), which is greater than the cleanup level of 5 µg/L, but within the range of previous sampling events from the past 5 years. Changes in the concentrations of TPH, PCP, and arsenic over time (over the past 10 years) are presented in Figure 5.

Table 4
Groundwater Analytical Results for PZ-3A—September 24, 2018

Analyte	Unit	Criteria(1)	Sample Result
Gasoline-range TPH	µg/L	10,000	50.0 U
Diesel-range TPH			1,590
Motor oil-range TPH			99.3 U
PCP		7.29	0.0997 U
Arsenic		5	551

Note:
1 Cleanup levels were established in the 1998 Consent Decree.

Qualifier:
U Analyte was not detected above the given reporting limit.

QUALITY ASSURANCE/QUALITY CONTROL AND DATA VALIDATION

Quality management for sample collection and reporting consisted of field and laboratory quality assurance (QA) objectives and quality control (QC) procedures with final in-house data validation. Laboratory results were evaluated by Fremont Analytical, Inc., against analysis of the method blank, matrix spikes, matrix spike duplicates, laboratory duplicates, laboratory control samples, and calibrations as required by the specific analytical methods. QC results for the groundwater sample were within the QA objective limits and are included in the Analytical Report included in Attachment 1.

After the data were received from the laboratory, data validation QC procedures (Compliance Screening, Stages 1 & 2a) were followed to provide an accurate evaluation of the data quality and usability. The data were reviewed regarding chain-of-custody/documentation, sample preservation and holding times, instrument performance, method blanks, reporting limits, and QC sample recoveries. The analytical holding times were met and the method blanks had no detections. The matrix spike and laboratory control sample recoveries and sample/sample duplicate relative percent differences all met USEPA requirements. No qualifiers were added to the analytical results based on the data quality review. Data are determined to be of acceptable quality for use as reported by the laboratory. Final validated data were entered into the Floyd|Snider project database.

ASPHALT CAP AND SOIL COVER

An asphalt cap and soil cover inspection was performed under the supervision of a Professional Engineer from Floyd|Snider on September 24, 2018. Field observations of cap integrity were documented on a field inspection checklist and Site Plan. The field inspection checklist and Site Plan, along with photographs of all relevant field observations, are included as Attachment 2. All nonconformities noted in the inspection checklist were considered minor and not a current concern to the performance objectives. These observations included limited cracking and rutting in the asphalt and vegetation in the asphalt cracks. Overall, the asphalt cap and soil cover were observed to be in good condition and are adequately meeting the performance objectives to prevent direct contact with contaminated soil and minimize infiltration. To keep the asphalt cap in good working condition, visible weeds will be removed from the cracks (physically or torching) prior to spring 2019.

PERFORMANCE AND COMPLIANCE MONITORING SCHEDULE

Water quality monitoring and cap inspections will continue on an annual basis in September of each year and results, along with water level measurements, will be reported as part of the annual PCMP summary report. Ecology will be notified if monitoring results indicate that performance criteria have not been met.

In addition, because piezometer PZ-3B was dry during the September 2018 monitoring event, Floyd|Snider recommends an additional monitoring event in December 2018 to measure water elevations at PZ-3A, PZ-3B, and LLMW-20D when the water table has returned to normal conditions. The results of this additional monitoring event will be included in the 2019 Annual Performance and Compliance Monitoring Report.

LIST OF REFERENCES

EMCON. 1998. *Performance and Compliance Monitoring Plan, Former Mill E/Koppers Facility, Everett, Washington*. Prepared for Weyerhaeuser Company. 8 October.

Floyd|Snider. 2017. *Former Mill E/Koppers Facility, Performance and Compliance Monitoring Plan Addendum*. Prepared for The Weyerhaeuser Company. August.

GeoEngineers. 2016. *Final Supplemental Remedial Investigation Report: Everett smelter Lowland Area, Everett Washington*. Prepared for the Washington State Department of Ecology. 8 February

Shaw Environmental, Inc. (Shaw). 2003. *2003 Annual Groundwater Compliance Monitoring and Five-Year Data Review Report, Weyerhaeuser Everett Former Mill E/Koppers Site, Everett, Washington*. Prepared for the Weyerhaeuser Company. 10 November.

LIST OF TABLES, FIGURES, AND ATTACHMENTS

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Table 2	Horizontal Hydraulic Head Difference Comparisons (Embedded)
Table 3	Vertical Hydraulic Head Difference Comparisons
Table 4	Groundwater Analytical Results for PZ-3A—September 24, 2018 (Embedded)
Figure 1	Vicinity Map
Figure 2	Site Features and Monitoring Network
Figure 3a	December 2017 Groundwater Elevations
Figure 3b	March 2018 Groundwater Elevations
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Figure 4	Groundwater Elevation Trends
Figure 5	Groundwater Quality Trends in PZ-3A
Attachment 1	Laboratory Report
Attachment 2	Cap Inspection Documentation

Tables

Table 1
Groundwater Elevation Measurements[1]

Piezometer[2]	Date	Time	Reference Elevation (feet) Top of PVC	Depth to Water (feet)	Groundwater Elevation (feet)
PZ-1A	12/28/2017	16:07	9.90	6.4	3.50
	3/21/2018	8:48	9.90	5.61	4.29
	6/15/2018	13:13	9.90	6.19	3.71
	9/24/2018	11:37	9.90	6.60	3.30
PZ-1B	12/28/2017	16:09	9.82	4.10	5.72
	3/21/2018	8:47	9.82	4.29	5.53
	6/15/2018	13:12	9.82	4.93	4.89
	9/24/2018	11:38	9.82	5.73	4.09
LLMW-19D	12/28/2017	16:12	10.56	6.70	3.86
	3/21/2018	8:50	10.56	6.38	4.18
	6/15/2018	13:26	10.56	10.89	-0.33
	9/24/2018	11:42	10.56	10.50	0.06
PZ-2A	12/28/2017	15:41	9.40	5.36	4.04
	3/21/2018	8:42	9.40	5.06	4.34
	6/15/2018	12:52	9.40	5.20	4.20
	9/24/2018	11:32	9.40	5.79	3.61
PZ-2B	12/28/2017	15:43	8.38	2.58	5.80
	3/21/2018	8:38	8.38	2.94	5.44
	6/15/2018	12:59	8.38	3.49	4.89
	9/24/2018	11:33	8.38	3.99	4.39
PZ-2D	12/28/2017	15:44	9.08	5.34	3.74
	3/21/2018	8:40	9.08	4.59	4.49
	6/15/2018	12:58	9.08	10.60	-1.52
	9/24/2018	11:34	9.08	9.89	-0.81

Table 1
Groundwater Elevation Measurements[1]

Piezometer[2]	Date	Time	Reference Elevation (feet) Top of PVC	Depth to Water (feet)	Groundwater Elevation (feet)
PZ-3A	1/23/2018[3]	16:18	10.31	6.85	3.46
	3/21/2018	8:30	10.31	6.83	3.48
	6/15/2018	12:42	10.31	7.15	3.16
	9/24/2018	11:15	10.31	7.74	2.57
PZ-3B	1/23/2018[3]	16:19	7.54	2.73	4.81
	3/21/2018	8:32	7.54	3.01	4.53
	6/15/2018	12:35	7.54	4.30	3.24
	9/24/2018	11:24	10.80[4]	Dry	--
LLMW-20D	1/23/2018[3]	16:20	11.26	10.30	0.96
	3/21/2018	8:34	11.26	6.11	5.15
	6/15/2018	12:34	11.26	13.62	-2.36
	9/24/2018	11:24	11.26	13.14	-1.88

Notes:

-- Not applicable, well was dry during monitoring event.

1 Top of well casing and groundwater elevations are presented in feet above or below MSL (Shaw 2003; GeoEngineers 2016).

2 "A" wells are located inside the barrier wall in the Upper Sand Aquifer; "B" wells are located outside the barrier wall in the Upper Sand Aquifer; "D" wells are located outside the barrier wall in the Lower Sand Aquifer.

3 PZ-3A, PZ-3B, and LLMW-20D were measured in January 2018 due to PZ-3B being inaccessible during the December 2017 monitoring event.

4 PZ-3B was repaired with a PVC riser and standpipe casing prior to the September 2018 monitoring event. The piezometer was resurveyed by the Port of Everett using a level-loop survey with LLMW-20D as the reference elevation.

Abbreviations:

MSL Mean sea level
PVC Polyvinyl chloride

Table 3
Vertical Hydraulic Head Difference Comparisons[1]

Piezometer Pair[2]	Location Relative to Barrier Wall	Monitoring Event	Upper Sand Aquifer Elevation	Lower Sand Aquifer Elevation[3]	Vertical Head Difference
PZ-1A/LLMW-19D	Inside	December	3.50	3.86	-0.36
PZ-1B/LLMW-19D	Outside		5.72	3.86	1.86
PZ-1A/LLMW-19D	Inside	March	4.29	4.18	0.11
PZ-1B/LLMW-19D	Outside		5.53	4.18	1.35
PZ-1A/LLMW-19D	Inside	June	3.71	-0.33	4.04
PZ-1B/LLMW-19D	Outside		4.89	-0.33	5.22
PZ-1A/LLMW-19D	Inside	September	3.30	0.06	3.24
PZ-1B/LLMW-19D	Outside		4.09	0.06	4.03
PZ-2A/PZ-2D	Inside	December	4.04	3.74	0.30
PZ-2B/PZ-2D	Outside		5.80	3.74	2.06
PZ-2A/PZ-2D	Inside	March	4.34	4.49	-0.15
PZ-2B/PZ-2D	Outside		5.44	4.49	0.95
PZ-2A/PZ-2D	Inside	June	4.20	-1.52	5.72
PZ-2B/PZ-2D	Outside		4.89	-1.52	6.41
PZ-2A/PZ-2D	Inside	September	3.61	-0.81	4.42
PZ-2B/PZ-2D	Outside		4.39	-0.81	5.20
PZ-3A/LLMW-20D	Inside	January[4]	3.46	0.96	2.50
PZ-3B/LLMW-20D	Outside		4.81	0.96	3.85
PZ-3A/LLMW-20D	Inside	March	3.48	5.15	-1.67
PZ-3B/LLMW-20D	Outside		4.53	5.15	-0.62
PZ-3A/LLMW-20D	Inside	June	3.16	-2.36	5.52
PZ-3B/LLMW-20D	Outside		3.24	-2.36	5.6
PZ-3A/LLMW-20D	Inside	September	2.57	-1.88	4.45
PZ-3B/LLMW-20D	Outside		Dry	-1.88	--

Notes:

-- Not applicable, well was dry during monitoring event.

1 Groundwater elevations are presented in feet above or below mean sea level.

2 "A" wells are located inside the barrier wall in the Upper Sand Aquifer; "B" wells are located outside the barrier wall in the Upper Sand Aquifer; "D" wells are located outside the barrier wall in the Lower Sand Aquifer.

3 The Lower Sand Aquifer piezometer/well was considered representative of the Lower Sand Aquifer elevation inside and outside the barrier wall and was used in both calculations. Rational for this decision is detailed in the *Performance and Compliance Monitoring Plan Addendum* (Floyd|Snider 2017).

4 PZ-3A, PZ-3B, and LLMW-20D were measured in January 2018 due to PZ-3B being inaccessible during the December 2017 monitoring event.

Figures

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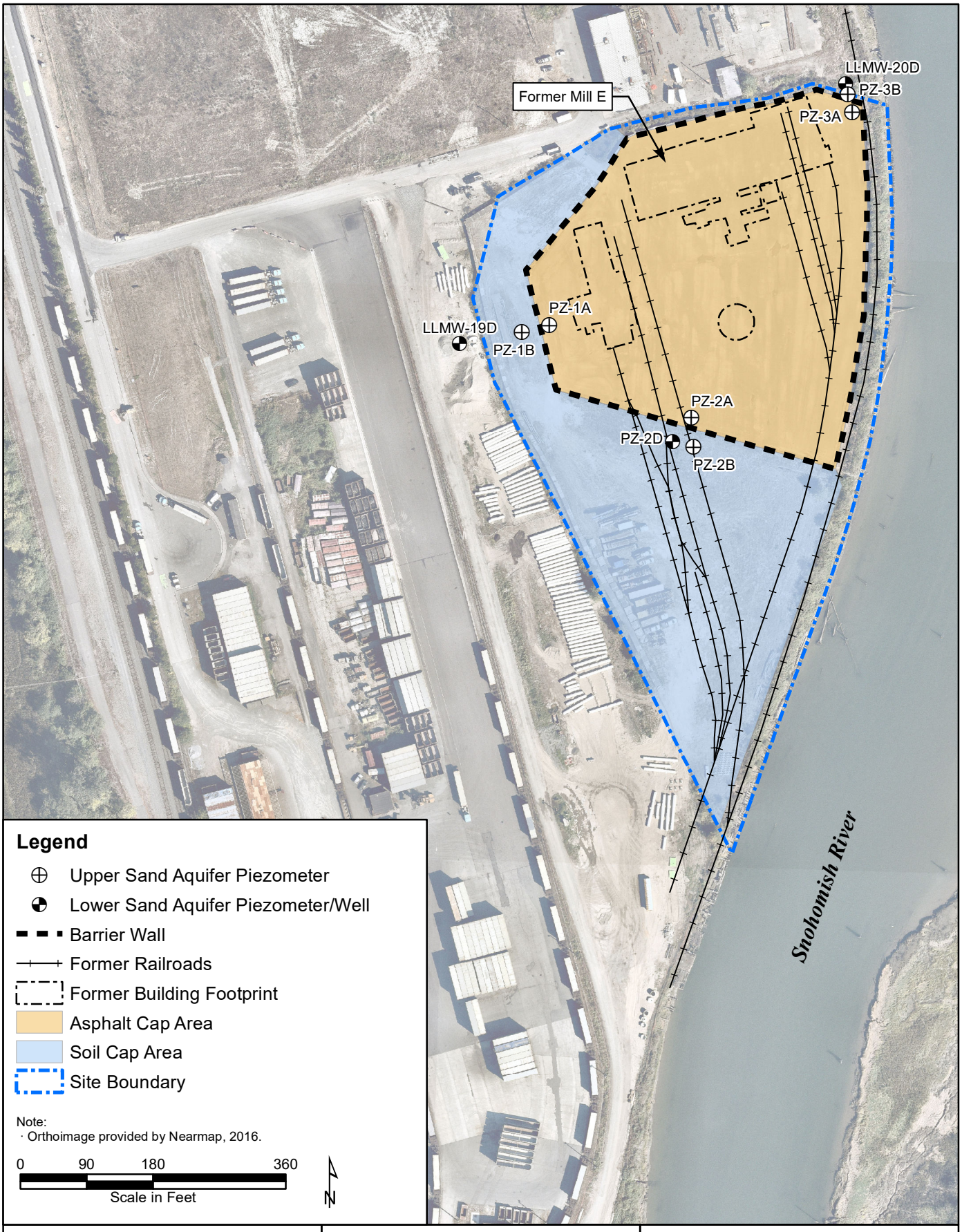
2018 Annual Performance and Compliance Monitoring Report
Former Mill E/Koppers Facility
Everett, Washington

Figure 1
Vicinity Map

I:\GIS\Projects\WEYER_MILL_E\MXD\Annual Performance and Compliance Monitoring Summary\2018\Figure 1 Vicinity Map.mxd
11/7/2018



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2018 Annual Performance and Compliance Monitoring Report Former Mill E/Koppers Facility Everett, Washington

Figure 2
Site Features and Monitoring Network

I:\GIS\Projects\WEYER_MILL_E\MXD\Annual Performance and Compliance Monitoring Summary\2018\Figure 2 Site Features and Monitoring Network.mxd
11/7/2018

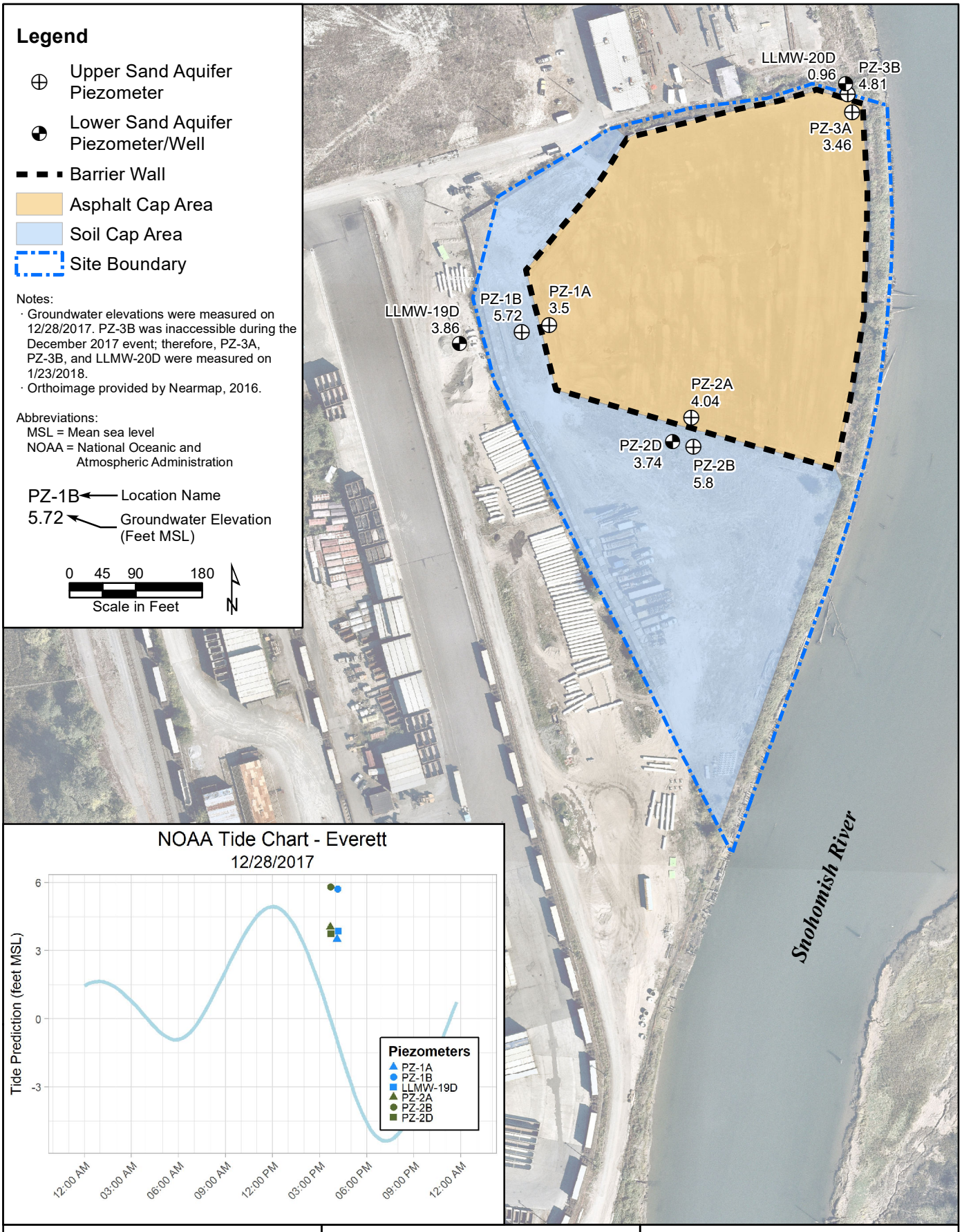

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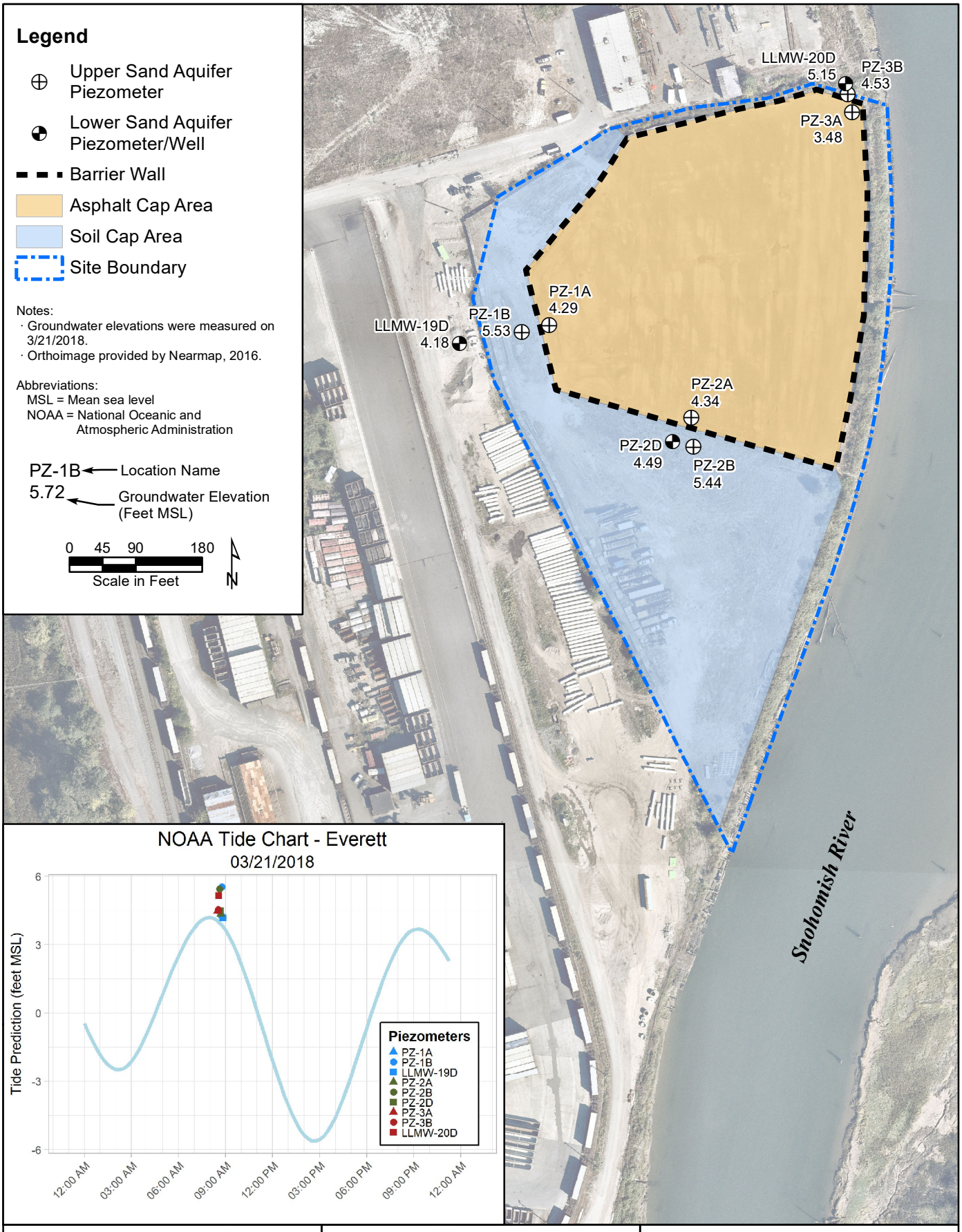
Figure 3a
December 2017
Groundwater Elevations

I:\GIS\Projects\WEYER_MILL_E\MXD\Annual Performance and Compliance Monitoring Summary\2018\Figure 3a December 2017 Groundwater Elevations.mxd
11/7/2018



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Everett, Washington

Figure 3b
March 2018
Groundwater Elevations

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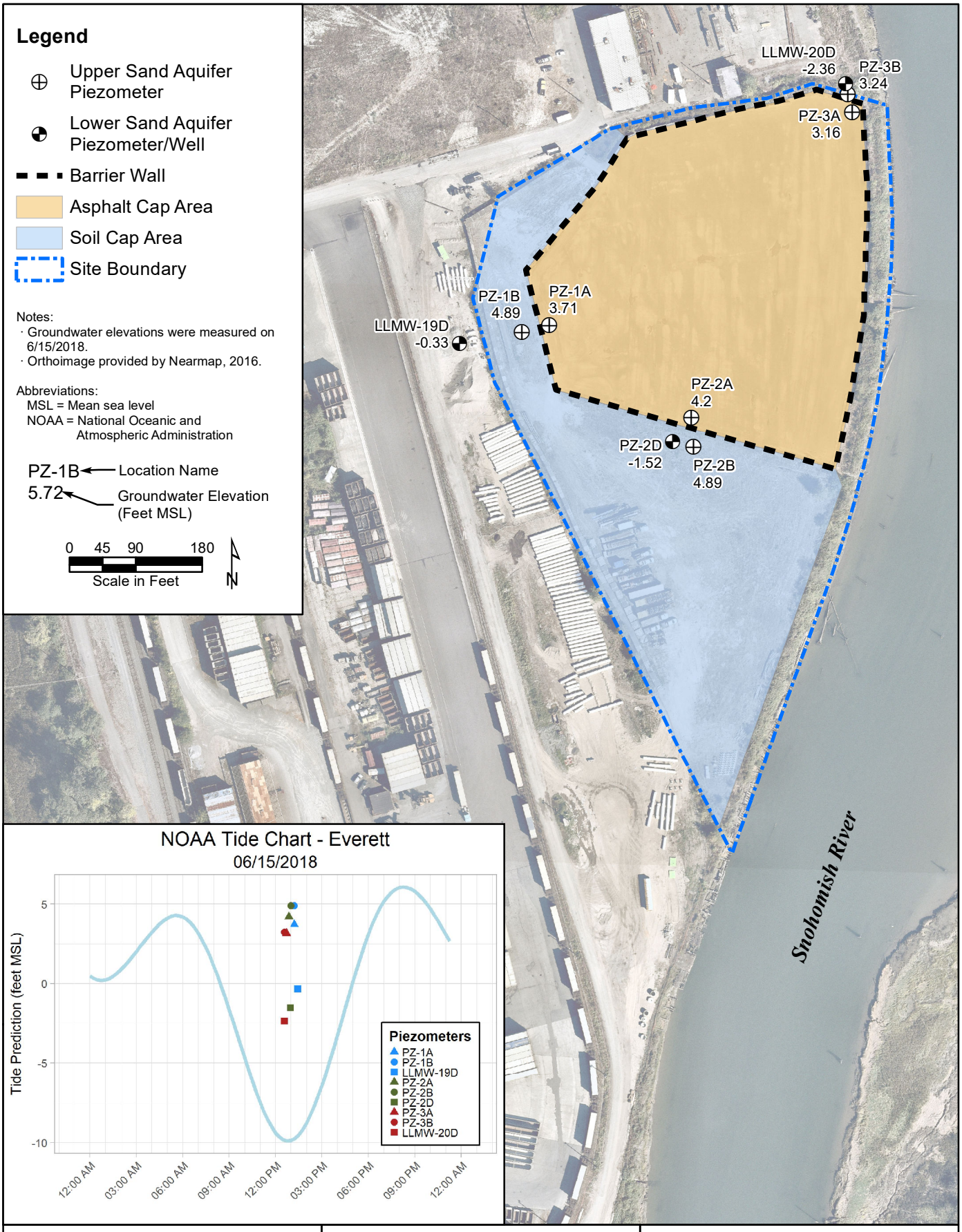
11/7/2018



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Former Mill E/Koppers Facility
Everett, Washington

Figure 3c
June 2018
Groundwater Elevations

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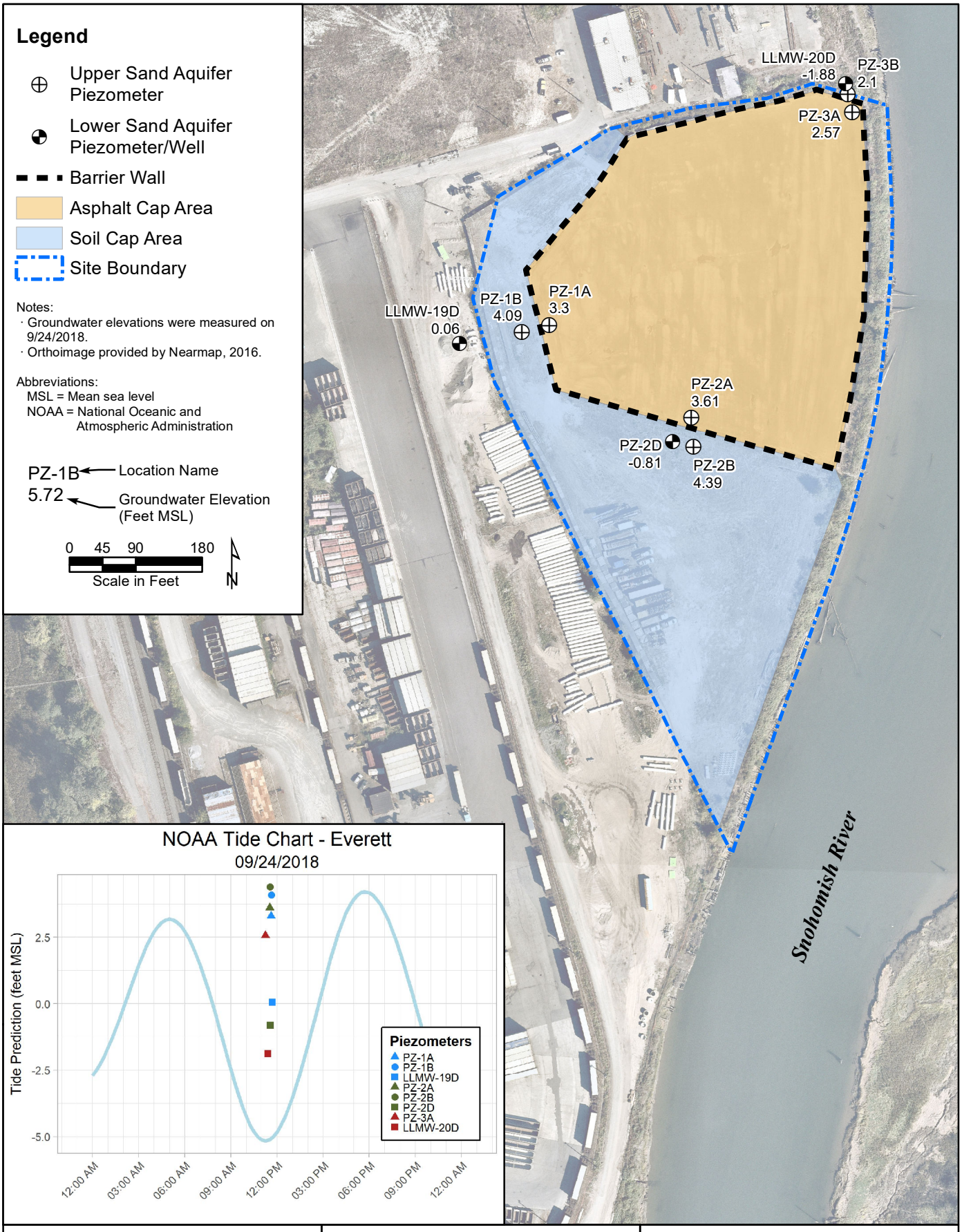
11/7/2018



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Everett, Washington

Figure 3d
September 2018
Groundwater Elevations

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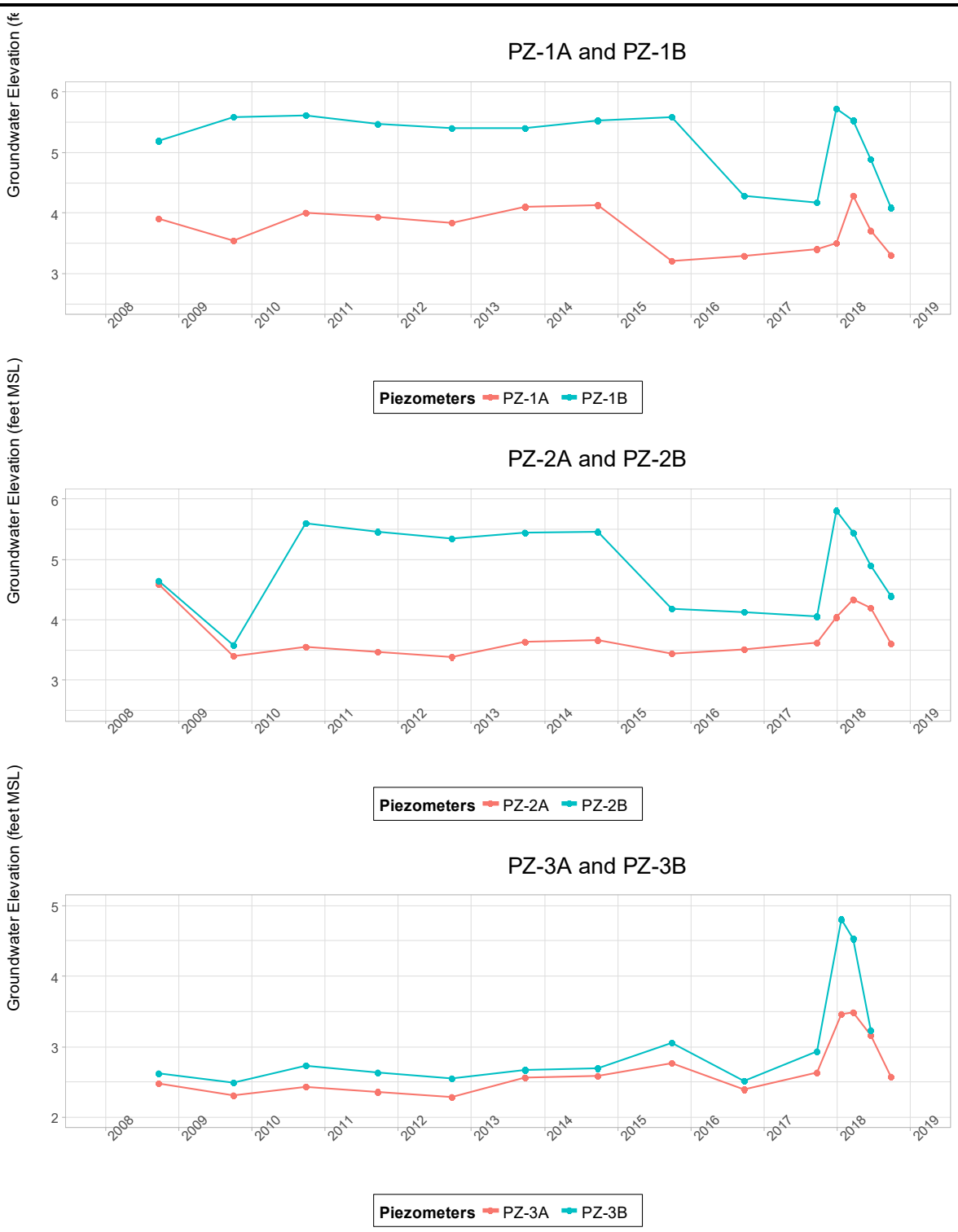
11/7/2018



Notes:

1. Top of well casing and groundwater elevations referenced to MSL (Shaw 2003; GeoEngineers 2016).
2. "A" wells are located inside the barrier wall in the Upper Sand Aquifer; "B" wells are located outside the barrier wall in the Upper Sand Aquifer.
3. The average water level elevation is shown for wells with multiple measurements over a single year.
4. PZ-3B was dry during the September 2018 monitoring event.

Abbreviation:

MSL = Mean sea level

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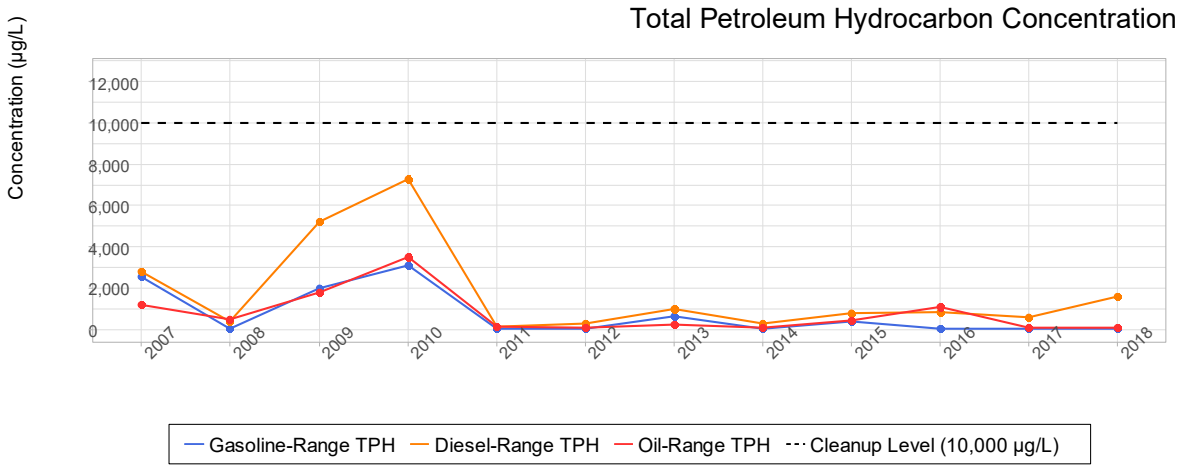
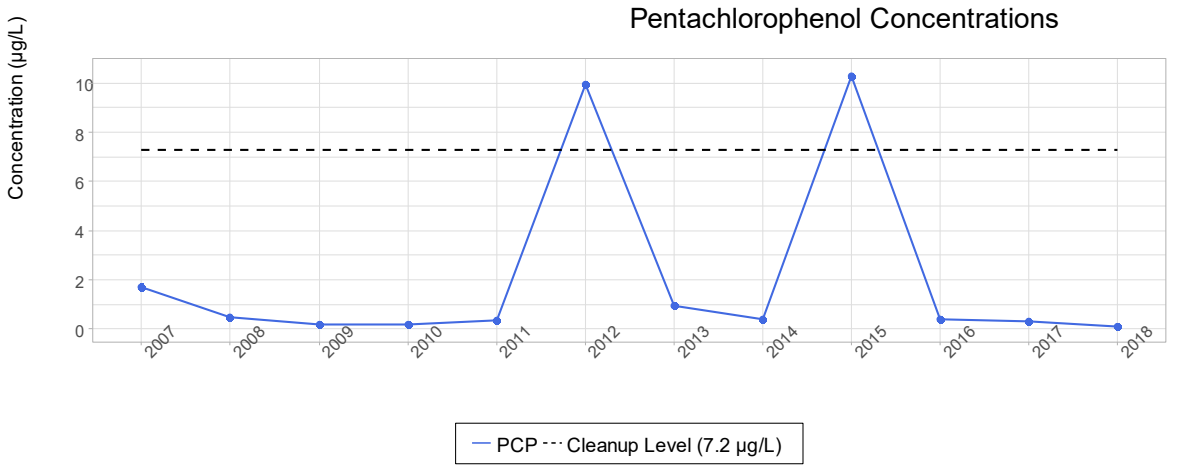
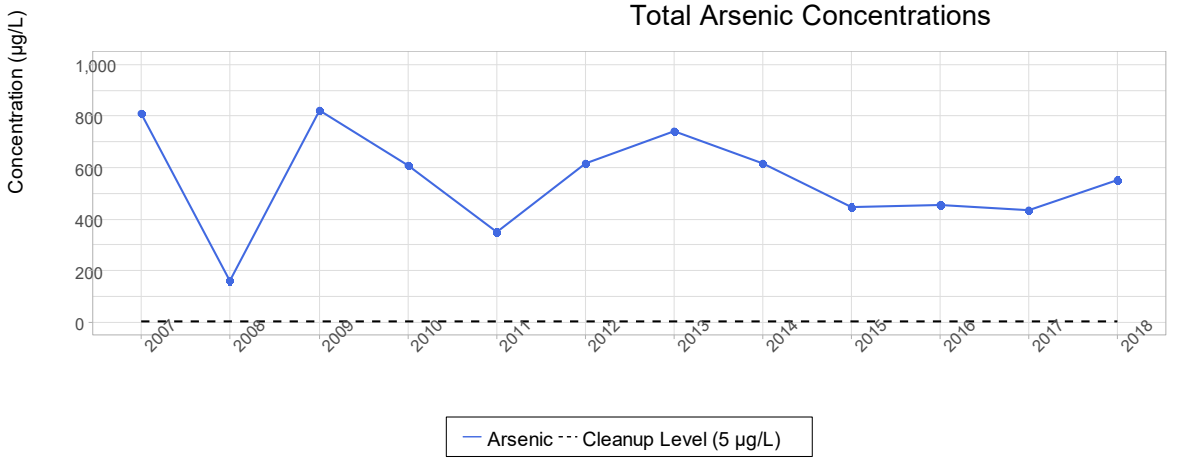
Figure 4
Groundwater Elevation Trends







Note:

1. Criteria are the cleanup levels established in the 1998 Consent Decree.

Abbreviations:

µg/L = Micrograms per liter; PCP = Pentachlorophenol; TPH = Total petroleum hydrocarbons

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\\corp.fsmseattle.com\shares\Projects N-Z\Weyer- Mill E\00 Deliverables\2018 PCMP Annual Report\03 Figures\Native Files\Figure 5 Water Quality\Figure 5 Water Quality Monitoring Trends.docx
11/7/2018

Attachment 1
Laboratory Report

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

Floyd | Snider
Lynn Grochala
601 Union St., Suite 600
Seattle, WA 98101

RE: Weyer - Mill E
Work Order Number: 1809375

October 01, 2018

Attention Lynn Grochala:

Fremont Analytical, Inc. received 2 sample(s) on 9/24/2018 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Gasoline by NWTPH-Gx
Pentachlorophenol by EPA Method 8270 (SIM)
Total Metals by EPA Method 200.8

This report consists of the following:

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

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

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

Date: *10/01/2018*

CLIENT: Floyd | Snider
Project: Weyer - Mill E
Work Order: 1809375

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1809375-001	PZ-3A-092418	09/24/2018 12:00 PM	09/24/2018 2:17 PM
1809375-002	Trip Blank	09/20/2018 8:10 AM	09/24/2018 2:17 PM

Case Narrative

WO#: **1809375**
Date: **10/1/2018**

CLIENT: Floyd | Snider
Project: Weyer - Mill E

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

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

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

Qualifiers:

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

Acronyms:

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

Analytical Report

Work Order: **1809375**
Date Reported: **10/1/2018**

Client: Floyd | Snider
Project: Weyer - Mill E
Lab ID: 1809375-001
Client Sample ID: **PZ-3A-092418**

Collection Date: 9/24/2018 12:00:00 PM
Matrix: Groundwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 22066		Analyst: SB
Diesel (Fuel Oil)	1,590	50.0		µg/L	1	9/27/2018 2:00:56 AM
Heavy Oil	ND	99.9		µg/L	1	9/27/2018 2:00:56 AM
Surr: 2-Fluorobiphenyl	92.4	50 - 150		%Rec	1	9/27/2018 2:00:56 AM
Surr: o-Terphenyl	116	50 - 150		%Rec	1	9/27/2018 2:00:56 AM
Pentachlorophenol by EPA Method 8270 (SIM)				Batch ID: 22082		Analyst: IH
Pentachlorophenol	ND	0.0997		µg/L	1	9/28/2018 3:36:06 AM
Surr: 2,4,6-Tribromophenol	86.5	34.6 - 146		%Rec	1	9/28/2018 3:36:06 AM
Gasoline by NWTPH-Gx				Batch ID: 22107		Analyst: TN
Gasoline	ND	50.0		µg/L	1	9/27/2018 11:43:47 PM
Surr: Toluene-d8	97.5	65 - 135		%Rec	1	9/27/2018 11:43:47 PM
Surr: 4-Bromofluorobenzene	95.0	65 - 135		%Rec	1	9/27/2018 11:43:47 PM
Total Metals by EPA Method 200.8				Batch ID: 22079		Analyst: TN
Arsenic	551	1.75		µg/L	1	9/26/2018 5:36:59 PM

Work Order: 1809375
CLIENT: Floyd | Snider
Project: Weyer - Mill E

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID	MB-22079	SampType:	MBLK			Units:	µg/L	Prep Date:	9/26/2018		RunNo:	46518	
Client ID:	MBLKW	Batch ID:	22079					Analysis Date:	9/26/2018		SeqNo:	904239	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Arsenic		ND	1.75										

Sample ID	LCS-22079	SampType:	LCS			Units:	µg/L	Prep Date:	9/26/2018		RunNo:	46518	
Client ID:	LCSW	Batch ID:	22079					Analysis Date:	9/26/2018		SeqNo:	904240	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Arsenic		99.9	1.75	100.0	0	99.9	85	115					

Sample ID	1809371-001ADUP	SampType:	DUP			Units:	µg/L	Prep Date:	9/26/2018		RunNo:	46518	
Client ID:	BATCH	Batch ID:	22079					Analysis Date:	9/26/2018		SeqNo:	904242	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Arsenic		3.86	1.75						3.316	15.2	30		

Sample ID	1809371-001AMS	SampType:	MS			Units:	µg/L	Prep Date:	9/26/2018		RunNo:	46518	
Client ID:	BATCH	Batch ID:	22079					Analysis Date:	9/26/2018		SeqNo:	904243	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Arsenic		534	1.75	500.0	3.316	106	70	130					

Sample ID	1809371-001AMSD	SampType:	MSD			Units:	µg/L	Prep Date:	9/26/2018		RunNo:	46518	
Client ID:	BATCH	Batch ID:	22079					Analysis Date:	9/26/2018		SeqNo:	904244	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Arsenic		492	1.75	500.0	3.316	97.7	70	130	534.3	8.29	30		

Work Order: 1809375
CLIENT: Floyd | Snider
Project: Weyer - Mill E

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID **MB-22066**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **9/25/2018**	RunNo: **46506**
Client ID: **MBLKW**	Batch ID: **22066**		Analysis Date: **9/26/2018**	SeqNo: **903793**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	50.0									
Heavy Oil	ND	100									
Surr: 2-Fluorobiphenyl	61.7		80.00		77.2	50	150				
Surr: o-Terphenyl	68.3		80.00		85.4	50	150				

Sample ID **LCS-22066**	SampType: **LCS**	Units: **µg/L**	Prep Date: **9/25/2018**	RunNo: **46506**
Client ID: **LCSW**	Batch ID: **22066**		Analysis Date: **9/26/2018**	SeqNo: **903794**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	880	50.0	1,000	0	88.0	65	135				
Surr: 2-Fluorobiphenyl	67.4		80.00		84.2	50	150				
Surr: o-Terphenyl	70.1		80.00		87.7	50	150				

Sample ID **1809339-001BDUP**	SampType: **DUP**	Units: **µg/L**	Prep Date: **9/25/2018**	RunNo: **46506**
Client ID: **BATCH**	Batch ID: **22066**		Analysis Date: **9/26/2018**	SeqNo: **904740**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	250	49.6						214.2	15.6	30	
Heavy Oil	ND	99.2						0		30	
Surr: 2-Fluorobiphenyl	64.9		79.37		81.8	50	150		0		
Surr: o-Terphenyl	68.6		79.37		86.4	50	150		0		

Sample ID **1809339-001BMS**	SampType: **MS**	Units: **µg/L**	Prep Date: **9/25/2018**	RunNo: **46506**
Client ID: **BATCH**	Batch ID: **22066**		Analysis Date: **9/26/2018**	SeqNo: **904741**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	1,120	49.7	993.0	214.2	90.8	65	135				
Surr: 2-Fluorobiphenyl	70.3		79.44		88.4	50	150				
Surr: o-Terphenyl	69.4		79.44		87.3	50	150				

Work Order: 1809375
CLIENT: Floyd | Snider
Project: Weyer - Mill E

QC SUMMARY REPORT

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID **1809339-001BMS** SampType: **MS** Units: **µg/L** Prep Date: **9/25/2018** RunNo: **46506**
Client ID: **BATCH** Batch ID: **22066** Analysis Date: **9/26/2018** SeqNo: **904741**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID **1809339-001BMSD** SampType: **MSD** Units: **µg/L** Prep Date: **9/25/2018** RunNo: **46506**
Client ID: **BATCH** Batch ID: **22066** Analysis Date: **9/26/2018** SeqNo: **904742**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	1,120	49.7	993.2	214.2	91.5	65	135	1,115	0.707	30	
Surr: 2-Fluorobiphenyl	69.6		79.46		87.6	50	150		0		
Surr: o-Terphenyl	67.9		79.46		85.5	50	150		0		

Sample ID **1809353-014BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **9/25/2018** RunNo: **46506**
Client ID: **BATCH** Batch ID: **22066** Analysis Date: **9/26/2018** SeqNo: **904755**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	50.0						0		30	
Heavy Oil	ND	100						0		30	
Surr: 2-Fluorobiphenyl	59.0		79.96		73.8	50	150		0		
Surr: o-Terphenyl	59.0		79.96		73.8	50	150		0		

Work Order: 1809375
CLIENT: Floyd | Snider
Project: Weyer - Mill E

QC SUMMARY REPORT

Pentachlorophenol by EPA Method 8270 (SIM)

Sample ID **MB-22082** SampType: **MBLK** Units: **µg/L** Prep Date: **9/26/2018** RunNo: **46570**
Client ID: **MBLKW** Batch ID: **22082** Analysis Date: **9/27/2018** SeqNo: **905437**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pentachlorophenol	ND	0.100									
Surr: 2,4,6-Tribromophenol	3.17		4.000		79.1	34.6	146				

Sample ID **LCS-22082** SampType: **LCS** Units: **µg/L** Prep Date: **9/26/2018** RunNo: **46570**
Client ID: **LCSW** Batch ID: **22082** Analysis Date: **9/27/2018** SeqNo: **905438**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pentachlorophenol	4.10	0.100	4.000	0	102	5	127				
Surr: 2,4,6-Tribromophenol	3.14		4.000		78.5	34.6	146				

Sample ID **LCSD-22082** SampType: **LCSD** Units: **µg/L** Prep Date: **9/26/2018** RunNo: **46570**
Client ID: **LCSW02** Batch ID: **22082** Analysis Date: **9/27/2018** SeqNo: **905439**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pentachlorophenol	4.04	0.100	4.000	0	101	5	127	4.098	1.34	30	
Surr: 2,4,6-Tribromophenol	3.40		4.000		85.1	34.6	146		0		

Work Order: 1809375
CLIENT: Floyd | Snider
Project: Weyer - Mill E

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID **LCS-22107**	SampType: **LCS**	Units: **µg/L**	Prep Date: **9/27/2018**	RunNo: **46589**
Client ID: **LCSW**	Batch ID: **22107**		Analysis Date: **9/27/2018**	SeqNo: **905840**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	422	50.0	500.0	0	84.4	65	135				
Surr: Toluene-d8	24.9		25.00		99.8	65	135				
Surr: 4-Bromofluorobenzene	24.1		25.00		96.2	65	135				

Sample ID **MB-22107**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **9/27/2018**	RunNo: **46589**
Client ID: **MBLKW**	Batch ID: **22107**		Analysis Date: **9/27/2018**	SeqNo: **905841**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	50.0									
Surr: Toluene-d8	24.6		25.00		98.3	65	135				
Surr: 4-Bromofluorobenzene	23.9		25.00		95.6	65	135				

Sample ID **1809356-002ADUP**	SampType: **DUP**	Units: **µg/L**	Prep Date: **9/27/2018**	RunNo: **46589**
Client ID: **BATCH**	Batch ID: **22107**		Analysis Date: **9/27/2018**	SeqNo: **905831**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	50.0						0		30	
Surr: Toluene-d8	24.4		25.00		97.8	65	135		0		
Surr: 4-Bromofluorobenzene	23.6		25.00		94.3	65	135		0		

Sample ID **1809353-016ADUP**	SampType: **DUP**	Units: **µg/L**	Prep Date: **9/27/2018**	RunNo: **46589**
Client ID: **BATCH**	Batch ID: **22107**		Analysis Date: **9/28/2018**	SeqNo: **905826**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	50.0						0		30	
Surr: Toluene-d8	24.2		25.00		96.9	65	135		0		
Surr: 4-Bromofluorobenzene	23.5		25.00		94.0	65	135		0		

Work Order: 1809375
CLIENT: Floyd | Snider
Project: Weyer - Mill E

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID **1809352-002AMS** SampType: **MS** Units: **µg/L** Prep Date: **9/27/2018** RunNo: **46589**
Client ID: **BATCH** Batch ID: **22107** Analysis Date: **9/28/2018** SeqNo: **905821**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	414	50.0	500.0	0	82.7	65	135				
Surr: Toluene-d8	24.5		25.00		98.2	65	135				
Surr: 4-Bromofluorobenzene	23.8		25.00		95.1	65	135				

Sample ID **1809352-002AMSD** SampType: **MSD** Units: **µg/L** Prep Date: **9/27/2018** RunNo: **46589**
Client ID: **BATCH** Batch ID: **22107** Analysis Date: **9/28/2018** SeqNo: **905822**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	471	50.0	500.0	0	94.2	65	135	413.5	13.0	30	
Surr: Toluene-d8	24.4		25.00		97.5	65	135		0		
Surr: 4-Bromofluorobenzene	24.0		25.00		95.8	65	135		0		

Sample Log-In Check List

Client Name:	**FS**	Work Order Number:	**1809375**
Logged by:	**Brianna Barnes**	Date Received:	**9/24/2018 2:17:00 PM**

Chain of Custody

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

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☐	No ☑	NA ☐
	Received straight from field.			
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☑	NA ☐
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

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

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler	3.2
Sample	6.1
Temp Blank	16.1

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

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 09/24/18 Page: 1 of: 1

Laboratory Project No (internal): 1809375

Project Name: Weyer - Mill E

Special Remarks:

Project No:

Client: Floyd|Snider

Collected by: Layni Wachter

Address: 601 Union St

Location: Mill E

City, State, Zip: Seattle, WA 98101

Report To (PM): Lynn Grochala

Sample Disposal: ☐ Return to client ☒ Disposal by lab (after 30 days)

Telephone: 206-292-2078

PM Email: lynn.grochala@floydsnider.com

Fax:

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T)	Dissolved (D)	Anions (IC)***	EDB (8011)	Penta by 8270			Comments
1	PZ-3A-092418	09/24	12:00	GW				X		X				X	T			X				Arsenic Only
2																						
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al (As) B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x Layni Wachter	09/24/18 14:17	x	09/24/18 1417
Relinquished	Date/Time	Received	Date/Time
x		x	

Turn-around Time:

- ☒ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day _____ (specify)

Attachment 2
Cap Inspection Documentation

Asphalt Cap and Soil Cover Inspection Form

Date/Time: 09/24/18 Location: Former Mill E/Koppers Facility

Inspector: Layni Wachter Owner: Pacific Topsoil

Weather: Overcast, partial sun, 65°F Rain in past 24 hr: Dry

As part of the Former Mill E/Koppers Facility Performance and Compliance Monitoring Plan (EMCON 1998) an inspection of the Asphalt Cap and Soil Cover is to be conducted annually. Any damage will be noted on the following checklist with locations referenced on the attached site plan.

VISUAL INSPECTION CHECKLIST

Asphalt Cap	Yes	No	If Yes, describe (locations identified on attached plan, photos of all described items will be included with the report):
Cracked or damaged asphalt	☒	☐	Minor cracks present as noted on figure. No concern re: direct contact exposure.
Areas of uneven settlement or standing water	☒	☐	Some minor areas of standing water. All areas < 10 ft. diameter and < 1 in. ponded depth.
Cracked or damaged drainage ditches	☐	☒	
Debris in drainage ditches	☒	☐	Accumulated sediment in ditches. < 1 in. in depth.
Vegetation in drainage ditches	☐	☒	
Sloughing or crumbling of edges of asphalt cap	☐	☒	
Other signs of cap damage, failure, or disturbance	☐	☒	

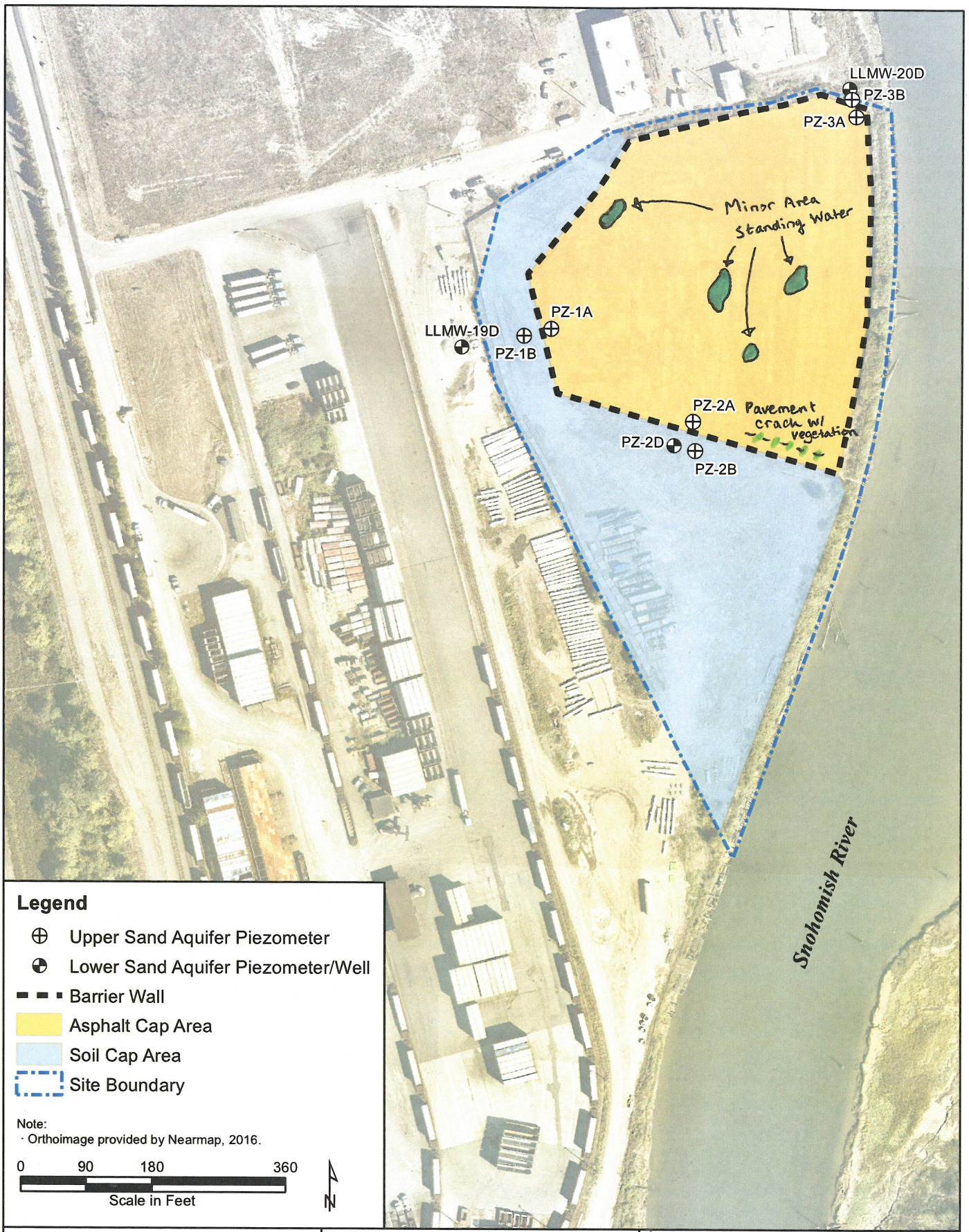
Soil Cover	Yes	No	If Yes, describe (photos of all described items will be included with the report):
Instability or erosion of the soils cap at levels of concern	☐	☒	
Excessive standing water or pooling indicating uneven settling or erosion.	☐	☒	

Layni Wachter
INSPECTOR SIGNATURE, Layni Wachter

9/24/2018
DATE

Kathryn Snider
P.E. SIGNATURE, Kathryn Snider, P.E.

9/24/2018
DATE



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2018 Annual Performance and Compliance Monitoring Report
Former Mill E/Koppers Facility
Everett, Washington

Figure A.2.1
September 2018 Cap Inspection

I:\GIS\Projects\WEYER_MILL_E\MXD\Annual Performance and Compliance Monitoring Summary\2018\Figure A.2.1 September 2018 Cap Inspection.mxd
11/5/2018

Photograph 1. Crack in asphalt and ponding on northwest side of the cap (looking north).

Photograph 2. Crack in asphalt through the center of the cap and ponding (looking north).

Photograph 3. Settled area with deposited dust and debris (looking northeast).

Photograph 4. Crack in the asphalt with growing vegetation along the south edge of the cap (looking west).

Photograph 5. Southeast side of soil cover (looking east).

Photograph 6. Northwest side of soil cover (looking west).