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Two Union Square
601 Union Street, Suite 600
Seattle, WA 98101
tel: 206.292.2078 fax: 206.682.7867

Memorandum

To: Mr. Ron Timm, Washington Department of Ecology

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

From: Lynn Grochala

Date: December 6, 2017

Project No: Weyer-Mill E, Task 1

Re: **Former Mill E/Koppers Site 2017 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 25, 2017, 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.

Monitoring activities included groundwater quality monitoring, groundwater level monitoring, and asphalt and soil cap inspection. This event was the first to incorporate modifications to the water level elevation monitoring outlined in the PCMP Addendum, which included the addition of Lower Sand Aquifer groundwater elevation measurements. This annual monitoring summary includes details from the installation of piezometer PZ-2D, which was required for water level monitoring of the Lower Sand Aquifer, and repairs to the existing piezometer PZ-1B. The following sections present the results of this monitoring event.

MODIFICATIONS TO THE PIEZOMETER NETWORK

Existing Lower Sand Aquifer monitoring wells LLMW-19D (located in close proximity to PZ-1A and PZ-1B) and LMW-20D (located in close proximity to PZ-3A and PZ-3B) were added to the water level monitoring network to better evaluate the performance of the hydraulic containment system (barrier wall and asphalt cap). Access to these monitoring wells was requested from Ecology and granted, as these wells are associated with the Everett Smelter Lowland Site. The locations of these wells are shown on Figure 2.

In accordance with the PCMP Addendum, a new piezometer (PZ-2D) was installed in the Lower Sand Aquifer outside the barrier wall and adjacent to piezometer PZ-2B to address Ecology's request for water level measurements from the Lower Sand Aquifer and consideration of vertical hydraulic gradients to assess the performance of the barrier wall. The location of the new piezometer is shown on Figure 2.

Floyd|Snider provided oversight to ESN Northwest, Inc. (ESN) on September 22, 2017, for the installation of piezometer PZ-2D, which is adjacent to Upper Sand Aquifer piezometer PZ-2B. PZ-2D was drilled to a maximum depth of 25 feet below ground surface (bgs) by ESN using a direct push/hollow stem auger combination drill rig. In accordance with the PCMP Addendum, PZ-2D was constructed with a 10-foot screened interval below the Upper Silt Aquitard, which was observed between 8.5 and 16.25 feet bgs. The soil boring/well completion log is included in Attachment 1.

The newly installed piezometer was developed by ESN using a submersible pump after installation to remove fine-grained material introduced during drilling. Investigation-derived wastes (soil and groundwater) were placed in 55-gallon drums and temporarily stored onsite pending characterization for off-site disposal. After installation, Floyd|Snider surveyed the top of casing (TOC) elevation for PZ-2D using the established elevations of PZ-2A and PZ-2B. The TOC elevation for PZ-2D is 9.08 feet above mean sea level (MSL).

During the February 2017 water level elevation monitoring event, the casing of piezometer PZ-1B, which is located within a vault, was identified as being much lower than the ground surface and was difficult to access safely during monitoring. Therefore, to address this concern, a new riser was installed on PZ-1B prior to the 2017 monitoring event. The new TOC elevation for PZ-1B was surveyed by Floyd|Snider on September 22, 2017, and is 9.82 feet above MSL.

GROUNDWATER LEVEL MONITORING

Depth to groundwater was measured at three piezometers inside the barrier wall (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 are shown on Figure 3.

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 the new piezometer in the Lower Sand Aquifer, PZ-2D, and the repaired piezometer, PZ-1B, were surveyed by Floyd|Snider on September 22, 2017.

Depth to water measurements were taken on September 22 following a low tide of -1.08 feet MSL at 3:08 PM rising toward a high tide of 2.81 feet MSL at 8:36 PM. Tide cycle elevations 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 Figure 3.

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	9/25/2017	15:32	9.90	6.50	3.40
PZ-1B	9/25/2017	15:33	9.82	5.65	4.17
LLMW-19D	9/25/2017	15:38	10.56	9.76	0.80
PZ-2A	9/25/2017	15:27	9.40	5.78	3.62
PZ-2B	9/25/2017	15:30	8.38	4.32	4.06
PZ-2D	9/25/2017	15:29	9.08	7.69	1.39
PZ-3A	9/25/2017	15:24	10.31	7.67	2.64
PZ-3B	9/25/2017	15:23	7.54	4.61	2.93
LLMW-20D	9/25/2017	15:25	11.26	10.45	0.81

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; "D" wells are located outside the barrier wall in the Lower Sand Aquifer.

Abbreviation:
PVC Polyvinyl chloride

Comparison of the groundwater elevations for each set of piezometers in the Upper Sand Aquifer (inside and outside barrier wall) from 2007 to 2017 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 and the results for the vertical hydraulic head differences are included in Table 3.

Table 2
Horizontal Hydraulic Head Difference Comparisons[1]

Piezometer Pair[2]	"B" Piezometer Upper Sand Aquifer Elevation	"A" Piezometer Upper Sand Aquifer Elevation	Horizontal Head Difference
PZ-1A/PZ-1B	4.17	3.40	0.77
PZ-2A/PZ-2B	4.06	3.62	0.44
PZ-3A/PZ-3B	2.93	2.64	0.29

Notes:
1 Groundwater elevations reference to 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.

Table 3
Vertical Hydraulic Head Difference Comparisons[1]

Piezometer Pair[2]	Location Relative to Barrier Wall	Upper Sand Aquifer Elevation	Lower Sand Aquifer Elevation[3]	Vertical Head Difference
PZ-1A/LLMW-19D	Inside	3.40	0.80	2.60
PZ-1B/LLMW-19D	Outside	4.17	0.80	3.37
PZ-2A/PZ-2D	Inside	3.62	1.39	2.23
PZ-2B/PZ-2D	Outside	4.06	1.39	2.67
PZ-3A/LLMW-20D	Inside	2.64	0.81	1.83

Notes:
1 Groundwater elevations reference to 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; "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 PCMP Addendum.

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, 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

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 (TPHs) 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 2. The results are compared to the Model Toxics Control Act (MTCA) cleanup levels for the Site established in the 1998 Consent Decree. Concentrations of diesel-range TPH and PCP were less than their respective cleanup levels and decreased relative to the previous monitoring event. Gasoline- and motor oil-range TPH were not detected at concentrations greater than laboratory reporting limits. Arsenic was detected at a concentration of 433 micrograms per liter (µg/L), which is greater than the cleanup level of 5 µg/L, but decreased relative to previous sampling events. Changes in the concentrations of TPH, PCP, and arsenic over time (over the last 10 years) are presented in Figure 5.

Table 4
Groundwater Analytical Results for PZ-3A, September 25, 2017

Analyte	Unit	Criteria[1]	Sample Result
Gasoline-Range TPH	µg/L	10,000	50.0 U
Diesel-Range TPH			588
Motor Oil-Range TPH			99.3 U
PCP		7.29	0.292
Arsenic		5	433

Note:
1 Criteria are from the cleanup levels established in the 1998 Consent Decree based on MTCA Method A and C.

Abbreviations:
µg/L Micrograms per liter
MTCA Model Toxics Control Act
PCP Pentachlorophenol
TPH Total Petroleum Hydrocarbons

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. A trip blank was included in the cooler with the sample being analyzed to ensure the sample containers did not contribute to any detected analyte concentrations and to identify any artifacts of improper sample handling, storage, or shipping. 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 2.

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. For all sample delivery groups, 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 25, 2017. 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 3. 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 uneven settlement in the asphalt, vegetation in the asphalt cracks and drainage ditches, accumulated sediment in the asphalt drainage ditches, and minimal tire rutting in the soil cap. 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), debris and accumulated sediment will be removed from the swale, and minor cracks will be sealed prior to Spring 2018.

PERFORMANCE AND COMPLIANCE MONITORING SCHEDULE

Water level monitoring will occur on a quarterly basis through June 2018 (i.e., December 2017, March 2018, and June 2018), before reverting back to annual monitoring in September 2018.

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.

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 ATTACHMENTS

Figure 1	Vicinity Map
Figure 2	Site Features and Monitoring Network
Figure 3	September 2017 Water Level Elevations
Figure 4	Water Level Monitoring Trends
Figure 5	Water Quality Trends in PZ-3A
Attachment 1	PZ-2D Soil Boring and Well Completion Log
Attachment 2	Laboratory Report
Attachment 3	Cap Inspection Documentation

Figures

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2017 Annual Performance and Compliance Monitoring Report
Former Mill E/Koppers Facility
Everett, Washington

Figure 1
Vicinity Map

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11/27/2017

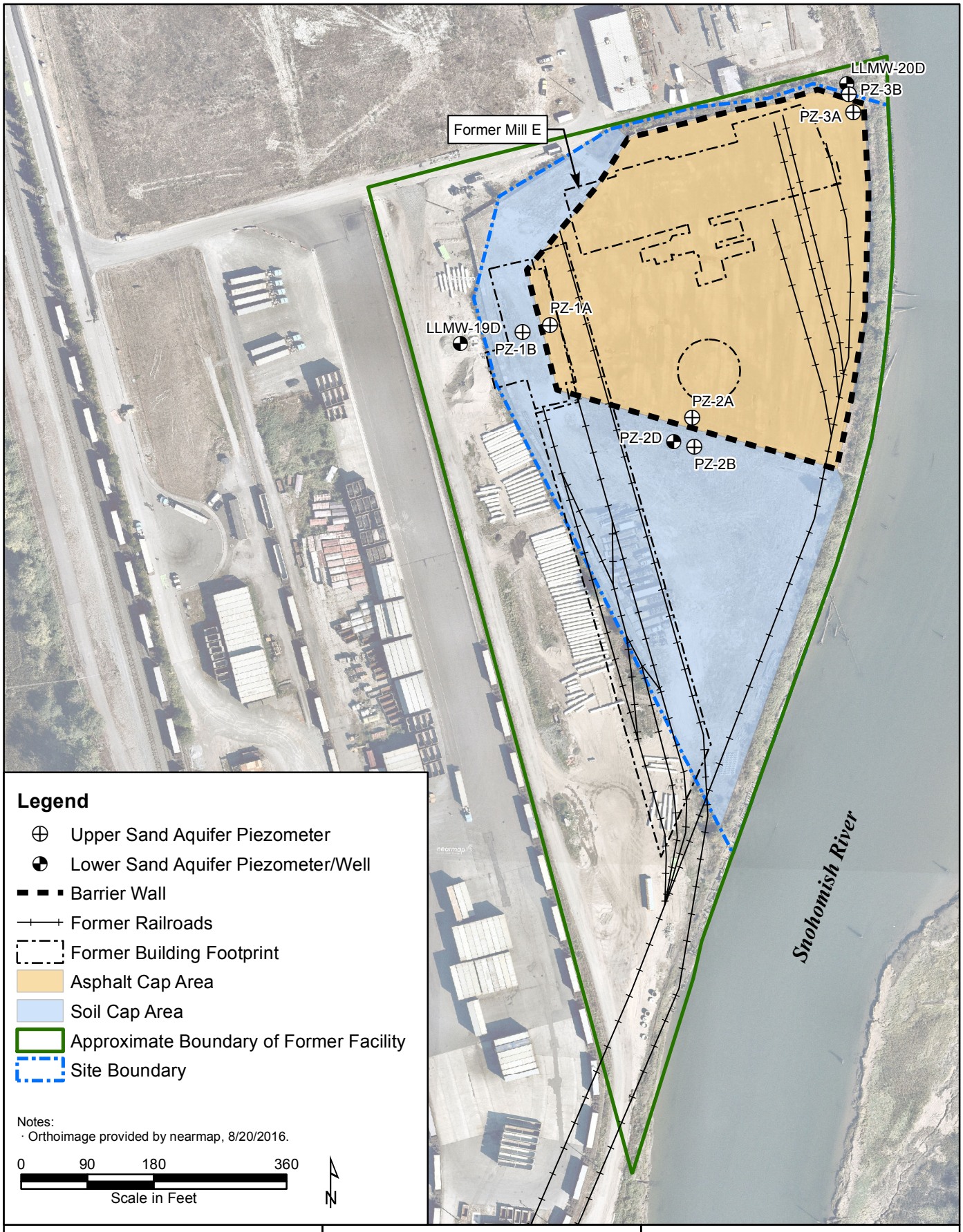

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Figure 2
Site Features and Monitoring Network

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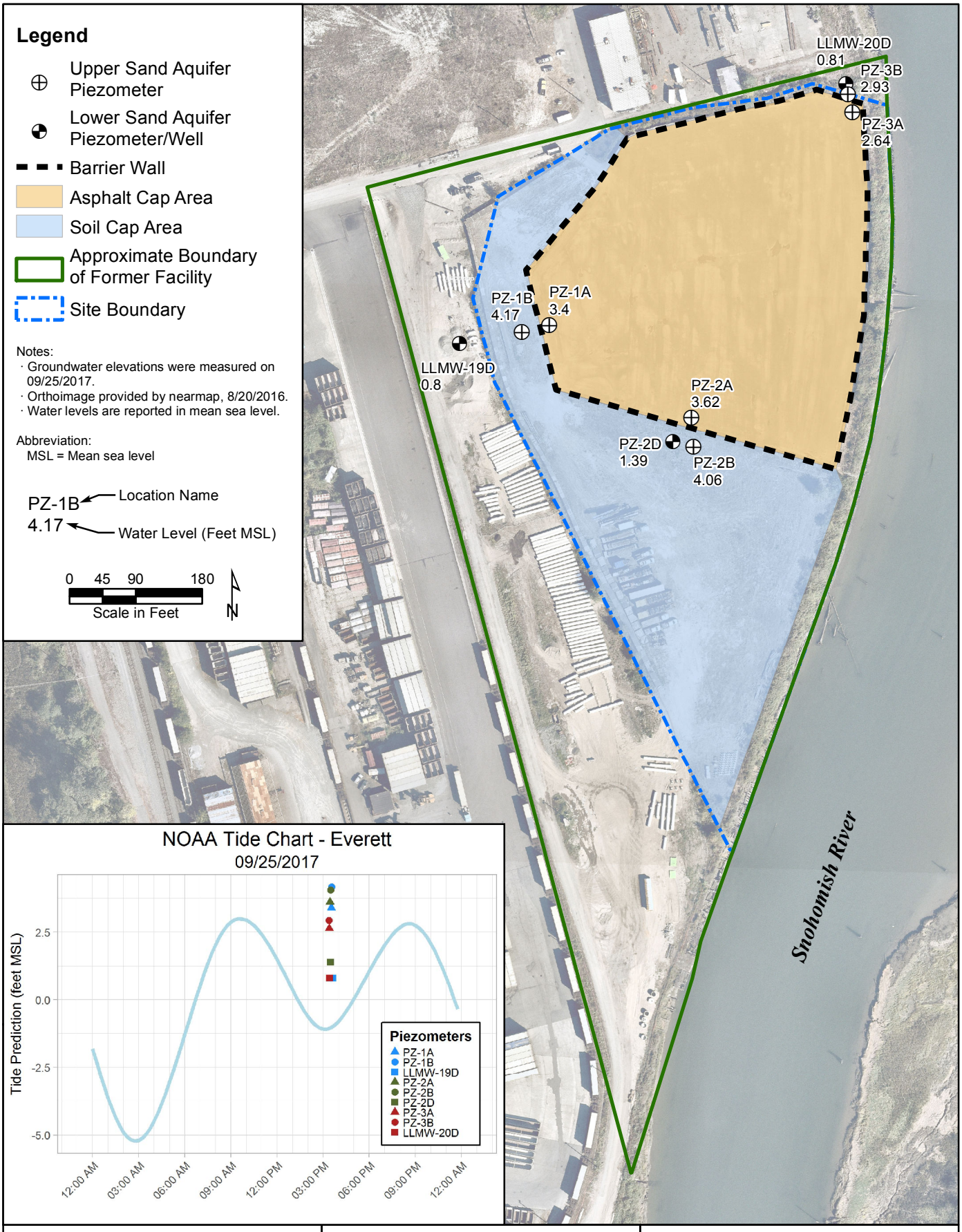
11/27/2017



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2017 Annual Performance and Compliance Monitoring Report
Former Mill E/Koppers Facility
Everett, Washington

Figure 3
September 2017 Water Level Elevations

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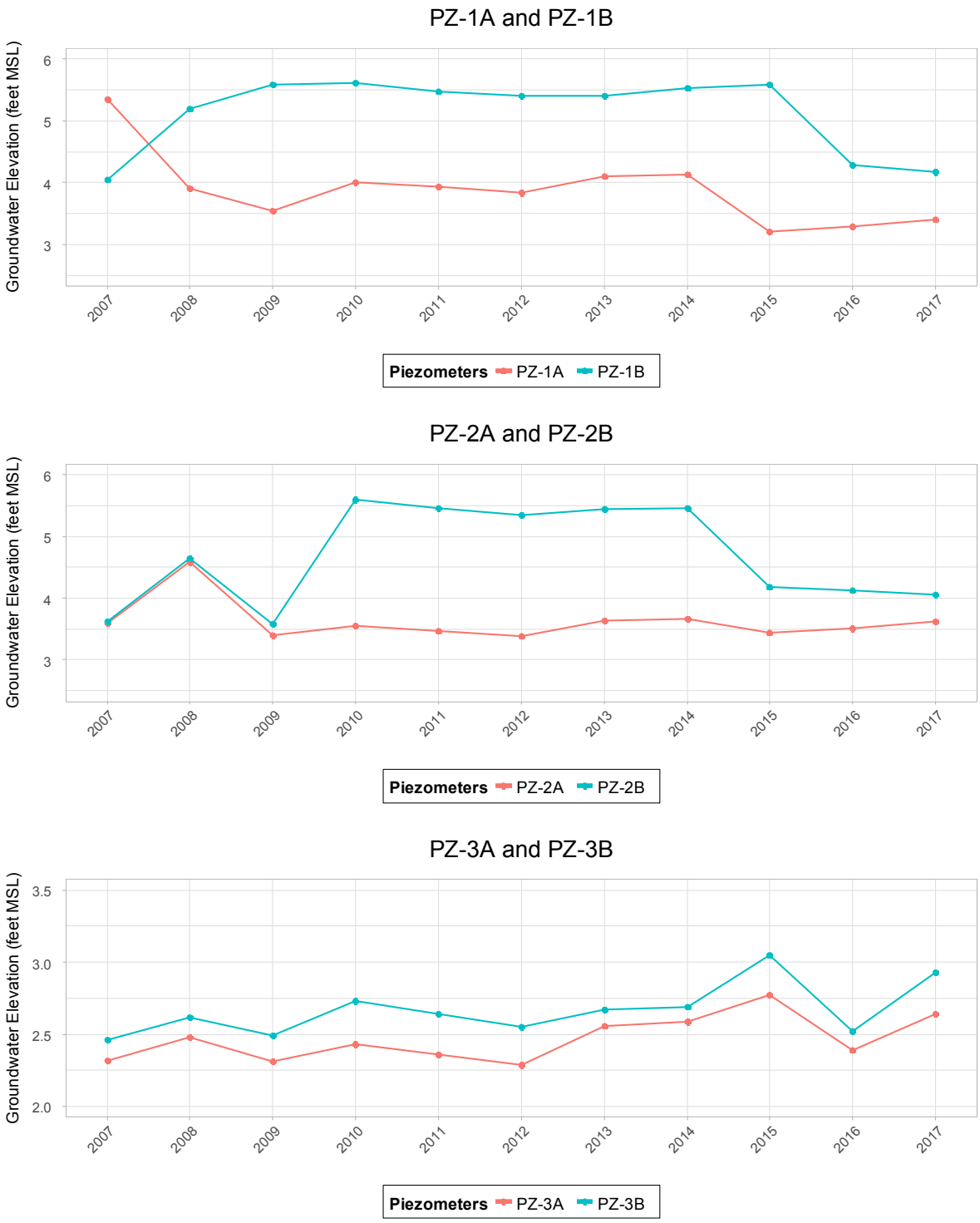
11/27/2017



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.

Abbreviation:

MSL = Mean Sea Level

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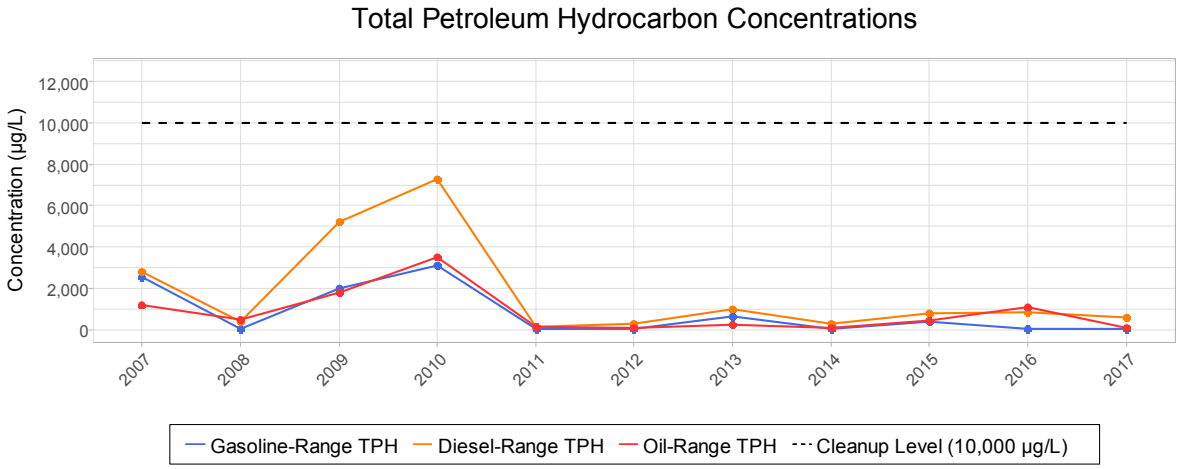
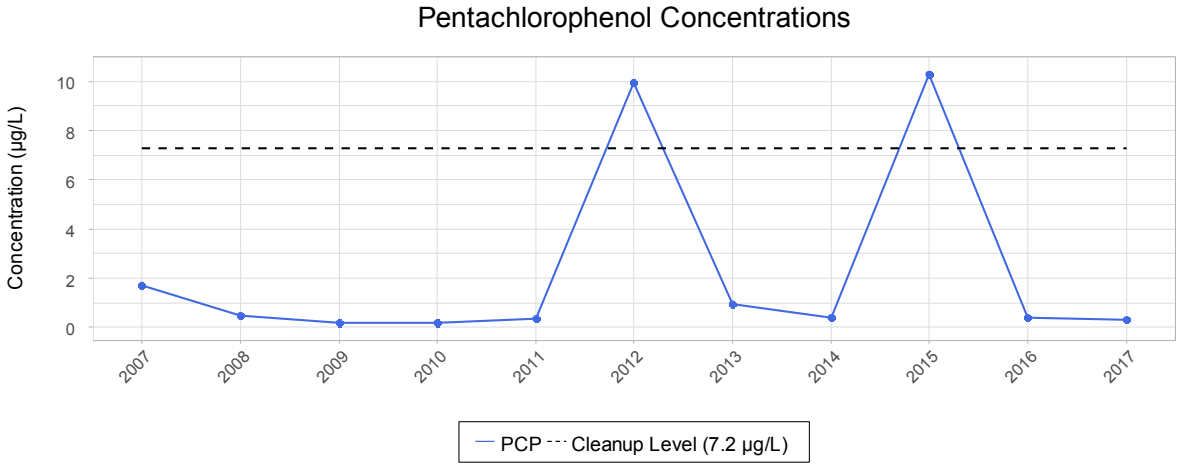
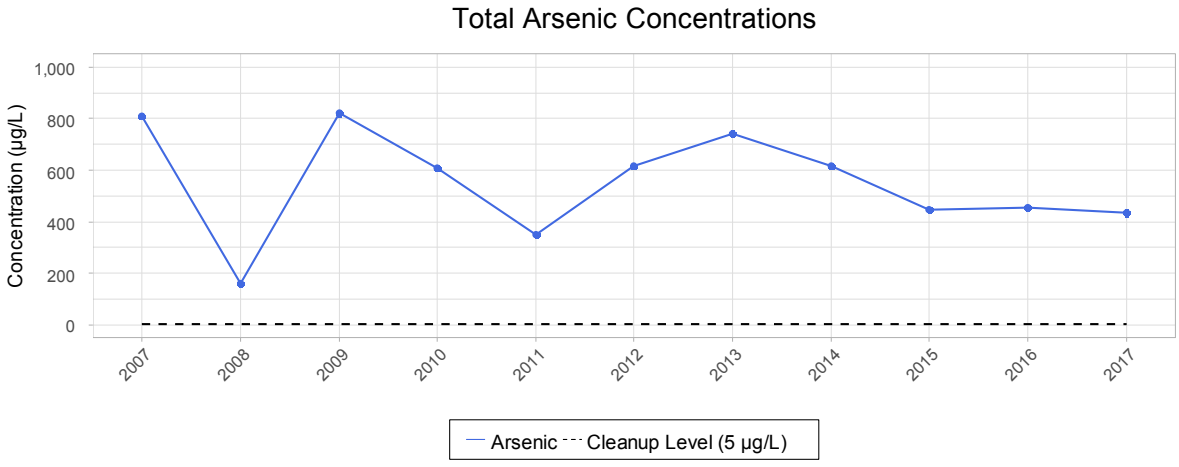
Figure 4
Water Level Monitoring Trends







Note:

1. Criteria are from the cleanup levels established in the 1998 Consent Decree based on MTCA Methods A and C.

Abbreviations:

µg/L = Micrograms per liter; MTCA = Model Toxics Control Act; PCP = Pentachlorophenol; TPH = Total petroleum hydrocarbon

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Figure 5
Groundwater Quality Trends in PZ-3A

F:\projects\Weyer- Mill E\00 Deliverables\2017 PCMP Annual Report\02 Figures\Native Files\Figure 5 Water Quality\Figure 5 Water Quality Monitoring Trends.docx
12/4/2017

Attachment 1
PZ-2D Soil Boring and Well Completion Log

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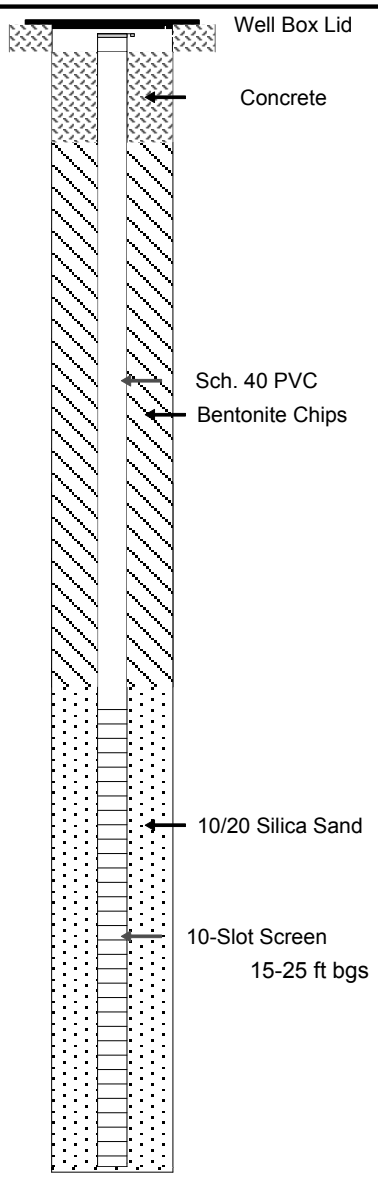
PROJECT: **Mill E**	LOCATION: **Everett, WA**	WELL ID: **PZ-2D**	
LOGGED BY: **G.Cisneros**	COORDINATE SYSTEM: **WGS 84**	ECOLOGY WELL ID: **BKX-552**	
DRILLED BY: **ESN- Cole**	SCREENED INTERVAL: **15-25 ft bgs**	LATITUDE: **48.01**	LONGITUDE: **-122.18**
DRILLING EQUIPMENT: **Geoprobe 7800**		GROUND SURFACE ELEV.: **--**	TOC ELEVATION: **9.08**
DRILLING METHOD: **Direct Push/Hollow Stem Auger Combo Rig**		TOTAL DEPTH (ft bgs): **29**	DEPTH TO WATER (ft bgs): **5.5 & 17**
SAMPLING METHOD: **Continuous 5-foot liner**		BORING DIAMETER: **2" & 8.25"**	DRILL DATE: **9/22/2017**

Depth (feet)	USCS Symbol	Description (color, density/consistency, minor constituent, size **MAJOR CONSTITUENT**, modifer, debris, odor, staining/sheen, moisture, etc.)	Drive/ Recovery	PID (ppm)
0	TS	Grass Topsoil		
	SP	Light brown, fine to medium **SAND**; no odor or sheen; dry to moist.		0
2	SW	Light brown, gravelly, fine to coarse **SAND** with 5% silt and 15% angular gravel; no odor or sheen; moist.		0
	IML	Orange mottled **SILT** layer.		
4		Brown, fine to coarse **SAND** with trace gravel; no odor or sheen; moist.		0
6	SP	Gray, fine to medium **SAND** with trace gravel; no odor or sheen; wet.		0
8				0
	ML/OL	Olive gray, organic **SILT** with high plasticity and abundant woody debris; no odor or sheen; moist.		2.1
10		Decreasing plasticity and organic matter with depth.		
		Olive gray, firm **SILT** with moderate plasticity and some woody debris; no odor or sheen; moist.		2.9
12	ML	No organic material; low to moderate plasticity; no odor or sheen.		2.5
14		Olive gray, sandy **SILT** with low plasticity.		2.2
16	SM	Gray, silty **SAND** with 40% silt; no odor or sheen; wet.		
		Gray, medium to coarse **SAND**; no odor or sheen; wet.		2.4
18				
20				
22	SP			2.1
24				
		Heaving sands pushed the bottom of the well screen up to 25 ft bgs during installation.		
26		Gray, fine to coarse **SAND**, no gravel; no odor or sheen; saturated.		
28				1.9
		Bottom of boring = 29 ft bgs.		

Well Construction



ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES: Used direct push to collect soil samples, followed by a hollow stem auger to install well. Traffic-rated well box set within a 2-foot by 2-foot concrete pad.

Attachment 2
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: 1709298

October 02, 2017

Attention Lynn Grochala:

Fremont Analytical, Inc. received 2 sample(s) on 9/25/2017 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: *10/02/2017*

CLIENT: Floyd | Snider
Project: Weyer-Mill E
Work Order: 1709298

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1709298-001	PZ-3A-092517	09/25/2017 4:10 PM	09/25/2017 6:14 PM
1709298-002	Trip Blank	09/20/2017 5:00 PM	09/25/2017 6:14 PM

Case Narrative

WO#: **1709298**
Date: **10/2/2017**

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: **1709298**
Date Reported: **10/2/2017**

Client: Floyd | Snider
Project: Weyer-Mill E
Lab ID: 1709298-001
Client Sample ID: **PZ-3A-092517**

Collection Date: 9/25/2017 4:10:00 PM
Matrix: Groundwater

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.				Batch ID: 18310		Analyst: SB
Diesel (Fuel Oil)	588	49.7		µg/L	1	9/28/2017 9:10:47 AM
Heavy Oil	ND	99.3		µg/L	1	9/28/2017 9:10:47 AM
Surr: 2-Fluorobiphenyl	84.9	50 - 150		%Rec	1	9/28/2017 9:10:47 AM
Surr: o-Terphenyl	87.9	50 - 150		%Rec	1	9/28/2017 9:10:47 AM
Pentachlorophenol by EPA Method 8270 (SIM)				Batch ID: 18327		Analyst: BT
Pentachlorophenol	0.292	0.0997	Q	µg/L	1	9/29/2017 3:20:41 PM
Surr: 2,4,6-Tribromophenol	105	34.6 - 146		%Rec	1	9/29/2017 3:20:41 PM
Gasoline by NWTPH-Gx				Batch ID: 18314		Analyst: MW
Gasoline	ND	50.0		µg/L	1	9/27/2017 3:13:34 AM
Surr: Toluene-d8	92.8	65 - 135		%Rec	1	9/27/2017 3:13:34 AM
Surr: 4-Bromofluorobenzene	105	65 - 135		%Rec	1	9/27/2017 3:13:34 AM
Total Metals by EPA Method 200.8				Batch ID: 18322		Analyst: TN
Arsenic	433	1.00		µg/L	1	9/27/2017 3:18:26 PM

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Work Order: 1709298
CLIENT: Floyd | Snider
Project: Weyer-Mill E

QC SUMMARY REPORT

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

Sample ID **1709298-001BMSD**	SampType: **MSD**	Units: **µg/L**	Prep Date: **9/26/2017**	RunNo: **38886**
Client ID: **PZ-3A-092517**	Batch ID: **18310**		Analysis Date: **9/27/2017**	SeqNo: **747724**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	1,330	49.9	998.4	587.9	74.5	65	135	1,244	6.78	30	
Surr: 2-Fluorobiphenyl	68.5		79.87		85.7	50	150		0		
Surr: o-Terphenyl	66.8		79.87		83.6	50	150		0		

Sample ID **MB-18310**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **9/26/2017**	RunNo: **38886**
Client ID: **MBLKW**	Batch ID: **18310**		Analysis Date: **9/28/2017**	SeqNo: **747733**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	49.9									
Heavy Oil	ND	99.9									
Surr: 2-Fluorobiphenyl	69.1		79.88		86.6	50	150				
Surr: o-Terphenyl	72.7		79.88		91.0	50	150				

Sample ID **LCS-18310**	SampType: **LCS**	Units: **µg/L**	Prep Date: **9/26/2017**	RunNo: **38886**
Client ID: **LCSW**	Batch ID: **18310**		Analysis Date: **9/28/2017**	SeqNo: **747734**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	698	49.9	998.3	0	69.9	65	135				
Surr: 2-Fluorobiphenyl	67.5		79.87		84.5	50	150				
Surr: o-Terphenyl	67.8		79.87		84.9	50	150				

Sample ID **1709298-001BDUP**	SampType: **DUP**	Units: **µg/L**	Prep Date: **9/26/2017**	RunNo: **38886**
Client ID: **PZ-3A-092517**	Batch ID: **18310**		Analysis Date: **9/28/2017**	SeqNo: **747736**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	624	49.9						587.9	6.00	30	
Heavy Oil	ND	99.7						0		30	
Surr: 2-Fluorobiphenyl	68.7		79.78		86.2	50	150		0		
Surr: o-Terphenyl	71.9		79.78		90.2	50	150		0		

Work Order: 1709298
CLIENT: Floyd | Snider
Project: Weyer-Mill E

QC SUMMARY REPORT

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

Sample ID **1709298-001BDUP**	SampType: **DUP**			Units: **µg/L**		Prep Date: **9/26/2017**		RunNo: **38886**			
Client ID: **PZ-3A-092517**	Batch ID: **18310**					Analysis Date: **9/28/2017**		SeqNo: **747736**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID **1709298-001BMS**	SampType: **MS**			Units: **µg/L**		Prep Date: **9/26/2017**		RunNo: **38886**			
Client ID: **PZ-3A-092517**	Batch ID: **18310**					Analysis Date: **9/28/2017**		SeqNo: **747737**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	1,240	49.9	997.6	587.9	65.8	65	135				
Surr: 2-Fluorobiphenyl	62.5		79.81		78.3	50	150				
Surr: o-Terphenyl	60.3		79.81		75.5	50	150				

Work Order: 1709298
CLIENT: Floyd | Snider
Project: Weyer-Mill E

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID	**MB-18314**	SampType:	**MBLK**	Units:	**µg/L**	Prep Date:	**9/26/2017**	RunNo:	**38866**
Client ID:	**MBLKW**	Batch ID:	**18314**			Analysis Date:	**9/26/2017**	SeqNo:	**747247**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	ND	50.0									
Surr: Toluene-d8	23.7		25.00		94.9	65	135				
Surr: 4-Bromofluorobenzene	24.1		25.00		96.3	65	135				

Sample ID	**LCS-18314**	SampType:	**LCS**	Units:	**µg/L**	Prep Date:	**9/26/2017**	RunNo:	**38866**
Client ID:	**LCSW**	Batch ID:	**18314**			Analysis Date:	**9/26/2017**	SeqNo:	**747246**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	531	50.0	500.0	0	106	65	135				
Surr: Toluene-d8	23.3		25.00		93.4	65	135				
Surr: 4-Bromofluorobenzene	25.4		25.00		102	65	135				

Sample ID	**1709264-003ADUP**	SampType:	**DUP**	Units:	**µg/L**	Prep Date:	**9/26/2017**	RunNo:	**38866**
Client ID:	**BATCH**	Batch ID:	**18314**			Analysis Date:	**9/26/2017**	SeqNo:	**747236**

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	23.5		25.00		94.2	65	135		0		
Surr: 4-Bromofluorobenzene	23.7		25.00		94.7	65	135		0		

Sample ID	**1709306-010ADUP**	SampType:	**DUP**	Units:	**µg/L**	Prep Date:	**9/26/2017**	RunNo:	**38866**
Client ID:	**BATCH**	Batch ID:	**18314**			Analysis Date:	**9/27/2017**	SeqNo:	**747242**

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	23.2		25.00		92.7	65	135		0		
Surr: 4-Bromofluorobenzene	23.7		25.00		94.9	65	135		0		

Work Order: 1709298
CLIENT: Floyd | Snider
Project: Weyer-Mill E

QC SUMMARY REPORT

Gasoline by NWTPH-Gx

Sample ID	**1709298-001AMS**	SampType:	**MS**	Units:	**µg/L**	Prep Date:	**9/26/2017**	RunNo:	**38866**
Client ID:	**PZ-3A-092517**	Batch ID:	**18314**			Analysis Date:	**9/27/2017**	SeqNo:	**747238**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	747	50.0	500.0	344.1	80.6	65	135				
Surr: Toluene-d8	23.0		25.00		91.9	65	135				
Surr: 4-Bromofluorobenzene	27.3		25.00		109	65	135				

Sample ID	**1709298-001AMSD**	SampType:	**MSD**	Units:	**µg/L**	Prep Date:	**9/26/2017**	RunNo:	**38866**
Client ID:	**PZ-3A-092517**	Batch ID:	**18314**			Analysis Date:	**9/27/2017**	SeqNo:	**747239**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline	823	50.0	500.0	344.1	95.7	65	135	747.2	9.60	30	
Surr: Toluene-d8	22.8		25.00		91.1	65	135		0		
Surr: 4-Bromofluorobenzene	26.5		25.00		106	65	135		0		

Work Order: 1709298
CLIENT: Floyd | Snider
Project: Weyer-Mill E

QC SUMMARY REPORT

Pentachlorophenol by EPA Method 8270 (SIM)

Sample ID **MB-18327** SampType: **MBLK** Units: **µg/L** Prep Date: **9/27/2017** RunNo: **38969**
Client ID: **MBLKW** Batch ID: **18327** Analysis Date: **9/28/2017** SeqNo: **749131**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pentachlorophenol	ND	0.0995									Q
Surr: 2,4,6-Tribromophenol	2.56		3.981		64.2	34.6	146				

NOTES:
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID **LCS-18327** SampType: **LCS** Units: **µg/L** Prep Date: **9/27/2017** RunNo: **38969**
Client ID: **LCSW** Batch ID: **18327** Analysis Date: **9/28/2017** SeqNo: **749132**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pentachlorophenol	2.66	0.0993	3.971	0	67.0	5	127				
Surr: 2,4,6-Tribromophenol	3.93		3.971		99.1	34.6	146				

Sample ID **1709298-001DDUP** SampType: **DUP** Units: **µg/L** Prep Date: **9/27/2017** RunNo: **38969**
Client ID: **PZ-3A-092517** Batch ID: **18327** Analysis Date: **9/29/2017** SeqNo: **749138**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pentachlorophenol	0.123	0.0997						0.2916	81.2	30	RQ
Surr: 2,4,6-Tribromophenol	4.09		3.989		103	34.6	146		0		

NOTES:
R - High RPD observed.
Q - Indicates an analyte with a continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF).

Sample ID **1709298-001DMS** SampType: **MS** Units: **µg/L** Prep Date: **9/27/2017** RunNo: **38969**
Client ID: **PZ-3A-092517** Batch ID: **18327** Analysis Date: **9/29/2017** SeqNo: **749139**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pentachlorophenol	5.60	0.0994	3.976	0.2916	133	15	134				
Surr: 2,4,6-Tribromophenol	4.10		3.976		103	34.6	146				

Work Order: 1709298
CLIENT: Floyd | Snider
Project: Weyer-Mill E

QC SUMMARY REPORT

Pentachlorophenol by EPA Method 8270 (SIM)

Sample ID **1709298-001DMSD** SampType: **MSD** Units: **µg/L** Prep Date: **9/27/2017** RunNo: **38969**
Client ID: **PZ-3A-092517** Batch ID: **18327** Analysis Date: **9/29/2017** SeqNo: **749140**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Pentachlorophenol	6.34	0.104	4.146	0.2916	146	15	134	5.598	12.4	30	S
Surr: 2,4,6-Tribromophenol	4.69		4.146		113	34.6	146		0		

NOTES:
S - Outlying spike recovery(ies) observed. A duplicate analysis was performed and recovered within range.

Work Order: 1709298
CLIENT: Floyd | Snider
Project: Weyer-Mill E

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID	MB-18322	SampType:	MBLK			Units:	µg/L			Prep Date:	9/27/2017			RunNo:	38870	
Client ID:	MBLKW	Batch ID:	18322							Analysis Date:	9/27/2017			SeqNo:	747359	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual				
Arsenic		ND	1.00													

Sample ID	LCS-18322	SampType:	LCS			Units:	µg/L			Prep Date:	9/27/2017			RunNo:	38870	
Client ID:	LCSW	Batch ID:	18322							Analysis Date:	9/27/2017			SeqNo:	747360	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual				
Arsenic		108	1.00	100.0	0	108	85	115								

Sample ID	1709294-001ADUP	SampType:	DUP			Units:	µg/L			Prep Date:	9/27/2017			RunNo:	38870	
Client ID:	BATCH	Batch ID:	18322							Analysis Date:	9/27/2017			SeqNo:	747362	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual				
Arsenic		ND	1.00						0		30					

Sample ID	1709294-001AMS	SampType:	MS			Units:	µg/L			Prep Date:	9/27/2017			RunNo:	38870	
Client ID:	BATCH	Batch ID:	18322							Analysis Date:	9/27/2017			SeqNo:	747365	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual				
Arsenic		553	1.00	500.0	0.3985	110	70	130								

Sample ID	1709294-001AMSD	SampType:	MSD			Units:	µg/L			Prep Date:	9/27/2017			RunNo:	38870	
Client ID:	BATCH	Batch ID:	18322							Analysis Date:	9/27/2017			SeqNo:	747366	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual				
Arsenic		547	1.00	500.0	0.3985	109	70	130	552.7	0.954	30					

Sample Log-In Check List

Client Name:	**FS**	Work Order Number:	**1709298**
Logged by:	**Brianna Barnes**	Date Received:	**9/25/2017 6:14:00 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 ☐
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 ☐ HNO3 added to 001C
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	3.0
Sample	4.7
Temperature Blank	2.9

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

Chain of Custody Record and Laboratory Services Agreement

Fremont Analytical

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

Date: 9/25/17

Laboratory Project No (internal): 1709290

Page: 1 of: 1

Client: Floyd | Snider

Address: 601 Union St. Suite 600

City, State, Zip: Seattle, WA 98101

Telephone: Fax:

Project Name: Weyer- Mill E

Project No:

Collected by: GC / LW

Location: Everett

Report To (PM): Lynn

PM Email: Lynn Grochala

*Matrix Codes: 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

	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 / 625)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	8270 Penta (PCP)			Comments
1	PZ-3A-092517	9/25	1610	GW			X		X				X	T			X				Penta=PCP only Arsenic
2																					
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					

**Metals Analysis (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

Sample Disposal: ☐ Return to Client ☐ Disposal by Lab (Samples will be held for 30 days unless otherwise noted. A fee may be assessed if samples are retained after 30 days.)

Turn-around times for samples received after 4:00pm will begin on the following business day.

Special Remarks:

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, 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 [signature]	9/25/17 18:14	x [signature]	9/29/17 1814
x		x	

TAT → SameDay^ NextDay^ 2 Day 3 Day STD

^Please coordinate with the lab in advance

Attachment 3
Cap Inspection Documentation

Asphalt Cap and Soil Cover Inspection Form

Date/Time: 09/25/17 Location: Mill E

Inspector: Layni Wachter Owner: Pacific Topsoil

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

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	☒	☐	Small weeds in and alongside ditches. Most in accumulated sediment.
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.	☐	☒	

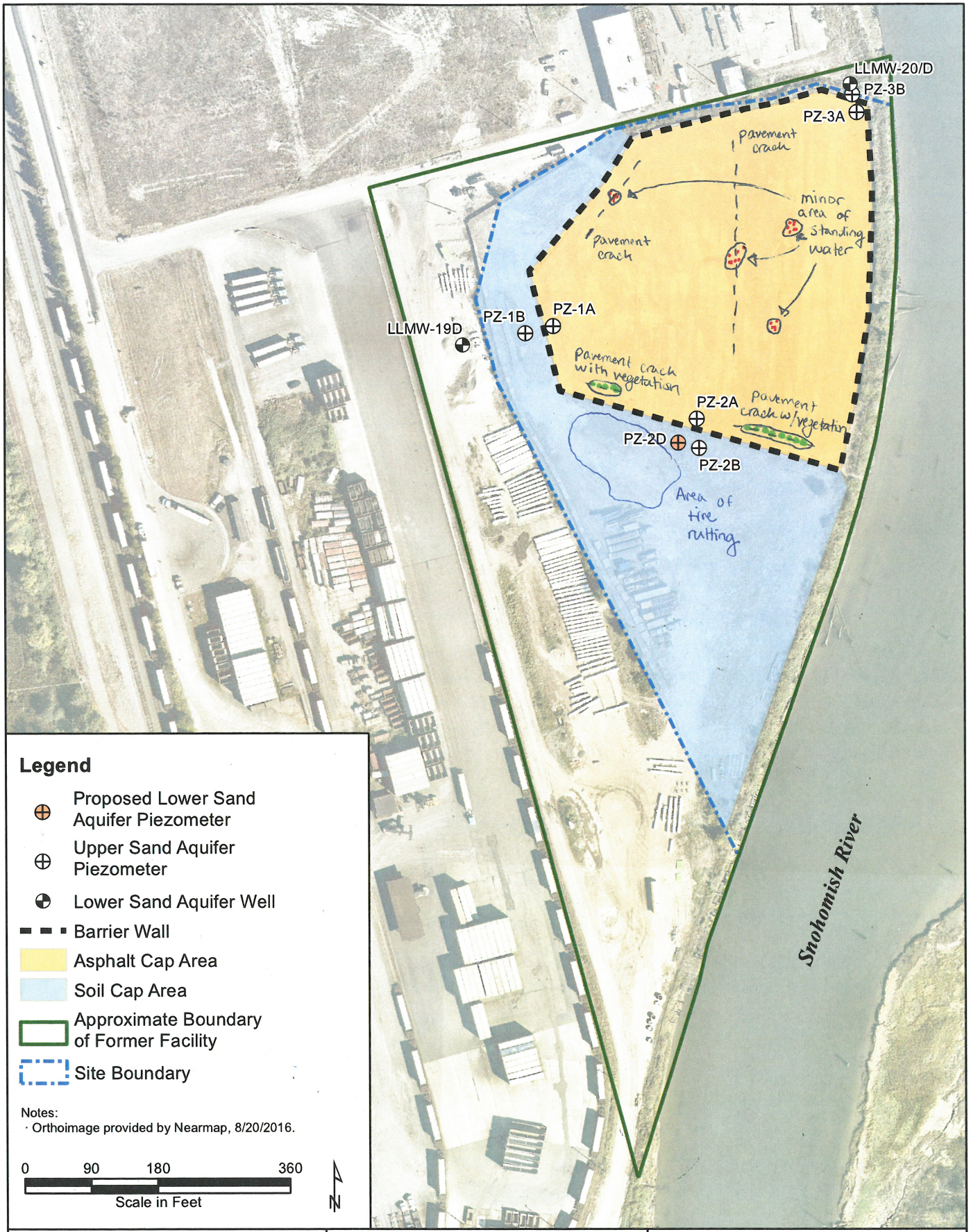
Minimal tire rutting in soil cap area. Ruts are 2” to 4” deep.

Layni Wachter
INSPECTOR SIGNATURE, Layni Wachter

9/25/2017
DATE

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

9/25/2017
DATE



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Performance and Compliance Monitoring Plan Addendum
Former Mill E/Koppers Facility
Everett, Washington

Figure 1-2
Site Map

I:\GIS\Projects\WEYER_MILL_E\MXD\PCMPAddendum\Figure 1-2 Site Map.mxd
4/6/2017

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

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

FLOYD | SNIDER strategy ▪ science ▪ engineering	**2017 Annual Performance and Compliance Monitoring Report Former Mill E/Koppers Facility Everett, Washington**	Asphalt Cap and Soil Cover Inspection Photo Log Photographs 1 and 2

Photograph 3. Standing water in the center of the cap (looking north).

Photograph 4. Settlement area with some standing water on east side of the cap (looking east).

Photograph 5. Crack in the asphalt with growing vegetation along the south edge of the cap (looking west).

Photograph 6. Accumulated sediment within the drainage ditch along the south edge of the cap (looking west).

Photograph 7. Southeast side of soil cover (looking east).

Photograph 8. Northwest side of soil cover (looking west).