State of Oregon
Department of Environmental Quality **Memorandum**

Date: **May 31, 2024 (Revised October 2, 2024 with Omitted Attachments)**

To: **Laura Hanna, US EPA**

Through: **Kevin Parrett, DEQ Cleanup Section Manager**

From: **Rob Hood, Project Manager *(RAH)***
David Lacey, Portland Harbor Source Control Lead

Subject: **Source Control Decision**
Glacier Northwest, Inc. (Calport)
ECSI #2378

1.0 Introduction

This memorandum presents the basis for the Oregon Department of Environmental Quality's (DEQ) stormwater source control decision for the Glacier Northwest, Inc. Industrial site, located at 5034 NW Front Avenue, Portland, Oregon. The site is one parcel of a three-parcel area, owned by the Zidell Companies and formerly known as Front Avenue Limited Partnership (ECSI #1239), which also includes Tube Forgings of America at 5200 NW Front Avenue and Hampton Tree Farms, Inc. (ECSI #5761) at 4950 NW Front Avenue. The attached Figures 1 and 2 show the Site Location and Site Plan.

Glacier Northwest, Inc. conducted a Source Control Evaluation (SCE) for the stormwater pathway at the site in accordance with the 2005 *EPA/DEQ Portland Harbor Joint Source Control Strategy,* also known as the JSCS, under a March 2017 Voluntary Cleanup Agreement between Glacier and the DEQ. Under a separate agreement, Tube Forgings of America is conducting source control evaluations for the entire three parcel area for the contaminant transport pathways of groundwater (including preferential transport in or along utilities to the river), riverbanks and overwater structures. Therefore, these pathways at the Glacier Northwest site will not be discussed further in this document.

DEQ concludes from review of the *Updated Source Control Evaluation Report* (APEX 2019) and *Upland Source Control Evaluation Addendum* (APEX 2020) and other documents in the record that Glacier Northwest investigated and controlled upland sources of contamination from current and past operations such that the stormwater transport pathway at the site does not pose a significant current or future threat to the Willamette River.

2.0 Site Description and History

The 11.71-acre property is located on the west bank of the Willamette River at approximately river mile 8.3, within the Guilds Lake geographic region of the uplands surrounding the Portland Harbor Superfund site (Figures 1 and 2). In the early 1900s, land only existed on the western portion of the three-parcel area. From the 1940s to the 1970s, the eastern half of the property was created by placement of slag, dredged material from the Willamette River and construction debris over several fill events. In 1942, Oregon Steel Mills purchased the western portion where it constructed an electric steel rolling mill. In 1955, Gilmore Steel Corporation purchased the property and operated the mill until 1978. In 1991, Glacier leased the parcel shown on Figure 2, where it operates a concrete ready mix and aggregates facility.

Surrounding properties include McCall Oil Company toward the northwest, Hampton Lumber Yard toward the south-southeast, Tube Forgings of America toward the southwest, and the Willamette River toward the east-southeast.

Current activities include ready mix concrete production, aggregate sales and distribution, and ecology block production. The majority of the site surface is aggregate, with concrete pavement on the eastern portion of the property. Concrete production at the property occurs at the south/southwestern end of the property. Glacier's process area includes a wet batch and dry batch concrete plant where raw materials are mixed prior to being transferred to a ready-mix delivery truck. Raw materials used in concrete production include cement, slag cement, fly ash, aggregate, water and small quantities of admixtures designed to enhance concrete properties. Most of the property is used for aggregate storage, roadways, and associated conveyor systems. A truck maintenance shop exists on the northeast corner of the property and four above-ground storage tanks (ASTs), one diesel-, one used oil- one engine oil-, and one hydraulic oil. Glacier Northwest generates the following wastes on-site: petroleum products, detergents, and truck maintenance related cleaners, solvents, and service fluids near the maintenance shop near the northeast corner of the property. Glacier has never had cement kiln dust at the site.

3.0 Regulatory History

Glacier entered a Voluntary Cleanup Agreement to complete the stormwater source control evaluation with DEQ in March 2017. Under a separate agreement, Tube Forgings of America is conducting source control evaluations for the entire three parcel area for the contaminant transport pathways of groundwater (including preferential transport in or along utilities to the river), riverbanks and overwater structures.

3.1 Stormwater Permits

Concrete process water is discharged to the City of Portland's sanitary sewer system pursuant to a City Industrial Wastewater Discharge Permit #400.189. Stormwater discharges to the Willamette River through a private outfall SW-1 (also known as WR-7), near the northernmost corner of the site, under DEQ's NPDES1200A stormwater and mine dewatering general discharge permit.

During the operating history of the site, Glacier received one violation. That violation was in 2009 associated with a release of water with a pH of 4.8 to the sanitary sewer on November 4, 2009. Additional controls were added to the process water system to avoid recurrence.

3.2 Hazardous Waste Generator

The facility is not registered with the USEPA as a generator of hazardous waste.

3.3 Underground Storage Tanks

No underground storage tanks have been reported.

4.0 Source Control Evaluation

Because the site is located within the uplands draining to the Portland Harbor Superfund study area, upland source control investigations were guided by the 2005 EPA/DEQ Joint Source Control Strategy. The objective of a source control evaluation is to determine whether existing and potential sources of contamination at the site have been identified and if additional characterization or source control measures are needed. While DEQ determined that the overwater, bank erosion, stormwater, docks, and groundwater pathways are complete, Glacier Northwest's source control evaluation is limited to the

stormwater pathway. As property owner of the three parcels, The Zidell Companies is evaluating the groundwater, bank and overwater pathways for all three of its parcels and DEQ will include these evaluations in a separate source control decision memorandum (ECSI 1239, Tube Forgings of America).

4.1 Stormwater Source Control Investigations

When stormwater presents as a potential pathway to mobilize contamination from the site to the river, source control determinations generally rest upon demonstrating that site-related information provides sufficient support to make the following findings:

1. Existing and potential facility-related contaminant sources have been identified and characterized.

2. Contaminant sources were removed or are being controlled to the extent feasible.

3. Performance monitoring conducted after source control measures were implemented supports the conclusion that the measures are effective.

4. Adequate measures are in place to ensure source control and good stormwater management measures occur in the future (DEQ 2010).

As detailed in the Updated Source Control Evaluation (APEX 2019), investigation of overland flows and the stormwater collection and conveyance system were undertaken at the site, in accordance with DEQ's 2009 Guidance for Evaluating the Stormwater Pathway at Upland Sites.

4.1.1 Contaminants of Potential Concern

As reported in DEQ's 2016 Portland Harbor Upland Source Control Summary Report, the sediment area of potential concern to which site stormwater discharges was found to have elevated concentrations (relative to preliminary remediation goals) of barium, cadmium, copper, iron, mercury, silver, zinc, PCBs, PAHs, delta-HCCH, dieldrin, endrin, chloroethane. Barium and delta-HCCH do not have 2017 EPA Portland harbor Record of Decision Table 17 surface water cleanup levels or 2005 EPA/DEQ Portland Harbor Joint Source Control Strategy water screening level values, so are not evaluated further.

Site stormwater was analyzed for the following list of contaminants:

- Metals (aluminum, barium, cadmium, copper, iron, manganese, mercury, silver, zinc)
- Polychlorinated biphenyls (aroclors)
- Polycyclic aromatic hydrocarbons
- Organochlorine Pesticides (aldrin, endrin, dieldrin, DDx, chlordane)
- Total suspended solids

Due to lack of elevations in sediment concentrations observed in the Portland Habor Remedial Investigation/Feasibility Study, and Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling datasets offshore of the Site, and no historical sources of these contaminants on the site, the following contaminants with surface water cleanup levels on Table 17 of the 2017 EPA Record of Decision were not evaluated: ethylbenzene, MCPP, pentachlorophenol, dioxins/furans and tributyltin.

Evaluation of the more recent sediment data reported in the River Mile 9 West Final Pre-Design Investigation Evaluation Report (Foth 2022) indicate dioxin/furans detections in samples collected in the vicinity of the Site's outfall but do not suggest stormwater from the outfall is a source of dioxins/ furans. Concentrations of individual congeners do not exceed the active remediation thresholds in surface sediment samples and are generally higher with depth and in the upstream samples. Sediment results are presented in Table 6-12a Task 7 Vibracore Sediment PCBs, Dioxin/Furan, and Convential

Results of the RM9W PDIER and are included in Attachment 1, along with a figure presenting sediment sample locations.

4.1.2 Description of Stormwater Conveyance System
Stormwater generated on the shared access road to the facility likely discharges to the Willamette River through City of Portland outfall 19A and was not evaluated as part of the site stormwater pathway.

At the northeast portion of the property, stormwater collected in downspouts from the driver's trailer (see Figure 2) infiltrates into the subsurface.

Stormwater generated in the process water locations shown on Figure 2, drains with process water to the sanitary sewer. Following processing at the publicly owned treatment works, these discharges from approximately one third of the site acreage go to the Columbia River, so are not further discussed with regard to source control for the Willamette River.

Stormwater from approximately two thirds or eight acres of the site is generated in the aggregate stockpiles, reclaim areas and truck access areas (Figure 2). This stormwater is directed to four sumps and is then pumped to three settling cells, one of two detention tanks and through a final sand filter, before discharging to the Willamette River through outfall SW-1 (also known as WR-7). Settled solids are periodically removed from the settling cells, but there are no catch basins within the system. Stormwater solids were not analyzed for this evaluation.

4.1.3 Best Management Practices
As noted in the source control evaluation report and 1200A stormwater pollution control plan, best management practices (BMPs) are regularly implemented to reduce pollutants in stormwater. BMPs include: inspection and painting of the aggregate conveyors; use of spill kits and absorbent pads, in the event of any petroleum releases from vehicles; all fueling and material handling occurs in the process water areas, which discharge to the sanitary sewer; periodic sweeping and keeping the aggregate storage area heavily compacted to prevent erosion. These BMPs and regular inspections, monitoring and corrective action, as warranted, will continue to be required at the site under the permit.

4.1.4 Stormwater Sample Evaluation
Stormwater sampling was conducted periodically between December 2014 and October 2019, as part of regular NPDES 1200A compliance monitoring was evaluated in the source control evaluation. Twenty-one sampling events were conducted under the 1200A permit and included sampling for the following: PCBs, PAHs, Pesticides, Total Oil and Grease, Total Iron, pH, total suspended solids (TSS) and settleable solids (SS), and Total Organic Carbon. In 2018, DEQ reviewed the draft SCE, which was based on 1200A data. DEQ concluded the dataset was not complete and requested Calport develop a stormwater work plan consistent with DEQ's stormwater guidance. Unfortunately, Calport did not fully follow the work plan in the field and could not achieve all four quarters of sampling the way we approved. Instead, they collected one sample event. However, based on the system and the data, DEQ has accepted the more limited data based on the available data and current treatment system. This was approved in the August 24, 2020, revised work plan by DEQ. Stormwater samples were collected at the manhole labeled SW-1 on Figure 2, located following all treatment and just prior to the discharge point. In October 2019, a sample was collected in accordance with the storm event sampling protocols specified in DEQ's 2009 Guidance for Evaluating the Stormwater Pathway at Upland Sites. This event included additional analytes specific to Table 17 CULs. These data are presented in Tables 1 through 9 (from *Upland Source Control Evaluation Addendum*) and are summarized below. In the field, they could not collect first flush samples in late 2018 and 2019 due to excess storage in their above-ground detention tanks. The stormwater

treatment system has storage capacity that allows for batches of stormwater to receive final treatment before discharge. This is accomplished through two above ground detention tanks that store stormwater that has received initial treatment (solids removal with weir system and settling cells). For the October 2019 sampling event the system was started in manual override mode to allow for discharge without extended detention. That sample is identified as SW-1, with an October 16, 2019, sample date in Tables 1 through 9. Please see the attached revised Hydrographs and Rank Order Curves (from *Upland Source Control Evaluation Addendum*).

Stormwater sampling results that exceeded the EPA surface water CULs or JSCS water screening level values were compared to DEQ charts from *Appendix E: Tools for Evaluating Stormwater Data*, which was updated in 2015. This tool was created by using contaminant concentration data from many of the stormwater and stormwater solids samples collected at Portland Harbor-area heavy industrial sites. This data was used to create a series of charts that plot rank-order samples against contaminant concentrations and are used to identify contaminant concentrations in samples that are atypically elevated.

Concentrations falling within the upper/steeper portion of the curve are an indication that uncontrolled contaminant sources may be present at the site and that additional evaluation or source control measures may be needed. Concentrations that fall on the lower/flatter portion of the curve suggest that stormwater is not being unusually impacted by contaminants at the site, and while concentrations may exceed the risk-based cleanup levels (CULs), they are within the range found in stormwater from active industrial sites in Portland Harbor.

Metals:
The stormwater collection and treatment system, along with BMPs, results in 1200A compliance monitoring of metals below permit benchmarks, such that waivers have been attained for metals. For source control purposes, DEQ required monitoring of metals, with one round completed in October 2019. Results for copper and zinc were below the surface water CULs and results for aluminum, cadmium, manganese, mercury and silver were below the JSCS SLVs. While there is only one full round of all metals in 2019, DEQ approved Calport to sample metals in stormwater prior to that per their 1200A sampling protocol. While this does not follow the work plan DEQ approved, DEQ accepts this data since concentrations are below CULs and JSCS SLVs and Total Iron analysis was completed from 2014 through 2019.

PCBs: There were no detections of PCBs in any sampling events including three events between December 2018 and October 2019. Method detection limits were always above the surface water CUL for total PCBs. MDLs of most samples were also above the individual Aroclor JSCS SLVs. However, the final October 2019 sampling event achieved MDLs comparable to the JSCS Aroclor SLVs, continued to be non-detect and all MDLs were well below the flat portion of the rank-order curve.

PAHs: There were no detections of PAHs in any sampling events including three events between December 2018 and October 2019. Data is reported for only 14 of the 17 individual PAHs on Table 17 and method detection limits were always above the surface water CULs and water SLVs for the seven reported individual PAHs with CULs and additional four reported individual PAHs with water SLVs. However, the final October 2019 sampling event achieved MDLs comparable to CULs and SLVs, continued to be non-detect and MDLs were well below the flat portion of the rank-order curve for total PAHs.

Pesticides: There were no detections of aldrin, endrin, dieldrin, DDx and chlordane, but MDLs were all above relevant CULs or SLVs. As noted in the SCE report, pesticides have not been used at the site and

were not expected to be detected, but were analyzed for due to the elevated concentrations of some in the offshore sediment where stormwater from the site discharges. Although method detection limits (MDLs) were typically several orders of magnitude above CULs, any undetected presence of pesticides would be at very low concentrations and in low volumes of stormwater with low concentrations of solids to associate with, such that potential for recontamination of offshore sediment would be very low.

TSS: Concentrations of TSS ranged from non-detect to 93 mg/L over 23 sampling events between 2014 and 2019. While one sample in 2017 fell within the knee of the rank-order curve, the 22 other events, including all samples in 2018 and 2019, fell at or below the flat portion of the rank-order curve.

4..1.5 Lines of Evidence Evaluation

In alignment with Section 5.3 of the JSCS, which describes appropriate approaches for screening of direct discharges, a weight-of-evidence evaluation was undertaken in consideration of the following site-specific factors:

1. Identification and characterization of potential sources of contaminants – Potential sources of contamination to the stormwater pathway at the site were investigated and no significant contamination was found within or discharging from the stormwater system. While not all contaminants in Table 17 were analyzed, it was apparent these were not sources at Calport. As discussed earlier, DEQ acknowledges only one full round of metals sampling has been completed, but in consideration of the site conceptual site model (CSM), treatment system, other contaminant concentrations and as results were below CULs and JSCS SLVs, DEQ is comfortable with the characterization

2. Regional background soil concentrations of naturally occurring chemicals for evaluating stormwater solids – It was not necessary to evaluate background concentrations for any contaminants analyzed in the site stormwater system, due to low detected concentrations and adequate source control measures in place.

3. Presence of bioaccumulative chemicals – No bioaccumulative chemicals were detected above surface water CULs.

4. Site hydrology including site conditions, size of drainage and location and estimated size of discharge – The entire 11.71-acre site is heavily compacted aggregate and generates runoff, which is collected and treated. Runoff from approximately three and a half acres of process areas is to the sanitary sewer for discharge into the Columbia River. Annual runoff volumes from approximately eight acres discharged after treatment to the Willamette River are estimated to be low to moderate in comparison to other industrialized sites discharging to Portland Harbor.

5. Stormwater system design and management – The straightforward stormwater collection, treatment and conveyance system at the site is described in section 4.1.1 above and more detail is provided in the site's 1200A stormwater pollution control plan. The low concentrations of metals and TSS and non-detected concentrations of PCBs, PAHs and pesticides indicate that the treatment system is effective and will continue to be so, as regulated under the 1200A permit.

6. Estimate of potential contaminant loading to the river –Supported by low concentrations of detected contaminants and TSS in stormwater and moderate volumes of annual stormwater discharge from the site, pollutant loads in stormwater from the site are not significant and will continue to be minimized under regulation by the 1200A permit.

5.0 Source Control Decision

Based on review of the file, DEQ concludes that this upland site is adequately characterized and controlled to minimize the potential for contaminants to be released through stormwater to the river. On-going stormwater discharges do not present a threat to the Willamette River. This determination is predicated on continued implementation of source control measures described in the facility's stormwater pollution control plan and stormwater monitoring required by the NPDES 1200A permit. The 1200A permit requires monitoring for a broad suite of contaminants (including most of the contaminants of concern for Portland Harbor sediments) and compels improvements to best management practices, as warranted by monitoring results. DEQ will continue to review site monitoring and permit compliance to ensure the effectiveness of source control.

6.0 References

APEX. 2019. Updated Source Control Evaluation, Glacier Northwest Inc. Front Avenue Ready Mix Facility. Prepared for Glacier Northwest, Inc. December 6, 2019.

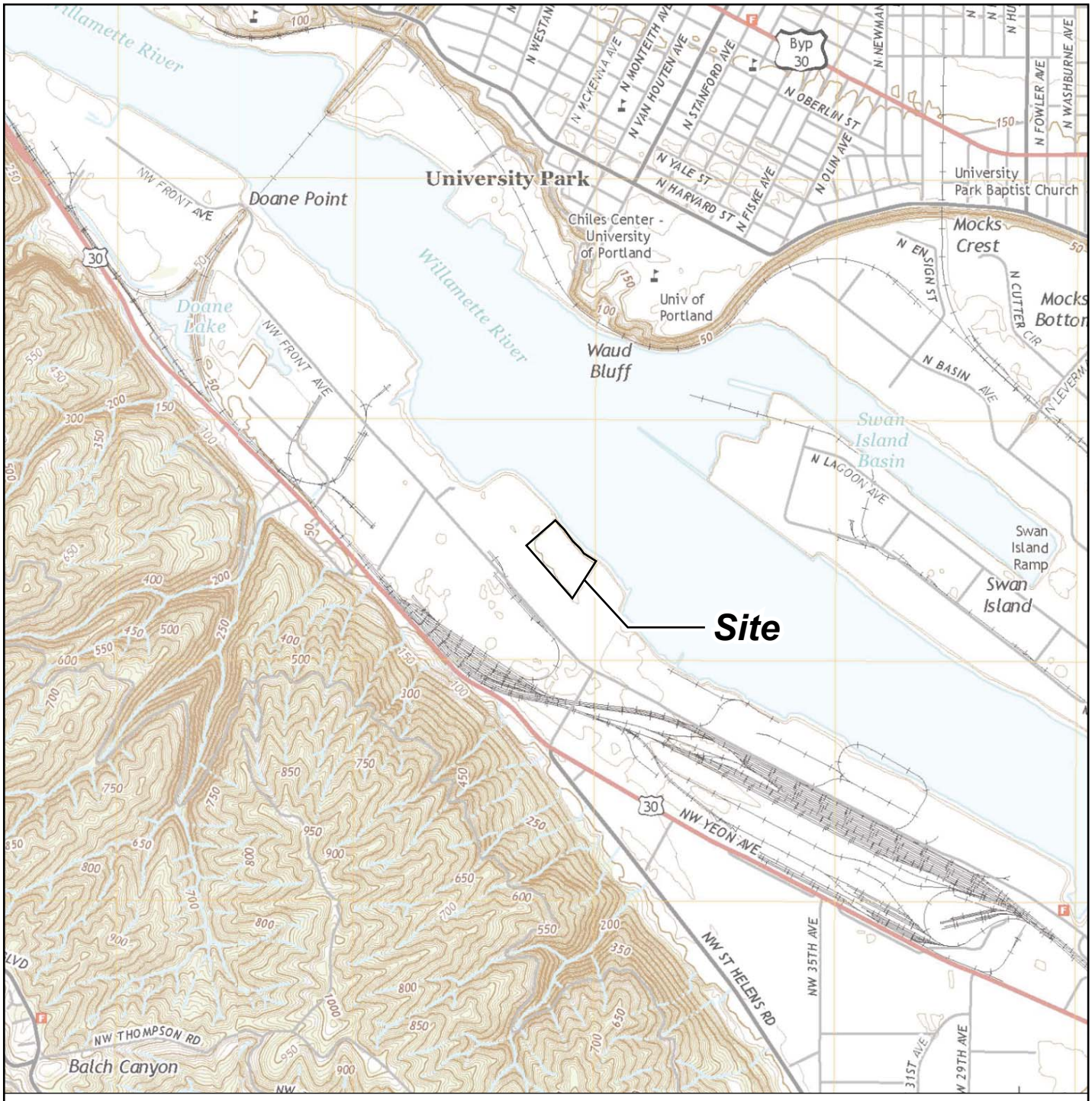
APEX. 2020. Upland Source Control Evaluation Addendum. Prepared for Glacier Northwest, Inc. August 24, 2020.

Foth. 2022. Final Pre-Design Investigation Evaluation Report, River Mile 9W Portland Harbor Superfund Site. Prepared by Foth on behalf of FMC Corporation. September 26, 2022.

DEQ. 2009 (updated 2010 and 2015). Guidance for Evaluating the Stormwater Pathway at Upland Sites. https://www.oregon.gov/deq/FilterDocs/cu-StormwaterSites.pdf.

DEQ. 2007 (January, updated April 2007). Guidance for Assessing Bioaccumulative Chemicals of Concern in Sediment. https://www.oregon.gov/deq/FilterDocs/GuidanceAssessingBioaccumulative.pdf.

Attachment 1



Note: Base map prepared from USGS 7.5-minute quadrangles of Linnton and Portland, OR, dated 2014 as provided by TerraServer-USA.

0 2,000 4,000

Approximate Scale in Feet

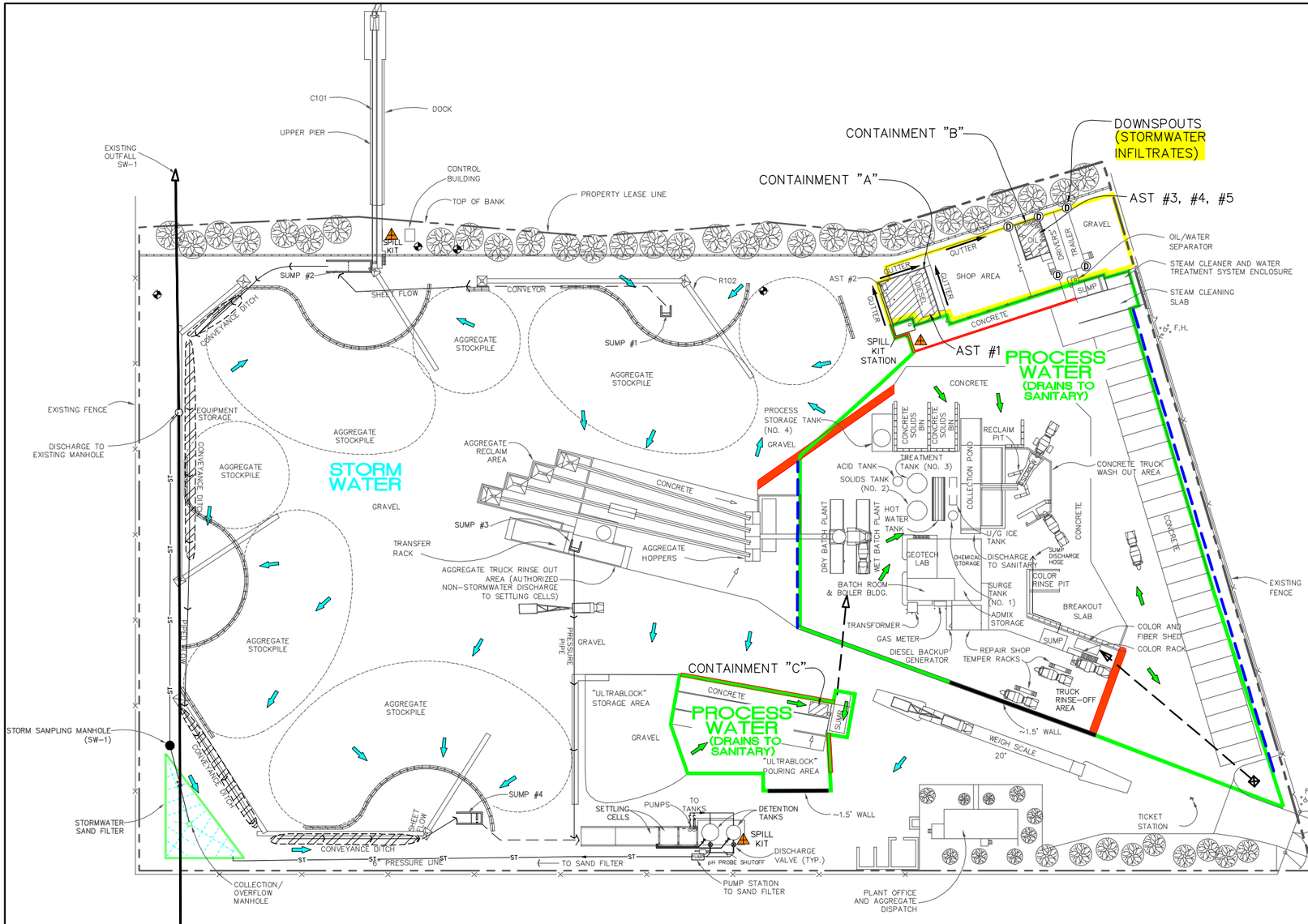
N

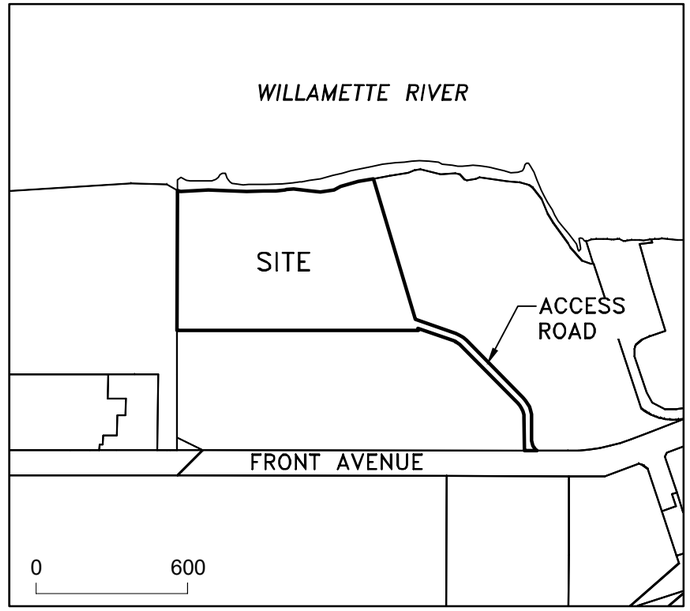
Site Location Map

Glacier Northwest, Inc. - Front Avenue Ready-Mix Plant
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1348-29	Figure
August 2020		1



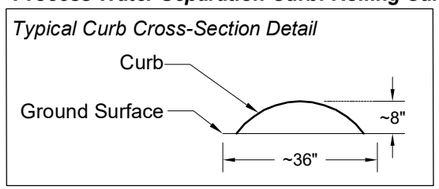


Legend:

- Surface Water Conveyance Piping and Flow Direction (Dashed Underground)
- Flow Direction
- Rolling Curb
- Square Curb
- Wall Section
- Conveyor
- Groundwater Monitoring Well

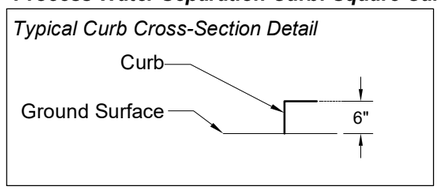
Process Water Separation Curb: Rolling Curb

Typical Curb Cross-Section Detail



Process Water Separation Curb: Square Curb

Typical Curb Cross-Section Detail



SWPCP - Site Plan

CalPortland - Front Avenue Ready-Mix and Aggregates
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1348-06	Figure
August 2020		2

Table 1
Stormwater Analytical Results - PCBs
Front Avenue SCE
Portland, Oregon

Sample ID:	S.W. 1,2,3,4, 5,6,7,8+9	SW-1	Stormwater	Stormwater	SW-1 Thru 9	SW-1 Thru 9	Stormwater 1-9	SW1	SW 1-9	SW 1-9	SW1-SW10	SW-1	Portland Harbor ROD CULs[9]	Portland Harbor JSCS[10]
Sample Date:	**12/9/2014**	**5/4/2015**	**11/17/2015**	**11/24/2015**	**6/3/2016**	**11/2/2016**	**5/16/2017**	**12/21/2017**	**5/17/2018**	**12/18/2018**	**5/16/2019**	**10/16/2019**		
Concentrations in µg/L														
Aroclor 1016	<0.0990	<0.102	<0.0962	<0.0990	<0.116	<0.103	<0.0971	<0.0990	<0.0980	<0.100	<0.0943	<0.0189		0.96
Aroclor 1221	<0.0990	<0.102	<0.0962	<0.0990	<0.116	<0.103	<0.0971	<0.0990	<0.0980	<0.100	<0.0943	<0.0189		0.034
Aroclor 1232	<0.0990	<0.102	<0.0962	<0.0990	<0.116	<0.103	<0.0971	<0.0990	<0.0980	<0.100	<0.0943	<0.0189		0.034
Aroclor 1242	<0.0990	<0.102	<0.0962	<0.0990	<0.116	<0.103	<0.0971	<0.0990	<0.0980	<0.100	<0.0943	<0.0189		0.034
Aroclor 1248	<0.0990	<0.102	<0.0962	<0.0990	<0.116	<0.103	<0.0971	<0.0990	<0.0980	<0.100	<0.0943	<0.0189	0.0000064	0.034
Aroclor 1254	<0.0990	<0.102	<0.0962	<0.0990	<0.116	<0.103	<0.0971	<0.0990	<0.0980	<0.100	<0.0943	<0.0189		0.033
Aroclor 1260	<0.0990	<0.102	<0.0962	<0.0990	<0.116	<0.103	<0.0971	<0.0990	<0.0980	<0.100	<0.0943	<0.0189		0.034
Aroclor 1262	--	--	--	--	--	--	--	--	--	--	--	<0.0189		--
Aroclor 1268	--	--	--	--	--	--	--	--	--	--	--	<0.0189		--
Total PCBs	<0.0990	<0.102	<0.0962	<0.0990	<0.116	<0.103	<0.0971	<0.0990	<0.0980	<0.100	<0.0943	<0.0189		0.034

Notes:

1. µg/L = Micrograms per liter.
2. Bold values indicate the compounds was detected above laboratory reporting limits.
3. < = Analyte was not detected above the reporting limit.
4. Shaded values indicate the compound was detected above at least one applicable screening level
5. -- = Value not available.
6. PCBs = Polychlorinated Biphenyls.
7. ROD CULs = Portland Harbor Record of Decision Cleanup Levels.
8. JSCS = Joint Source Control Strategy.
9. US EPA, Portland Harbor Superfund Site Record of Decision, January 2017.
10. US EPA and State of Oregon Department of Environmental Quality (DEQ), Portland Harbor Joint Source Control Strategy, December 2005.
11. Samples were analyzed for PCBs by EPA Method 608.

Table 2
Stormwater Analytical Results - Pesticides
Front Avenue SCE
Portland, Oregon

Sample ID:	S.W. 1,2,3,4, 5,6,7,8+9	SW-1	Stormwater	Stormwater	SW-1 Thru 9	SW-1 Thru 9	Stormwater 1-9	SW1	SW 1-9	SW 1-9	SW1-SW10	SW-1	Portland Harbor ROD CULs[8]	Portland Harbor JSCS[9]
Sample Date:	**12/9/2014**	**5/4/2015**	**11/17/2015**	**11/24/2015**	**6/3/2016**	**11/2/2016**	**5/16/2017**	**12/21/2017**	**5/17/2018**	**12/18/2018**	**5/16/2019**	**10/16/2019**		
Concentrations in µg/L														
Aldrin	<0.0594	<0.0612	<0.0583	<0.0625	<0.0706	<0.0594	<0.0612	<0.0606	<0.0303	<0.0577	<0.0566	<0.0283	0.00000077	0.00005
delta-BHC	--	--	--	--	--	--	--	--	--	--	--	<0.0283	--	0.052
4,4'-DDD	--	--	--	--	--	--	--	--	--	--	--	<0.0283	0.000031	0.00031
4,4'-DDE	<0.00990	<0.0102	<0.00971	<0.0104	<0.0118	<0.00990	<0.0102	<0.0101	<0.00505	<0.00962	<0.00943	<0.00472	0.000018	0.00022
4,4'-DDT	<0.0594	<0.0612	<0.0583	<0.0625	<0.0706	<0.0594	<0.0612	<0.0606	<0.0303	<0.0577	<0.0566	<0.0283	0.000022	0.00022
Dieldrin	<0.0396	<0.0408	<0.0388	<0.0417	<0.0471	<0.0396	<0.0408	<0.0606	<0.0303	<0.0577	<0.0566	<0.0283	--	0.000054
Endrin	--	--	--	--	--	--	--	--	--	--	--	<0.0283	--	0.036
Chlordane	<0.743	<0.765	<0.728	<0.781	<0.882	<0.743	<0.765	<0.758	<0.379	<0.721	<0.708	<0.354	0.000081	0.00081

Notes:

1. µg/L = Micrograms per liter.
2. Bold values indicate the compounds was detected above laboratory reporting limits.
3. < = Analyte was not detected above the reporting limit.
4. Shaded values indicate the compound was detected above at least one applicable screening level
5. -- = Value not available.
6. ROD CULs = Portland Harbor Record of Decision Cleanup Levels.
7. JSCS = Joint Source Control Strategy.
8. US EPA, Portland Harbor Superfund Site Record of Decision, January 2017.
9. US EPA and State of Oregon Department of Environmental Quality (DEQ), Portland Harbor Joint Source Control Strategy, December 2005.
10. Samples were analyzed for pesticides by EPA Method 608.

Table 3
Stormwater Analytical Results - PAHs
Front Avenue SCE
Portland, Oregon

Sample ID:	S.W. 1,2,3,4, 5,6,7,8+9	SW-1	Stormwater	Stormwater	SW-1 Thru 9	SW-1 Thru 9	Stormwater 1-9	SW1	SW 1-9	SW 1-9	SW1-SW10	SW-1	Portland Harbor ROD CULs[8]	Portland Harbor JSCS[9]
Sample Date:	**12/9/2014**	**5/4/2015**	**11/17/2015**	**11/24/2015**	**6/3/2016**	**11/2/2016**	**5/16/2017**	**12/21/2017**	**5/17/2018**	**12/18/2018**	**5/16/2019**	**10/16/2019**		
Concentrations in µg/L														
Acenaphthene	<0.758	<0.765	<0.971	<0.990	<0.862	<0.773	<0.990	<0.952	<0.990	<0.962	<0.935	<0.0192	--	0.2
Acenaphthylene	--	--	--	--	--	--	--	--	--	--	--	<0.0192	--	0.2
Anthracene	<0.758	<0.765	<0.971	<0.990	<0.862	<0.773	<0.990	<0.952	<0.990	<0.962	<0.935	<0.0192	--	0.2
Benz(a)anthracene	<0.758	<0.765	<0.971	<0.990	<0.862	<0.773	<0.990	<0.952	<0.990	<0.962	<0.935	<0.0192	0.0012	0.018
Benzo(a)pyrene	<0.758	<0.765	<0.971	<0.990	<0.862	<0.773	<0.990	<0.952	<0.990	<0.962	<0.935	<0.0288	0.00012	0.018
Benzo(b)fluoranthene	<0.758	<0.765	<0.971	<0.990	<0.862	<0.773	<0.990	<0.952	<0.990	<0.962	<0.935	<0.0288	0.0012	0.018
Benzo(k)fluoranthene	<0.758	<0.765	<0.971	<0.990	<0.862	<0.773	<0.990	<0.952	<0.990	<0.962	<0.935	<0.0288	0.0013	0.018
Benzo(g,h,i)perylene	--	--	--	--	--	--	--	--	--	--	--	<0.0192	--	0.2
Chrysene	<0.758	<0.765	<0.971	<0.990	<0.862	<0.773	<0.990	<0.952	<0.990	<0.962	<0.935	<0.0192	0.0013	0.018
Dibenz(a,h)anthracene	<0.758	<0.765	<0.971	<0.990	<0.862	<0.773	<0.990	<0.952	<0.990	<0.962	<0.935	<0.0192	0.00012	0.018
Fluoranthene	<0.758	<0.765	<0.971	<0.990	<0.862	<0.773	<0.990	<0.952	<0.990	<0.962	<0.935	<0.0192	--	0.2
Fluorene	<0.758	<0.765	<0.971	<0.990	<0.862	<0.773	<0.990	<0.952	<0.990	<0.962	<0.935	<0.0192	--	0.2
Indeno(1,2,3-cd)pyrene	<0.758	<0.765	<0.971	<0.990	<0.862	<0.773	<0.990	<0.952	<0.990	<0.962	<0.935	<0.0192	0.0012	0.018
Pyrene	<0.758	<0.765	<0.971	<0.990	<0.862	<0.773	<0.990	<0.952	<0.990	<0.962	<0.935	<0.0192	--	0.2
Total PAHs	<0.758	<0.765	<0.971	<0.990	<0.862	<0.773	<0.990	<0.952	<0.990	<0.962	<0.935	<0.0192	--	--

Notes:

1. µg/L = Micrograms per liter.
2. Bold values indicate the compounds was detected above laboratory reporting limits.
3. < = Analyte was not detected above the reporting limit.
4. Shaded values indicate the compound was detected above at least one applicable screening level
5. -- = Value not available.
6. ROD CULs = Portland Harbor Record of Decision Cleanup Levels.
7. JSCS = Joint Source Control Strategy.
8. PAHs = Polycyclic Aromatic Hydrocarbons.
8. US EPA, Portland Harbor Superfund Site Record of Decision, January 2017.
9. US EPA and State of Oregon Department of Environmental Quality (DEQ), Portland Harbor Joint Source Control Strategy, December 2005.
10. Samples were analyzed for PAHs by EPA Method 625.

Table 4
Stormwater Analytical Results - Total Oil and Grease
Front Avenue SCE
Portland, Oregon

Sample ID	Sample Date	Concentrations in mg/L
		Total Oil and Grease
S.W. 1,2,3,4,5,6,7,8+9	12/9/2014	<4.76
Stormwater	12/29/2014	<5.00
SW-1	5/4/2015	<4.95
SW	6/2/2015	<4.90
Stormwater	11/17/2015	<4.85
Stormwater	11/24/2015	<5.26
SW 1 Thru 4	12/29/2015	<4.85 UJ
RW-1 Thru 4	3/29/2016	<4.90
SW-1 Thru 9	6/3/2016	<5.75
SW-1 Thru 9	11/2/2016	<5.21
SW 1-4	12/23/2016	<4.95
SW 1,2,3,4	4/26/2017	<5.26
Stormwater 1-9	5/16/2017	<5.00
SW-1-3	12/7/2017	<4.85
SW1	12/21/2017	<5.00
SW	12/28/2017	<4.95
SW 1 Thru 4	4/6/2018	<4.76
SW 1-9	5/17/2018	<4.95
SW 1,2,3,4	11/27/2018	<5.00
SW 1-9	12/18/2018	<4.76
SW-1-4	4/8/2019	<4.95
SW1-SW10	5/16/2019	<4.85
SW-1	10/16/2019	<4.67
Portland Harbor ROD CULs[8]		--
Portland Harbor JSCS[9]		--

Notes:

1. mg/L = Milligrams per liter.
2. Bold values indicate the compounds was detected above laboratory reporting limits.
3. < = Analyte was not detected above the reporting limit.
4. Shaded values indicate the compound was detected above at least one applicable screening level
5. -- = Value not available.
6. ROD CULs = Portland Harbor Record of Decision Cleanup Levels.
7. JSCS = Joint Source Control Strategy.
8. US EPA, Portland Harbor Superfund Site Record of Decision, January 2017.
9. US EPA and State of Oregon Department of Environmental Quality (DEQ), Portland Harbor Joint Source Control Strategy, December 2005.
10. UJ = The not detected result is estimated at the current reporting limit due to laboratory quality control failures.
11. Samples were analyzed for total oil and grease by EPA Method 1664A.

Table 5
Stormwater Analytical Results - Total Metals
Front Avenue SCE
Portland, Oregon

Sample ID	Sample Date	Total Aluminum	Total Barium	Total Cadmium	Total Copper	Total Iron	Total Manganese	Total Mercury	Total Silver	Total Zinc
		Concentrations in mg/L								
S.W. 1,2,3,4,5,6,7,8+9	12/9/2014	--	--	--	--	**4.69**	--	--	--	--
SW-1	5/4/2015	--	--	--	--	**0.499**	--	--	--	--
Stormwater	11/17/2015	--	--	--	--	**2.83**	--	--	--	--
Stormwater	11/24/2015	--	--	--	--	**2.31**	--	--	--	--
SW-1 Thru 9	6/3/2016	--	--	--	--	**1.24**	--	--	--	--
SW-1 Thru 9	11/2/2016	--	--	--	--	**0.492**	--	--	--	--
Stormwater 1-9	5/16/2017	--	--	--	--	**2.31**	--	--	--	--
SW1	12/21/2017	--	--	--	--	**5.38**	--	--	--	--
SW 1-9	5/17/2018	--	--	--	--	**0.949**	--	--	--	--
SW 1-9	12/18/2018	--	--	--	--	**0.375**	--	--	--	--
SW1-SW10	5/16/2019	--	--	--	--	**0.714**	--	--	--	--
SW-1	10/16/2019	**0.0633**	**0.0653**	**0.0000271 J**	**0.00149**	**0.166**	**0.00294**	<0.00005	<0.00005	**0.00273 J**
Portland Harbor ROD CULs[8]		--	--	--	0.00274	--	--	--	--	0.0365
Portland Harbor JSCS[9]		0.05-0.2 [11]	--	0.000094	0.0027	--	0.05	0.00077	0.00012	0.036

Notes:

1. mg/L = Milligrams per liter.
2. Bold values indicate the compounds was detected above laboratory reporting limits.
3. < = Analyte was not detected above the reporting limit.
4. Shaded values indicate the compound was detected above at least one applicable screening level
5. -- = Value not available.
6. ROD CULs = Portland Harbor Record of Decision Cleanup Levels.
7. JSCS = Joint Source Control Strategy.
8. US EPA, Portland Harbor Superfund Site Record of Decision, January 2017.
9. US EPA and State of Oregon Department of Environmental Quality (DEQ), Portland Harbor Joint Source Control Strategy, December 2005.
10. Samples were analyzed by EPA Method 200.8 for total metals and EPA Method 245.1 for mercury.
11. Portland Harbor JSCS value for aluminum is from the U.S. Environemtnal Protection Agency's Maximum Contaminant Level, where a range of concentrations is given.
12. J = Result is an estimated value and was detected between the method detection limit and the reporting limit.

Table 6
Stormwater Analytical Results - pH
Front Avenue SCE
Portland, Oregon

Sample ID	Sample Date	pH
S.W. 1,2,3,4,5,6,7,8+9	12/9/2014	**7.65**
Stormwater	12/29/2014	**7.74**
SW-1	5/4/2015	**7.63**
SW	6/2/2015	**7.58**
Stormwater	11/17/2015	**7.50**
Stormwater	11/24/2015	**7.55**
SW 1 Thru 4	12/29/2015	**7.50**
RW-1 Thru 4	3/29/2016	**7.78**
SW-1 Thru 9	6/3/2016	**7.44**
SW-1 Thru 9	11/2/2016	**7.31**
SW 1-4	12/23/2016	**7.91**
SW 1,2,3,4	4/26/2017	**7.98**
Stormwater 1-9	5/16/2017	**7.45**
SW-1-3	12/7/2017	**7.82**
SW1	12/21/2017	**7.90**
SW	12/28/2017	**8.06**
SW 1 Thru 4	4/6/2018	**7.41**
SW-1 Thru 9	5/17/2018	**7.65**
SW 1,2,3,4	11/27/2018	**7.69**
SW 1-9	12/18/2018	**7.51**
SW 1-4	4/8/2019	**7.37**
SW1-SW10	5/16/2019	**7.02**
SW-1	10/16/2019	**7.50**
Portland Harbor ROD CULs[7]		--
Portland Harbor JSCS[8]		--

Notes:

1. Bold values indicate the compounds was detected above laboratory reporting limits.
2. < = Analyte was not detected above the reporting limit.
3. Shaded values indicate the compound was detected above at least one applicable screening level
4. -- = Value not available.
5. ROD CULs = Portland Harbor Record of Decision Cleanup Levels.
6. JSCS = Joint Source Control Strategy.
7. US EPA, Portland Harbor Superfund Site Record of Decision, January 2017.
8. US EPA and State of Oregon Department of Environmental Quality (DEQ), Portland Harbor Joint Source Control Strategy, December 2005.
9. Samples were analyzed for pH by EPA Method 150.1.

Table 7
Stormwater Analytical Results - TSS and SS
Front Avenue SCE
Portland, Oregon

Sample ID	Sample Date	TSS (mg/L)	SS (mL/L)
S.W. 1,2,3,4,5,6,7,8+9	12/9/2014	**53.0**	<0.11
Stormwater	12/29/2014	**35.0**	<0.10
SW-1	5/4/2015	**10.0**	<0.10
SW	6/2/2015	**18.0**	<0.12
Stormwater	11/17/2015	**9.00**	<0.12
Stormwater	11/24/2015	**12.0**	<0.10
SW 1 Thru 4	12/29/2015	**36.0**	<0.11
RW-1 Thru 4	3/29/2016	<5.00 UJ	<0.10
SW-1 Thru 9	6/3/2016	**10.0**	<0.10
SW-1 Thru 9	11/2/2016	**5.00**	<0.10
SW 1-4	12/23/2016	**18.0**	<0.11
SW 1,2,3,4	4/26/2017	<5.00	<0.10
Stormwater 1-9	5/16/2017	**8.00**	<0.10
SW-1-3	12/7/2017	**93.0**	**0.16 J**
SW1	12/21/2017	**48.0**	<0.10
SW	12/28/2017	**37.0**	<0.10
SW 1 Thru 4	4/6/2018	**18.0**	<0.10
SW 1-9	5/17/2018	**11.0**	<0.10
SW 1,2,3,4	11/27/2018	**5.00**	<0.10
SW 1-9	12/18/2018	<5.00	<0.10
SW-1-4	4/08/2019	<5.00	<0.10
SW1-SW10	5/16/2019	**5.00**	<0.10
SW-1	10/16/2019	<5.00	<0.10
Portland Harbor ROD CULs[11]		--	--
Portland Harbor JSCS[12]		--	--

Notes:

1. mg/L = Milligrams per liter.
2. mL/L = Milliliter per liter.
3. Bold values indicate the compounds was detected above laboratory reporting limits.
4. < = Analyte was not detected above the reporting limit.
5. Shaded values indicate the compound was detected above at least one applicable screening level
6. -- = Value not available.
7. ROD CULs = Portland Harbor Record of Decision Cleanup Levels.
8. JSCS = Joint Source Control Strategy.
9. TSS = Total Suspended Solids.
10. SS = Settleable Solids.
11. US EPA, Portland Harbor Superfund Site Record of Decision, January 2017.
12. US EPA and State of Oregon Department of Environmental Quality (DEQ), Portland Harbor Joint Source Control Strategy, December 2005.
13. Samples were analyzed for TSS by Method SM 2540 D and SS by Method SW 2540 F.
14. J = Result is estimated.
15. UJ = The not detected result is estimated at the current reporting limit due to laboratory quality control failures.

Table 8
Stormwater Analytical Results - Total Organic Carbon
Front Avenue SCE
Portland, Oregon

Sample ID	Sample Date	Concentrations in mg/L
		Total Organic Carbon
SW-1	10/16/2019	<1.00
Portland Harbor ROD CULs[8]		--
Portland Harbor JSCS[9]		--

Notes:

1. mg/L = Milligrams per liter.
2. Bold values indicate the compounds was detected above laboratory reporting limits.
3. < = Analyte was not detected above the reporting limit.
4. Shaded values indicate the compound was detected above at least one applicable screening level
5. -- = Value not available.
6. ROD CULs = Portland Harbor Record of Decision Cleanup Levels.
7. JSCS = Joint Source Control Strategy.
8. US EPA, Portland Harbor Superfund Site Record of Decision, January 2017.
9. US EPA and State of Oregon Department of Environmental Quality (DEQ), Portland Harbor Joint Source Control Strategy, December 2005.
10. Samples were analyzed for total organic carbon by SM Method 5310C.

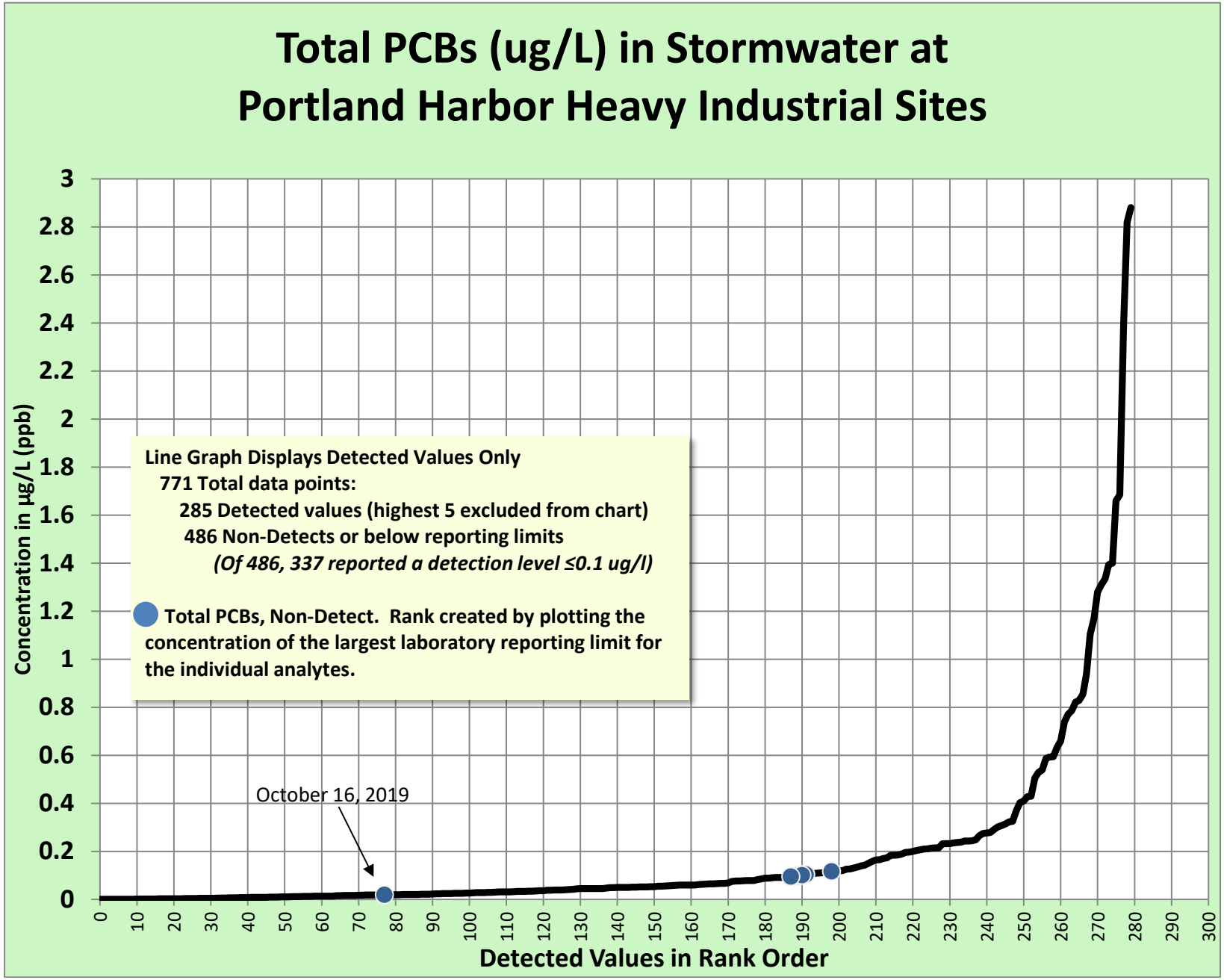
Table 9
Stormwater Analytical Results - Chloroethane
Front Avenue SCE
Portland, Oregon

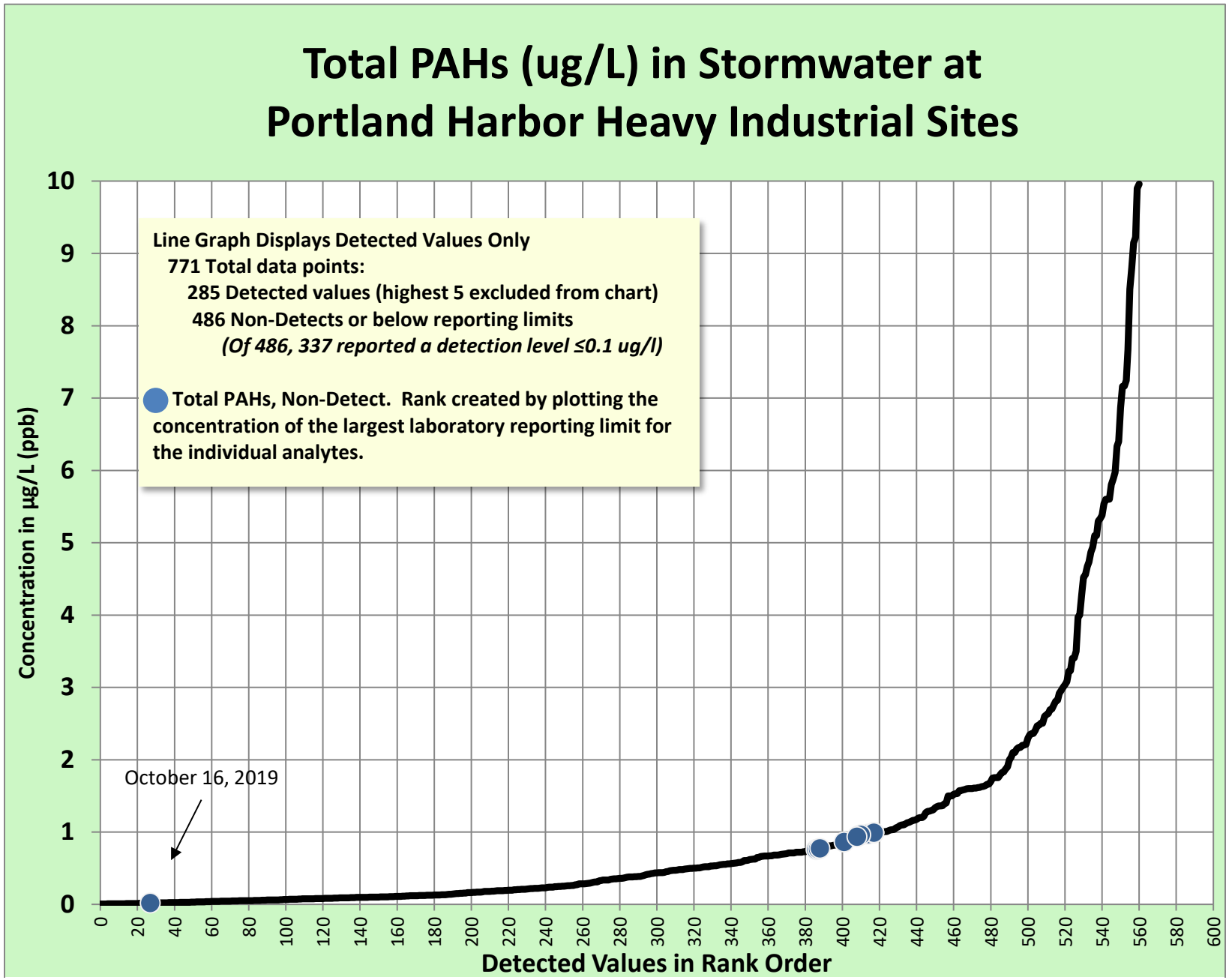
Sample ID:	SW-1	Portland Harbor ROD CULs[9]	Portland Harbor JSCS[10]
Sample Date:	10/16/2019		
Concentrations in µg/L			
Chloroethane	<5.00	--	23

Notes:

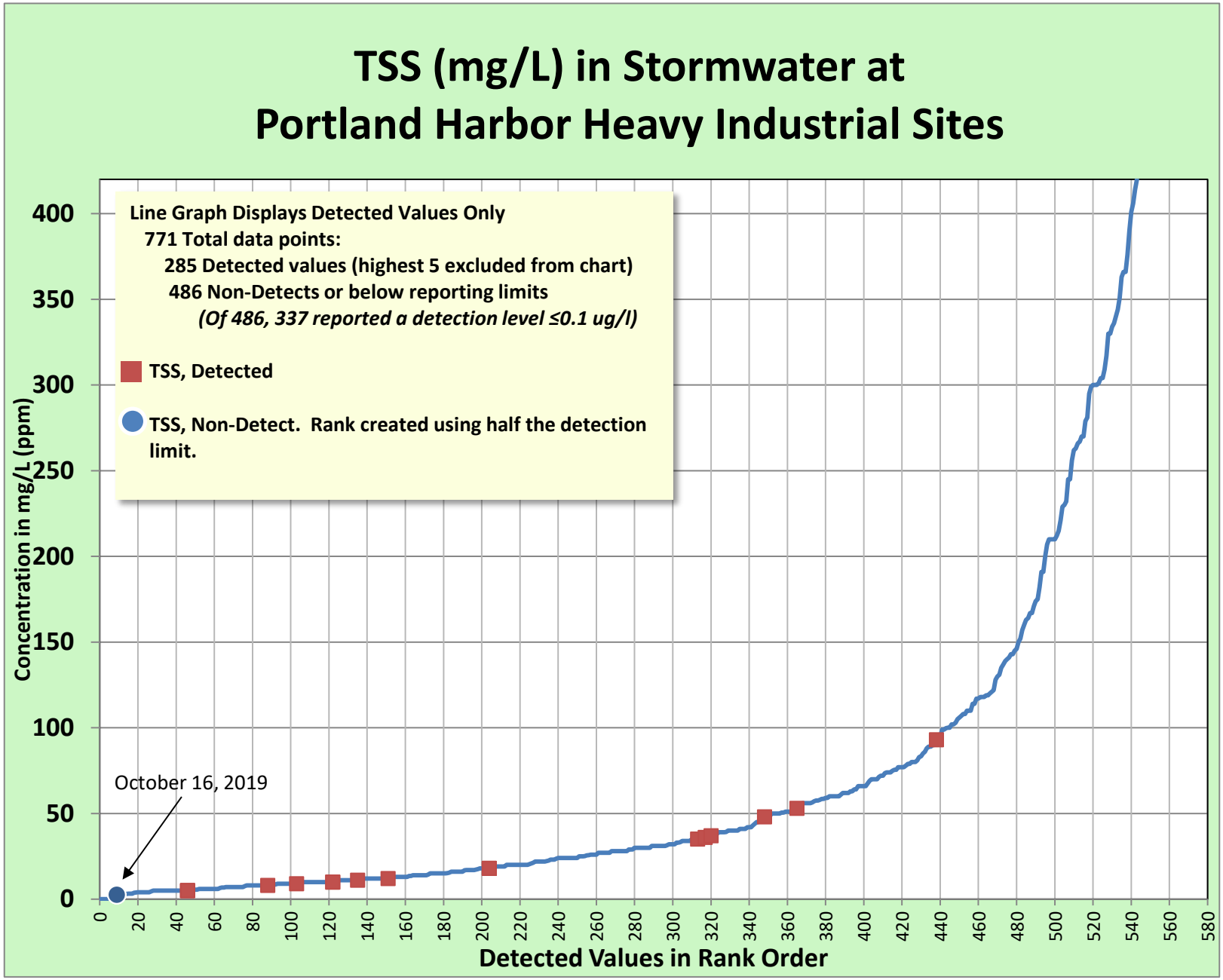
1. µg/L = Micrograms per liter.
2. Bold values indicate the compounds was detected above laboratory reporting limits.
3. < = Analyte was not detected above the reporting limit.
4. Shaded values indicate the compound was detected above at least one applicable screening level
5. -- = Value not available.
6. ROD CULs = Portland Harbor Record of Decision Cleanup Levels.
7. JSCS = Joint Source Control Strategy.
8. PAHs = Polycyclic Aromatic Hydrocarbons.
9. US EPA, Portland Harbor Superfund Site Record of Decision, January 2017.
10. US EPA and State of Oregon Department of Environmental Quality (DEQ), Portland Harbor Joint Source Control Strategy, December 2005.
11. Samples were analyzed for chloroethane by EPA Method 624.

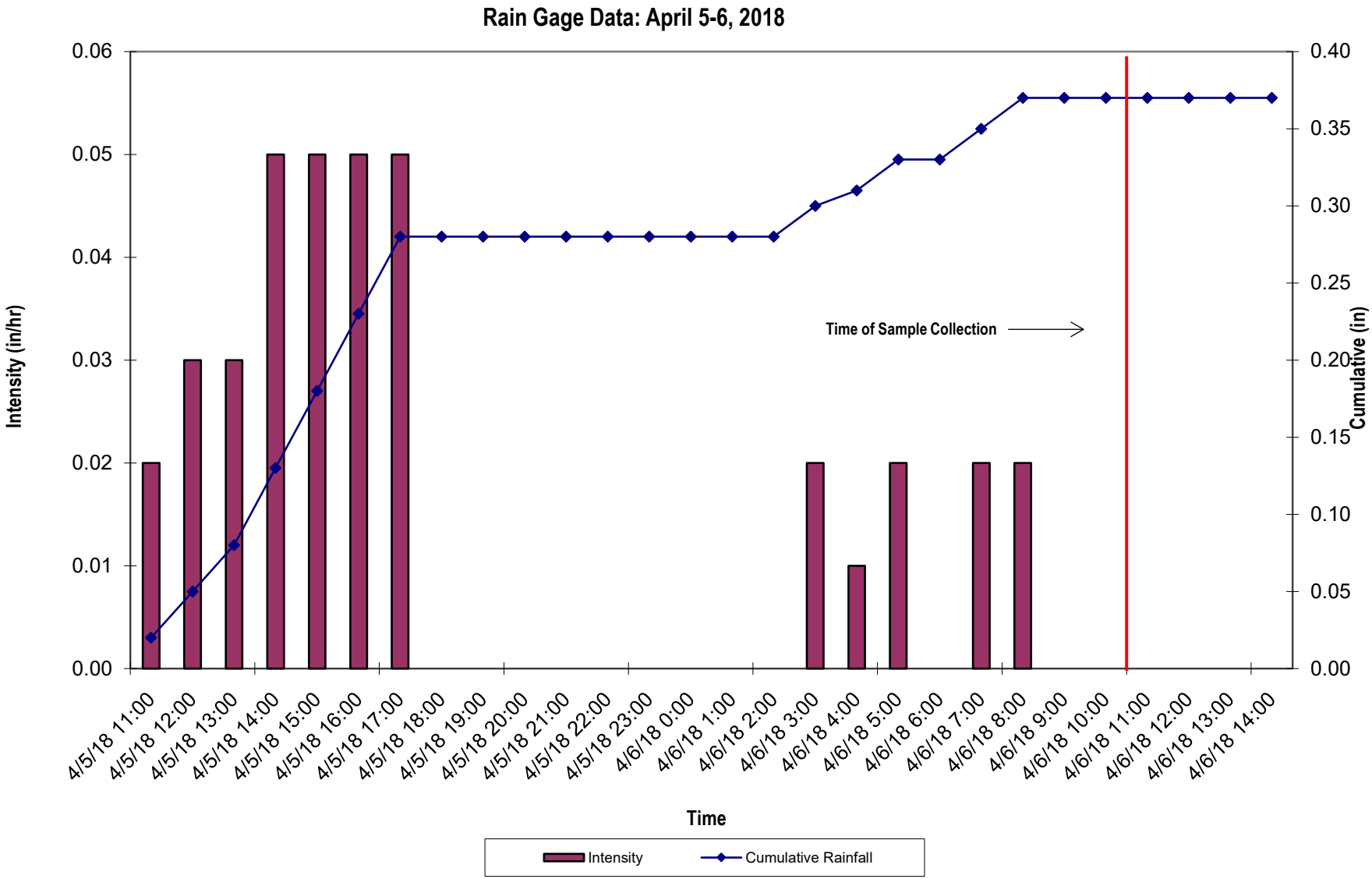
Total PCBs (ug/L) in Stormwater at Portland Harbor Heavy Industrial Sites

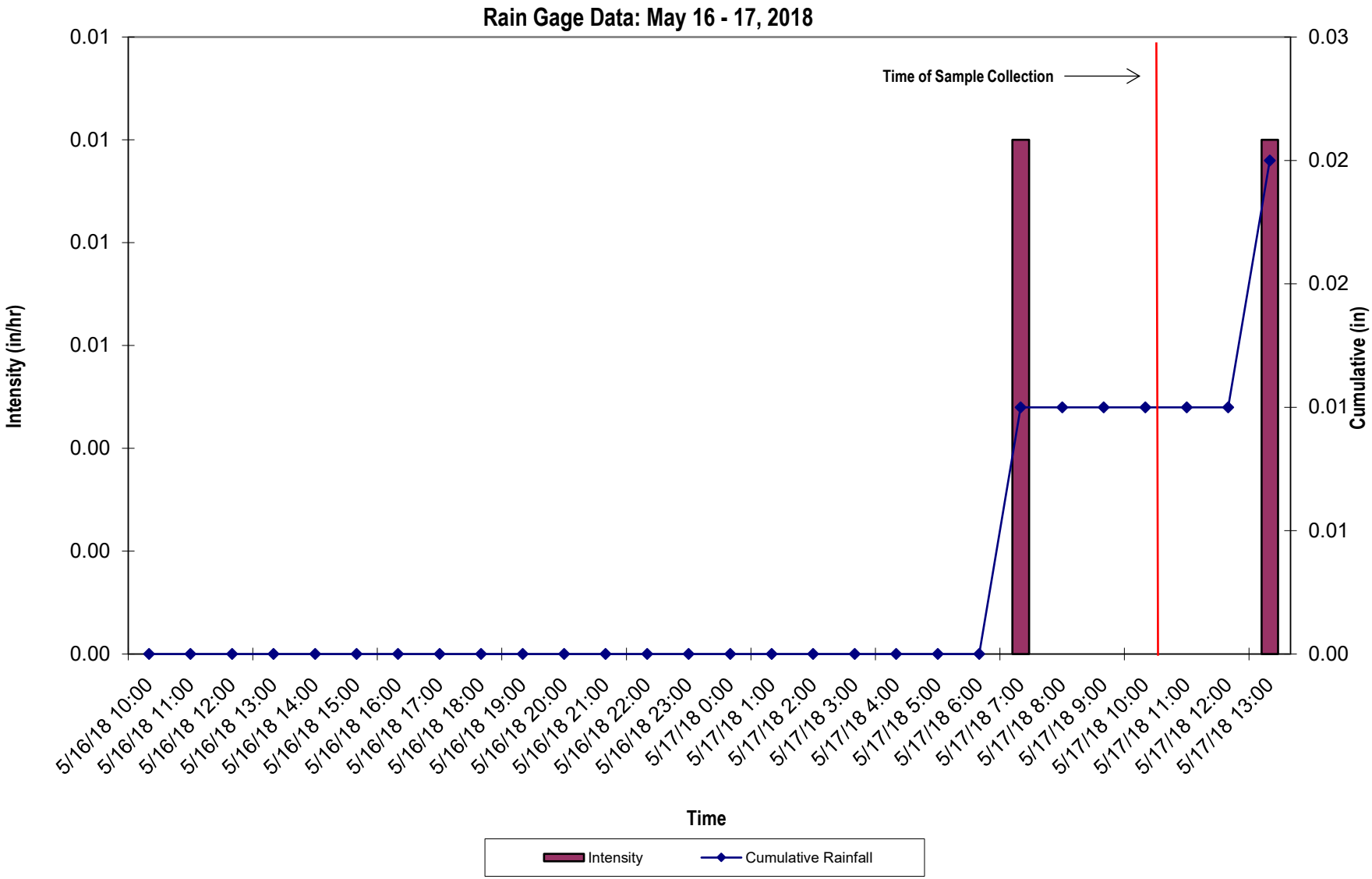


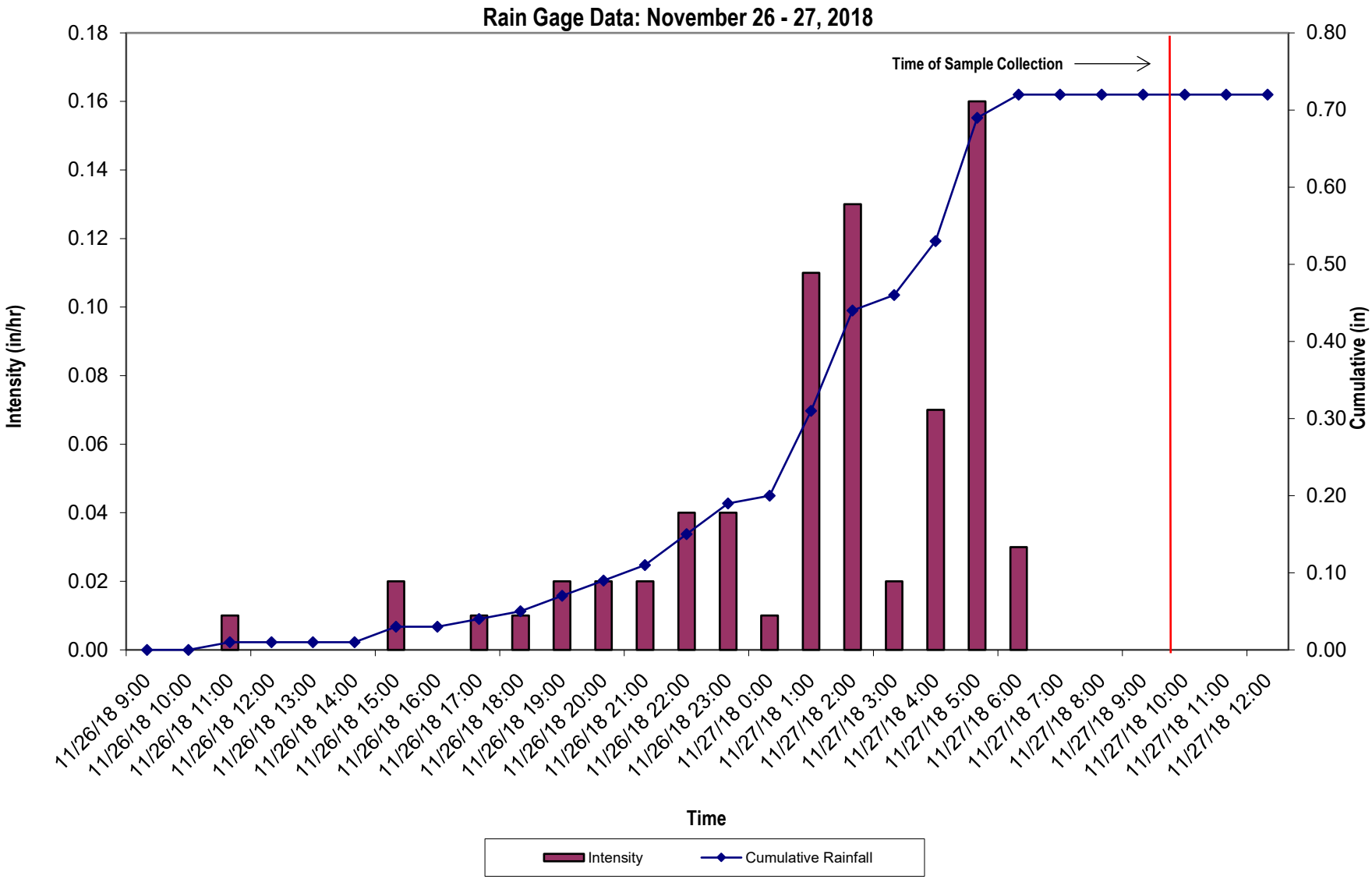

Total PAHs (ug/L) in Stormwater at
Portland Harbor Heavy Industrial Sites
Line Graph Displays Detected Values Only
771 Total data points:
285 Detected values (highest 5 excluded from chart)
486 Non-Detects or below reporting limits
(Of 486, 337 reported a detection level ≤0.1 ug/l)
Total PAHs, Non-Detect. Rank created by plotting the concentration of the largest laboratory reporting limit for the individual analytes.
October 16, 2019
Concentration in µg/L (ppb)
Detected Values in Rank Order
0
1
2
3
4
5
6
7
8
9
10
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
400
420
440
460
480
500
520
540
560
580
600

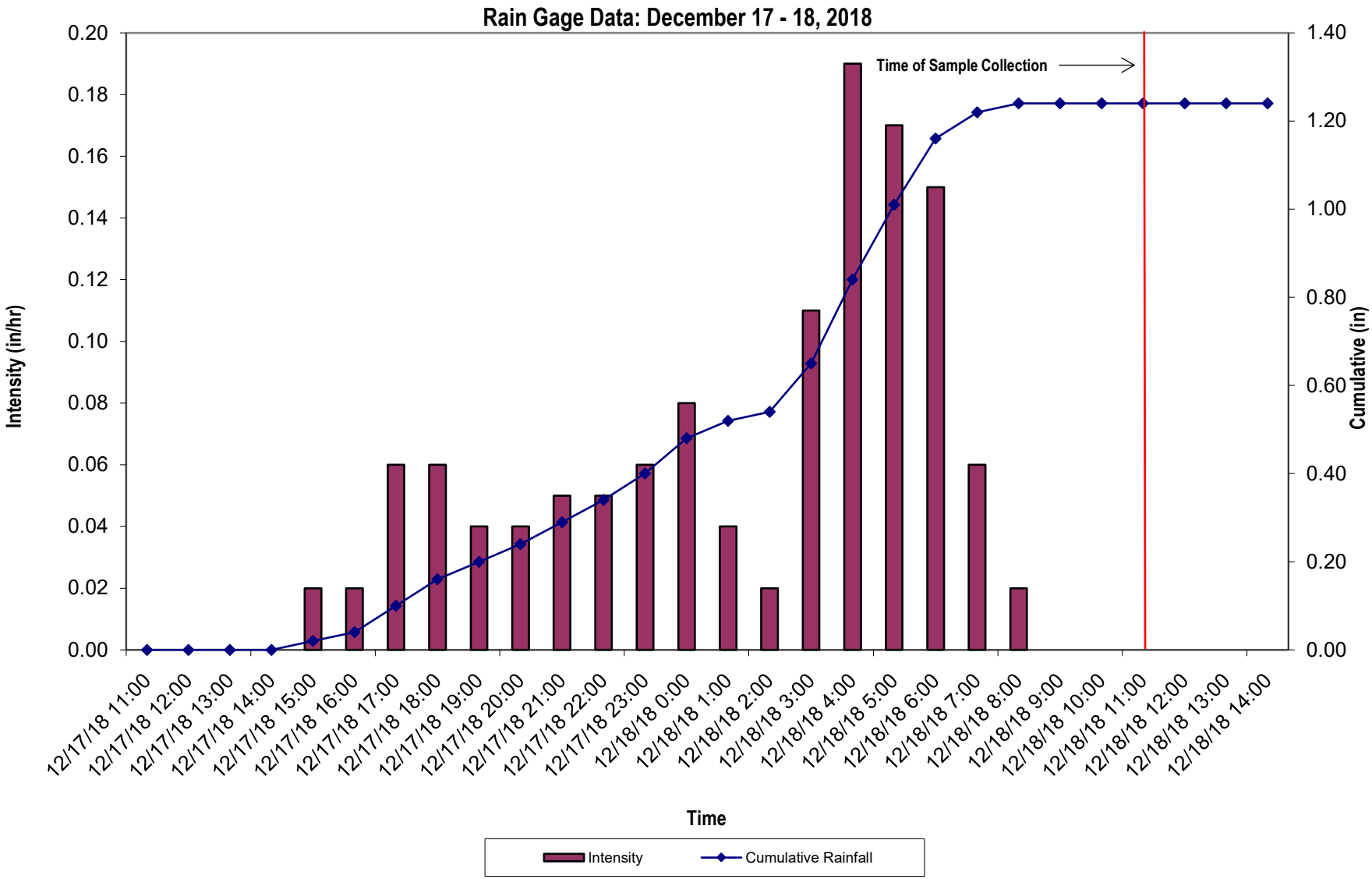
TSS (mg/L) in Stormwater at Portland Harbor Heavy Industrial Sites

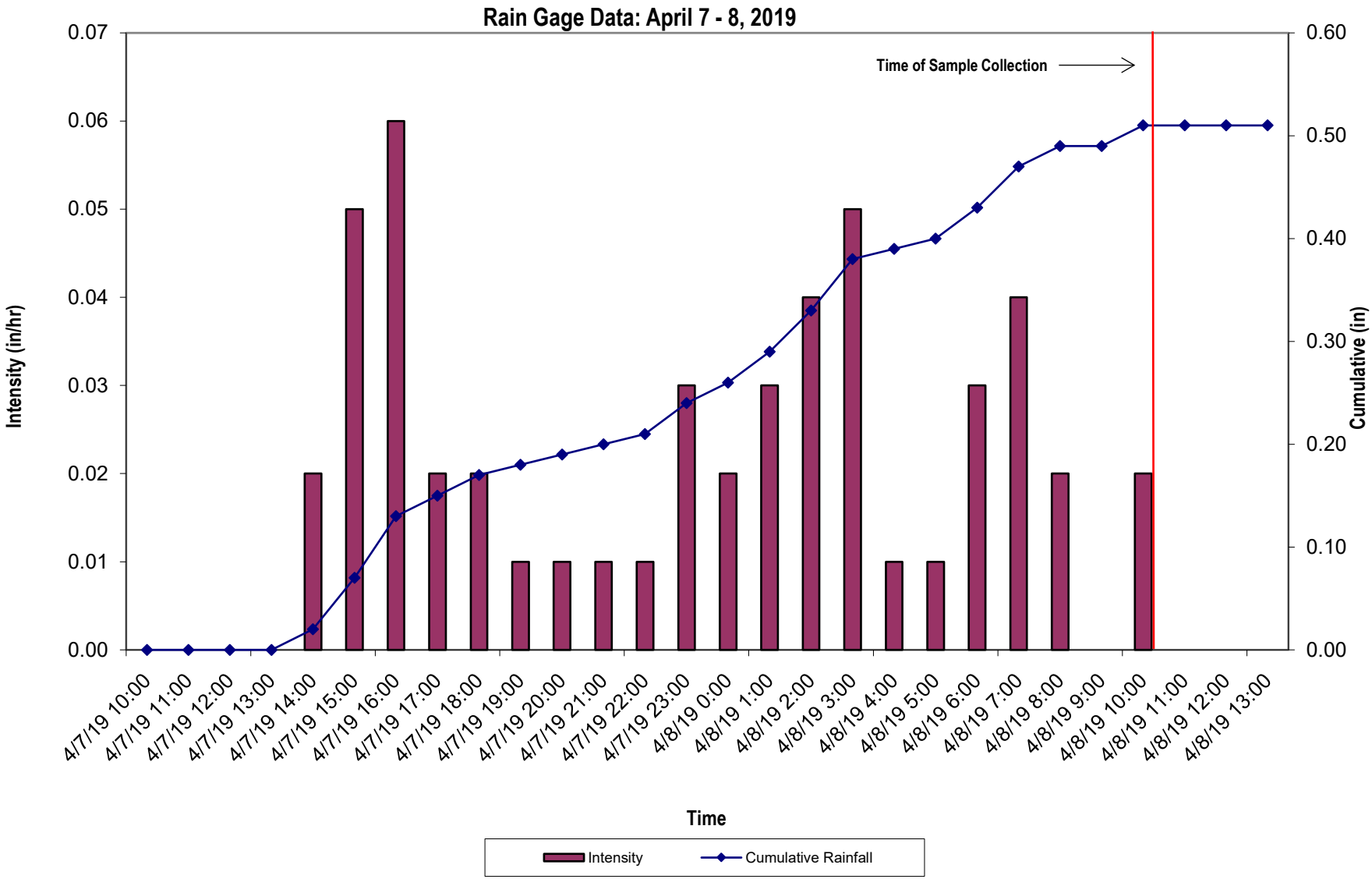


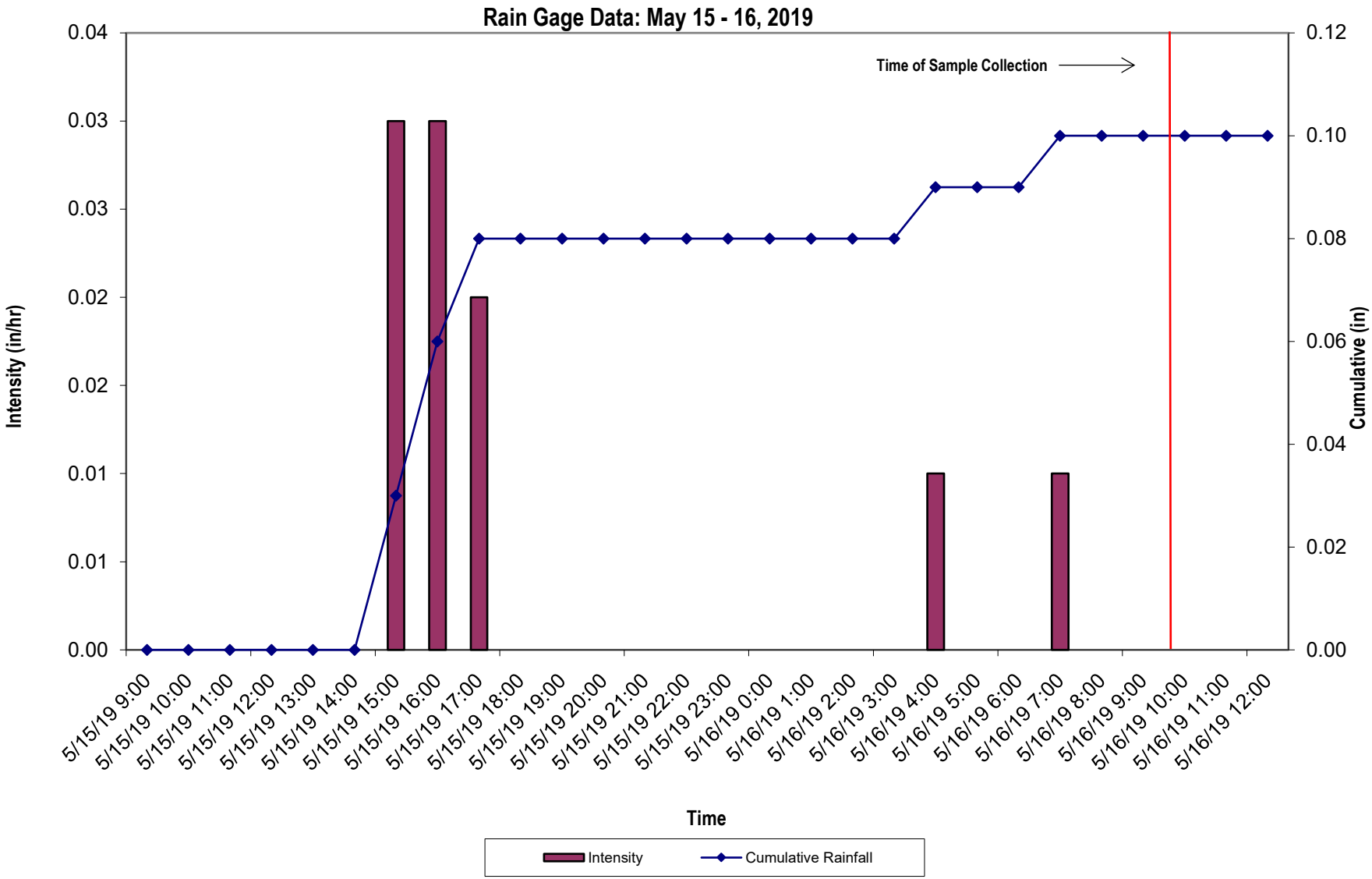

Rain Gage Data: April 5-6, 2018
Intensity (in/hr)
Cumulative (in)
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Time of Sample Collection
4/5/18 11:00
4/5/18 12:00
4/5/18 13:00
4/5/18 14:00
4/5/18 15:00
4/5/18 16:00
4/5/18 17:00
4/5/18 18:00
4/5/18 19:00
4/5/18 20:00
4/5/18 21:00
4/5/18 22:00
4/5/18 23:00
4/6/18 0:00
4/6/18 1:00
4/6/18 2:00
4/6/18 3:00
4/6/18 4:00
4/6/18 5:00
4/6/18 6:00
4/6/18 7:00
4/6/18 8:00
4/6/18 9:00
4/6/18 10:00
4/6/18 11:00
4/6/18 12:00
4/6/18 13:00
4/6/18 14:00
Time
Intensity
Cumulative Rainfall

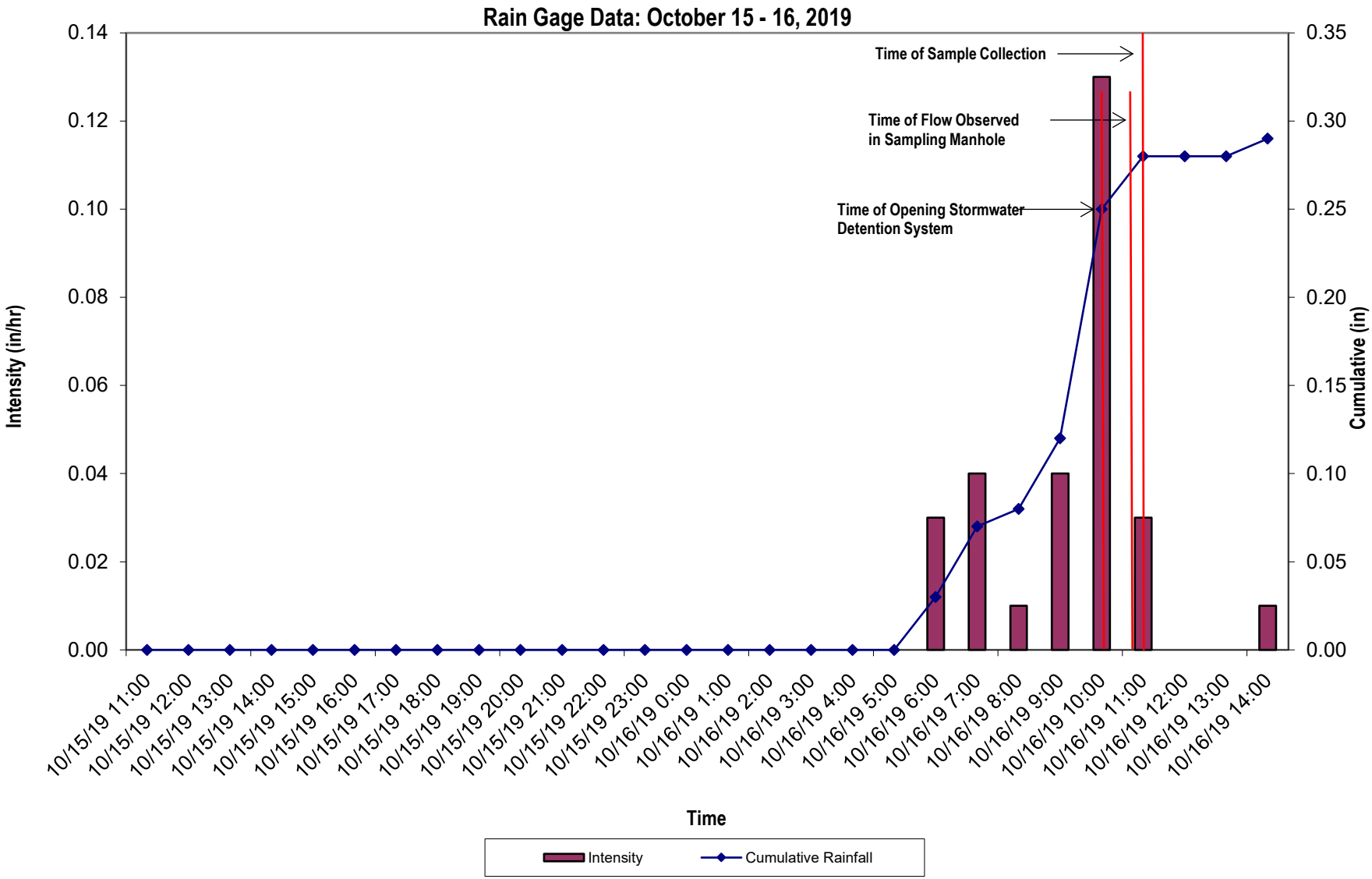

Rain Gage Data: May 16 - 17, 2018
Time of Sample Collection
Intensity (in/hr)
Cumulative (in)
0.01
0.01
0.01
0.01
0.00
0.00
0.03
0.02
0.02
0.01
0.01
0.00
5/16/18 10:00
5/16/18 11:00
5/16/18 12:00
5/16/18 13:00
5/16/18 14:00
5/16/18 15:00
5/16/18 16:00
5/16/18 17:00
5/16/18 18:00
5/16/18 19:00
5/16/18 20:00
5/16/18 21:00
5/16/18 22:00
5/16/18 23:00
5/17/18 0:00
5/17/18 1:00
5/17/18 2:00
5/17/18 3:00
5/17/18 4:00
5/17/18 5:00
5/17/18 6:00
5/17/18 7:00
5/17/18 8:00
5/17/18 9:00
5/17/18 10:00
5/17/18 11:00
5/17/18 12:00
5/17/18 13:00
Time
Intensity
Cumulative Rainfall


Rain Gage Data: November 26 - 27, 2018
Time of Sample Collection
Intensity (in/hr)
Cumulative (in)
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
11/26/18 9:00
11/26/18 10:00
11/26/18 11:00
11/26/18 12:00
11/26/18 13:00
11/26/18 14:00
11/26/18 15:00
11/26/18 16:00
11/26/18 17:00
11/26/18 18:00
11/26/18 19:00
11/26/18 20:00
11/26/18 21:00
11/26/18 22:00
11/26/18 23:00
11/27/18 0:00
11/27/18 1:00
11/27/18 2:00
11/27/18 3:00
11/27/18 4:00
11/27/18 5:00
11/27/18 6:00
11/27/18 7:00
11/27/18 8:00
11/27/18 9:00
11/27/18 10:00
11/27/18 11:00
11/27/18 12:00
Time
Intensity
Cumulative Rainfall


Rain Gage Data: December 17 - 18, 2018
Time of Sample Collection
Intensity (in/hr)
Cumulative (in)
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
12/17/18 11:00
12/17/18 12:00
12/17/18 13:00
12/17/18 14:00
12/17/18 15:00
12/17/18 16:00
12/17/18 17:00
12/17/18 18:00
12/17/18 19:00
12/17/18 20:00
12/17/18 21:00
12/17/18 22:00
12/17/18 23:00
12/18/18 0:00
12/18/18 1:00
12/18/18 2:00
12/18/18 3:00
12/18/18 4:00
12/18/18 5:00
12/18/18 6:00
12/18/18 7:00
12/18/18 8:00
12/18/18 9:00
12/18/18 10:00
12/18/18 11:00
12/18/18 12:00
12/18/18 13:00
12/18/18 14:00
Time
Intensity
Cumulative Rainfall


Rain Gage Data: April 7 - 8, 2019
Time of Sample Collection
Intensity (in/hr)
Cumulative (in)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.60
0.50
0.40
0.30
0.20
0.10
0.00
4/7/19 10:00
4/7/19 11:00
4/7/19 12:00
4/7/19 13:00
4/7/19 14:00
4/7/19 15:00
4/7/19 16:00
4/7/19 17:00
4/7/19 18:00
4/7/19 19:00
4/7/19 20:00
4/7/19 21:00
4/7/19 22:00
4/7/19 23:00
4/8/19 0:00
4/8/19 1:00
4/8/19 2:00
4/8/19 3:00
4/8/19 4:00
4/8/19 5:00
4/8/19 6:00
4/8/19 7:00
4/8/19 8:00
4/8/19 9:00
4/8/19 10:00
4/8/19 11:00
4/8/19 12:00
4/8/19 13:00
Time
Intensity
Cumulative Rainfall


Rain Gage Data: May 15 - 16, 2019
Time of Sample Collection
Intensity (in/hr)
Cumulative (in)
0.04
0.03
0.03
0.02
0.02
0.01
0.01
0.00
0.12
0.10
0.08
0.06
0.04
0.02
0.00
5/15/19 9:00
5/15/19 10:00
5/15/19 11:00
5/15/19 12:00
5/15/19 13:00
5/15/19 14:00
5/15/19 15:00
5/15/19 16:00
5/15/19 17:00
5/15/19 18:00
5/15/19 19:00
5/15/19 20:00
5/15/19 21:00
5/15/19 22:00
5/15/19 23:00
5/16/19 0:00
5/16/19 1:00
5/16/19 2:00
5/16/19 3:00
5/16/19 4:00
5/16/19 5:00
5/16/19 6:00
5/16/19 7:00
5/16/19 8:00
5/16/19 9:00
5/16/19 10:00
5/16/19 11:00
5/16/19 12:00
Time
Intensity
Cumulative Rainfall


Rain Gage Data: October 15 - 16, 2019
Time of Sample Collection
Time of Flow Observed in Sampling Manhole
Time of Opening Stormwater Detention System
Intensity (in/hr)
Cumulative (in)
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
10/15/19 11:00
10/15/19 12:00
10/15/19 13:00
10/15/19 14:00
10/15/19 15:00
10/15/19 16:00
10/15/19 17:00
10/15/19 18:00
10/15/19 19:00
10/15/19 20:00
10/15/19 21:00
10/15/19 22:00
10/15/19 23:00
10/16/19 0:00
10/16/19 1:00
10/16/19 2:00
10/16/19 3:00
10/16/19 4:00
10/16/19 5:00
10/16/19 6:00
10/16/19 7:00
10/16/19 8:00
10/16/19 9:00
10/16/19 10:00
10/16/19 11:00
10/16/19 12:00
10/16/19 13:00
10/16/19 14:00
Time
Intensity
Cumulative Rainfall

RM9W-C001
RM9W-C002
RM9W-C003
RM9W-C004
RM9W-C005
RM9W-C006
RM9W-C007
RM9W-C008
RM9W-C009
RM9W-C010
RM9W-C011
RM9W-C012
RM9W-C013
RM9W-C014
RM9W-C015
RM9W-C016
RM9W-C017
RM9W-C019
WR-8
WR-10
WR-7
WR-257
WR-256
-20
-10
0
10
3:1
8:2
GLACIER NW (Part of Front Ave Properties)
HAMPTON (Part of Front Ave Properties)
Index
AOI 5
AOI 4
AOI 3
AOI 2
AOI 1

This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data used for reference purposes only.

NOTES:

1. Horizontal Coordinate System: NAD 1983 State Plane Oregon North Ft Intl. Vertical Datum: NAVD88, North American Vertical Datum of 1988
2. 2020 Imagery supplied by Oregon Metro.
3. The river miles and RM9W project area supplied by USEPA in January, 2020.
4. Elevations from Solmar Hydro Marine Engineering and Surveying, Inc. merged Digital Elevation Model (DEM) (April 2022).

LEGEND

- 2021 RM9W PDI Vibracore Location
- Active Private Outfall
- Inactive Private Outfall
- Unknown Private Outfall
- Properties with Known Contaminated Riverbanks (ROD Riverbanks)
- River Mile Tenth
- USACE Navigation Channel
- Shoreline Parcels
- RM9W Project Area

Bathymetry [4]

- 2ft Bathymetric Elevation Contours
- 10ft Bathymetric Contours
- +3.3 ft. NAVD88 = Boundary between Shallow and Intermediate Regions

N

Foth

0 50 100 Feet

FMC

FIGURE 3-13
PDI VIBRACORE SEDIMENT SAMPLING LOCATIONS (AOI 5 OF 5)
PDI EVALUATION REPORT
RIVER MILE 9 WEST

Date: MAY 2022	Revision Date:	
Drawn By: DAT	Checked By: ECH1	Project:18F008

Path: Q:\FMC\18F008\GIS\mxd\PDI Evaluation Report\Figure 3-13 - PDI Vibracore Sediment Sampling Locations (AOI 5 of 5).mxd Date: 8/16/2022

Table 6-12a
Task 7 Vibracore Sediment PCB, Dioxin/Furan, and Conventional Results

Analyte	Units	Sediment CUL	Nearshore RT	Navigation Channel RT	RM9W-C001				RM9W-C002			RM9W-C003						
					0-1 ft	4-5 ft	9-10 ft	13-14 ft	0-1 ft	4-5 ft	8-9 ft	0-1 ft	1-2 ft	2-3 ft	3-4 ft	4-5 ft	9-10 ft	12-13 ft	13-14 ft
					5/26/21				26 May 2021			5/26/21							
Conventional Parameters																			
Total Organic Carbon	percent				0.56	3.07	2.13	2.48	1.75	1.75	2.42	1.20	1.31	1.55	1.75	1.74	3.82	2.18	2.06
Total Solids	percent				80.1	56.8	62.5	62.0	56.7	59.5	59.6	64.6	59.5	64.1	60.7	61.9	55.9	62.4	64.3
Water	percent				24.8	76.0	60	61.4	76.5	68.1	67.7	54.8	68.0	56.0	64.6	61.6	78.9	60.4	55.5
Moisture Content	percent				19.9	43.2	37.5	38.0	43.3	40.5	40.4	35.4	40.5	35.9	39.3	38.1	44.1	37.6	35.7
Clay, Percent	percent				1.91	17.72	20.69	22.97	8.96	14.40	21.13	7.39	9.01	13.08	17.64	14.54	14.75	25.30	17.86
Silt, Percent	percent				5.96	66.03	63.20	64.32	55.62	63.00	71.17	39.49	34.61	53.55	65.49	63.89	64.98	58.73	57.78
Sieve Size #4 - Percent Finer	percent				1.10	0	0	0	0	0	0	5.42	22.36	0	0	0	0	0	1.32
Sieve Size #10 - Percent Finer	percent				1.88	0.11	0	0.05	1.07	0.07	0.05	0.91	1.19	0.05	0.09	0.65	0.41	0.09	0.27
Sieve Size #20 - Percent Finer	percent				1.66	0.71	0.15	0.17	0.67	0.16	0.07	0.94	0.93	0.72	0.16	0.22	0.80	0.17	0.33
Sieve Size #40 - Percent Finer	percent				37.26	1.29	0.26	0.23	2.22	0.23	0.16	2.28	1.80	3.79	0.44	0.65	1.20	0.17	0.22
Sieve Size #60 - Percent Finer	percent				32.67	1.32	0.37	0.18	3.34	1.35	0.51	6.31	3.99	9.30	1.67	1.21	1.18	0.20	1.55
Sieve Size #100 - Percent Finer	percent				10.83	1.68	0.95	0.64	4.60	4.22	0.86	10.82	4.88	5.94	1.83	2.14	1.34	1.05	1.67
Sieve Size #140 - Percent Finer	percent				2.79	2.15	3.13	2.68	5.13	4.74	2.11	8.93	4.07	2.78	1.78	3.18	1.40	3.74	2.86
Sieve Size #200 - Percent Finer	percent				1.39	4.29	5.96	5.15	7.50	6.77	3.07	8.85	5.87	3.86	3.70	6.59	3.52	5.92	4.90
Sieve Size #230 - Percent Finer	percent				0.81	4.68	5.97	3.97	5.47	7.51	2.35	6.58	3.58	2.47	2.66	5.56	5.30	4.75	2.74
Total Fines - Portland Harbor Sum	percent				7.87	83.8	83.9	87.3	64.6	77.4	92.3	46.9	43.6	66.6	83.1	78.4	79.7	84	75.6
Dioxins/Furans																			
1,2,3,4,7,8-HxCDF	pg/g	0.4	40	40	7.9	3.71 J	26	3.92 J	3.85 J	38	16.4	3.44 J	1.86 J	4.6	8.25	16.3	2.57 J	20.4	5.08
1,2,3,6,7,8-HxCDF	pg/g				3.47	11.3	18.4	15.6	2.78 J	16.8	27	1.42 J	1.46 J	3.29 J	5.26	8.94	11.8	12.2	5.29
1,2,3,7,8,9-HxCDF	pg/g				1.28 J	1.26 J	4.09 J	1.65 J	1.2 J+	4.04 J	4.08 J	0.593 J	0.623 J	1.39 J	1.81 J	2.52 J	0.96 J+	3.38 J	1.29 J
2,3,4,6,7,8-HxCDF	pg/g				5 J+	4.94	10.1	7.92	3.7 J+	8.26	13.3	1.23 J	1.64 J	3.85 J	8.6 J+	5.62	5.03	6.83	4.56
1,2,3,7,8-PeCDD	pg/g	0.2	0.8	3	0.972 J	1.17 J	2.03 J	0.81 J+	1.23 J	3 J	3.75 J	0.537 J	0.648 J	1.53 J	1.97 J	1.85 J	0.879 J	1.94 J	0.703 J
1,2,3,7,8-PeCDF	pg/g				3.05 J	1.2 J+	8.9	1.11 J	1 J+	14.1	6.1	0.706 J	0.672 J	2.48 J	2.95 J	7.51	0.99 J	9.64	3.83 J
2,3,4,7,8-PeCDF	pg/g	0.3	200	200	3.39	4.1 J	7.15 J	9.15	2.46 J	11.2	10.4	0.959 J	1.11 J	3.34 J	4.4	6.76	4.18 J	9.76	7.61
2,3,7,8-TCDD	pg/g	0.2	0.6	2	0.392 J	0.668 J-	1.1 J	0.225 J	0.281 J	1.23	1.64	0.129 J	0.293 J	0.504 J	0.688 J	0.774 J	0.536 J	0.922	0.2 J+
2,3,7,8-TCDF	pg/g	0.40658	600	600	3.46	0.673 J-	4.01	0.571 J	1.6 J+	12.5	2.56	0.879	1.22	3.48	3.41	6.72	0.611 J	5.38	2.97
1,2,3,4,6,7,8-HpCDD	pg/g				180	243	537	105	353	530	637	151	116	287	302	304	149	281	74.1
1,2,3,4,6,7,8-HpCDF	pg/g				41.4	113	248 J	207	53.6	103	252	19.9	18.9	38.6	51.7	74.7	70.9	104	45.8
1,2,3,4,7,8,9-HpCDF	pg/g				3.1 J	3.68 J	14.1	3.05 J	3.69 J	11.7	11.5	2 J	1.42 J	3.52 J	4.38	5.77	3 J+	8.75	2.39 J
1,2,3,4,7,8-HxCDD	pg/g				1.27 J	1.41 J	3.17 J	0.634 J	3.95 J	3.76 J	4.94	1.21 J	1.07 J	2.3 J	2.66 J	2.3 J	1.04 J	1.9 J+	0.551 J
1,2,3,6,7,8-HxCDD	pg/g				6.13	7.98	17.1	5.3	8.6 J+	22.5	25.1	4.16	4.9	13.4	16.1	13.5	5.64	10.3	3.59 J
1,2,3,7,8,9-HxCDD	pg/g				2.89 J	3.62 J	7.7 J	1.84 J	9.2 J+	10.3	12	2.38 J	2.88 J	6.09	7.6	6.66	2.51 J	5.08	1.59 J
OCDD	pg/g				2630	4090	8570	1620	2350	7060	9720	1260	1170	2610	3130	3400	2280	4250	1260
OCDF	pg/g				108	277	637	193	214	238	508	104	77	173	150	168	142	267	69.4
Total PCDD/Fs - Portland Harbor Sum	pg/g				3000 J	4770 J	10100 J	2180 J	3010 J	8090 J	11300 J	1550 J	1400 J	3160 J	3700 J	4030 J	2680 J	5000 J	1490 J
Total PCDD/Fs TEQ (2,3,7,8-TCDD Eq) Avian - Portland Harbor Sum	pg/g				12 J	11 J	26 J	16 J	9.2 J	40 J	31 J	4.1 J	4.7 J	12 J	15 J	23 J	9.8 J	26 J	14 J
Total PCDD/Fs TEQ (2,3,7,8-TCDD Eq) Fish - Portland Harbor Sum	pg/g				6.8 J	8.8 J	19 J	11 J	7.4 J	22 J	24 J	3.1 J	3.2 J	7.6 J	10 J	13 J	7.4 J	16 J	7.7 J
Total PCDD/Fs TEQ (2,3,7,8-TCDD Eq) Mammal - Portland Harbor Sum	pg/g	10			8.7 J	12 J	25 J	11 J	11 J	28 J	31 J	4.6 J	4.6 J	11 J	14 J	16 J	8.7 J	18 J	7.4 J
PCB Aroclors																			
PCBs - Aroclor 1016	ug/kg				3.5 UJ	4.1 UJ	4 UJ	4.5 UJ	3.7 UJ	4.1 UJ	4.3 UJ	3.6 UJ	4.1 UJ	3.7 UJ	4.8 UJ	4.2 UJ	5.0 UJ	4.7 UJ	4.3 UJ
PCBs - Aroclor 1221	ug/kg				3.5 UJ	4.1 UJ	4 UJ	4.5 UJ	3.7 UJ	4.1 UJ	4.3 UJ	3.6 UJ	4.1 UJ	3.7 UJ	4.8 UJ	4.2 UJ	5.0 UJ	4.7 UJ	4.3 UJ
PCBs - Aroclor 1232	ug/kg				3.5 UJ	4.1 UJ	4 UJ	4.5 UJ	3.7 UJ	4.1 UJ	4.3 UJ	3.6 UJ	4.1 UJ	3.7 UJ	4.8 UJ	4.2 UJ	5.0 UJ	4.7 UJ	17 UJ
PCBs - Aroclor 1242	ug/kg				37 J	28 J	4 UJ	4.5 UJ	10 J	130 J	36 J	7.6 J	6.5 J	22 J	4.8 UJ	51 J	39 J	4.7 UJ	15 UJ