Preliminary Assessment / Source Control Evaluation End of Swan Island Lagoon

City of Portland Property
Portland, Oregon

ECSI #3901

Prepared for

City of Portland
Bureau of Environmental Services

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Prepared by

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Abbreviations and Acronyms

AOPC	area of potential concern
BES	Bureau of Environmental Services
bgs	below ground surface
BHHRA	baseline human health risk assessment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
BLP	City of Portland Bureau of Planning
City	City of Portland
CSM	conceptual site model
CSO	combined sewer overflow
DEQ	Oregon Department of Environmental Quality
ECSI	Environmental Cleanup Site Information
EDR	environmental data report
EPA	United States Environmental Protection Agency
ERA	ecological risk assessment
ESLV	ecological screening level value
IGA	Intergovernmental Agreement
JSCS	Joint Source Control Strategy
LWG	Lower Willamette Group
msl	mean sea level
mg/Kg	milligram(s) per kilogram
µg/Kg	microgram(s) per kilogram
µg/L	microgram(s) per liter
NFA	No Further Action
NPL	National Priorities List
ORS	Oregon Revised Statutes
PA	Preliminary Assessment
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
Port	Port of Portland
RBC	risk-based concentration
SARA	Superfund Amendments and Reauthorization Act
SCE	source control evaluation
SLV	screening level value
SVOC	semivolatile organic compound
USC	United States Code
VOC	volatile organic compound
WPCL	Water Pollution Control Laboratory
WWTF	Wet Weather Treatment Facility

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SECTION 1

Introduction

This report presents the results of a Preliminary Assessment (PA) and Source Control Evaluation (SCE) conducted for a City of Portland (City)-owned property (Site) located on the Willamette River in the 5400 block of North Basin Avenue at the end of the Swan Island Lagoon. The City initiated the PA/SCE of the End of Swan Island Lagoon Site in response to the Oregon Department of Environmental Quality's (DEQ) request during a July 16, 2009 meeting with BES to determine if the Site could be a source of contaminants detected in adjacent Willamette River sediments (DEQ/BES, 2009). Based on contaminant detections in Site groundwater, DEQ requested an adjacent upgradient Cleanup site to evaluate potential offsite migration to the Site (DEQ, 2009). DEQ requested the City evaluate existing soil and groundwater data and also investigate the possible erodible soil pathway for contaminants to be transported from the Site to the Willamette River. This report evaluates potential risks to human health and the environment and to the Willamette River from all potential contaminant migration pathways to support a No Further Action (NFA) determination for the Site.

The Site currently is owned and operated by the City's Bureau of Environmental Services (BES). The City purchased the Site in 1996 for potential construction of facilities to support the Combined Sewer Overflow (CSO) Abatement Program. The public boat ramp was at the Site when the City purchased the property. CSO facility construction did not occur; the City subsequently divided the Site into two parcels to facilitate long-term management of the boat ramp and associated greenway and future redevelopment of the upland portion of the Site.

Since purchasing the Site, the City has performed numerous onsite environmental investigations. The evaluation presented in this report was developed using existing data collected at and adjacent to the Site. This report demonstrates that the Site is not a current significant source of contaminants to the Willamette River and that source control measures are not warranted. In addition, upland soil and groundwater contamination do not appear to pose unacceptable risk to human health or the environment. Therefore, no further actions are warranted.

This report was developed in accordance with the scope of work developed under the terms of the *Intergovernmental Agreement* (IGA) between DEQ and the City[1] (BES, 2012a). The PA/SCE was conducted in general accordance with the following:

- Oregon Environmental Cleanup Law (Oregon Revised Statute (ORS) 465.200 et seq.);
- *Portland Harbor Joint Source Control Strategy* (DEQ/EPA, 2005);

[1] *Intergovernmental Agreement for Oversight of Environmental Investigations and Remedial Actions*, dated February 1, 2010 (DEQ NO. LQVC-NWR·09-08), between the City and DEQ.

- *Screenings and Preliminary Assessments (*DEQ, 2012a*)*;
- *Expanded Preliminary Assessment Report Guidance* (DEQ, 2012b); and
- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 (42 United States Code (USC). §§ 9601 et seq.)

A PA is designed to determine whether a Site is releasing, has released, or could release hazardous substances to the environment, and whether remedial action is warranted. Components of a PA include summaries of available site information including; site history and operations, potential sources of contamination, pathways for migration of contaminants, and receptors or targets potentially affected by the contamination. DEQ added the Site to its Environmental Cleanup Site Information (ECSI) database in 2003 under the name "End of Swan Island Lagoon" with ECSI identification number 3901 and recommended that a site screening be performed. This report is intended to meet site screening and PA requirements.

On December 1, 2000, a section of the Willamette River within the City of Portland, the Portland Harbor, was added to the Superfund National Priority List (NPL). The U.S. Environmental Protection Agency (EPA) is the lead agency for in-water contamination. DEQ, using state cleanup authority is the lead agency for the upland contamination and for coordinating with the EPA on upland contamination that may impact the river (*e.g.,* sediment, groundwater, transition zone water, and/or surface water). This report is intended to meet the requirements for a SCE, as defined by the *Portland Harbor Joint Source Control Strategy* (JSCS; [DEQ/EPA, 2005]). This report provides a risk screening evaluation of potentially complete migration pathways to the Willamette River (e.g., stormwater, groundwater, and riverbank erosion).

SECTION 2

Site Background

2.1 Site Description

The Site is located at the south end of the Swan Island Lagoon on the east bank of the Willamette River at approximately river mile 9.1. The Site is located in Multnomah County, Township 1N, Range 1E, Section 20 and is accessed from N. Basin Avenue. Figure 1 shows the Site location and Figure 2 shows the current Site layout. The Site is generally flat with a gentle downward slope to the north. The portion of the Site along the shoreline slopes more steeply downward, toward the lagoon. Most of the Site has a general elevation of approximately 30 to 32 feet above mean sea level (msl). No buildings are located on the Site.

The City purchased the Site for locating CSO project infrastructure. The Site includes two taxlots, shown on Figure 2, encompassing approximately 10 acres and identified as Lots 1 and 2 in this report. BES divided the Site into these taxlots in 2006 in anticipation of selling Lot 1 when market conditions are favorable and transferring Lot 2 to the Bureau of Parks and Recreation. The City also platted a small portion of the original Site as "Tract A" – an area now jointly owned by the two adjacent parcels for access purposes. Lots 1 and 2 are further described in the following sections.

2.1.1 Lot 1

Lot 1 (eastern parcel), shown on Figure 2 encompasses approximately 7.2 acres and is currently undeveloped and partially fenced. Current zoning on Lot 1 is light industrial. The City plans to sell Lot 1 when market conditions are favorable. Long-term future land use of Lot 1 will likely be consistent with the light industrial zoning in the area.

2.1.2 Lot 2

Lot 2 (western parcel), shown on Figure 2, encompasses approximately 2.8 acres and contains:

- A paved parking lot (approximately 140 feet by 650 feet in area) with access to a boat ramp managed by the City for public use. The boat ramp is utilized by small recreational motorized and non-motorized boats.
- A paved nature trail, viewing pad, and interpretative signage;
- Open recreational space; and
- Landscaped areas with riverbank plantings.

Lot 2 is zoned for light industrial use. However, the City platted the taxlot for Lot 2 in 2006 to provide open green space next to the river and to meet potential Willamette Greenway requirements in the event Lot 1 is developed. The long-term future use of Lot 2 is for continued use as a public boat ramp and open green space consistent with its current uses.

2.2 Site Ownership and Operating History

Aerial photographs depicting the history and development of the Site and the surrounding area are presented in Figures 3 through 6. Historically the Swan Island Lagoon was larger than its current configuration and the Site did not did not exist (see Figures 3 and 4). The Site was created between 1970 and 1984 by placement of fill material in the lagoon (Port, 1999). In about 1975, as shown in Figure 4, a dike of fill material was placed across the lagoon to segregate approximately the upstream third of the lagoon. After that time, the portion of the lagoon located southeast of the dike was no longer in use for river-related purposes. The extent of the fill placed at the Site and in this area of the lagoon is shown on Figure 5. Fill placed at the Site includes material dredged from the Willamette River (Port, 1999).

Before this area was filled, a former City stormwater outfall (M-4) discharged near the former head of the lagoon, where the Site is now located. Outfall M-4 was constructed in 1952 primarily to provide service to the former Freightliner (now Daimler Trucks) facility located across N. Basin Avenue from the lagoon. There was also a Port of Portland (Port) outfall located just west of M-4 that drained the parking areas for the boat ramp and Freightliner (located at 5400 N. Basin). Outfall M-4 and the Port outfall were abandoned in 1989[2] and stormwater flows were rerouted to City Outfall M-3. The locations of Outfall M-3 and the former Outfall M-4 and Port outfall are shown on Figure 2. Outfall M-4 is discussed further in Section 4.1.

The majority of the Site has never been developed and industrial operations have never occurred on the Site. The Port owned the Site from the time of its creation until 1996, when the City purchased the Site. A public parking lot and boat ramp were constructed at the Site by the Port during the Port's ownership of the property. The City purchased the Site to construct a Wet Weather Treatment Facility at this location, but the facility was not constructed. A portion of the Portsmouth Force Main was constructed beneath the Site (see Figure 2) in 2011 to convey sanitary flow from the Swan Island Pump Station (located 0.75 miles to the southeast) to the Columbia Boulevard Wastewater Treatment Plant.

A temporary parking lot was constructed on a portion of Lots 1 and 2 during the construction of the Portsmouth Force Main on the northeastern portion of the site, as shown on Figure 6. Stormwater runoff from the temporary parking lot drained to a vegetated stormwater swale and infiltrated (see Figure 7). Following completion of the Portsmouth Force Main, the City removed the temporary parking lot and swale and regraded the soil/fill. The City constructed the temporary parking lot in Winter 2009 and removed it in Fall 2011, restoring Boat ramp parking to its original location at that time (see Figure 2).

During force main construction, the City also constructed a temporary staging area on Lot 2 (see Figure 7). Preparation of the staging area included removing and disposing of the top six inches of soil, covering the area with geotextile fabric and clean aggregate base material, and installing erosion control fencing around the perimeter of the staging area. Upon project completion the City removed the aggregate base, geotextile fabric, and silt fencing, and then regraded and reseeded the area.

[2] City Project No, 4420

The southwestern Site boundary (see Figure 2) is undeveloped and has minimal vegetation. Historically, this area may have been used as a roadway or gravel parking area by the adjacent property (5036 N. Lagoon Avenue). Development of this adjacent property occurred between 1990 and 1999, based on a review of historical aerial photographs. In the 1990 photograph (Figure 5), the Site is vacant, graded, and unvegetated. In the 1999 photograph (Figure 6), it appears that the parking lot/road associated with the adjacent property encroached onto the southwestern portion of the Site. The City confirmed that the Site has never been leased. By 2011 (see Figure 2), it appears that a fence had been constructed along the southwestern Site boundary and parking on the adjacent property had shifted to the west of the property line.

2.3 Surrounding Land Use

City zoning maps show properties surrounding the Site to be zoned for light industrial use. The Site is bounded to the north and northeast by N. Basin Avenue and a small section of a vacant shoreline lot. Industrial properties border the Site to the east and south. A parking lot used for truck and truck trailer storage (owned by Anchor Park, LLC) adjoins the southwestern Site boundary. The nearest residential-zoned properties are located approximately 0.3 miles southeast of the Site. Swan Island Lagoon borders the Site to the northwest.

2.4 Inriver Sediment

In 2010, EPA identified areas of potential concern (AOPC) in the Willamette River for the Portland Harbor Superfund Site. AOPC 17S includes the entire Swan Island Lagoon; this AOPC was identified based on elevated sediment concentrations of metals, tributyltin, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pesticides, and other contaminants in sediments (EPA, 2010).

2.5 Site Stormwater System

Current stormwater drainage at the Site is depicted on Figure 8. The majority of the Site is unpaved and stormwater infiltrates in these areas. The boat ramp and boat ramp parking area are paved; rain falling on the boat ramp discharges directly to the river via overland flow. Stormwater runoff from the paved parking area flows to a single catch basin that discharges to the river via Outfall M-3.

2.6 Environmental Setting

2.6.1 Hydrogeologic Setting

The Site is underlain by fill material that extends to depths of up to approximately 70 feet. The fill consists of sands, gravels, silts and clays, with occasional debris (brick fragments, wood glass fragments, plastic and aluminum) (CH2M HILL, 2001a). Native soil underlying the fill consists of sand/silt alluvium, gravel alluvium with random large cobbles and boulders, and the Troutdale Formation, consisting of tightly packed gravels with

interbedded sand, silt and clay lenses (CH2M HILL, 2002). Groundwater depths encountered in direct push and monitoring well explorations at the site indicates the groundwater table at the site is approximately 20 feet below ground surface (bgs). The uppermost aquifer at the Site is expected to be unconfined, and exists at the approximate elevation of the Willamette River. The direction of groundwater flow at the site is presumed to be to the northwest, toward the lagoon.

There are no groundwater monitoring wells or production wells onsite. A preliminary search of the Oregon Water Resources Department GRID database did not identify municipal, domestic or industrial uses of groundwater within one-half mile of the Site. The area around the Site is serviced by the City's public water supply system. Four industrial wells are located within approximately one-quarter mile of the Site; these wells are completed to depths ranging from 164 to 200 feet bgs.

Discharge of shallow groundwater from the Site to the river appears to be the only reasonably likely beneficial use of the uppermost aquifer. This assumption is based on the lack of documented use of the uppermost aquifer (locally and regionally) for domestic or industrial purposes.

2.6.2 Hydrologic Setting

The Site borders the southern end of Swan Island Lagoon within the Willamette River Watershed. The historical course of the river was to the northwest, flowing along the east side of Swan Island through what is now the Swan Island Lagoon. The historical channel was filled, except for the lagoon, and the river now flows west of the "island." Shoreline bank treatments along the Swan Island Lagoon include pilings, vegetated and non-vegetated rip rap, seawall, rock and unclassified fill. As a result of historical and current industrial uses, there are numerous areas of soil, surface water, groundwater, and near shore sediment contamination that exist in the Swan Island Lagoon area (CH2M HILL, 2002).

The Site is generally located with the 100-year Willamette River flood plain. The site was reportedly flooded during the 1996 flood (BOP, 2001).

2.6.3 Ecological Setting

The Site is adjacent to the Willamette River, which is a Sensitive Environment as defined in OAR 340-122-115. The Willamette River is a habitat for federally threatened and endangered species (e.g., steelhead trout, chinook salmon, and peregrine falcons).

The west shoreline of Swan Island Lagoon is almost entirely covered by docks and other structures (BOP, 2009). Much of the eastern shore is vegetated rip rap but a section of unarmored beach is present northwest of the boat ramp. The beach begins on the eastern shore near N. Ensign Street and continues adjacent to the Site and over to the southern corner of the lagoon. Remnant forest, woodland and shrubland vegetation line the east banks of the Swan Island Lagoon. The vegetation association is characteristic of more disturbed sites along the river, with Himalayan blackberry and black cottonwood as dominant species. Riparian cover along the banks is fragmented by active river industrial uses, but in many places contains well-established stands of black cottonwood. Native

Wapato vegetation may be present in localized low-lying wet areas adjacent to the Swan Island Lagoon.

Adjacent to the Site, the shoreline is a gradual sand beach with trees, shrubs and grasses present closer to the top of the bank (see Appendix G for site photos). The Port of Portland had removed non-native invasive species and planted native trees and shrubs in order to enhance bank habitat and reduce erosion (BOP, 2009). Plant species include cottonwood, ninebark, rose, madrone, hawthorn, and several incense cedars.

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SECTION 3

Site Investigation History

Several environmental investigations have been performed by the City to assess potential contamination at the Site. This section briefly describes the work completed by the City since purchasing the Site in 1996 and provides references to reports describing investigation activities in more detail. Results generated during these investigations provide the basis for evaluating potential risks to human health and the environment (Section 5).

3.1 Background

As part of the early planning for Willamette River CSO project, the City purchased the Site for construction of a WWTF. Subsequent alternative analyses in 2001 determined that a WWTP would not be constructed but rather that a pump station would be needed to pump sewage and wet weather flows to the Columbia Boulevard Wastewater Treatment Plant (CBWTP) (BES 2001). The Site was identified as a candidate for location of the Swan Island Pump Station.

Under the direction of BES, three rounds of environmental soil and groundwater investigations were conducted at the Site, as described below, to support the evaluation and design of the proposed pump station. Ultimately, the Swan Island Pump Station was constructed approximately 0.75 miles southeast of the Site and a portion of the Portsmouth Force Main was constructed beneath the Site (see Figure 2) and the Site was utilized as a temporary construction staging area for the project. The City conducted an additional soil and groundwater investigation in 2008 to support the evaluation and design of the Portsmouth Force Main (see Section 3.3).

In 2006, BES began construction of the East Side Big Pipe, a six-mile long, 22-foot diameter tunnel to collect sewage from the east side of the Willamette and to control CSOs to the Willamette River. The tunnel parallels the east bank of the Willamette River from SE 17th Avenue and McLoughlin Boulevard to Swan Island at an average depth of 150 feet. The project included construction of the Portsmouth Force Main, which conveys sewage from the Swan Island Pump Station to the CBWTP. The City completed tunneling in October 2010 and completed connecting combined sewers to the east side tunnel in September 2011.

3.2 2001 Proposed Pump Station Investigation

Three soil and groundwater investigations were conducted in 2001 to assess whether future construction activities could generate contaminated media that would require special management and disposal by the City during redevelopment if the Site were to be selected as the location of the pump station. Various reports (CH2M HILL, 2001a through 2001e, 2002; Parsons Brinckerhoff, 2001a through 2001e) document these field investigations and sampling results. Appendix A includes electronic copies of data tables from these

investigations and full electronic copies of investigation reports. Appendix B provides some of the reference maps extracted from the various reports that show soil and groundwater sampling locations from the Site investigations. The investigations focused on the proposed pump station construction areas (the center and northern sections of the Site) and included:

- Advancement of approximately 20 soil direct push or mud rotary geotechnical borings to depths up to about 100 feet bgs;
- Advancement of one soil boring to a depth of 316 feet bgs and installation of a deep monitoring well screened between 142 and 195 feet; and
- Collection and analyses of over 170 soil and groundwater samples.

The results of the 2001 environmental investigations are summarized in the *Environmental Data Interpretive Report, Swan Island Lagoon Site* (BES, 2003). The investigations document that the fill at the Site extends to a depth of approximately 70 feet bgs and low concentrations of contaminants are present in the fill material from ground surface to depths of approximately 70 feet bgs. Contaminants detected in soil include: heavy oil, diesel, and gasoline range hydrocarbons; PAHs; PCBs; pesticides; volatile organic compounds (VOCs); and metals. Table 1 provides a summary of the maximum detected concentrations in Site soils. Sample results are discussed relative to risk screening levels in Section 5.

Groundwater grab samples were collected from depths of approximately 20 feet bgs from four direct-push sample locations. Samples from two sampling depths (approximately 20 feet bgs and 55 feet bgs) were collected from five direct-push sample locations. In addition, a groundwater sample was collected from a deep well screened from 142 to 195 feet bgs. VOCs were detected in three of the 2001 groundwater samples. Table 2 summarizes the groundwater analytical results.

3.3 2008 Portsmouth Force Main Investigation

Following the decision to construct the Swan Island Pump Station offsite, the City conducted a soil and groundwater investigation in 2008 to assess potential environmental conditions along the alignment of the Portsmouth Force Main. This investigation is documented in the *Environmental Data Report (EDR) for the Portsmouth Force Main Project – BES 6902 – Segment 1* (Struthers, 2008). Appendix B provides a map of sampling locations for this investigation; an electronic copy of this report is provided in Appendix A.

One direct push boring, PMF-E-13A, was located on the Site. A total of five soil samples were collected from this boring, from depths of up to 24 feet bgs, and were analyzed for petroleum hydrocarbons, metals, PCBs, PAHs, pesticides, and organotins (Struthers, 2008). Metals, PAHs, and PCBs were detected. Other analytes were not detected. A groundwater sample was collected from direct push boring PMF-E-13, located approximately 250 feet southeast of the Site, and analyzed for metals, PAHs, and VOCs. Metals and PAHs were detected in this groundwater sample; VOCs were not detected. Groundwater results are summarized in Table 2.

3.4 2010 Riverbank Soil Investigation

In June 2010, the City collected surface soil samples from the riverbank area of the Site (see Figure 9). The purpose of this investigation was to assess whether contaminants were present in Site bank soils and, if so, to evaluate the erodible soils pathway (JSCS screening evaluation). Four composite near-surface samples (and one duplicate sample) were collected from four transects perpendicular to the lagoon. A separate composite sample (and duplicate) was collected from five locations along a transect on the top of the bank that parallels the lagoon. These samples were analyzed for petroleum hydrocarbons, metals, PCBs, PAHs, phthalates, herbicides, pesticides, and organotins. Sample locations are shown on Figure 9 and sample results are summarized in Table 3. Field sampling procedures, field documentation, and laboratory data sheets are provided in Appendix C.

Low concentrations of metals, tributyltin, pesticides, petroleum hydrocarbons, PAHs, and phthalates were detected in riverbank fill. Sample results are discussed relative to risk screening levels in Section 5.

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SECTION 4

Conceptual Site Model

This section describes the conceptual site model (CSM) for the City's End of Swan Island Site. The CSM describes potential sources of contamination, considers how and where the contaminants are likely to move (pathways) and identifies who and what are likely to be affected by Site contaminants.

4.1 Potential Contaminant Sources

No potential sources of contamination (e.g., spills, tanks) have been identified associated with current and historical uses of the Site. Historical uses were limited to a public boat ramp, parking, and temporary construction staging for the Portsmouth Force Main project. Measures were implemented to minimize environmental impacts of temporary staging activities (see Section 2.2). Currently, the northeastern portion of the Site is used as a boat ramp and for parking and the remainder of the Site is vacant. Therefore, the term "source" is used in this document to describe the environmental media (e.g., fill, groundwater) in which contaminants of interest are contained. The primary sources of contaminants onsite are associated with historical fill placed to create the property and potential historical discharges from or along former stormwater Outfall M-4, that discharged near the former head of the lagoon where the Site is now located.

4.1.1 Fill

As previously stated, the Site was created between 1970 and 1984 by placement of fill material in the former lagoon by the Port. Fill extends to a depth of approximately 70 feet bgs at the Site.

4.1.2 Groundwater

Historical discharges from facilities connected to the former Outfall M-4 or preferential groundwater contaminant migration along the pipe and/or pipe bedding may have resulted in contamination of fill or groundwater beneath the Site.

Former Outfall M-4 discharged to Swan Island Lagoon between 1952 and 1989, at a location now occupied by the Site. Outfall M-4 was constructed in 1952, likely to convey discharges from the new Freightliner Truck Manufacturing Plant (TMP II) facility, located at 5400 N. Basin Avenue (DEQ ECSI No. 115) to Swan Island Lagoon (see Figure 10). Outfall construction in 1952 included one manhole in N. Basin Avenue and 200 feet of pipe between the manhole and the lagoon. No connections to the N. Basin manhole were constructed at that time, though the as-built map indicates that a connection was planned from the Freightliner facility. The TMP II facility was constructed in 1951. The Outfall M-4 drainage area remained small due to the presence of other historical outfalls conveying stormwater from facilities along N. Basin Avenue to the lagoon. The City abandoned Outfall M-4 and

the Port outfall located on the Site in 1989 and rerouted drainage to a new Outfall M-3 conveyance system.

Site data indicate that the former Outfall M-4 was a likely historical pathway from offsite sources to what is now the Site. VOCs were detected in Site groundwater collected from two borings completed on the City's property near the location of former Outfall M-4 (CH2M HILL, 2001c). The depth range of VOC detections in subsurface soil on the City property corresponds to the approximate depth of where Outfall M-4 formerly discharged and the bottom of the Swan Island Basin offshore of Outfall M-4. The most significant VOC impacts in groundwater beneath the City property were detected in a sample obtained from a depth of 55 feet bgs from a boring completed in the immediate vicinity of the former Outfall M-4 location. All but one of the detected compounds were chlorinated VOCs. Discharges from TMPII to the Site via Outfall M-4 have been identified as potential sources of VOC contamination to the Site (GSI 2007; BES, 2007, 2012b; BES, 2012c). Appendix D provides electronic copies of documents regarding former Outfall M-4.

Based on a review of groundwater and soil investigations, solvent use and historical releases at TMPII, DEQ requested that Daimler include the VOC data from the Site in the Remedial Investigation, Risk Assessment, and Source Control Evaluation being completed for the TMP II Facility (DEQ, 2009).

4.2 Contaminants of Interest

Metals, VOCs, PAHs, PCBs, petroleum hydrocarbons, pesticides, and organotins have been identified as contaminants of potential interest for the Site based on detections in soil and/or groundwater.

4.3 Potential Contaminant Exposure Pathways and Receptors

This section identifies the current and reasonably likely future pathways by which human or environmental receptors may come into contact with or be exposed to Site contaminants.

4.3.1 Potential Current Pathways and Receptors

Soil (Ingestion, Dermal Contact, and Inhalation). The majority of the site is vegetated or paved. Surface soil on localized portions of the Site is exposed at ground surface and potentially complete current pathways exist for human or ecological receptors to be exposed to contaminated soil/fill. Under current Site conditions, open space/beach users (e.g., recreationists, fishers, boaters) or trespassers may be exposed to contaminated fill/soil on the Site. No current complete pathway exists for the portion of the Site that is capped by pavement.

Groundwater (Ingestion and Inhalation from Tap Water). No current complete groundwater pathway exists to human receptors, because groundwater is not currently used onsite. While potential groundwater impacts were identified, it is unlikely that a complete route of exposure exists for contaminated groundwater to be transported offsite and to reach potential receptors (e.g., Willamette River) for the following reasons:

- Contaminants detected in Site soils (e.g., PCBs, PAHs, metals, organotins) are generally characterized by low solubility in water, adsorb tightly to soil, and do not significantly leach in aqueous soil systems.
- Groundwater VOC contaminant concentrations were detected in two out of 17 Site groundwater samples (Table 2) suggesting contamination is localized.
- The river is approximately 200 feet from the area with the highest groundwater concentration. This distance provides an opportunity for physical and chemical processes to significantly reduce concentrations before contaminants reach the river. Detected groundwater VOC concentrations decrease by approximately three orders-of-magnitude over a distance of approximately 250 feet riverward from the maximum concentration located near former Outfall M-3 (see Map 5 presented in Appendix B).
- Detected groundwater concentrations may be biased high because groundwater samples were collected as grab samples using direct push drilling technology.

Volatilization to Outdoor Air (soil and groundwater). VOCs may volatilize from contaminated soil and/or groundwater to outdoor air and subsequently be inhaled by site workers and/or trespassers. VOCs were not detected in the upper 15 feet of soil. VOCs were detected in two groundwater samples collected at depths of 28 and 55 feet bgs. The detected soil and groundwater concentrations are expected to be significantly reduced as the contaminants migrate vertically upperwards over 30 feet to the ground surface by diffusion, sorption, and degradation. Available soil and groundwater data are screened and evaluated in Section 5.

Vapor intrusion into buildings (soil and groundwater). VOCs may volatilize from contaminated soil and/or groundwater and the vapors may migrate and intrude into onsite buildings and subsequently be inhaled by site workers. No buildings exist onsite; therefore, this pathway is incomplete.

Stormwater. Rain falling on paved parking and boat ramp areas may directly reach the river via overland flow or piped discharge from Outfall M-3. Runoff from the paved portion of the Site does not come in contact with potential contaminant sources identified in Section 4.1 (i.e., contaminated fill materials). No complete overland flow pathway has been identified in the unpaved areas of the Site. Soils in the undeveloped areas of the Site are vegetated and pervious and stormwater infiltrates in these areas.

Bank Erosion. There is a potential for the bank soils to be eroded and transported to the Willamette River. However, this pathway is not considered to be significant for the following reasons:

- The northwest Site boundary is located at approximately the high water line on the upstream end of Swan Island Lagoon. Bank erosion above the high water mark is expected to occur rarely and only during infrequent major flood events. Bank erosion above the high water mark is likely insignificant due to the low potential for contact with river water. Furthermore, the bank is at the upstream end of the lagoon which is quiescent and therefore, the bank has a low potential for erosion.

- Precipitation falling on the river bank infiltrates limiting the potential for bank erosion to occur.
- No visual evidence of bank erosion was observed during recent field investigations.
- Contaminant concentrations (metals, tributyltin, pesticides, semivolatile organic compounds [SVOCs], and phthalates) are low in riverbank surface soil. The low soil concentrations and low potential for bank erosion indicate bank soils are not significant source of contaminants to the Willamette River. Risks to potential human or ecological receptors exposed to bank soils above the high water mark, are considered with soil receptors in Section 5.

Beach Sediment. Potential receptors exposed to beach sediment, below the high water mark, are located offsite, and potential risks are addressed in the LWG's Portland Harbor remedial investigation and risk assessment under EPA oversight.

4.3.2 Potential Future Pathways and Receptors

Soil (Ingestion, Dermal Contact, and Inhalation). Potentially complete exposure pathways exist for future industrial/commercial workers and trespassers on Lot 1 and for recreational users or ecological receptors on Lot 2. Future workers (occupational, construction and excavation workers) may be exposed to contaminated soil/fill before and during future redevelopment or construction projects. It is reasonably likely, following redevelopment of the Site, that contaminated soils will be capped by a building(s), paved (asphaltic concrete, concrete) and stormwater will be managed on site preventing or eliminating potential human and ecological receptors from exposure to soil contaminants through direct contact or incidental ingestion.

Groundwater (Ingestion and Inhalation from Tap Water). No reasonably likely future complete groundwater pathway exists. Groundwater is not currently used onsite and is not planned to be in future. A preliminary search of the Oregon Water Resources Department well log database did not identify drinking water supply wells in the immediate area (Appendix E). Properties in the area are connected to the public water supply system to meet drinking and other property water needs. It is reasonably likely that following Site development, the Site will be connected to the City of Portland's municipal water supply. Exposure of offsite receptors via the groundwater pathway is considered unlikely (see Section 4.3.1). Therefore, no reasonably likely future uses of groundwater were identified and this pathway is considered incomplete.

Volatilization to Outdoor Air (soil and groundwater). VOCs may volatilize from contaminated soil and/or groundwater to outdoor air and subsequently be inhaled by future site workers. VOCs were not detected in the upper 15 feet of soil. VOCs were detected in two groundwater samples at collected from depths of 28 and 55 feet bgs. The detected soil and groundwater concentrations are expected to be significantly reduced as the contaminants migrate vertically upperwards over 30 feet to the groundsurface by diffusion, sorption, and degradation. Available soil and groundwater data are screened and evaluated in Section 5.

Vapor intrusion into buildings (soil and groundwater). VOCs may volatilize from contaminated soil and/or groundwater and the vapors may migrate and intrude into onsite

buildings and subsequently be inhaled by site workers. Available soil and groundwater data are screened and evaluated in Section 5.

Stormwater. Rain falling on the existing developed portion of the Site will continue to be discharged to the river from the paved areas and to infiltrate in the undeveloped areas. No contaminant sources are present in the developed area, therefore, the stormwater pathway is considered incomplete. Future development of the Site (paving, building construction) will likely eliminate the potential for stormwater to directly contact contaminated fill material and result in an incomplete stormwater pathway. Future development likely will be required to comply with the City's *Stormwater Management Manual* (BES, 2008) which encourages onsite stormwater management and/or treatment.

Bank Erosion. As discussed in Section 4.3.1, bank erosion is not considered a significant contaminant migration pathway to the Willamette River. Potential risks to receptors exposed to bank soils above the high water mark are considered with soil receptors, as discussed in Section 5.

Beach Sediment. The Site has limited beach areas below the high water mark. . Potential risks associated with beach sediments are addressed in the Portland Harbor remedial investigation and risk assessment being performed by the LWG under EPA oversight.

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SECTION 5

Risk Screening Evaluation

This section presents the results of a risk screening evaluation to identify potentially unacceptable risks to human health and the environment. Site soil and groundwater data are compared to potentially applicable risk-based concentrations (RBCs) or screening level values (SLVs) to identify contaminants, pathways, and receptors that may be exposed to unacceptable risks. Exceedance of an RBC or SLV does not necessarily indicate that the upland source poses an unacceptable risk to human health or the environment. It does, however, indicate that the need for source control or remedial action warrants further consideration using a weight-of-evidence evaluation, which is presented in Section 6.

5.1 Identification of Potential Risks to Human Health

5.1.1 Risk Screening

DEQ sets cleanup levels based on reasonably likely exposure scenarios developed from an evaluation of current and future land and groundwater use. DEQ's guidance *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* (DEQ, 2003; Table 3 revised 11/2011), and its supporting tables provide RBCs for screening contaminant concentrations to identify potential risks to human health associated with exposure to contaminated fill material or groundwater. Four groups of human receptors were identified (see Section 4), as having potentially complete exposure pathways to contaminants under current and future Site conditions including recreational users and occupational, construction, and excavation workers. DEQ's risk assessment guidance (DEQ, 2003; DEQ, 2010) states risks to potential occupational workers should include soils from a depth range of 0 to 3 feet bgs and risks to potential construction and excavation workers should include consideration of soil from a depth range of 0 to 15 feet bgs.

Table 1 summarizes the maximum concentrations detected in Site soil/fill. These concentrations were compared to DEQ's RBCs for occupational, construction, and excavation workers to identify potential risks to human health. DEQ has not developed RBCs for recreational or trespass exposure scenarios; however, potential risks for recreational users are discussed in Section 5.1.2. Table 3 presents the results of the 2010 riverbank surface soil investigation. It should be noted that use of maximum soil concentrations for risk screening is considered conservative. Current and future site workers and ecological receptors will not be exposed to a single sample location for the exposure durations assumed in the calculations of the RBCs. Rather, workers would be expected to be exposed to a range of concentrations encountered across the Site or a given work area.

Occupational Workers: The maximum soil/fill concentrations detected in the upper 3 feet of fill exceeds applicable occupational worker RBCs for soil ingestion, dermal contact or inhalation for the following analytes:

- Arsenic (<5 times the applicable RBC and <1.2 times the DEQ background arsenic soil concentration)
- Naphthalene (<1.1 times the applicable RBC)
- Benzo(a)anthracene (<2.2 times the applicable RBC)
- Benzo(b)fluoranthene (<1.2 times the applicable RBC)
- Benzo(a)pyrene (<16 times the applicable RBC)
- Dibenz(a,h)anthracene (<3.1 times the applicable RBC)

While the maximum soil concentration for some contaminants may exceed occupational RBCs in some samples collected below 3 feet bgs, the pathway is not considered a complete pathway under reasonable likely current or future land uses (i.e., workers are not likely to be exposed to soil contamination at depth). Maximum soil concentrations between 3 and 15 feet bgs were conservatively screened against occupational worker RBCs for soil ingestion, dermal contact, and inhalation to assess potential future risks in the event these soils are exposed during future site development activities. RBC exceedances in the fill between 3 and 15 feet bgs are similar to those identified above in the fill between 0 and 3 feet bgs (see Table 1).

Occupational RBCs for contaminant volatilization to outdoor air or into buildings were not exceeded for Site soil. Groundwater samples did not exceed the occupational RBCs for volatilization to outdoor air; one groundwater sample exceeded the vinyl chloride RBC for occupational exposure to vapor intrusion into buildings. This sample was collected from a depth of 55 feet bgs; vinyl chloride was not detected in a shallower groundwater sample collected from a depth of 20 feet at this location.

Riverbank surface soil samples do not exceed occupational worker RBCs with the exception of slight exceedances of arsenic. These arsenic concentrations are not considered to pose unacceptable risk because the concentrations are less than DEQ's regional background concentration for arsenic (7 mg/kg) in all riverbank soil samples.

Construction Workers: The maximum soil concentration detected in the upper 15 feet exceeds the construction worker RBCs for benzo(a)pyrene (<4.5 times the applicable RBC) and dibenz(a,h)anthracene (<2.8 times the applicable RBC). One groundwater sample exceeded the RBC for excavation/construction workers exposure to groundwater for vinyl chloride (<4 times the applicable RBC); this sample was collected from a depth of 55 feet bgs. No riverbank soil sample concentrations exceeded the applicable construction worker RBCs.

Excavation Workers: No maximum soil concentration detected in the upper 15 feet exceeded the applicable excavation worker RBCs. No riverbank soil samples exceeded the applicable excavation worker RBCs.

5.1.2 Evaluation of Potential Risks

Lot 1.

Lot 1 is currently undeveloped and partially fenced. It is anticipated that Lot 1 will be developed in the future for commercial or light industrial purposes. Though maximum soil concentrations exceed DEQ occupational and construction worker RBCs for some contaminants, potential risks to Site trespassers and Site workers are low. Potential exposure pathways associated with groundwater include direct contact in an excavation, vapors migrating from groundwater into a building, or volatilization of vapors from groundwater to outdoor air. These pathways are considered to be incomplete due to the depth of identified groundwater contamination. Specifically, contaminated groundwater above RBCs is well below the depth expected to be contacted by construction/excavation workers. As previously, discussed the risk screening results described above are considered conservative because the screening was performed primarily on maximum detected soil/fill concentrations and it is highly unlikely that Site trespassers and/or Site workers (current and future) would be exposed to a single sample location (i.e., the maximum soil concentration) at the exposure frequencies or exposure durations assumed in the calculation of the DEQ RBCs. Rather, Site trespassers and workers would be expected to be exposed to a range of concentrations across the Site or a given work area and the actual exposure point concentration is expected to be significantly lower. Given the generally low magnitude of RBC exceedances, potential risks to human health are expected to be low. Following future Site development, it is reasonably likely that buildings, pavement, or other structures will reduce or eliminate the potential for worker exposure to the identified contaminated soil/fill. Therefore, no adverse risks to current or future occupational, construction, or excavation workers were identified.

Lot 2.

Lot 2 is currently and will be used in the future as a public boat ramp and open space. The results and screening of the 2010 riverbank samples indicate that contaminant concentrations are less than applicable occupational RBCs and DEQ soil background concentrations. The occupational worker RBCs are considered protective of current and future recreational users or park maintenance workers. If calculated, recreational user or trespasser RBCs for a given contaminant would be higher than the occupational worker RBCs due to significantly lower exposure frequencies and exposure durations. Therefore, no adverse risk to current or future occupational workers (e.g., Site maintenance workers) or recreational users (e.g., fishers, boaters) were identified.

This conclusion of no adverse human health risk is supported by the results of the *Portland Harbor Remedial Investigation and Baseline Human Health Risk Assessment* (BHHRA; LWG, 2013). The LWG evaluated the potential risks from human use of selected beaches located within the Portland Harbor Superfund study area (LWG, 2011). The beach adjacent to the Site was sampled and analyzed for contaminants as part of this study. A composite beach sediment sample was collected from approximately the boat ramp to the southeastern corner of the lagoon (approximately the southern Site boundary – see Map 2-1 in Appendix F). Table 4 presents the results of the 2004 LWG beach sediment sample included in the BHHRA. The LWG evaluated potential risks associated with beach sediment to dockside workers, transients, recreational beach users (adult, child), tribal fishers, fishers, high-

frequency fishers, and breastfeeding infants of adults exposed to beach sediment. The results of the LWG beach sediment risk assessment did not identify adverse risks for the beach adjacent to the Site, except for tribal fishers (Note: the risk to tribal fishers is reported as acceptable when arsenic is excluded based on background concentrations). Appendix F provides selected pages and maps from the Lower Willamette Group's (LWG) human health risk assessment. In general, contaminant concentrations detected in the adjacent 2004 beach sample are higher than those detected in Site riverbank soils supporting the conclusion that the potential risks to riverbank users are low.

5.2 Identification of Potential Risks to Ecological Receptors

A *Level 1 – Ecological Scoping Risk Assessment* (ERA) was conducted for the Site. The ERA presents a qualitative determination as to whether ecological receptors and/or exposure pathways are present or potentially present at the Site. The beach adjacent to the Site is below the mean high-water mark is not owned by the City. The beach has been investigated by the LWG as part of the Portland Harbor Superfund Site remedial investigation and risk assessment under the oversight of the EPA.

5.2.1 Site Visit Summary

BES staff conducted a Site visit on September 28, 2012 to assess ecological features and conditions in order to complete DEQ's *Ecological Scoping Check List* (DEQ, 1998; updated 2001). The assessment was led by Chris Prescott, a biologist with the BES Science, Fish & Wildlife group. The completed *Level I - Ecological Scoping Checklist* and Site photographs are provided in Appendix G. Key findings of the visit include:

- The Site is largely undeveloped. Areas of the Site not covered by the paved boat ramp, interpretive trail and parking lot are comprised of landscaped and vegetated areas. The Site is comprised of ~2.5 % wooded, ~11.5% shrub (mostly blackberries) and ~50.1% ruderal (i.e., growing where the natural vegetational cover has been disturbed) terrestrial habitats, as shown on Figure 11.
- No signs (visual, olfactory, staining, etc.) of a chemical release were observed.
- No signs of threatened and/or endangered species or their habitat within or adjacent to the Site were observed.
- No groundwater discharges to the land surface (seeps, springs) were observed.

Ecological species that may frequent the Site were identified based on observed onsite habitats and a review of species distribution and habitat preferences in the Portland area. In addition, City of Portland Water Pollution Control Laboratory (WPCL) staff keep an informal log of species (primarily birds) observed on the WPCL property, located on the east bank of the Willamette River approximately 3 miles downriver from the Site. The following species may frequent the End of Swan Island Lagoon Site:

Birds	**Birds (continued)**	**Mammals**
Great Blue Heron	Mallard	Raccoon
Osprey	Hooded Merganser	Coyote
Belted Kingfisher	Bushtits	Beaver
Bald Eagle	Canada Geese	Little Brown Bat
Peregrine Falcon	Song Sparrows	Fox Squirrel
Red Tailed Hawk	Black Capped	Nutria*
Cooper's Hawk	Chickadee	Western Gray
Green Heron	Oregon Junco	Squirrel*
Wood Duck	Swallow	
Red Winged	Gull	**Amphibians**
Blackbird		Pacific Chorus Frog
American Goldfinch		

Note: * indicates non-native species

5.2.2 Exposure Pathways

No complete ecological exposure pathways to ecologically important species or habitats were identified at the Site between identified soil contamination and potential receptors using DEQ's *Attachment 2 – Evaluation of Receptor – Pathway Interactions* checklist (DEQ, 1998). This checklist was completed based on available Site information and is provided in Appendix G. Ecological receptor exposure to identified soil contamination likely is limited due to: limited quality of onsite vegetation and habitats; the low concentrations detected in onsite soils; and the existing Site development.

5.2.3 Evaluation of Potential Risks

Lot 2

Current and future land use on this portion of the Site is a public boat ramp and open space. Preliminary screening of riverbank soil/fill results indicates that analyte concentrations are less than DEQ ecological screening level values (ESLV) for terrestrial receptors (DEQ, 1998). No adverse risks to current or future ecological receptors were identified and therefore, no further ecological investigation at this Site is recommended.

Potential erosion of riverbank soil to the Willamette River was evaluated by comparing riverbank concentrations to JSCS SLVs for upland soils. No riverbank contaminant concentrations exceeded applicable JSCS toxicity SLVs. The following contaminants exceeded the JSCS bioaccumulation SLVs:

- Tributyltin (<4.2 times the SLV).
- DDT (<1.6 times the SLV); the detected concentrations are flagged as estimated values by the analytical laboratory.
- Dieldrin (< 40 times the SLV); the detected concentration was flagged as an estimated value by the analytical laboratory and dieldrin was not detected in the duplicate sample.

These JSCS SLV exceedances are low and indicate that riverbank erosion would not adversely impact Willamette River sediment quality.

Lot 1

Lot 1 is currently undeveloped and partially fenced. It is anticipated that Lot 1 will be developed in the future for commercial or light industrial purposes. Table 1 summarizes the maximum concentrations detected in Site soil/fill. These concentrations were compared to DEQ ESLV for terrestrial receptors (DEQ, 1998) including plants, invertebrates, birds, and mammals to identify potential risks to ecological receptors. The following ESLVs were exceeded:

- Plants: The maximum soil concentration detected in the upper 3 feet exceeds the ESLV for chromium, lead, mercury, zinc, and naphthalene.
- Invertebrates: The maximum soil concentration detected in the upper 3 feet exceeds the ESLV for chromium and mercury.
- Birds: The maximum soil concentration detected in the upper 3 feet exceeds the ESLV for barium, chromium, lead, and zinc.
- Mammals: The maximum soil concentration detected in the upper 3 feet did not exceed the ESLVs for mammals.

While maximum soil concentrations exceed DEQ ESLVs for some contaminants, potential risks to ecological receptors likely are low. The risk screening results described above are considered conservative because the screening was performed using maximum detected soil/fill concentrations and it is highly unlikely that ecological receptors would be exposed to a single sample location (i.e., maximum soil concentrations) at the exposure frequencies or exposure durations assumed in the calculation of the DEQ ESLVs. Potential receptors would be expected to be exposed to a range of concentrations across the Site and the actual exposure point concentration is expected to be significantly lower. Given the limited observed habitat on Lot 1, potential risks to ecological receptors are expected to be low. Following future Site development, it is reasonably likely that buildings, pavement, or other structures will reduce or eliminate the potential for ecological receptors to be exposed to the identified contaminated soil/fill. Therefore, no adverse risks to potential ecological receptors were identified and no further ecological investigation at this Site is recommended.

5.3 Evaluation of Potential Hot Spots

The hot spot evaluation for soil included an evaluation of highly concentrated, highly mobile, and not reliably-containable contaminants consistent with Oregon Administrative Rules (OAR) 340-122-00115. Highly concentrated hot spot levels are defined as risk-based concentrations corresponding to 100 times the acceptable risk level for human exposure to individual carcinogens, equal to an excess cancer risk of 1×10^{-4} risk level, or a hazard quotient corresponding to 10 for human exposure to individual non-carcinogens.

To evaluate whether highly concentrated soil contamination is present at the Site, maximum soil concentrations were compared to concentrations equivalent to a hazard quotient of 10 for non-carcinogens and to excess risk levels of 1×10^{-4} for carcinogens for identified receptors (occupation workers, construction workers and excavation workers). DEQ requires that the lower of the two values be used to evaluate hot spots. No concentrations above levels considered hot spots based on the protection of current or future workers were identified.

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SECTION 6

Findings and Conclusions

The End of Swan Island Lagoon Site is not a current or historical source of contaminants to the Willamette River. The Site has had no history of commercial or industrial uses since the land was created between 1970 and 1984. The fill used to create the Site, within a former channel of the Willamette River, includes material dredged from the Willamette River (Port, 1999). The majority of the Site remains undeveloped and the developed portion of the Site is limited to recreational use.

No potential sources of contamination have been identified associated with current or historical uses of the Site. The primary sources of contaminants detected onsite are associated with fill placed to create the property and potential historical offsite migration of contaminants from upland sources to the Site via former stormwater outfall M-4 (e.g., via direct discharge or preferential pathways from upstream facilities). Former Outfall M-4 and a Port outfall discharged directly to a former portion of the lagoon, where the Site is now located before the area was filled.

Potential risks to current and future receptors exposed to soil or groundwater contamination were evaluated for recreational users (e.g., boaters, fishers); site workers (occupational, construction, excavation); trespassers; and upland terrestrial species (plants, invertebrates, birds, mammals). No adverse risks to human health or the environment were identified and no further action at the Site is recommended.

Potential contaminant migration pathways from the Site to the Willamette River were evaluated to determine potential adverse impacts to the river. Pathways evaluated included riverbank erosion, stormwater discharge, and groundwater discharge. These pathways are considered insignificant sources of contaminants to the river. Future redevelopment requirements are expected to include onsite stormwater management. Due to the presence of contaminated soil and groundwater at the Site, the City anticipates coordination between the City and DEQ during the permitting process to ensure that proposed Site redevelopment does not pose adverse risk.

This report demonstrates that the Site is not a significant current or likely future source of contaminants to the Willamette River. In addition, upland soil and groundwater contamination do not appear to pose unacceptable risk to human health or the environment. Therefore, source control is not necessary at the Site and no further action is warranted.

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SECTION 7

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Tables

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Table 1
Maximum Soil/Fill Contaminant Concentrations
End of Swan Island Lagoon

Analyte	Maximum Detected Concentration[a] (mg/Kg)			Number of Samples Analyzed			*DEQ Background (mg/Kg)*	DEQ RBCs[b] (mg/Kg)				
								Soil Ingestion, Dermal Contact and Inhalation			Volatilization to Outdoor Air	Vapor Intrusion into Buildings
	0 - 3' bgs	3 - 15' bgs [c]	> 15' bgs	0 - 3' bgs (N = 15)	3 - 15' bgs (N = 43)	> 15' bgs (N = 141)		Occupational[d]	Construction Worker[d]	Excavation Worker[d]	Occupational[d]	Occupational[d]
Total Petroleum Hydrocarbons (TPH)												
Hydrocarbon ID (NWHCID)	Detected	Detected	Detected	15	43	139	--	--	--	--	--	--
TPH - Gasoline	NA	NA	3540	0	0	6	--	20,000	9,700	>Max	69,000	>Max
TPH - Diesel	<25	112	2680	2	7	49	--	14,000	4,600	>Max	>Max	>Max
TPH - Heavy Oil	90	454	3750	2	8	51	--	36,000	11,000	>Max	>Max	>Max
Metals												
Arsenic	8.43	7.13	9.79	15	43	138	7	1.7	13	370	NV	NV
Barium	187	480	274	15	43	138	--	190,000	60,000	> Max	NV	NV
Cadmium	0.18	1.21	4.02	15	43	138	1	510	150	4300	NV	NV
Chromium	116	61.3	179	15	43	138	42	> Max	460,000	>Max	NV	NV
Copper	33	71.1	161	15	43	138	36	41,000	12,000	340,000	NV	NV
Lead	144	261	486	15	43	138	17	800	800	800	NV	NV
Mercury	0.981	0.762	2.18	15	43	138	0.07	310	93	2,600	NV	NV
Nickel	25.8	30.4	37.7	15	43	138	38	20,000	6,100	170,000	NV	NV
Silver	0.18	0.3	1.83	15	43	138	1	5,100	1,500	43,000	NV	NV
Zinc	102	543	318	15	43	138	86	--	--	--	--	--
Organotins												
Monobutyltin	ND	0.019	ND	1	4	6	--	--	--	--	--	--
Dibutyltin	ND	0.12	0.024	1	4	6	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons (PAHs)												
Naphthalene	23.8	0.599	8.48	14	40	131	--	23	580	16,000	99	99
Acenaphthylene	0.18	1.09	2.69	14	40	131	--	--	--	--	--	--
Acenaphthene	4.41	1.49	11.8	14	40	131	--	61,000	19,000	520,000	>Max	>Max
Fluorene	3.01	1.18	10.8	14	40	131	--	41,000	12,000	340,000	>Max	>Max
Phenanthrene	11.4	11.2	63.5	14	40	131	--	--	--	--	--	--
Anthracene	2.79	3.46	15.4	14	40	131	--	310,000	93,000	>Max	>Max	>Max
Fluoranthene	15.9	11	72	14	40	131	--	29,000	8900	250,000	>Max	>Max
Pyrene	11.3	14.9	101	14	40	131	--	21,000	6700	190,000	--	--
Benzo(a)anthracene	5.84	2.83	32.4	14	40	131	--	2.7	21	590	NV	NV
Chrysene	6.23	7.65	40.8	14	40	131	--	250	2100	57,000	>Csat	>Csat
Benzo(b)fluoranthene	3.2	5.58	9.34	14	40	131	--	2.7	21	590	>Csat	>Csat
Benzo(k)fluoranthene	3.92	6.71	27.5	14	40	131	--	27	210	5,900	NV	NV
Benzo(a)pyrene	4.31	9.52	36.1	14	40	131	--	0.27	2.1	59	NV	NV
Indeno(1,2,3-cd)pyrene	2.41	4.84	18.7	14	40	131	--	2.7	21	590	NV	NV
Dibenz(a,h)anthracene	0.85	5.84	2.26	14	40	131	--	0.27	2.1	59	NV	NV
Benzo(g,h,i)perylene	2.56	6.29	22.8	14	40	131	--	--	--	--	--	--

Table 1
Maximum Soil/Fill Contaminant Concentrations
End of Swan Island Lagoon

Analyte	Maximum Detected Concentration[a] (mg/Kg)			Number of Samples Analyzed			*DEQ Background (mg/Kg)*	DEQ RBCs[b] (mg/Kg)				
								Soil Ingestion, Dermal Contact and Inhalation			Volatilization to Outdoor Air	Vapor Intrusion into Buildings
	0 - 3' bgs	3 - 15' bgs [c]	> 15' bgs	0 - 3' bgs (N = 15)	3 - 15' bgs (N = 43)	> 15' bgs (N = 141)		Occupational[d]	Construction Worker[d]	Excavation Worker[d]	Occupational[d]	Occupational[d]
Volatile Organic Compounds (VOCs)												
1,2,3-Trichlorobenzene	ND	ND	0.145	8	16	82	--	--	--	--	--	--
1,2,4-Trichlorobenzene	ND	ND	0.436	8	16	82	--	--	--	--	--	--
1,2,4-Trimethylbenzene	ND	ND	1.1	8	16	82	--	2,000	2,000	54,000	1,000	1,000
1,3,5-Trimethylbenzene	ND	ND	0.3	8	16	82	--	10,000	3,100	86,000	--	--
Chloroethane	ND	ND	0.408	8	16	82	--	--	--	--	--	--
cis-1,2-Dichloroethene	ND	ND	0.267	8	16	82	--	2,000	620	17,000	>Max	>Max
Ethylbenzene	ND	ND	1.22	8	16	82	--	140	1,600	44,000	160	12
Hexachlorobutadiene	ND	ND	0.235	8	16	82	--	--	--	--	--	--
n-Propylbenzene	ND	ND	0.137	8	16	82	--	--	--	--	--	--
Naphthalene	ND	ND	26.7	8	16	82	--	23	580	16,000	99	99
o-Xylene	ND	ND	0.124	8	16	82	--	25,000	19,000	540,000	>Csat	>Csat
Tetrachloroethene	ND	ND	1.24	8	16	82	--	940	1,600	44,000	>Csat	36
Toluene	ND	ND	0.804	8	16	82	--	77,000	24,000	680,000	>Csat	>Csat
Polychlorinated Biphenyls (PCBs)												
Aroclor 1248	ND	ND	0.111	15	43	139	--	--	--	--	--	--
Aroclor 1254	ND	0.439	1.8	15	43	139	--	--	--	--	--	--
Aroclor 1260	ND	0.262	0.456	15	43	139	--	--	--	--	--	--
Total PCBs[e]	ND	0.439	1.8	15	43	139	--	0.56	4.4	120	>Csat	>Csat
Organochlorine Pesticides												
4,4'-DDD	ND	ND	0.0576	7	20	66	--	11	83	2,300	NV	NV
4,4'-DDT	0.0142	0.215	ND	7	20	66	--	7.7	58	1,600	NV	NV
Beta-BHC	ND	ND	0.0104	7	20	66	--	1.7	15	400	>Csat	>Csat
Methoxychlor	0.0283	ND	ND	7	20	66	--	--	--	--	--	--

Notes:

[a] Table presents maximum concentrations detected in onsite soils/fill collected during site investigations in 2001. Soil data is presented in various reports; electronic copies of these reports are as Appendix A on CD. Copies of data tables presenting detected concentrations are also presented in Appendix A.

[b] DEQ Risk Based Concentrations (RBCs) (DEQ, 2003; Table updated June 2012).

[c] Includes samples identified in reports as collected between 0 - 4 feet bgs ('LA' series borings) and 0 - 5 feet bgs (Boring PFM-E-13A).

[d] Colored shading identifies maximum detected analyte concentrations that exceed potentially applicable DEQ RBCs. Soil concentrations between 0 - 3' bgs were used to assess current and future risk to potential site occupational workers. Soil concentrations between 3 - 15' bgs were used to assess current and future risk to potential site construction or excavation workers; in addition, soil concentrations are conservatively screened against occupational worker RBCs to assess potential future risks in the event these soils are exposed during future site development activites. No complete exposure pathway to soil >15' bgs was identified (see Sections 4.3 and 5) and concentrations are not screened. Identification of a RBC exceedance does not necessarily indicate unacceptable risk.

Table 2
Groundwater Results
End of Swan Island Lagoon

	Results for Detected Analytes[a] (µg/L)																	DEQ RBCs[b] (µg/L)			
Sample Location (Boring)	**PB-1003R**	**PB-1003R**	**PB-1003R**	**PB-1005R**	**PB-1005R**	**PB-1401**	**LA-1**	**LA-1**	**LA-2b**	**LA-2c**	**LA-3c**	**LA-3f**	**LA-4**	**LA-5**	**LA-6**	**LA-7**	**PFM-E-13[c]**	**DEQ Background (µg/L)**	**Ingestion and Inhalation from Tap Water**	**Volatilization to Outdoor Air**	**Vapor Intrusion into Buildings**	**Groundwater in Excavation**
Sample Depth (ft bgs)	142 - 194.5	20	55	24	55	24.5	28	56	20	55	24	55	20	28	20	20	~ 20					
Sample Date	6/14/2001	6/21/2001	6/21/2001	6/22/2001	6/22/2001	8/24/2001	6/20/2001	6/20/2001	6/22/2001	6/27/2001	6/28/2001	6/28/2001	6/21/2001	6/22/2001	6/22/2001	6/22/2001	11/28/2008					
Sample Type[e]	Well	GP	GP	GP	GP	GP	GP	GP	GP	GP	GP	GP	GP	GP	GP	GP	GP					
Analyte																			Occupational[d]	Occupational[d]	Occupational[d]	Construction and Excavation Worker[d]
Metals																						
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	13.9	2	0.3	NV	NV	5,800
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.1	1	220,000	NV	NV	--
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	12.1	9	5,800	NV	NV	5,000,000
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.94	13.3	15	NV	NV	--
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.002	<0.1	44	NV	NV	--
Molybdenum											NA	NA	NA	NA	NA	NA	1.72	--	--	NV	NV	--
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.08	5.5	2,900	NV	NV	12,000,000
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	14.2	38	--	--	--	--
Polycyclic Aromatic Hydrocarbons (PAHs)																						
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0598	--	--	--	--	--
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.062	--	--	>S	>S	>S
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.571	--	--	--	--	--
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.153	--	--	>S	>S	>S
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.672	--	--	>S	>S	>S
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.831	--	--	--	--	--
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.384	--	0.56	NV	NV	9.1
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.293	--	--	>S	>S	>S
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.302	--	0.16	>S	>S	>S
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.106	--	--	NV	NV	NV
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.328	--	0.056	NV	NV	0.53
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.126	--	--	NV	NV	>S
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.148	--	--	--	--	--
Volatile Organic Compounds (VOCs)																						
1,1 Dichloroethane	ND	ND	910	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	13	73,000	16,000	10,000
1,1,1-Trichloroethane	ND	ND	605	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	38,000	>S	>S	1,100,000
Chloroethane	ND	ND	2,520	ND	ND	ND	78.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	88,000	>S	>S	2,400,000
cis-1,2-Dichloroethene	ND	ND	22,800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	290	>S	>S	24,000
Toluene	ND	ND	3,750	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	9,200	>S	>S	210,000
Trichloroethene	2.15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	3.6	19,000	3,300	430
Vinyl chloride	ND	ND	4,080	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	0.52	6,800	910	1,200

Notes:

[a] Groundwater data extracted from site investigation reports presented in Appendix A.

[b] DEQ Risk Based Concentrations (RBCs) (DEQ, 2003; Table updated June 2012).

[c] Groundwater data (Struthers, 2008) from offsite boring completed during Portsmouth Forcemain Project. Data represent upgradient groundwater quality. Groundwater sample depth not reported; soil samples were collected to approximately 20 feet bgs.

[d] Colored shading identifies potential exceedances of DEQ RBCs. Identification of a RBC exceedance does not necessarily indicate unacceptable risk.

[e] Sample Type: Well indicates sample collected from a constructed monitoring well; and GP indicated a groundwater grab sample was collected from a direct-push boring.

µg/L = Micrograms per liter.
ft bgs = Feet below ground surface.
NA = Not analyzed.
ND = Not detected above laboratory reporting limit.
NV = nonvolatile. "This chemical is considered 'nonvolatile' for purposes of the exposure calculations." (DEQ, 2012)
>S indicates the RBC exceeds the chemicals solubility limit. Groundwater concentrations in excess of S indicate free product may be present (DEQ, 2012).

Table 3
2010 Riverbank Surface Soil Results
End of Swan Island Lagoon

		Transect 1	Transect 2		Transect 3	Transect 4	Transect 5		JSCS[1] Screening Level Value		*DEQ Background*	DEQ RBCs[2]
		Surface Soil Composite	Surface Soil Composite	Surface Soil Composite (Duplicate)	Surface Soil Composite	Surface Soil Composite	Surface Soil Composite	Surface Soil Composite (Duplicate)				*Soil Ingestion, Dermal Contact and Inhalation*
		FO105711	FO105712	FO105716	FO105713	FO105714	FO105715	FO105717				
Analyte	**Units**	6/2/2010	6/2/2010	6/2/2010	6/2/2010	6/2/2010	6/2/2010	6/2/2010	**Toxicity[3]**	**Bioaccumulation[3]**		**Occupational[3]**
Total Solids (SM 2540 g)												
TS	%	90.1	92.3	91.9	84.7	93.0	90.6	90.8	--	--	--	--
Metals (EPA 6020)												
Aluminum (EPA 6010)	mg/Kg	16,500	15,100	12,900	15,700	13,200	12,700	12,500	--	--	--	--
Antimony	mg/Kg	0.18	0.15	0.20	0.19	0.13	0.17	0.15	64	--	--	--
Arsenic	mg/Kg	1.72	1.5	1.85	2.07	1.84	1.88	2.09	33	7	7	1.7
Barium	mg/Kg	97.5	77.9	108	99.5	84.8	85.0	77.9	--	--	--	190,000
Cadmium	mg/Kg	0.10 U	0.10 U	0.10 U	0.15	0.10 U	0.10 U	0.10 U	4.98	1	1	510
Chromium	mg/Kg	21.6	17.5	17.6	21.6	18.1	17.5	16.3	111	--	42	>Max
Copper	mg/Kg	23.5	18.7	19.1	23.0	17.9	23.0	22.9	149	--	36	41,000
Lead	mg/Kg	6.49	5.12	5.73	8.21	5.01	6.53	6.37	128	17	17	800
Mercury	mg/Kg	0.025	0.034	0.021	0.024	0.025	0.026	0.022	1.06	0.07	0.07	310
Nickel	mg/Kg	19.2	17.1	17.4	19.0	17.8	16.8	17.0	48.6	--	38	20,000
Silver	mg/Kg	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	5	--	1	5,100
Zinc	mg/Kg	71.7	61.9	61.5	85.8	61.1	67.1	63.2	459	--	86	23,000
Organotins (PSEP GC/MS)												
Dibutyltin	µg/Kg	1.5 U	1.4 U	1.4 U	1.6 U	1.4 U	1.5 U	1.4 U	--	--	--	180,000
Monobutyltin	µg/Kg	11 J	1.4 U	4.0 J	1.6 U	1.4 U	1.5 U	7.5 J	--	--	--	--
Tetrabutyltin	µg/Kg	4.0 U	3.8 U	3.9 U	4.2 U	3.8 U	3.9 U	3.9 U	--	--	--	--
Tributyltin	µg/Kg	4.0	1.4 U	4.4	1.6 U	1.4 U	5.2	9.6	--	2.3	--	180,000
Organochlorine Pesticides (EPA 8081A)												
4,4'-DDD	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	28	0.33	--	11,000
4,4'-DDE	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	31.3	0.33	--	7,600
4,4'-DDT	µg/Kg	0.95 U	0.23 J	0.98 U	1.0 U	0.52 J	0.99 U	1.0 U	62.9	0.33	--	7,700
Estimated Total DDx[4]	µg/Kg	ND	0.23 J	ND	ND	0.52 J	ND	ND	--	0.33	--	--
Aldrin	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	40	--	--	--
alpha-BHC (α-BHC)	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	--	--	--	--
beta-BHC (β-BHC)	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	--	--	--	--
delta-BHC (δ-BHC)	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	--	--	--	--
gamma-BHC (γ-BHC, Lindane)	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	4.99	--	--	--
alpha-Chlordane[5]	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	--	--	--	--
beta-Chlordane[5]	µg/Kg	0.095 J	0.98 U	0.98 U	0.11 J	0.97 U	0.99 U	1.0 U	--	--	--	--
Total Chlordane[6]	µg/Kg	0.095 J	ND	ND	0.11 J	ND	ND	ND	17.6	0.37	--	7,000
Dieldrin	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	0.32 J	61.8	0.0081	--	130
Endosulfan I	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	--	--	--	--
Endosulfan II	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	--	--	--	--
Endosulfan sulfate	µg/Kg	0.95 U	1.1 U	0.98 U	3.1 U	0.97 U	0.99 U	2.6	--	--	--	--
Endrin	µg/Kg	0.95 U	0.98 U	0.31 J	1.0 U	0.97 U	0.99 U	1.0 U	207	--	--	230,000
Endrin aldehyde	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	--	--	--	--
Endrin ketone	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	--	--	--	--
Heptachlor	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	10	--	--	--
Heptachlor epoxide	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	16	--	--	--
Methoxychlor	µg/Kg	0.95 U	0.98 U	0.98 U	1.0 U	0.97 U	0.99 U	1.0 U	--	--	--	--
Toxaphene	µg/Kg	48 U	50 U	49 U	50 U	150 U	50 U	53 U	--	--	--	--

Table 3
2010 Riverbank Surface Soil Results
End of Swan Island Lagoon

		Transect 1	Transect 2		Transect 3	Transect 4	Transect 5		JSCS[1] Screening Level Value		*DEQ Background*	DEQ RBCs[2]
		Surface Soil Composite	Surface Soil Composite	Surface Soil Composite (Duplicate)	Surface Soil Composite	Surface Soil Composite	Surface Soil Composite	Surface Soil Composite (Duplicate)				*Soil Ingestion, Dermal Contact and Inhalation*
		FO105711	FO105712	FO105716	FO105713	FO105714	FO105715	FO105717				
Analyte	**Units**	6/2/2010	6/2/2010	6/2/2010	6/2/2010	6/2/2010	6/2/2010	6/2/2010	**Toxicity[3]**	**Bioaccumulation[3]**		**Occupational[3]**
Chlorinated Herbicides (EPA 8151)												
2,4,5-T	µg/Kg	27 U	27 U	22 U	23 U	22 U	22 U	22 U	--	--	--	--
2,4,5-TP (Silvex)	µg/Kg	27 U	27 U	22 U	23 U	22 U	22 U	22 U	--	--	--	--
2,4-D	µg/Kg	110 U	110 U	88 U	92 U	89 U	89 U	88 U	--	--	--	7,700,000
2,4-DB	µg/Kg	110 U	110 U	88 U	92 U	89 U	89 U	88 U	--	--	--	--
Dalapon	µg/Kg	120 U	120 U	99 U	100 U	100 U	100 U	99 U	--	--	--	--
Dicamba	µg/Kg	55 U	53 U	44 U	46 U	45 U	45 U	44 U	--	--	--	--
Dichlorprop	µg/Kg	110 U	110 U	88 U	92 U	89 U	89 U	88 U	--	--	--	--
Dinoseb	µg/Kg	16 U	16 U	13 U	14 U	13 U	13 U	13 U	--	--	--	--
MCPA	µg/Kg	11,000 U	11,000 U	8,800 U	9,200 U	8,900 U	8,900 U	8,800 U	--	--	--	380,000
MCPP	µg/Kg	11,000 U	11,000 U	8,800 U	9,200 U	8,900 U	8,900 U	8,800 U	--	--	--	--
Pentachlorophenol	µg/Kg	15 U	15 U	12 U	13 U	12 U	56	12 U	--	--	--	3,700
Polychlorinated Biphenyls Aroclors (PCBs) (EPA 8082)												
Aroclor 1016/1242	µg/Kg	10 U	10 U	10 U	10 U	10 U	10 U	10 U	530	--	--	--
Aroclor 1221	µg/Kg	20 U	20 U	20 U	20 U	20 U	20 U	20 U	--	--	--	--
Aroclor 1232	µg/Kg	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--	--	--	--
Aroclor 1248	µg/Kg	10 U	10 U	10 U	10 U	10 U	10 U	10 U	1,500	--	--	--
Aroclor 1254	µg/Kg	10 U	10 U	10 U	10 U	10 U	10 U	10 U	300	--	--	--
Aroclor 1260	µg/Kg	10 U	10 U	10 U	10 U	10 U	10 U	10 U	200	--	--	--
Aroclor 1262	µg/Kg	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--	--	--	--
Aroclor 1268	µg/Kg	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--	--	--	--
Total PCBs[7]	µg/Kg	ND	ND	ND	ND	ND	ND	ND	676	0.39	--	560
Polycyclic Aromatic Hydrocarbons (EPA 8270-SIM)												
1-Methylnaphthalene	µg/Kg	15.3 U	14.4 U	14.3 U	15.9 U	14.4 U	14.7 U	14.7 U	--	--	--	--
2-Methylnaphthalene	µg/Kg	15.3 U	14.4 U	14.3 U	15.9 U	14.4 U	14.7 U	14.7 U	200	--	--	--
Acenaphthene	µg/Kg	15.3 U	14.4 U	6.64 J	15.9 U	14.4 U	14.7 U	14.7 U	300	--	--	61,000,000
Acenaphthylene	µg/Kg	15.3 U	14.4 U	14.3 U	15.9 U	14.4 U	6.09 J	14.7 U	200	--	--	--
Anthracene	µg/Kg	15.3 U	14.4 U	14.3 U	15.9 U	14.4 U	14.7 U	14.7 U	845	--	--	10,000,000
Benzo(a)anthracene	µg/Kg	13.7 J	7.44 J	12.5 J	18.9	7.92 J	17.1	13.6 J	1,050	--	--	2,700
Benzo(a)pyrene	µg/Kg	18.5	10.0 J	17.9	22.8	11.5 J	30.1	18.7	1,450	--	--	270
Benzo(b)fluoranthene	µg/Kg	16.3	10.1 J	13.6 J	22.6	9.91 J	23.6	15.8	--	--	--	2,700
Benzo(g,h,i)perylene	µg/Kg	18.4	10.2 J	20.6	20.9	12.2 J	36.2	21.0	300	--	--	--
Benzo(k)fluoranthene	µg/Kg	14.2 J	7.99 J	12.0 J	17.9	7.86 J	19.7	12.9 J	13,000	--	--	27,000
Chrysene	µg/Kg	16.3	9.56 J	14.2 J	26.0	9.76 J	22.4	16.7	1,290	--	--	250,000
Dibenzo(a,h)anthracene	µg/Kg	15.3 U	14.4 U	14.3 U	4.55 J	14.4 U	4.91 J	3.93 J	1,300	--	--	270
Fluoranthene	µg/Kg	26.4	12.4 J	35.1	30.5	15.5	30.1	23.5	2,230	37,000	--	29,000,000
Fluorene	µg/Kg	15.3 U	14.4 U	14.3 U	15.9 U	14.4 U	14.7 U	14.7 U	536	--	--	41,000,000
Indeno(1,2,3-cd)pyrene	µg/Kg	15.2 J	8.54 J	14.9	18.6	9.76 J	26.2	16.4	100	--	--	2,700
Naphthalene	µg/Kg	15.3 U	14.4 U	14.3 U	15.9 U	14.4 U	14.7 U	14.7 U	561	--	--	23,000
Phenanthrene	µg/Kg	12.3 J	4.06 J	24.0	9.69 J	6.97 J	7.33 J	8.61 J	1,170	--	--	--
Pyrene	µg/Kg	26.4	13.1 J	40.4	29.8	16.5	36.5	27.4	1,520	1,900	--	21,000,000
Total PAH[7]	µg/Kg	178	93.4	212	222	108	260	179	--	--	--	--

Table 3
2010 Riverbank Surface Soil Results
End of Swan Island Lagoon

		Transect 1	Transect 2		Transect 3	Transect 4	Transect 5		JSCS[1] Screening Level Value		*DEQ Background*	DEQ RBCs[2]
		Surface Soil Composite	Surface Soil Composite	Surface Soil Composite (Duplicate)	Surface Soil Composite	Surface Soil Composite	Surface Soil Composite	Surface Soil Composite (Duplicate)				*Soil Ingestion, Dermal Contact and Inhalation*
		FO105711	FO105712	FO105716	FO105713	FO105714	FO105715	FO105717				
Analyte	**Units**	6/2/2010	6/2/2010	6/2/2010	6/2/2010	6/2/2010	6/2/2010	6/2/2010	**Toxicity[3]**	**Bioaccumulation[3]**		**Occupational[3]**
Phthalates (EPA 8270-SIM)												
Bis(2-ethylhexyl) phthalate (BEHP)	µg/Kg	40.4	31.0	25.5 J	43.9	37.8	33.9	28.1 J	800	330	--	150,000
Butyl Benzyl Phthalate	µg/Kg	37.2	25.2 J	21.8 J	32.1	23.1 J	21.1 J	24.1 J	--	--	--	--
Diethyl phthalate	µg/Kg	30.6 U	28.7 U	28.6 U	31.8 U	28.8 U	29.5 U	29.5 U	600	--	--	--
Dimethyl phthalate	µg/Kg	30.6 U	28.7 U	28.6 U	31.8 U	28.8 U	29.5 U	29.5 U	--	--	--	--
Di-n-butyl phthalate	µg/Kg	30.6 U	28.7 U	28.6 U	31.8 U	28.8 U	29.5 U	29.5 U	100	60	--	--
Di-n-octyl phthalate	µg/Kg	30.6 U	28.7 U	28.6 U	31.8 U	28.8 U	29.5 U	29.5 U	--	--	--	--
Hydrocarbons (NWTPH-HCID)												
Diesel	mg/Kg	50 U	50 U	50 U	50 U	50 U	50 U	50 U	--	--	--	14,000
Diesel Range Hydrocarbons (NWTPH-Dx)	mg/Kg	NA	NA	NA	NA	NA	NA	25 U	--	--	--	14,000
Gasoline	mg/Kg	20 U	20 U	20 U	20 U	20 U	20 U	20 U	--	--	--	36,000
Lube Oil	mg/Kg	100 U	100 U	100 U	100 U	100 U	100 U	DETECT	--	--	--	36,000
Oil Range Hydrocarbons (NWTPH-Dx)	mg/Kg	NA	NA	NA	NA	NA	NA	50 U	--	--	--	--

Notes:
J = The result is an estimated concentration because the value is less than the MRL but greater than or equal to the MDL, or, for butyltins, the result may be a high estimate based on a high laboratory control sample recovery.
U = The analyte was not detected above the reported sample quantification limit.
NA = not analyzed.
ND = not detected.
µg/Kg = micrograms per kilogram.
mg/Kg = milligrams per kilogram.
[1] JSCS - Portland Harbor Joint Source Control Strategy (DEQ/EPA Final December 2005, Amended July 2007).
[2] DEQ Risk Based Concentrations (RBCs) (DEQ, 2003; Table updated June 2012)
[3] Colored shading identifies potential exceedances of DEQ RBCs or SLVs. Identification of a RBC or SLV exceedance does not necessarily indicate unacceptable risk.
[4] Estimated Total DDx is the sum of DDE, DDD, and DDT.
[5] Alpha-chlordane is also known as cis-Chlordane. Beta-Chlordane is also known as trans-chlordane and gamma-chlordane.
[6] Total Chlordane is the sum of alpha- and beta-isomers.
[7] Total PCBs and PAHs are calculated by assigning "0" to undetected constituents.

Table 4
2004 LWG Beach Sediment Results
End of Swan Island Lagoon

		Beach Composite (0 - 15 cm)
		LW2-BO24
Analyte	**Units**	7/30/2004
Conventionals (PSEP)		
Total Organic Carbon	%	0.27
Total Solids	%	77.9
Metals		
Aluminum (SW 6010B)	mg/Kg	12,600
Antimony (SW 6020)	mg/Kg	2.41 J
Arsenic (SW 6020)	mg/Kg	8
Cadmium (SW 6020)	mg/Kg	0.535
Chromium (SW 6010B)	mg/Kg	26.8
Copper (SW 6010B)	mg/Kg	60.5
Lead (SW 6020)	mg/Kg	73.1
Mercury (SW 7471A)	mg/Kg	0.101
Nickel (SW 6010B)	mg/Kg	19.4
Selenium (SW 7742)	mg/Kg	0.08 J
Silver (SW 6020)	mg/Kg	0.093
Zinc (SW 6010B)	mg/Kg	272
Organotins (PSEP GC/MS)		
Dibutyltin	µg/Kg	NA
Monobutyltin	µg/Kg	NA
Tetrabutyltin	µg/Kg	NA
Tributyltin	µg/Kg	NA
Organochlorine Pesticides (EPA 8081A)		
4,4'-DDD	µg/Kg	4.71 NJ
4,4'-DDE	µg/Kg	5.03
4,4'-DDT	µg/Kg	0.789 NJ
Estimated Total DDx[(1)]	µg/Kg	10.529
Aldrin	µg/Kg	0.0317 U
Dieldrin	µg/Kg	0.0518 U
Endosulfan I	µg/Kg	0.0291 U
Endosulfan II	µg/Kg	0.0243 U
Endosulfan sulfate	µg/Kg	0.0747 U
Endrin	µg/Kg	0.0401 UJ
Endrin aldehyde	µg/Kg	0.0442 U
Endrin ketone	µg/Kg	0.0298 U
Heptachlor	µg/Kg	0.0308 U
Heptachlor epoxide	µg/Kg	0.0401 U
Methoxychlor	µg/Kg	0.95 NJ
Toxaphene	µg/Kg	9.51 U
delta-Hexachlorocyclohexane	µg/Kg	0.0723 UJ
Mirex	µg/Kg	0.0363 U
2,4'-DDE	µg/Kg	0.0346 U
2,4'-DDD	µg/Kg	2.93 J
2,4'-DDT	µg/Kg	0.0457 U
alpha-BHC (α-BHC)	µg/Kg	0.0338 U
beta-BHC (β-BHC)	µg/Kg	0.746 NJ
delta-BHC (δ-BHC)	µg/Kg	0.0772 U
gamma-BHC (γ-BHC, Lindane)	µg/Kg	0.0772 U
cis-Chlordane	µg/Kg	1.85
Oxychlordane	µg/Kg	0.0182 U
trans-Chlordane	µg/Kg	3.09
trans-Nonachlor	µg/Kg	0.943 J
cis-Nonachlor	µg/Kg	0.448 J
Total Chlordane[(2)]	µg/Kg	7.077

Table 4
2004 LWG Beach Sediment Results
End of Swan Island Lagoon

		Beach Composite (0 - 15 cm)
		LW2-BO24
Analyte	**Units**	7/30/2004
Phenols (EPA 8151)		
2,3,4,6;2,3,5,6-Tetrachlorophenol coelution	µg/Kg	2.4 U
2,3,4,5-Tetrachlorophenol	µg/Kg	3.8 U
Pentachlorophenol	µg/Kg	2.6 U
2,4,6-Trichlorophenol	µg/Kg	2.4 U
2,4,5-Trichlorophenol	µg/Kg	1.9 U
Phenols (EPA 8270)		
4-Nitrophenol	µg/Kg	39 U
2,4-Dimethylphenol	µg/Kg	7.2 U
4-Methylphenol	µg/Kg	3.8 U
Phenol	µg/Kg	3.2 U
2,4-Dichlorophenol	µg/Kg	2.4 U
2,4-Dinitrophenol	µg/Kg	47 U
4,6-Dinitro-2-methylphenol	µg/Kg	2.2 U
4-Chloro-3-methylphenol	µg/Kg	2.8 U
2-Nitrophenol	µg/Kg	3.4 U
2-Methylphenol	µg/Kg	4.4 U
2-Chlorophenol	µg/Kg	2.2 U
Semivolatile Organic Compounds (EPA 8270)		
4-Nitroaniline	µg/Kg	4.4 U
Benzyl alcohol	µg/Kg	4.8 U
4-Bromophenyl phenyl ether	µg/Kg	1.9 U
Azobenzene	µg/Kg	3.2 U
1,4-Dichlorobenzene	µg/Kg	2.5 U
4-Chloroaniline	µg/Kg	2.8 U
Bis(2-chloroethyl) ether	µg/Kg	3.2 U
Bis(2-chloroethoxy) methane	µg/Kg	1.7 U
1,2,4-Trichlorobenzene	µg/Kg	2 U
2,4-Dinitrotoluene	µg/Kg	3.7 U
Bis(2-chloroisopropyl) ether	µg/Kg	1.6 U
1,3-Dichlorobenzene	µg/Kg	2.1 U
2,6-Dinitrotoluene	µg/Kg	3.7 U
N-Nitrosodipropylamine	µg/Kg	4.2 U
Aniline	µg/Kg	2 U
N-Nitrosodimethylamine	µg/Kg	7.9 U
Benzoic acid	µg/Kg	130 U
4-Chlorophenyl phenyl ether	µg/Kg	2.6 U
Hexachlorocyclopentadiene	µg/Kg	20 U
Isophorone	µg/Kg	2.1 U
N-Nitrosodiphenylamine	µg/Kg	2.9 U
Carbazole	µg/Kg	2.5 J
2-Nitroaniline	µg/Kg	3.5 U
2-Chloronaphthalene	µg/Kg	4.7 U
3,3'-Dichlorobenzidine	µg/Kg	4.8 U
1,2-Dichlorobenzene	µg/Kg	1.7 U
Nitrobenzene	µg/Kg	2.6 U
3-Nitroaniline	µg/Kg	3.4 U

Table 4
2004 LWG Beach Sediment Results
End of Swan Island Lagoon

		Beach Composite (0 - 15 cm)
		LW2-BO24
Analyte	**Units**	7/30/2004
Polychlorinated Biphenyls Aroclors (PCBs) (EPA 8082)		
Aroclor 1016/1242	µg/Kg	3.8 U
Aroclor 1221	µg/Kg	7 U
Aroclor 1232	µg/Kg	6.3 U
Aroclor 1248	µg/Kg	37
Aroclor 1254	µg/Kg	2.3 U
Aroclor 1260	µg/Kg	36
Aroclor 1262	µg/Kg	3.5 U
Aroclor 1268	µg/Kg	3 U
Total PCBs[(3)]	µg/Kg	73
Polychlorinated Biphenyls Congeners (PCBs) (E1668)		
PCB077	µg/Kg	0.271
PCB105	µg/Kg	1.25
PCB169	µg/Kg	0.000919 U
PCB156	µg/Kg	0.333
PCB189	µg/Kg	0.0415
PCB167	µg/Kg	0.161
PCB126	µg/Kg	0.0172
PCB123	µg/Kg	0.0728
PCB157	µg/Kg	0.0819
PCB081	µg/Kg	0.0492
PCB114	µg/Kg	0.0772
PCB106 & 118	µg/Kg	2.83
Total PCB Congeners	µg/Kg	5.1848
Polycyclic Aromatic Hydrocarbons (EPA 8270-SIM)		
Dibenzofuran	µg/Kg	0.63 J
2-Methylnaphthalene	µg/Kg	1.4 J
Acenaphthene	µg/Kg	1.2
Acenaphthylene	µg/Kg	2.2
Anthracene	µg/Kg	3.7
Benzo(a)anthracene	µg/Kg	20
Benzo(a)pyrene	µg/Kg	22
Benzo(b)fluoranthene	µg/Kg	36
Benzo(g,h,i)perylene	µg/Kg	23
Benzo(k)fluoranthene	µg/Kg	11 J
Chrysene	µg/Kg	24
Dibenzo(a,h)anthracene	µg/Kg	4.5
Fluoranthene	µg/Kg	35
Fluorene	µg/Kg	1.1
Indeno(1,2,3-cd)pyrene	µg/Kg	18 J
Naphthalene	µg/Kg	2.4
Phenanthrene	µg/Kg	10 J
Pyrene	µg/Kg	40 U
Total PAH[(3)]	µg/Kg	216
Phthalates (EPA 8270-SIM)		
Bis(2-ethylhexyl) phthalate (BEHP)	µg/Kg	39
Butyl Benzyl Phthalate	µg/Kg	2 U
Diethyl phthalate	µg/Kg	4.6 U
Dimethyl phthalate	µg/Kg	2.4 U
Di-n-butyl phthalate	µg/Kg	8.5 J
Di-n-octyl phthalate	µg/Kg	1.6 U

Table 4
2004 LWG Beach Sediment Results
End of Swan Island Lagoon

		Beach Composite (0 - 15 cm)
		LW2-BO24
Analyte	**Units**	7/30/2004
Dioxin Furans (E1613)		
2,3,7,8-Tetrachlorodibenzo-p-dioxin	pg/g	1.291
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	pg/g	3.772
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	pg/g	154.258
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	pg/g	1.023
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	pg/g	0.666 J
2,3,7,8-Tetrachlorodibenzofuran	pg/g	0.636
1,2,3,4,7,8,9-Heptachlorodibenzofuran	pg/g	0.837 J
2,3,4,7,8-Pentachlorodibenzofuran	pg/g	0.663 J
1,2,3,7,8-Pentachlorodibenzofuran	pg/g	0.341 U
1,2,3,6,7,8-Hexachlorodibenzofuran	pg/g	1.569
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	pg/g	5.697
2,3,4,6,7,8-Hexachlorodibenzofuran	pg/g	1.421
1,2,3,4,6,7,8-Heptachlorodibenzofuran	pg/g	26.99
1,2,3,4,7,8-Hexachlorodibenzofuran	pg/g	1.55
1,2,3,7,8,9-Hexachlorodibenzofuran	pg/g	0.063 U
Tetrachlorodibenzofuran homologs	pg/g	7.51
Pentachlorodibenzofuran homologs	pg/g	18.709
Octachlorodibenzo-p-dioxin	pg/g	1659.661 J
Hexachlorodibenzo-p-dioxin homologs	pg/g	37.147
Pentachlorodibenzo-p-dioxin homologs	pg/g	3.704
Heptachlorodibenzo-p-dioxin homologs	pg/g	318.567
Heptachlorodibenzofuran homologs	pg/g	99.954
Octachlorodibenzofuran	pg/g	128.235
Tetrachlorodibenzo-p-dioxin homologs	pg/g	2.254
Hexachlorodibenzofuran homologs	pg/g	40.543

Notes:

J = The result is an estimated concentration because the value is less than the MRL but greater than or equal to the MDL, or, for butyltins, the result may be a high estimate based on a high laboratory control sample recovery.

U = The analyte was not detected above the reported sample quantification limit.
NA = not analyzed.
ND = not detected.
µg/Kg = micrograms per kilogram.
mg/Kg = milligrams per kilogram.
pg/g = picograms per gram.
(1) Estimated Total DDx is the sum of DDE, DDD, and DDT.
(2) Total Chlordane is the sum of alpha- and beta-isomers. The total concentration is calculated by assigning "0" to undetected constituents.
(3) Total PCBs and PAHs are calculated by assigning "0" to undetected constituents.

Source:
Integral Consulting, Inc., Windward Environmental, LLC, Kennedy/Jenks Consultants, Anchor Environmental, LLC. 2007. *Portland Harbor RI/FS Comprehensive Round 2 Site Characterization Summary and Data Gaps Analysis Report. Appendix C – Nature and Extent* . Prepared for The Lower Willamette Group (LWG). Portland, OR. February 21, 2007. Sample identifed as 09B024 in Appendix F of this report.

Figures

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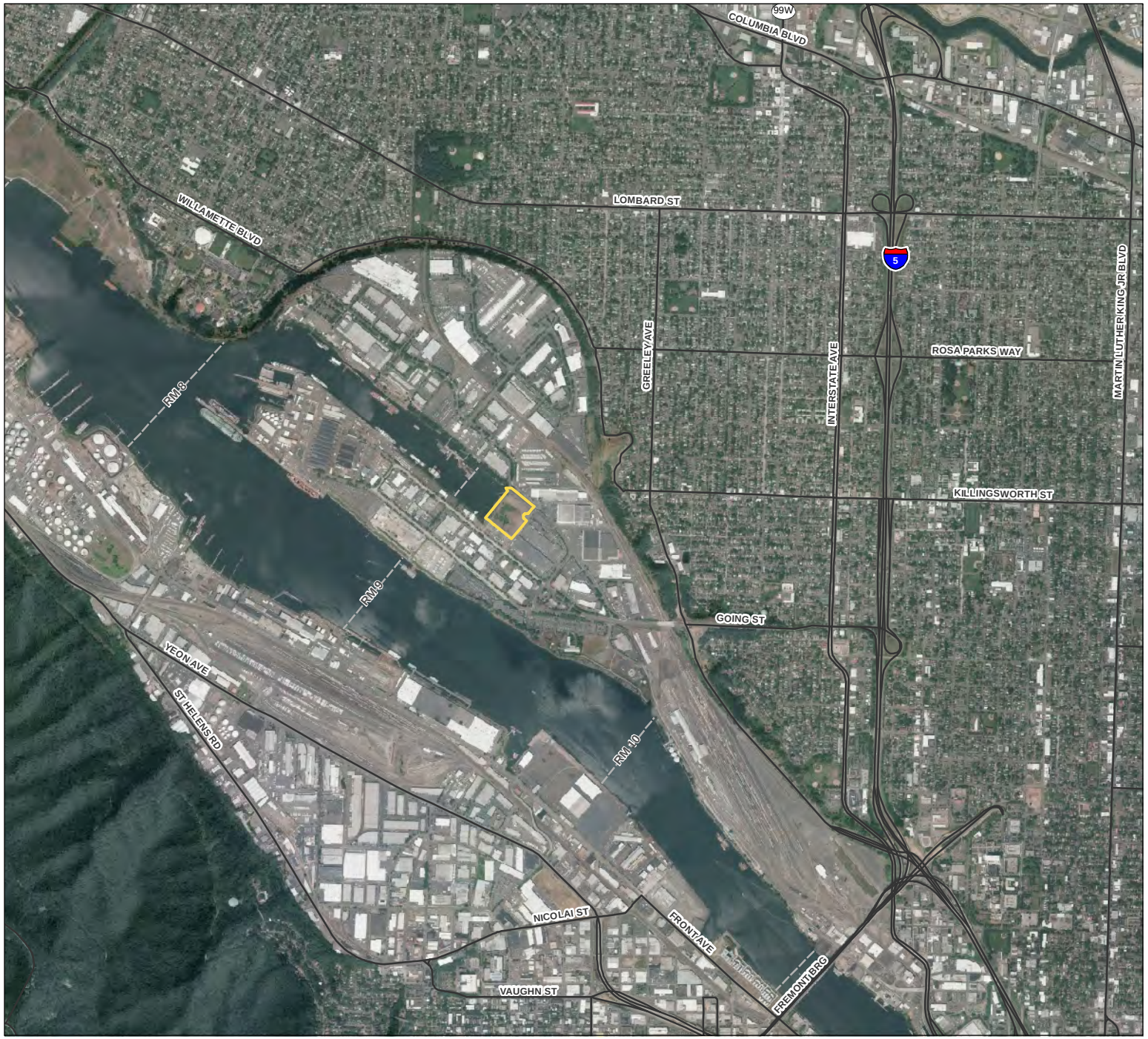


LEGEND

- Property Boundary
- Major Road
- River Mile (RM)

N

0 0.25 0.5
Miles

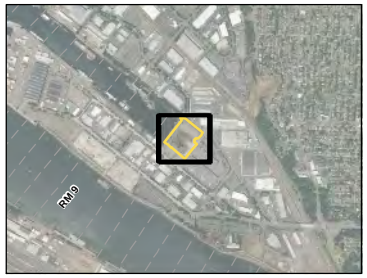
FIGURE 1
Site Location
End of Swan Island Lagoon

Disclaimer:
Information contained on this map is accurate according to available records, however the City of Portland makes no warranty, expressed or implied, as to the completeness or accuracy of the information published.

Prepared By:
GSI, March 15, 2012
005_SC\Swan_Island_Tech_Services

Source:
City of Portland BES, Aerial Photo Fall 2012

GSI Water Solutions, Inc.



LEGEND

- Property Boundary
- Lot Line
- DEQ ECSI Site
- Manhole
- Catch Basin
- City Outfall
- Port Outfall
- Storm Line
- Abandoned Main
- Portsmouth Force Main
- River Mile Tenths

N

0 75 150
Feet

FIGURE 2
Current Site Features -
End of Swan Island Lagoon

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Prepared By:
GSI, April 4, 2013
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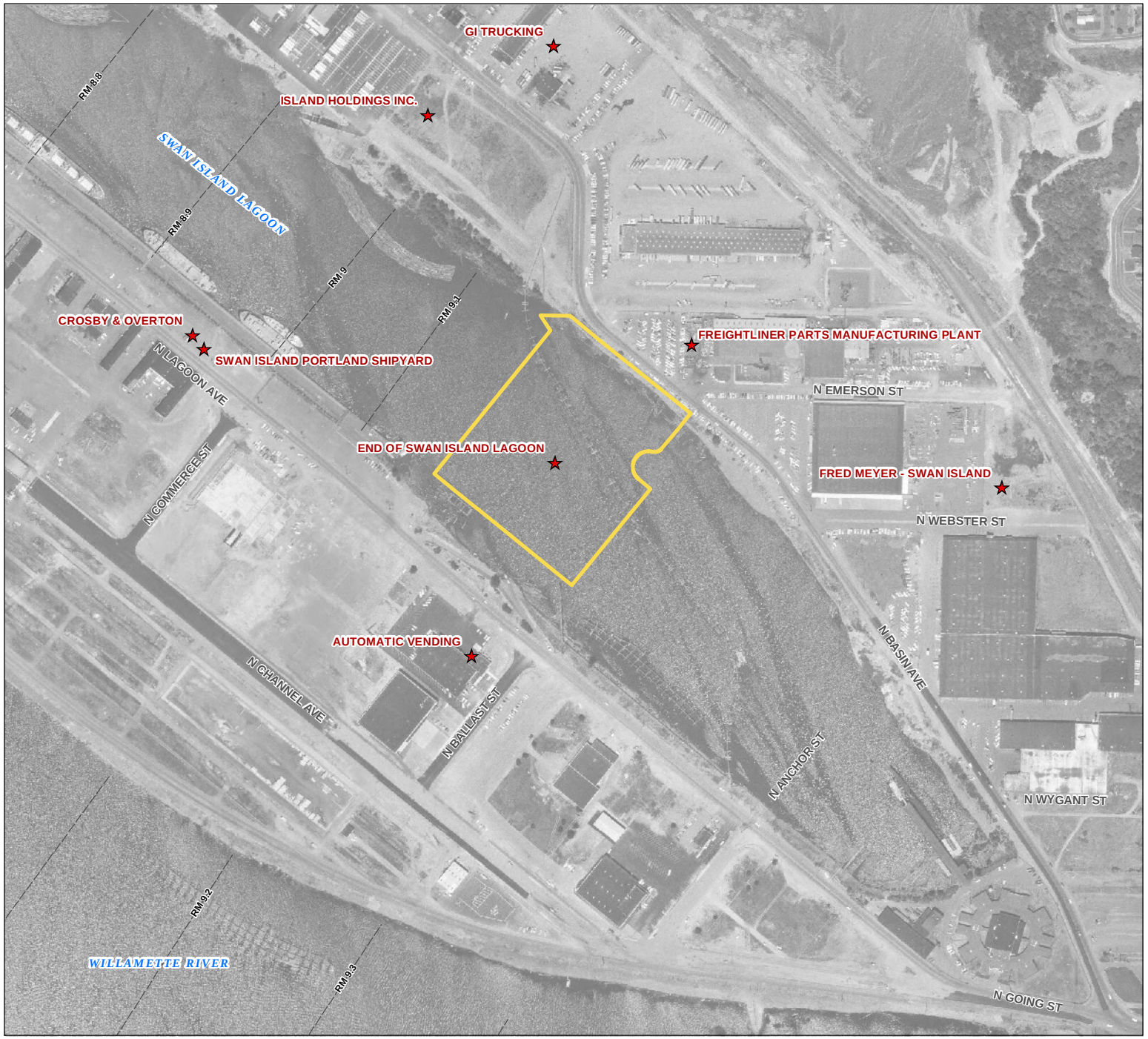
Tech_Services

Source:
City of Portland BES,
Aerial Photo Fall 2012

GSI Water Solutions, Inc.



LEGEND

- Property Boundary
- DEQ ECSI Site
- River Mile Tenths

N

0 250 500
Feet

FIGURE 3
Site Overview - 1960's
End of Swan Island Lagoon

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GSI, March 15, 2013
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Source:
City of Portland BES, Aerial Photo 1960s

GSI Water Solutions, Inc.

LEGEND

- Property Boundary
- DEQ ECSI Site
- River Mile Tenths

N

0 250 500

Feet

FIGURE 4

Site Overview - 1975

End of Swan Island Lagoon

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Prepared By:
GSI, March 15, 2013
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Source:
City of Portland BES, Aerial Photo 1975

GSI Water Solutions, Inc.

LEGEND

- Property Boundary
- DEQ ECSI Site
- River Mile Tenths

N

0 250 500

Feet

FIGURE 5

Site Overview - 1990

End of Swan Island Lagoon

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GSI, March 15, 2013
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Source:
City of Portland BES, Aerial Photo 1990

GSI Water Solutions, Inc.

LEGEND

- Property Boundary
- DEQ ECSI Site
- River Mile Tenths

N

0 250 500

Feet

FIGURE 6

Site Overview - 1999

End of Swan Island Lagoon

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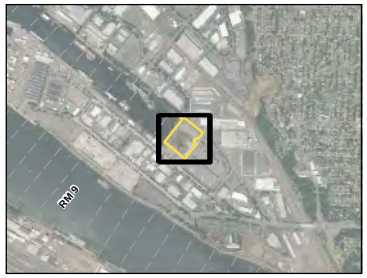
Source:
City of Portland BES, Aerial Photo 1999

GSI Water Solutions, Inc.



LEGEND

- Property Boundary
- Temporary Vegetated Swale (2009 - 2011)
- Temporary Parking (2009-2011)
- Temporary Staging Area
- DEQ ECSI Site
- Portsmouth Force Main (Sanitary)

N

0 75 150

Feet

FIGURE 7

Temporary Site Features
End of Swan Island Lagoon

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Prepared By:
GSI, March 15, 2013
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Source:
City of Portland BES, Aerial Photo 2010

GSI Water Solutions, Inc.

LEGEND

- Property Boundary
- Manhole
- Catch Basin
- City Outfall
- Storm Line
- Drainage Direction
- River Mile Tenths

Drainage Area

- 1 - Drains to OF M-3
- 2 - Overland Flow to River
- 3 - Overland Flow Off Nature Trail, Infiltration in Adjacent Soils
- 4 - Inflitration

N

0 75 150
Feet

FIGURE 8
Current Site Drainage
End of Swan Island Lagoon

Disclaimer:
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Prepared By:
GSI, March 15, 2013
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Source:
City of Portland BES, Aerial Photo Fall 2012

GSI Water Solutions, Inc.

LEGEND

- Transect Composite Sub Sample Location
- Bank Transect Composite Sample
- Property Boundary
- DEQ ECSI Site
- River Mile Tenths

N

0 50 100

Feet

FIGURE 9

2010 Riverbank Surface Soil Sample Locations
End of Swan Island Lagoon

Disclaimer:
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Prepared By:
GSI, January 8, 2013
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Source:
City of Portland BES, Aerial Photo 2010

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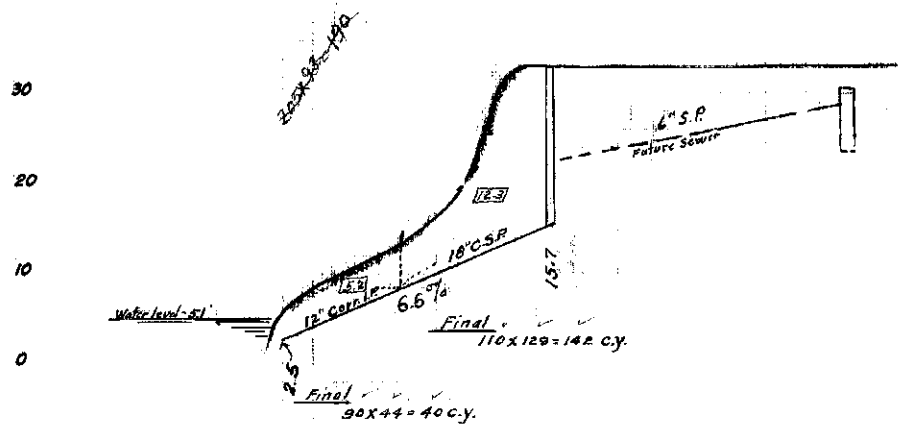
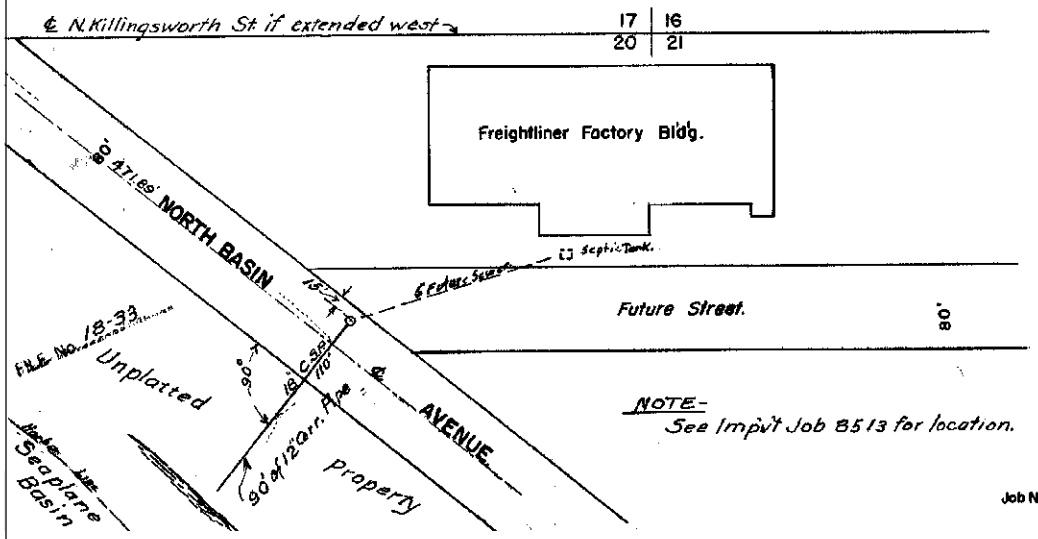


FILE No. 18-33

FINAL MAP

Sewer Constructed by L.H. Hoffman Co.
Sewer Completed April 1, 1952
Kind of Pipe C.S.P. & Conc. I.P.
Map Corrected by DMB Checked by
Data Entered on ¼ Sec. Map by DMB Checked by
Data Entered on Dist. Map by ____ Checked by ____ (Storm Sewer)



NOTE- See Impvt Job B513 for location.

PERMIT JOB
ORD. NO. 76971
EXHIBIT "A"

STORM

SEWER IN NORTH BASIN AVENUE

PORTLAND, ORE. JAN, 1952.

L.G. APPERSON
CITY ENGINEER
Scale: 1" = 100'

APPROVED L.G. Apperson DATE 1-31-52
City Engineer.
Reg. Prof. Engr. No. 219. Nov. 8, 1919.

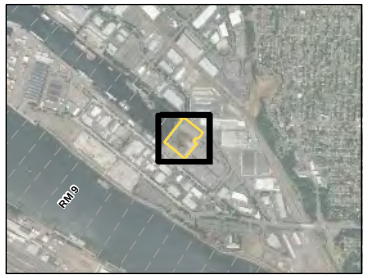
Job No. 1959 ¼ Sec. No. 2526 D'wn by DAB Ch'k'd by

FIGURE 10
Former Outfall M-4

Prepared By:
GSI, March 15, 2015
005_SC\Swan_Island_Tech_Services

Source:
City of Portland BES,

GSI Water Solutions, Inc.



LEGEND

- Property Boundary
- River Bank/Beach
- Uplands
- Parking/Boat Ramp
- Former Staging and Parking Area Revegetated in 2011
- Nature Trail

N

0 75 150

Feet

FIGURE 11

Level 1 Ecological Risk Assessment Survey - 2012
End of Swan Island Lagoon

Disclaimer:
Information contained on this map is accurate according to available records, however the City of Portland makes no warranty, expressed or implied, as to the completeness or accuracy of the information published.

Prepared By:
GSI, March 15, 2013
005_SC\Swan_Island_Tech_Services

Source:
City of Portland BES, Aerial Photo Fall 2012

GSI Water Solutions, Inc.

APPENDIX A

Site Reports (on DVD only)

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APPENDIX B

Sample Location Maps

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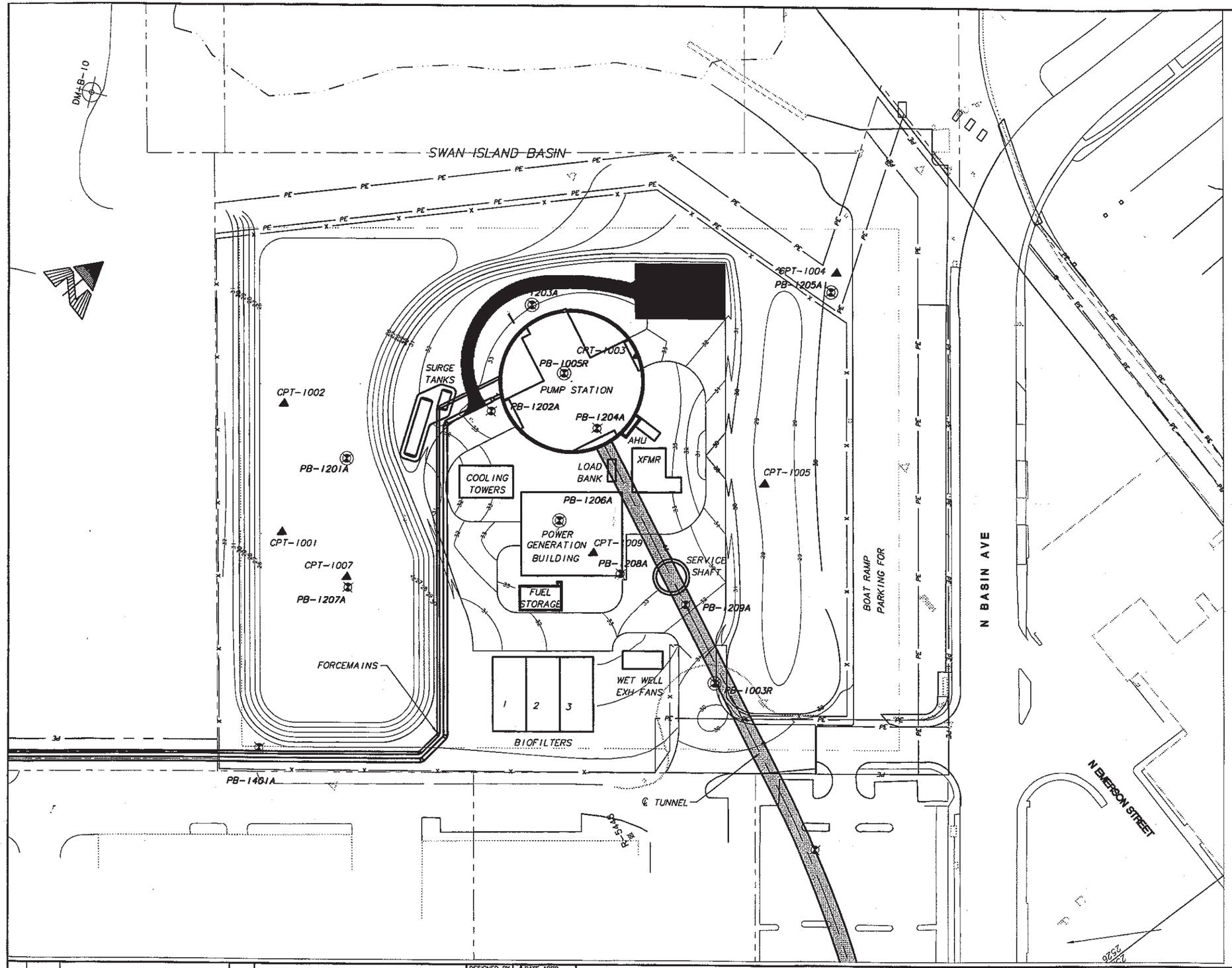


LEGEND

- PREVIOUS BORING BY OTHERS
- PREVIOUS MONITORING WELL BY OTHERS
- BORING DRILLED FOR THIS PROJECT
- BORING DRILLED FOR THIS PROJECT WITH A MONITORING WELL INSTALLED
- CPT PUSHED FOR THIS PROJECT

1 INCH

BAR EQUALS ONE INCH WHEN DRAWING IS PLOTTED FULL SIZE. IF NOT, SCALE ACCORDINGLY

50 0 25 50 100

SCALE FEET

NO.	DATE	DESCRIPTION	APPD.
A	11/29/01	DEQ DESIGN SUBMITTAL	

REVISION

XREF(S) USED: 6680X10, 6680X03, 6680X06, 6680X30
ROTATION ANGLE: 0
CONSTRUCTED BY
PROJECT COMPLETED
MAP CORRECTED BY CHECKED BY
FINAL MAP DATA
GDR23.dwg, 11/13/01 at 11:59

DESIGNED BY	MZ	DATE APPD.	
DRAWN BY	EDL	PROGRAM MGR	
CHECKED BY	GDH	CONST. MGR.	PDG
DESIGN MGR.	GDH	CADD MGR.	LMM

CITY OF PORTLAND
ENVIRONMENTAL SERVICES
WILLAMETTE RIVER CSO CONTROL PROJECT

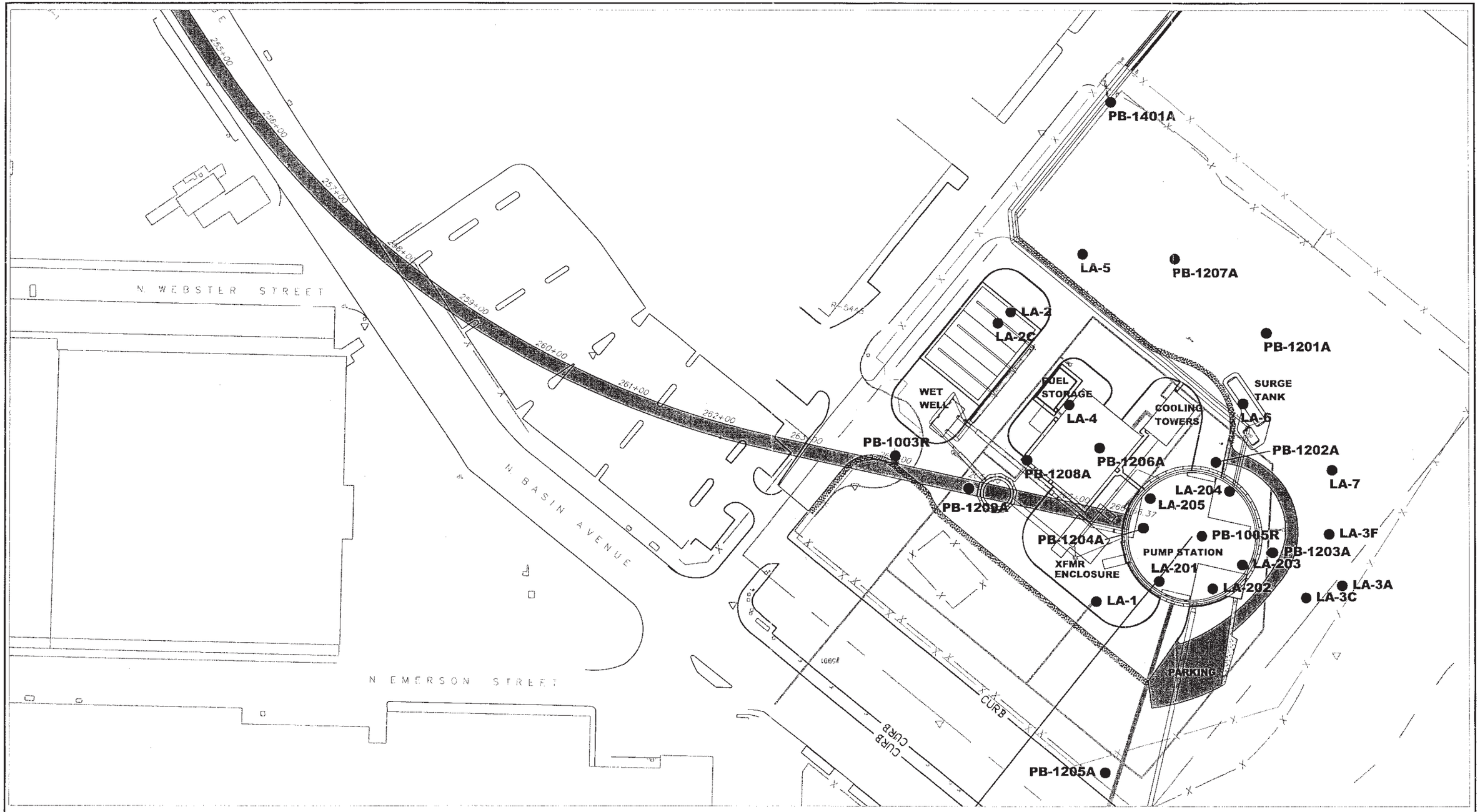
PARSONS BRINCKERHOFF
400 S.W. Sixth Ave. Portland, OR 97204

carollo engineers
A PROFESSIONAL CORPORATION

WEST SIDE CSO PROJECT
BORING LOCATION PLAN
SWAN ISLAND PUMP STATION
FIGURE 2.V

1/4 SECTION
JOB NO. 6680
SHEET NO. GDR23
-- OF --

From *Geotechnical Data Report – DEQ Design Submittal, Volume 7 - West Side CSO Project.* Prepared by Parsons Brinckerhoff for the City of Portland – Bureau of Environmental Services. Dated November 29, 2001.



0 50 100
SCALE IN FEET

LEGEND

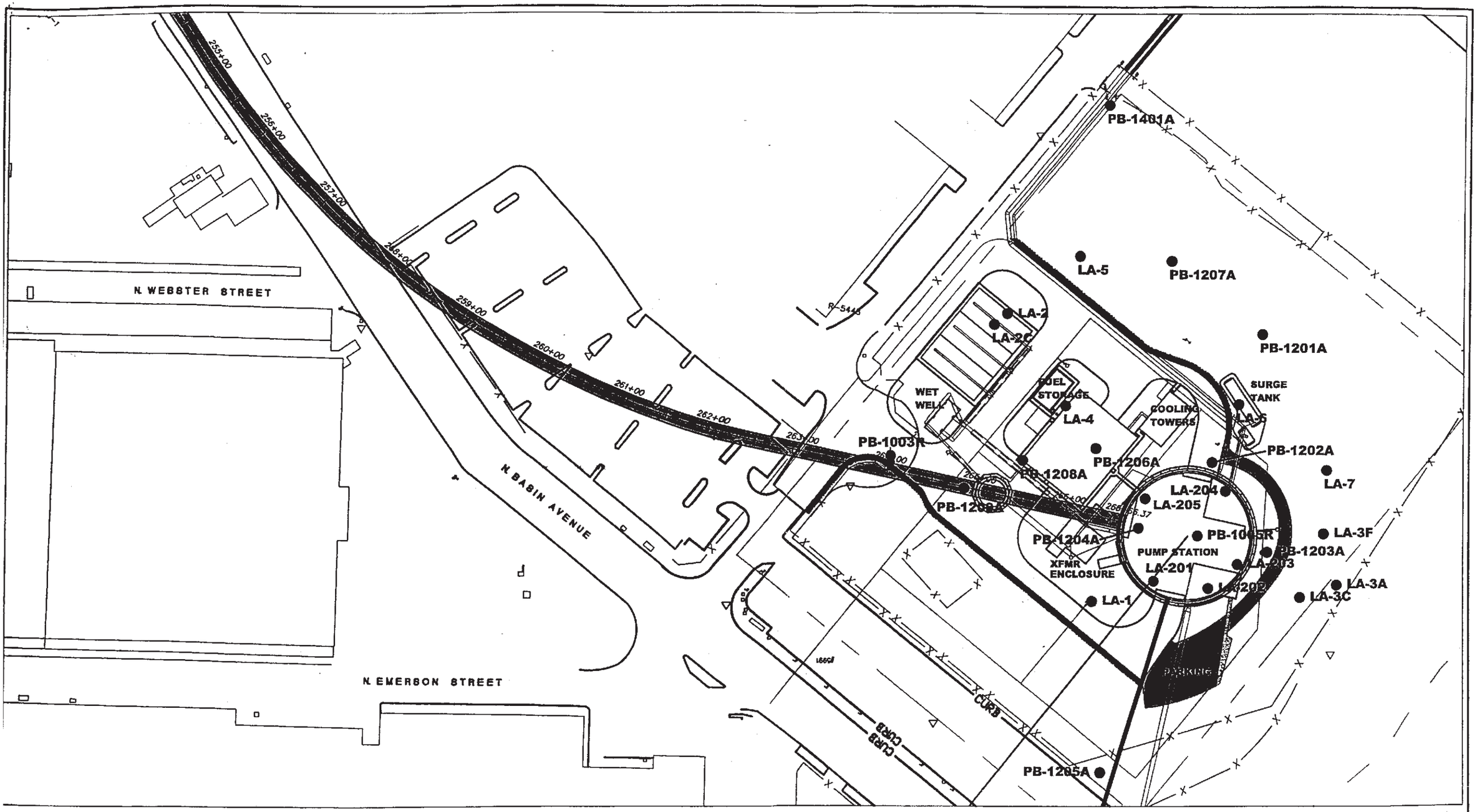
● BORING LOCATION

From *Environmental Data Report – Tables and Figures, DEQ Design Submittal, Volume 9B, West Side CSO Tunnel, Pump Station & Pipeline Project.* Prepared by Parsons Brinckerhoff for the City of Portland Bureau of Environmental Services. November 29, 2001

Figure 4-29
SWAN ISLAND PUMP STATION
BORING LOCATION
CITY OF PORTLAND
PORTLAND, OREGON

CH2MHILL

352G001Z.DWG



0 50 100
SCALE IN FEET

LEGEND

● BORING LOCATION

From *Summary of Swan Island Pump Station Environmental Conditions, Portland, Oregon.*
Prepared by CH2M HILL for the City of Portland – Bureau of Environmental Services. February 2002.

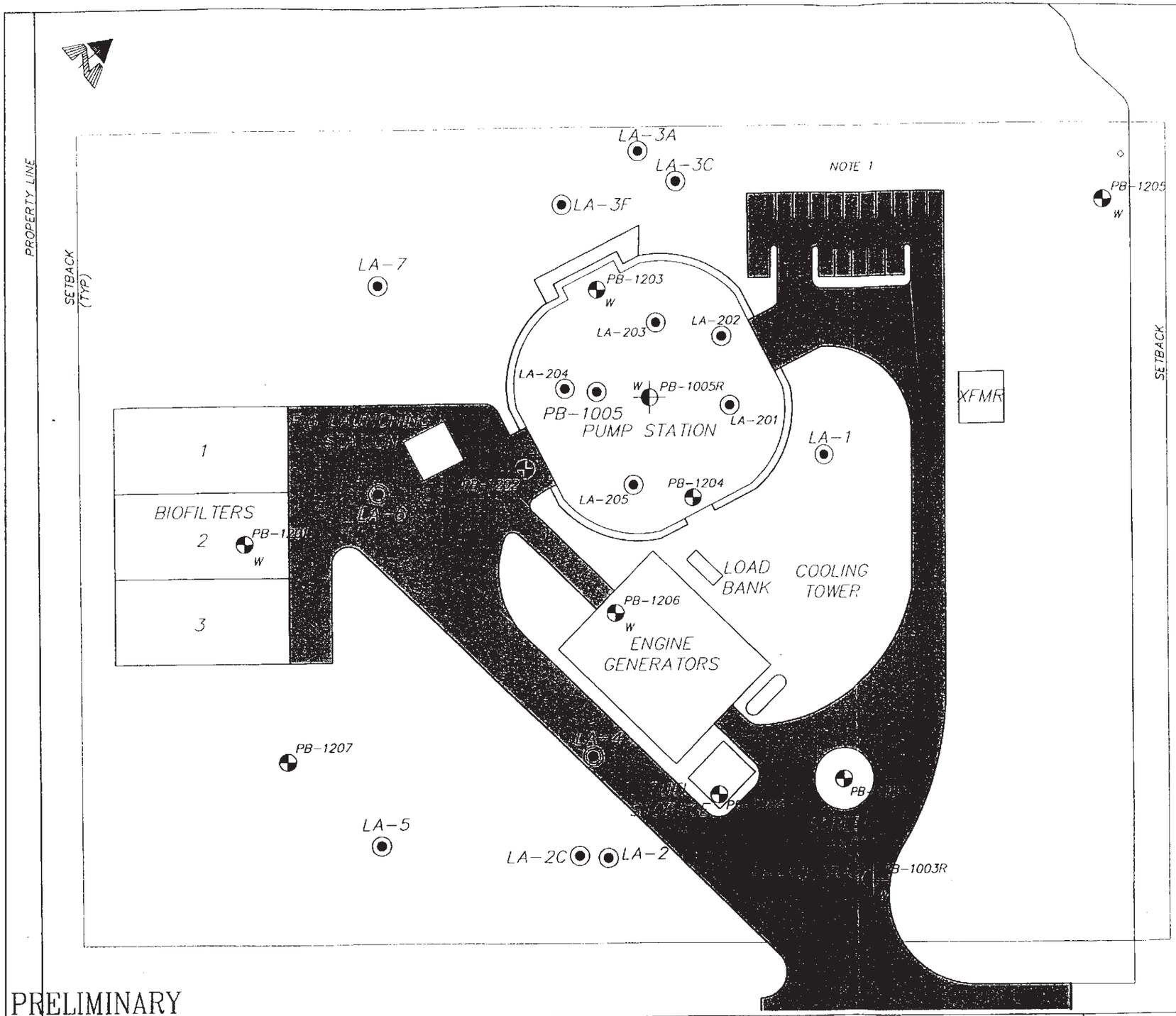
52G001Z.DWG

Figure 1
SWAN ISLAND PUMP STATION
BORING LOCATION
CITY OF PORTLAND
PORTLAND, OREGON

CH2MHILL

From *Environmental Data Interpretive Report, Swan Island Lagoon Site.* Prepared by the City of Portland Bureau of Environmental Services. June 2003.

From *Environmental Data Interpretive Report, Swan Island Lagoon Site.* Prepared by the City of Portland Bureau of Environmental Services. June 2003.



GENERAL NOTES:

A. HORIZONTAL DATUM BASED ON MULTIPLYING THE NAD 83/91 STATE PLANE COORDINATES (GRID) BY 1.000082406.

B VERTICAL ELEVATIONS BASED ON CITY OF PORTLAND VERTICAL DATUM.

LEGEND:

- ROTOSONIC BORING
- MUD ROTARY BORING
- W WELL
- GEOPROBE BORING

1 INCH

BAR EQUALS ONE INCH WHEN DRAWING IS PLOTTED FULL SIZE. IF NOT, SCALE ACCORDINGLY

40 0 20 40 80

SCALE FEET

PRELIMINARY

NO.	DATE	DESCRIPTION	APPD.
		REVISION	

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ROTATION ANGLE: 0
CONSTRUCTED BY
PROJECT COMPLETED
MAP CORRECTED BY CHECKED BY
FINAL MAP DATA
6680G30BC.dwg, 10/29/01 at 14:15

DESIGNED BY	MJC	DATE APPD.	
DRAWN BY	JPC	PROGRAM MGR.	
CHECKED BY	CDH	CONST. MGR.	PDC
DESIGN MGR.	CDH	CADD MGR.	LMH

CITY OF PORTLAND
ENVIRONMENTAL SERVICES
WILLAMETTE RIVER CSO CONTROL PROJECT

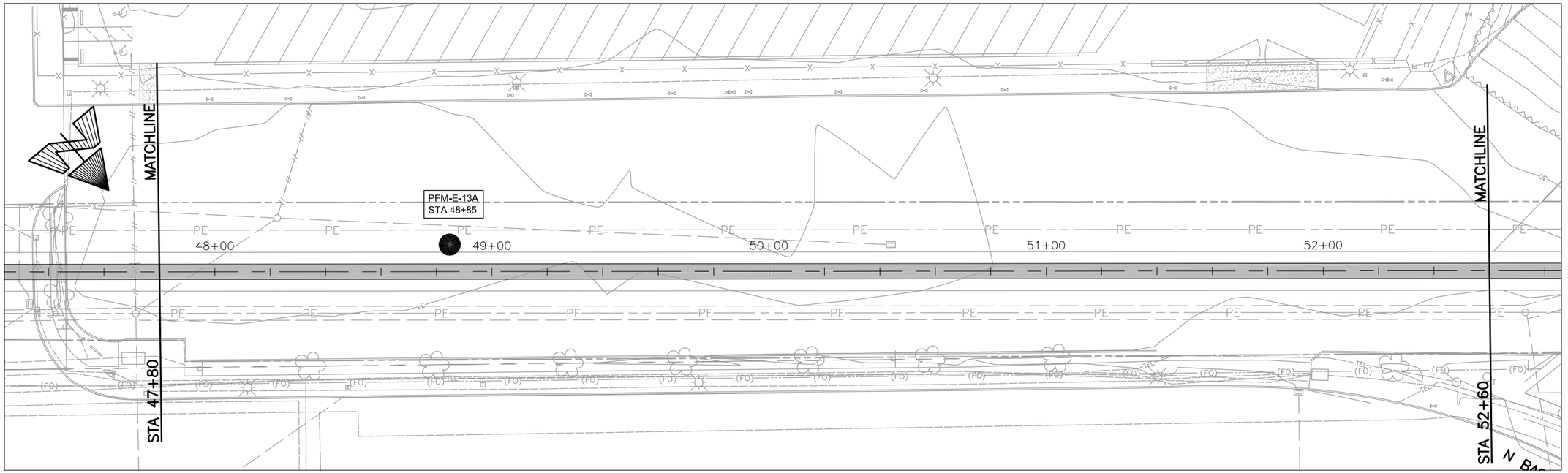
PB PARSONS BRINCKERHOFF Inc. 400 S.W. Sixth Ave, Portland, OR 97204

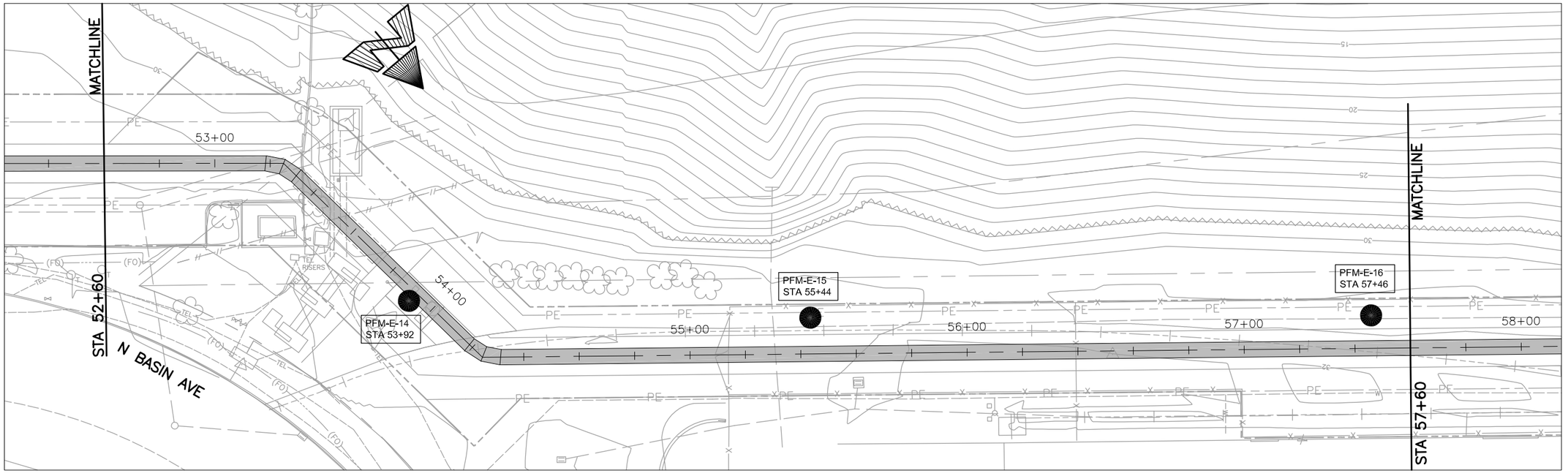
carollo engineers A PROFESSIONAL CORPORATION

WEST SIDE CSO PROJECT
SWAN ISLAND PUMP STATION

SITE PLAN
FIGURE 1

1/4 SECTION	
JOB NO.	6680
SHEET NO.	G-306
	OF





LEGEND

- SOIL BORING LOCATIONS
- SOIL AND GROUNDWATER BORING LOCATIONS

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SCALE FEET

DATE: Oct 13, 2008 – 12:09pm USER: kprado
FILE: P:\129133-CityPortland-PortsmouthForceMainDesign_CADD\2-Sheets\C-Civil\FIG-E-SEGMENT-1.dwg

From *Environmental Data Report (EDR) for the Portsmouth Force Main Project – BES 6902 – Segment 1.* Prepared by Gary Struthers Associates, Inc., for the City of Portland Bureau of Environmental Services. November 2008

CITY OF PORTLAND
ENVIRONMENTAL SERVICES

BROWN AND CALDWELL

100% DESIGN

FIGURE E

PORTSMOUTH FORCE MAIN
SEGMENT 1
ENVIRONMENTAL BOREHOLE LOCATION MAP

APPENDIX C

Riverbank Surface Soil Investigation

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Riverbank Surface Soil Field Sampling Procedures
End of Swan Island Lagoon

1. SAMPLE COLLECTION PROTOCOLS

A total of 7 (5 transect samples and 2 duplicate samples) composite riverbank soil samples were collected by City of Portland Bureau of Environmental Services Staff on June 21, 2010 from the City owned property at the End of Swan Island Lagoon. Riverbank soil was collected and analyzed to evaluate whether bank materials are a potential source of contaminants to the Willamette River (e.g., soil erosion pathway).

A. Transect 1 - 4 Composite Samples

Soil samples were collected in accordance with the City's *Standard Operating Procedure: Sampling of Soil and Sediment*[1]. Sampling protocols are summarized below.

i. Transects 1 through 4 Subsample Locations. Samples were collected from four bank transects shown on Figure C-1. Four discrete soil subsamples were collected along each transect and composited for laboratory analyses. Discrete subsamples were collected at approximately each end of the transect line and at 1/3 and 2/3 the length of the transect.

ii. Sample Collection.

- To minimize the potential for cross-contamination, nitrile gloves were worn by the field crew between each transect.
- Vegetation was scraped away from an approximate 1-foot square area sampling location with a decontaminated stainless steel spoon
- Approximately equal soil samples were collected from each transect location to a depth of approximately 6 inches below ground surface and placed in a decontaminated stainless steel bowl for characterization and homogenizing.
- Organic materials (twigs, leaves) and rocks greater than ½ inch were removed before homogenizing the sample.
- Soil from each transect location was described before mixing. The composite sample bowl was covered with aluminum foil between discrete subsample locations.
- Samples were homogenized by hand mixing with a stainless steel spoon.
- Samples were transferred directly into laboratory-supplied sample jars.
- Sample jars were placed on ice in coolers for transfer to the laboratory following chain-of-custody procedures.
- Following sample collection, the central point of each transect was located in the field using a hand help GPS unit or measured from at least two fixed locations.

[1] BES, 2008. *Field Operations Standard Operating Procedure: Sampling of Soil and Sediment*. City of Portland, Bureau of Environmental Services, Environmental Investigations Division. SOP No. 5.01a. Revision 3. Dated October 31, 2008.

iii. Field QC Samples
- One field duplicate was collected from a transect selected by the BES field crew.

iv. Equipment Decontamination Procedures
- Decontamination procedures for all sampling handling and homogenization equipment (e.g., spoons, bowls) were performed at the lab before field activities. Cleaned equipment was stored by wrapping in aluminum foil.
- Before using field sampling equipment was rinsed with de-ionized water.

B. Transect 5 Composite Sample

i. Subsample Locations. Samples were collected from five equally spaced discrete bank locations located along Transect 5 (see Figure C-1) . The discrete subsamples composited for laboratory analyses were collected from a 0-6 inch below ground surface depth interval

ii. Sample Collection (see above).

iii. Field QC Samples
- A field duplicate was for Transect 5.

iv. Equipment Decontamination Procedures (see above)

2. LABORATORY ANALYSES

The bank and transect composite samples and duplicate samples were submitted for analyses of the parameters listed below:

i. PCBs Aroclors
ii. Metals (Al, Sb, Ba, Cd, Cr, Cu, Pb, Hg, Ni, Ag, Zn)
iii. Organotins
iv. Herbicides
v. Pesticides
vi. PAHs / Phthalates
vii. Petroleum Hydrocarbons

LEGEND

- Transect Composite Sub Sample Location
- Bank Transect Composite Sample
- Property Boundary
- DEQ ECSI Site
- River Mile Tenths

N

0 50 100

Feet

FIGURE C1

2010 Riverbank Surface Soil Sample Locations
End of Swan Island Lagoon

Disclaimer:
Information contained on this map is accurate according to available records, however the City of Portland makes no warranty, expressed or implied, as to the completeness or accuracy of the information published.

Prepared By:
GSI, January 8, 2012
005_SC\Swan_Island_Tech_Services

Source:
City of Portland BES, Aerial Photo 2010

GSI Water Solutions, Inc.

June 21, 2010 Riverbank Soil Sampling
End of Swan Island Lagoon Property (ECSI # 3901)

Photo 1. Homogenized composite sample for Transect 1.

Photo 2. Collecting sample at Transect 1, looking upslope.

Photo 3. Homogenized composite sample for Transect 2.

Photo 4. Sample location at Transect 2, looking upslope.

Photo 5. Homogenized composite sample for Transect 3.

Photo 6. Sample location at Transect 3, looking upslope.

Photo 7. Homogenized composite sample for Transect 4.

Photo 8. Collecting sample at Transect 4, looking upslope.

Photo 9. Homogenized composite sample for discrete locations for Transect 5 along riverbank.

Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
(503) 823-5696

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 6/21/10
Page: 1 of 1
Collected By: JXB/PTB

Project Name: PORTLAND HARBOR INLINE SAMP
File Number: 1020.001 **Matrix:** SEDIMENT

End of Swan Island Lagoon

[1]Run NWTPH-Dx and NWTPH-Gx if detects on NWTPH-HCID

Requested Analyses

WPCL Sample I.D.	Location	Point Code	Sample Date	Sample Time	Sample Type	Organics: PCB Aroclors - LL	Organics: PAH + Phthalates	Organics: Pesticides (Low-level)	Organics: Herbicides	Organics: NWTPH-HCID[1]	General: Total Soldis	General: Organitons	Metals: Total Metals (Al, Sb, Ba Cd, Cr Cu, Hg, Pb, Ni, Ag, Zn)	Field Comments
FO105711	TRANSECT 1 COMPOSITE	SIL_1	6/21/10	1308	C	●	●	●	●	●	●	●	●	
FO105712	TRANSECT 2 COMPOSITE	SIL_2	↓	1336	C	●	●	●	●	●	●	●	●	
FO105713	TRANSECT 3 COMPOSITE	SIL_3	↓	1409	C	●	●	●	●	●	●	●	●	
FO105714	TRANSECT 4 COMPOSITE	SIL_4	↓	1422	C	●	●	●	●	●	●	●	●	
FO105715	DISCRETE LOCATIONS COMPOSITE	SIL_5	6/21/10	1443	C	●	●	●	●	●	●	●	●	
	EQUIPMENT BLANK	EQBLANK											●	JXB
FO105716	DUPLICATE	DUP1	6/21/10		C	●	●	●	●	●	●	●	●	
FO105717	DUPLICATE	DUP2	6/21/10		C	●	●	●	●	●	●	●	●	

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.	Relinquished By: 4.
Signature:	Signature:	Signature:	Signature:
Time: 1555	Time:	Time:	Time:
Printed Name: Jeremiah Bowden	Printed Name:	Printed Name:	Printed Name:
Date: 6/21/10	Date:	Date:	Date:
Received By: 1.	**Received By:** 2.	**Received By:** 3.	**Received By:** 4.
Signature:	Signature:	Signature:	Signature:
Time: 1555	Time:	Time:	Time:
Printed Name: Mackenzie Zick	Printed Name:	Printed Name:	Printed Name:
Date: 6/21/10	Date:	Date:	Date:

City of Portland
Environmental Services

DAILY FIELD REPORT

Project PORTLAND HARBOR INLINE SAMP
Project No. 1020.001
Location END OF SWAN ISLAND LAGOON
Date 6/21/2010
Subject Transect Soil Sampling
By JXB, PTB

1230 Arrive on-site & laid out transects. spaced 80 feet apart per work order with grab sub-samples for the 5th composite at 80 feet apart spaced beginning from 40 feet off South edge of concrete pad with interpretive signs.

1245 Measured Transect 1 to 48 feet in length. Subsamples to be placed at 0, 16, ~~32~~ & 48 feet starting from SE to NW end of transect.

1308 Finished Transect 1 sub-samples. Homogenized & filled sample jars. SIL-1

1324 Measured Transect 2 to 54 feet in length. Sub-samples at ~~0, 13.5, 27~~ (PTB) 0, 18, 36, 54 feet. Trowel used on this transect to produce more material for jars. Hole is 3 in. diameter in a conical or U-shaped hole.

1336 Finished Transect 2 sub-samples. Homogenized & filled jars. Duplicate jars filled here. → DUP1 (PTB) to SIL-2

1343 Measured Transect 3 to ~~70~~ 50 feet. Sub-samples at 0, ~~23, 46, 70~~ 16 32 50 feet from SE to NW along transect.

1409 Finish Transect 3 subsamples. Homogenized & filled jars. SIL-3

Attachments

City of Portland
Environmental Services

DAILY FIELD REPORT

Project PORTLAND HARBOR INLINE SAMP
Project No. 1020.001
Location END OF SWAN ISLAND LAGOON
Date 6/21/10
Subject TRANSECT SOIL SAMPLING
By JXB, PTB

1415 Measured Transect 4 at 50 feet. Sub-samples at 0, 16, 32 & 50 feet.

1422 Finished Transect 4. Homogenized Sample filled jars. SIL-4

1430 ~~Composite Transect~~ 5 with Archive jars taken at each sub-sample. ~~Sampling begins~~ from a separate bore hole adjacent to the composite sub-sample

1443 Finished ~~Transect~~ Composite 5 w/ Archive jars. Homogenized sample & filled jars. Completed Sampling & returned to WPCL
↳ for SIL-5 and DUP2
PTB

Attachments

SIL_1

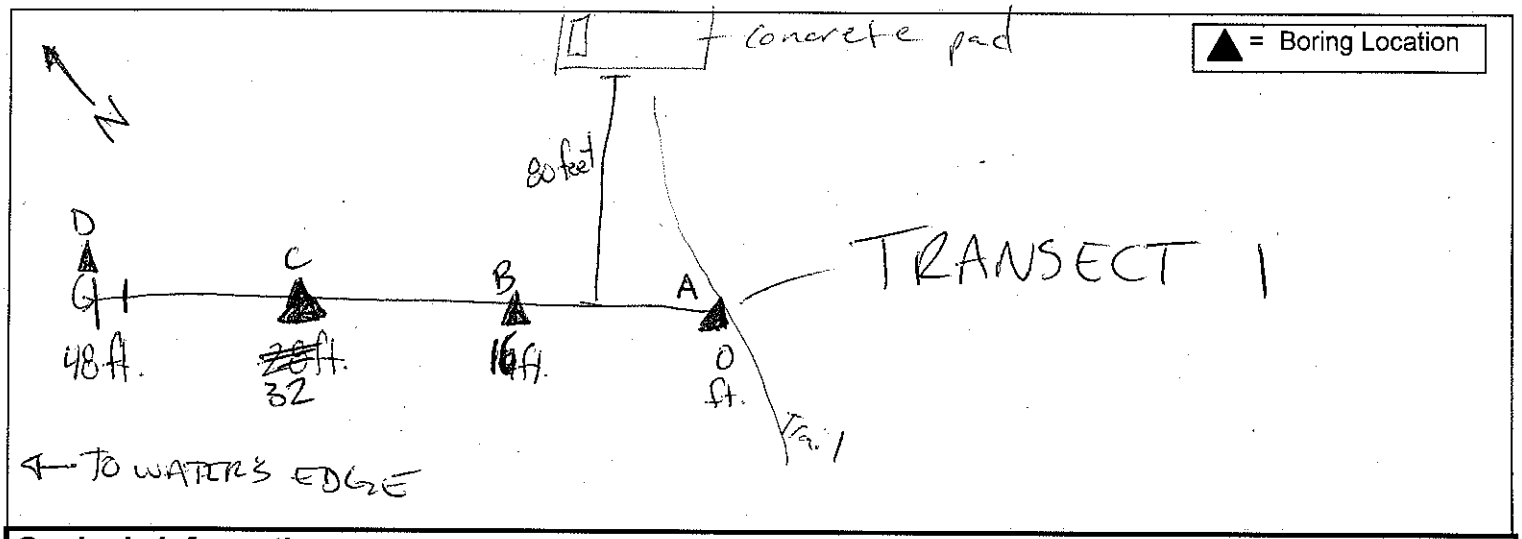
City of Portland Bureau of Environmental Services

Soil Sampling Log

Project: Portland Harbor Inline Sed Samp
Project No.: 1020.001
Location: END OF SWAN ISLAND LAGOON
Sampling Equipment & Method: Auger + bowl

Date: 6/21/2010
By: JXB, PTB
Page: 1 of 2

Site Diagram

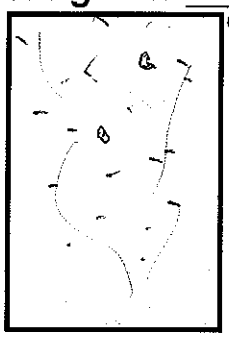


Geologic Information		Sample Information
Boring Log	Soil Description / Classification:	*Depict sample depth range, pointcode, FO sticker and sample type (grab or comp sub-sample).*

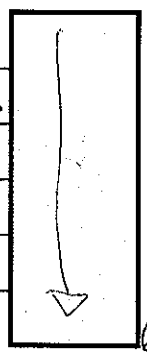
Depth

Depth

Boring I.D.: SIL-1-A



90% fine to medium coarse sands. < 2% large 3/4 minus
1% organics, roots, grass
Brown in color



SUB-SAMPLE A

Boring I.D.: SIL-1-B

removed sod cap.
90% fine to medium coarse brown sands
10% organics (roots/grass)

SUB-SAMPLE B

Notes:

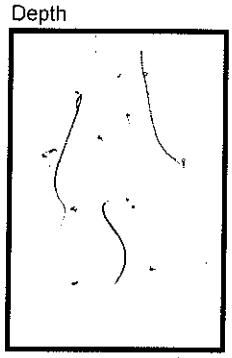
Project: Portland Harbor Inline Sed Samp
Project No.: 1020.001
Location: END OF SWAN ISLAND LAGOON

Date: 6/21/2010
By: JXB, PTB
Page: 2 of 2

Geologic Information | ***Sample Information***

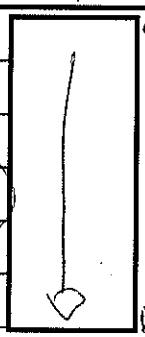
Boring Log	Soil Description / Classification:	Sample Log *Depict sample depth range, pointcode, FO sticker and sample type (grab or comp sub-sample).*

Boring I.D.: SIL-1-C



Depth

Removed grass. 90% fine to medium coarse brown sands.
10% organics (roots/grass)

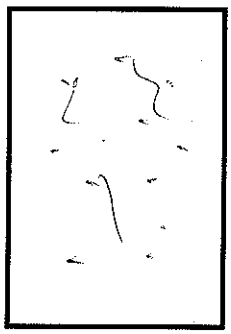


Depth

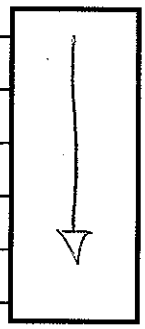
0in.
6in.

SUB-SAMPLE C

Boring I.D.: SIL-1-D



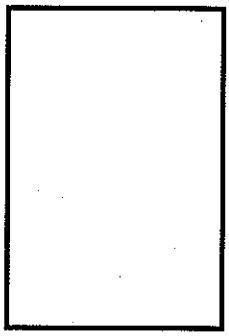
Removed grass. 90% fine to medium, coarse brown sands.
10% organics (roots/grass

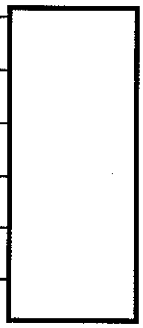


0in.
6in.

SUB-SAMPLE D

Boring I.D.: _____





Notes: Photo 1 - looking up transect, Photo 2 - Homogenized composite. Composite description: 92% fine to medium coarse brown sands. 8% organics (roots/grass) - <1% 3/4 mins gravels. Removed 5% of bulk sample which was a large bound-up organic mat.

SAMPLE TIME: 1308 ON COC

FO105711

FO STICKER FOR COMPOSITE FROM TRANSECT 1:

JXB FO STICKER FOR DUP1:

SIL-2
+ DUP1

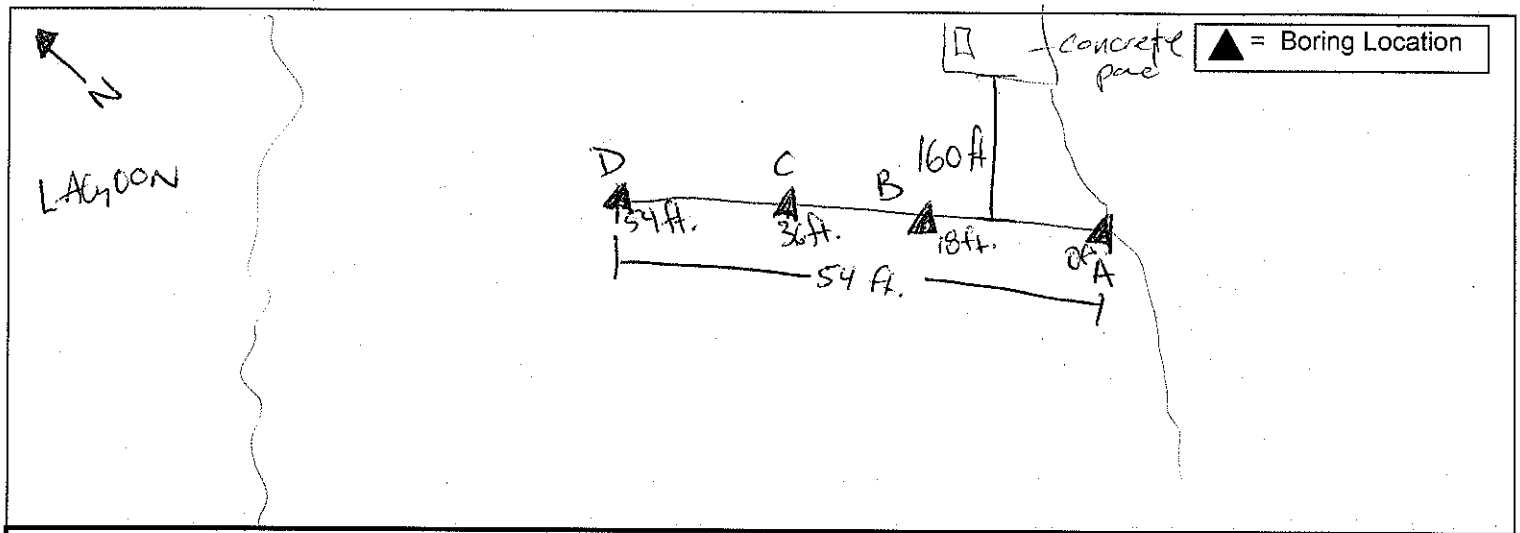
City of Portland Bureau of Environmental Services

Soil Sampling Log

Project: Portland Harbor Inline Sed Samp
Project No.: 1020.001
Location: END OF SWAN ISLAND LAGOON
Sampling Equipment & Method: _____

Date: 6/21/2010
By: JXB, PTB
Page: 1 of 2

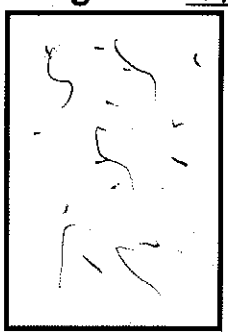
Site Diagram



Geologic Information		Sample Information
Boring Log	Soil Description / Classification:	*Depict sample depth range, pointcode, FO sticker and sample type (grab or comp sub-sample).*

Depth

Boring I.D.: SIL-2-A



90% fine to coarse brown sands
10% organics

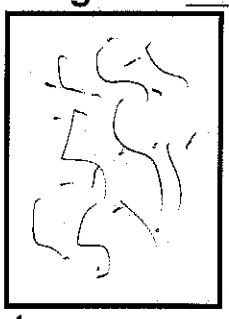
Depth

0in.

SUB-SAMPLE

6in.

Boring I.D.: SIL-2-B



80% fine to coarse brown sands with 20% organic matter

0in

SUB-SAMPLE

6in.

Notes: _____

Project: Portland Harbor Inline Sed Samp
Project No.: 1020.001
Location: END OF SWAN ISLAND LAGOON

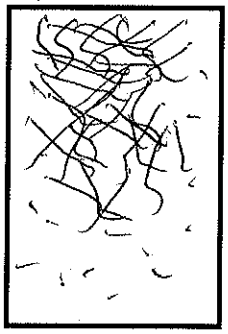
Date: 6/21/2010
By: JXB, PTB
Page: 2 of 2

Geologic Information | ***Sample Information***

Boring Log	Soil Description / Classification:	Sample Log *Depict sample depth range, pointcode, FO sticker and sample type (grab or comp sub-sample).*

Boring I.D.: SIL-2-C

Depth



60% roots & organic matter (EXCLUDED)
40% fine to coarse brown sands.

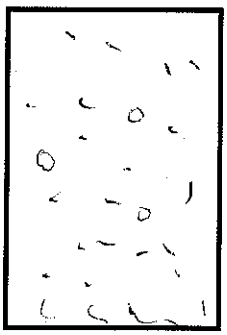
Depth

0 in.

SUB-SAMPLE

6 in.

Boring I.D.: SIL-2-D



95% fine to coarse sands.
5% gravels (small)

0 in.

SUB-SAMPLE

6 in.

Boring I.D.: _____

Notes: Photo 1: Transect overview. Photo 2: Homogenized composite.
Composite Notes: Reddish brown 96% fine to coarse sands, 3% coarse gravels, 1% organics
Removed < 1% of bulk sample, primarily gravels & organics.
DUPLICATE COLLECTED HERE. DUPLICATE ID: DUP1 → FO105716
SAMPLE TIME: 1336

FO ID # FOR TRANSECT 2: FO105712

SIL-3

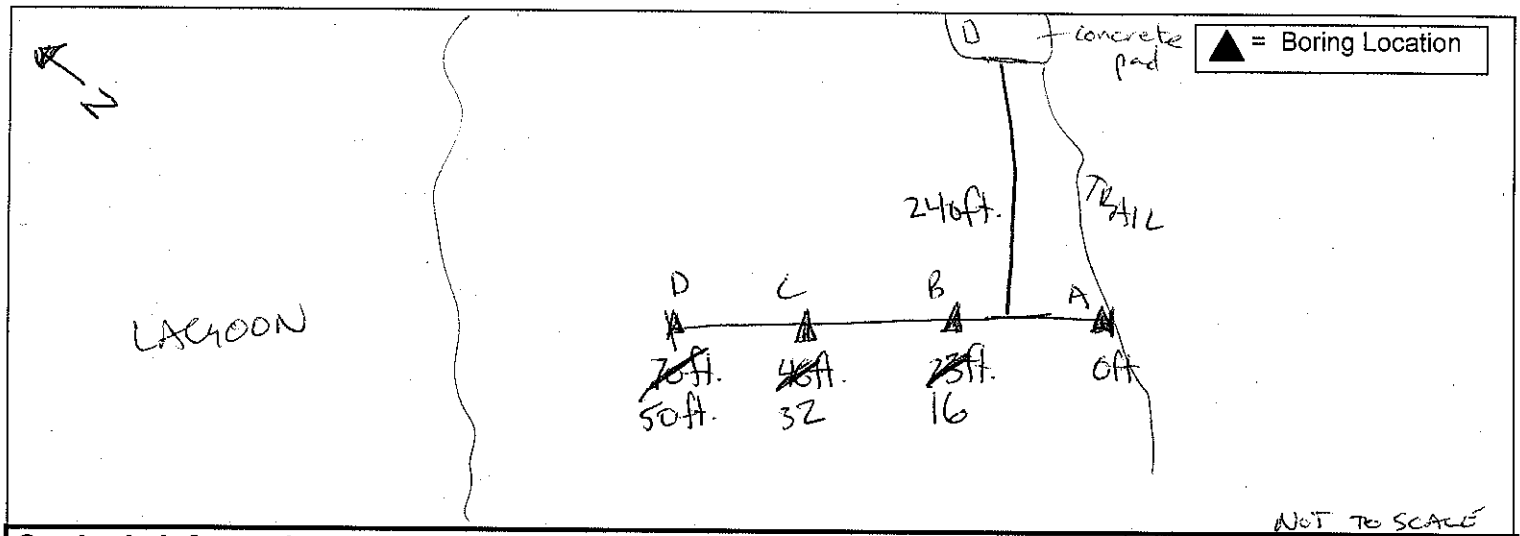
City of Portland Bureau of Environmental Services

Soil Sampling Log

Project: Portland Harbor Inline Sed Samp
Project No.: 1020.001
Location: END OF SWAN ISLAND LAGOON
Sampling Equipment & Method: Trowel & bowl

Date: 6/21/2010
By: JXB, PTB
Page: 1 of 2

Site Diagram

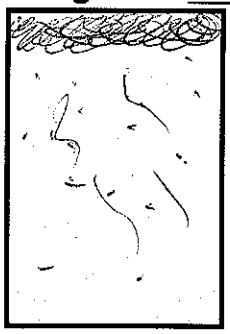


Geologic Information		Sample Information
Boring Log	Soil Description / Classification:	*Depict sample depth range, pointcode, FO sticker and sample type (grab or comp sub-sample).*

Depth

Depth

Boring I.D.: SIL-3-A



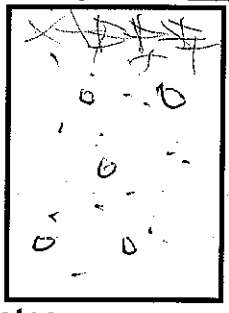
Top ½ inch dark brown loam
Bottom 5½ 95% dark brown sands, coarse 5% organics

0in.

SOB-SAMPLE

6in.

Boring I.D.: SIL-3-B



0-2in. organic mat of roots
2-6in 90% fine to coarse sands
10% fine to coarse gravels

0in.

SOB-SAMPLE

6in.

Notes:

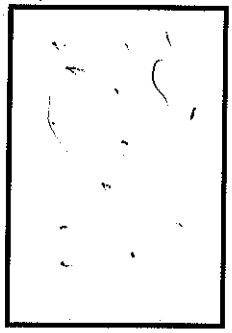
Project: Portland Harbor Inline Sed Samp
Project No.: 1020.001
Location: END OF SWAN ISLAND LAGOON

Date: 6/21/2010
By: JXB, PTB
Page: 2 of 2

Geologic Information		*Sample Information*
Boring Log	Soil Description / Classification:	Sample Log *Depict sample depth range, pointcode, FO sticker and sample type (grab or comp sub-sample).*

Boring I.D.: SIL-3-C

Depth



99% fine sands & silts
<1% organics (roots)

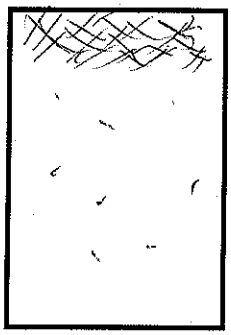
Depth

0in.

SUB-SAMPLE

6in.

Boring I.D.: SIL-3-D



0-2in organic mat of roots
2-6in. 98% fine sands & silts, 2% gravels.

0in.

SUB-SAMPLE

6in.

Boring I.D.: _____

Notes: Photo1: Transect from Lagoon Photo2: Homogenized composite
Composite Notes: Brownish gray. 94% fine silts & sands. 3% organics (roots) 3% angular gravels removed <1% of total bulk sample (gravels roots)

SAMPLE TIME: 1409

FO ID: FO105713

SIL_4

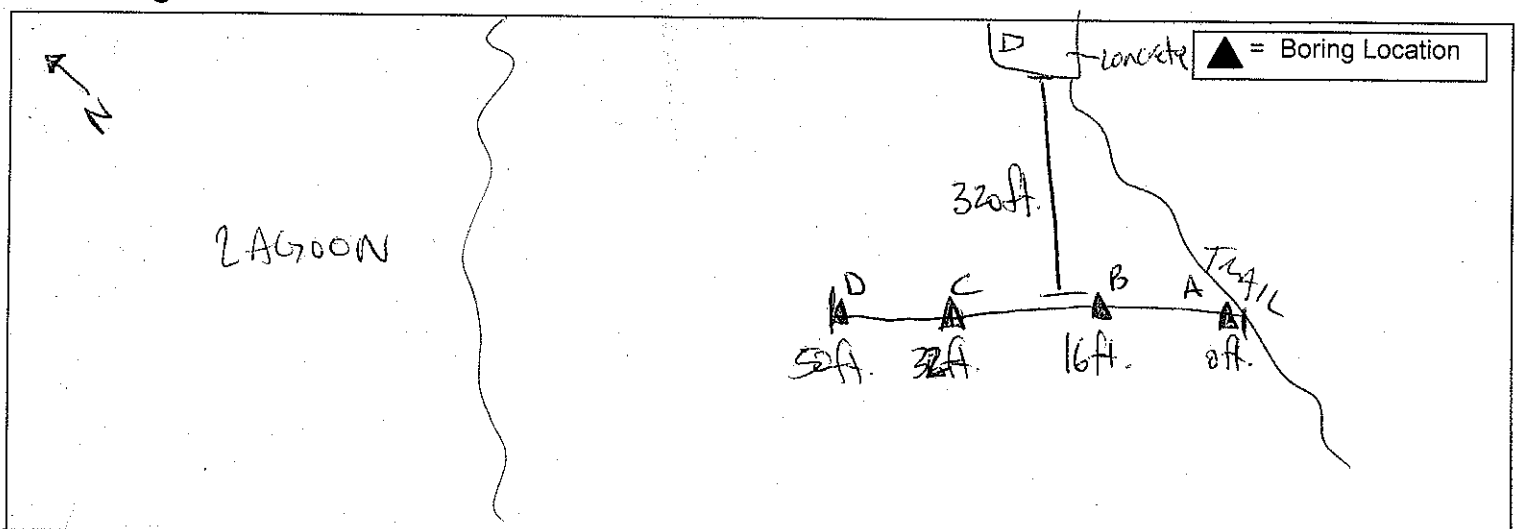
City of Portland Bureau of Environmental Services

Soil Sampling Log

Project: Portland Harbor Inline Sed Samp
Project No.: 1020.001
Location: END OF SWAN ISLAND LAGOON
Sampling Equipment & Method: Trowel + bowl

Date: 6/21/2010
By: JXB, PTB
Page: 1 of 2

Site Diagram



Geologic Information		Sample Information
Boring Log	Soil Description / Classification:	*Depict sample depth range, pointcode, FO sticker and sample type (grab or comp sub-sample).*

Depth

Boring I.D.: SIL-4-A

0-3in compact root mat
3-6in medium to coarse sands. Many roots. Some angular gravels.

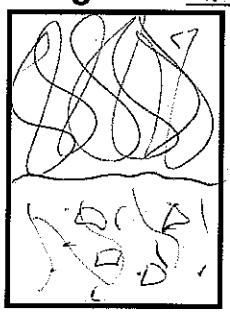
Depth

0in.

SUB-SAMPLE

6in.

Boring I.D.: SIL-4-B



0-3in. compact root mat.
3-6in. medium to coarse sands. Many roots. Some angular gravels

0in.

SUB-SAMPLE

6in.

Notes:

Project: Portland Harbor Inline Sed Samp
Project No.: 1020.001
Location: END OF SWAN ISLAND LAGOON

Date: 6/21/2010
By: JXB, PTB
Page: 2 of 2

Geologic Information | ***Sample Information***

Boring Log	Soil Description / Classification:	Sample Log *Depict sample depth range, pointcode, FO sticker and sample type (grab or comp sub-sample).*

Boring I.D.: SIL-4-C

Depth

0-3in. compact root mat.
3-6in. medium to coarse sands. many roots. Some angular gravels

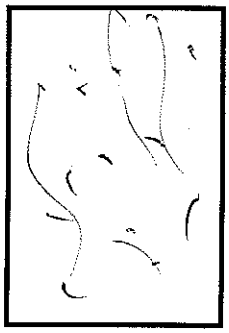
Depth

0 in

SUB-SAMPLE

6in.

Boring I.D.: SIL-4-D



Medium to coarse sands. many roots. Some angular gravels.

0 in.

SUB-SAMPLE

6in.

Boring I.D.: _____

Notes: Photo 1: Transect overview. Photo 2: Homogenized composite
Composite notes: 95% brown sands, 3% angular gravels & 2% organics (roots) 10% bulk Sample removed.

SAMPLE TIME: 1422

FO ID: FO105714

SIL-5 + DUP2

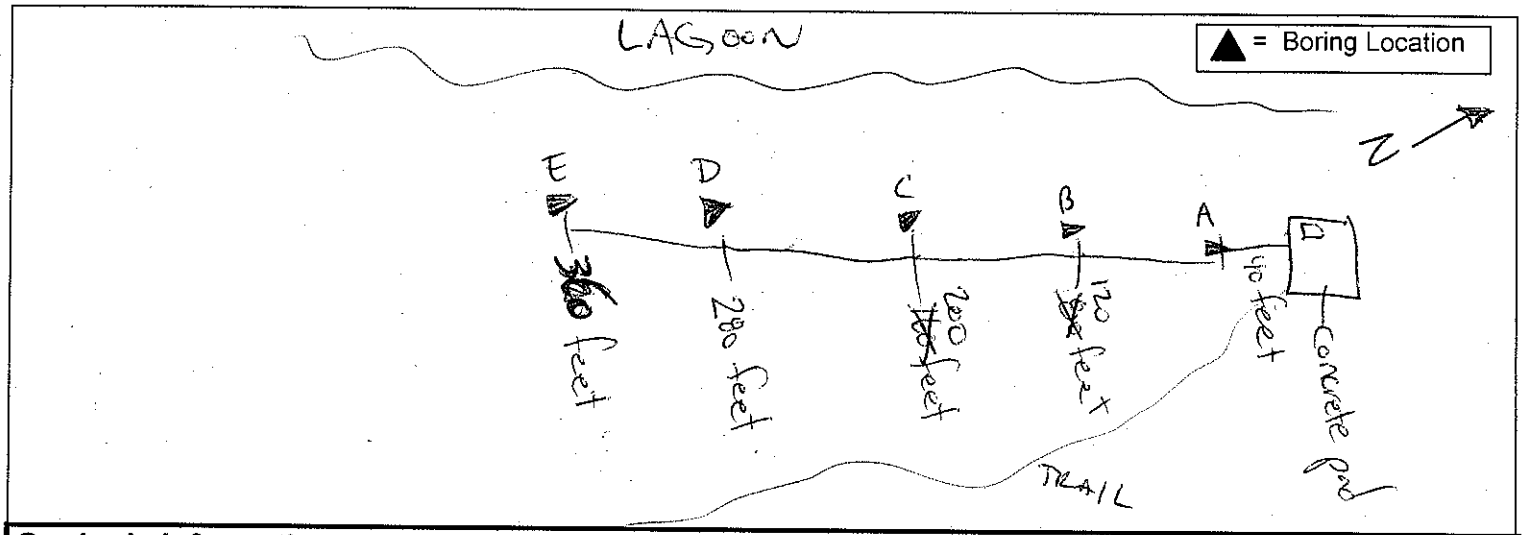
City of Portland Bureau of Environmental Services

Soil Sampling Log

Project: Portland Harbor Inline Sed Samp
Project No.: 1020.001
Location: END OF SWAN ISLAND LAGOON
Sampling Equipment & Method: Trowel bowl

Date: 6/21/2010
By: JXB, PTB
Page: 1 of 2

Site Diagram



Geologic Information		Sample Information
Boring Log	Soil Description / Classification:	*Depict sample depth range, pointcode, FO sticker and sample type (grab or comp sub-sample).*

Depth

Depth

Boring I.D.: SIL-5-A

Top inch is organics
95% sands, 3% angular gravels, 2% organics

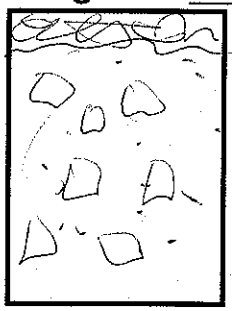
0 in

SUB-SAMPLE

SEPARATE BORE HOLE ADJACENT TO SIL-5-A FOR ARCHIVE 1434

6 in.

Boring I.D.: SIL-5-B



Top inch loam with roots + large angular gravels
40% gravels / 60% sands
1-5 in.

0 in

SUB-SAMPLE

ARCHIVE 1435

6 in

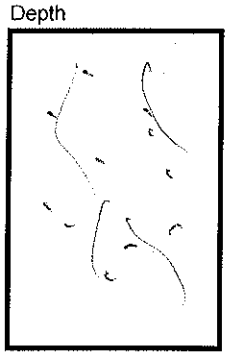
Notes:

Project: Portland Harbor Inline Sed Samp
Project No.: 1020.001
Location: END OF SWAN ISLAND LAGOON

Date: 6/21/2010
By: JXB, PTB
Page: 2 of 2

Geologic Information		*Sample Information*
Boring Log	Soil Description / Classification:	Sample Log *Depict sample depth range, pointcode, FO sticker and sample type (grab or comp sub-sample).*

Boring I.D.: SIL-S-C



Depth

All fine-sands & silts with roots

Depth

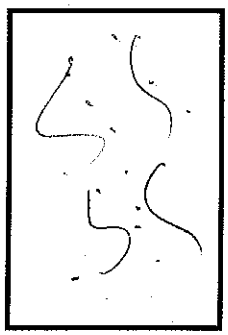
0 in.

SUB-SAMPLE

ARCHIVE 1437

6 in

Boring I.D.: SIL-S-D



All fine sands & silts with roots

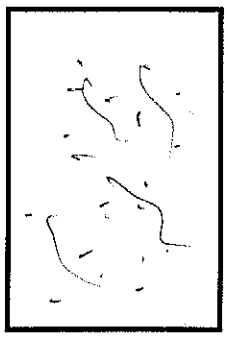
0 in.

SUB-SAMPLE

ARCHIVE 1440

6 in.

Boring I.D.: SIL-S-E



All fine sands & silts with roots

0 in

SUB-SAMPLE

ARCHIVE 1441

6 in.

Notes: Photo 1: Homogenized Composite notes: 94% fine sands & silts, 4% gravels, 1% organics 3% of bulk sample removed. DUPLICATE #2 collected here

SAMPLE TIME: 1443

DUPLICATE FO STICKER IN: DUP 2

FO105717

FO ID: FO105715 → (+)

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info@gsiwatersolutions.com www.gsiwatersolutions.com

Laboratory Data QA/QC Review
Riverbank Soil Investigation
End of Swan Island Lagoon

To: File

From: Andrew Davidson, GSI Water Solutions, Inc. (GSI)

Date: June 16, 2011

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated from a sampling event conducted by the City of Portland (City) at the end of Swan Island Lagoon on June 21, 2010. Five composite, near-surface soil samples (FO105711 – FO105715) and two duplicate samples (FO105716 and FO105717) were collected and submitted for analyses.

The laboratory analyses for these samples were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and subcontracted laboratories. The following laboratories conducted the analyses listed:

- BES WPCL
    - Total Solids – SM 2540G
    - Metals – EPA 6010 (for aluminum); EPA 6020 (all other metals)
    - Petroleum Hydrocarbons – NWTPH-HCID
    - Polychlorinated Biphenyls (PCBs) Aroclors – EPA 8082
- Test America (TA)
    - Chlorinated Herbicides – EPA 8151
    - Organotin Compounds – PSEP GC/MS
    - Polycyclic Aromatic Hydrocarbons (PAHs) and Phthalates – EPA 8270-SIM
- Columbia Analytical Services (CAS)
    - Organochlorine Pesticides – EPA 8081A

The WPCL summary report and the subcontracted laboratory reports for all analyses associated with this sampling event are attached. The WPCL summary report comments that unless otherwise noted, all analytical QA/QC criteria were met for these samples including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable.

The following QA/QC review of the analytical data is based on the available documentation provided by the subcontracted laboratories and on exceptions noted in the WPCL summary report. The QA/QC review of the analytical data consisted of reviewing the following elements for each laboratory report, if applicable and/or available:

- Chain-of-custody – for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method blanks
- Surrogate recoveries within laboratory control limits
- Internal standard recoveries within accuracy control limits
- Matrix spike and matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control and duplicate laboratory control (LC/DLC) sample recoveries within laboratory control limits
- Relative percent differences (RPDs) for laboratory duplicate samples within laboratory control limits

The results of the QA/QC review of the subcontracted laboratory reports are presented below.

Chain-of-Custody

The chain-of-custody forms showed continuous custody of the samples. The chain-of-custody procedures appear to have been adequate indicating that sample integrity was maintained throughout the sample collection and delivery process.

Analysis Holding Times

Due to some organotin analytes recovered outside of laboratory-control limits in the QA/QC samples, a second organotin analysis was conducted. The second batch of samples was extracted outside of method-specified holding times. WPCL's report includes the organotin results from the original batch of samples extracted and analyzed within the method-specific holding times. The TA report includes results for both analyses. Samples for all other analyses were extracted and analyzed within the recommended method-specific holding times.

Method Blanks

Methods blanks were processed during the subcontracted laboratory analyses of chlorinated herbicides, organotins, PAHs and phthalates, and organochlorine pesticides. No analytes were detected in the method blanks.

Surrogate Recoveries

Surrogate recoveries were completed during the laboratory analyses of organochlorine pesticides, PAHs/phthalates, organotins, and chlorinated herbicides. All surrogate recoveries are within laboratory control limits.

Matrix Spike/Matrix Spike Duplicate

MS/MSD samples were processed during the subcontracted analyses of PAHs/phthalates, organotins, and organochlorine pesticides. MS/MSD recoveries for several phthalates are slightly above method-specified control limits. However, LC sample recoveries for phthalates are all within laboratory control limits, and the data are not qualified. The MS/MSD sample recoveries for tetra-n-butyltin are below method-specified control limits. However, tetra-n-butyltin was recovered within laboratory control limits in the LC sample, and the data are not qualified further. Analyte recoveries and relative percent differences (RPDs) for MS/MSD samples in all other analyses are within laboratory control limits.

Laboratory Control Samples

LC samples were processed during the subcontracted laboratory analyses of PAHs/phthalates, organotins, chlorinated herbicides, and organochlorine pesticides. A DLC sample was processed during the analysis of chlorinated herbicides. All analyte recoveries are within laboratory control limits for LC samples processed during the PAH/phthalate and organochlorine pesticide analyses. All analyte recoveries for LC/DLC samples processed during the chlorinated herbicide analysis are within laboratory control limits; however, the RPD for Dinoseb is above laboratory control limits. Because Dinoseb was not detected in any of the samples, the data are not qualified further.

In the initial batch of samples processed during the organotin analysis, the LC sample recovery of monobutyltin was slightly above laboratory control limits. A second LC sample was processed in a subsequent batch of samples, and the monobutyltin recovery was within acceptance limits. The WPCL report includes organotin data from the first batch of samples. The TA report includes data from both analyses. As such, sample results for monobutyltin are flagged as estimates (“J”).

Other

CAS reports that the detection limit was elevated for at least one analyte in all samples, and that the sample chromatograms indicate the presence of interference from non-target background components. The matrix interference prevented adequate resolution of the target compounds at the normal limit, and the results are flagged “Ui” in the subcontracted report to indicate the interference. For several organochlorine pesticides, results from the primary and verification chromatography columns vary by more than 40 percent RPD. These values are flagged “P” in the CAS report.

During the analyses of PAHs/phthalates and organochlorine pesticides, several analytes were detected below the method reporting limit but above the method detection limit. These analytes are flagged as estimates “J” in the subcontracted CAS and TA reports.

WPCL reports that due to the high recoveries of phthalates in the MS/MSD samples, detected phthalate analytes may be high estimates. However, because the phthalate recoveries are within acceptance limits in the LC samples, the data are not further qualified.

Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
(503) 823-5696

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 6/21/10
Page: 1 of 1
Collected By: JXB/PTB

Project Name: PORTLAND HARBOR INLINE SAMP
File Number: 1020.001 **Matrix:** SEDIMENT

End of Swan Island Lagoon

[1]Run NWTPH-Dx and NWTPH-Gx if detects on NWTPH-HCID

Requested Analyses

WPCL Sample I.D.	Location	Point Code	Sample Date	Sample Time	Sample Type	Organics: PCB Aroclors - LL	Organics: PAH + Phthalates	Organics: Pesticides (Low-level)	Organics: Herbicides	Organics: NWTPH-HCID[1]	General: Total Soldis	General: Organitons	Metals: Total Metals (Al, Sb, Ba Cd, Cr Cu, Hg, Pb, Ni, Ag, Zn)	Field Comments
FO105711	TRANSECT 1 COMPOSITE	SIL_1	6/21/10	1308	C	●	●	●	●	●	●	●	●	
FO105712	TRANSECT 2 COMPOSITE	SIL_2	↓	1336	C	●	●	●	●	●	●	●	●	
FO105713	TRANSECT 3 COMPOSITE	SIL_3	↓	1409	C	●	●	●	●	●	●	●	●	
FO105714	TRANSECT 4 COMPOSITE	SIL_4	↓	1422	C	●	●	●	●	●	●	●	●	
FO105715	DISCRETE LOCATIONS COMPOSITE	SIL_5	6/21/10	1443	C	●	●	●	●	●	●	●	●	
	EQUIPMENT BLANK	EQBLANK											●	JXB
FO105716	DUPLICATE	DUP1	6/21/10		C	●	●	●	●	●	●	●	●	
FO105717	DUPLICATE	DUP2	6/21/10		C	●	●	●	●	●	●	●	●	

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.	Relinquished By: 4.
Signature:	Signature:	Signature:	Signature:
Time: 1555	Time:	Time:	Time:
Printed Name: Jeremiah Bawsen	Printed Name:	Printed Name:	Printed Name:
Date: 6/21/10	Date:	Date:	Date:
Received By: 1.	**Received By:** 2.	**Received By:** 3.	**Received By:** 4.
Signature:	Signature:	Signature:	Signature:
Time: 1555	Time:	Time:	Time:
Printed Name: Mackenzie Tick	Printed Name:	Printed Name:	Printed Name:
Date: 6/21/10	Date:	Date:	Date:

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105711 **Sample Collected:** 06/21/10 13:08 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON TRANSECT 1 COMPOSITE
Sample Point Code: SIL_1
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05703
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates. Based on high LCS recovery, the result for Monobutyltin may be a high estimate; MS/MSD analysis for this sample exhibited low recoveries for tetrabutyltin.

Test Parameter	Result	Units	MRL	Method	Analysis Date
GENERAL					
TOTAL SOLIDS	90.1	% W/W	0.01	SM 2540 G	06/22/10
METALS					
ALUMINUM	16500	mg/Kg dry wt	2.5	EPA 6010	06/24/10
ANTIMONY	0.18	mg/Kg dry wt	0.10	EPA 6020	06/25/10
ARSENIC	1.72	mg/Kg dry wt	0.50	EPA 6020	06/25/10
BARIUM	97.5	mg/Kg dry wt	0.10	EPA 6020	06/25/10
CADMIUM	<0.10	mg/Kg dry wt	0.10	EPA 6020	06/25/10
CHROMIUM	21.6	mg/Kg dry wt	0.50	EPA 6020	06/25/10
COPPER	23.5	mg/Kg dry wt	0.25	EPA 6020	06/25/10
LEAD	6.49	mg/Kg dry wt	0.10	EPA 6020	06/25/10
MERCURY	0.025	mg/Kg dry wt	0.010	EPA 6020	06/25/10
NICKEL	19.2	mg/Kg dry wt	0.25	EPA 6020	06/25/10
SILVER	<0.10	mg/Kg dry wt	0.10	EPA 6020	06/25/10
ZINC	71.7	mg/Kg dry wt	0.50	EPA 6020	06/25/10
GC ANALYSIS					
NWTPH-HCID					
DIESEL	<50	mg/Kg dry wt	50	NWTPH-HCID	06/16/10
GASOLINE	<20	mg/Kg dry wt	20	NWTPH-HCID	06/16/10
LUBE OIL	<100	mg/Kg dry wt	100	NWTPH-HCID	06/16/10
Surrogate Recovery (%)	92	mg/Kg dry wt		NWTPH-HCID	06/16/10
POLYCHLORINATED BIPHENYLS (PCB)					
Aroclor 1016/1242	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1221	<20	µg/Kg dry wt	20	EPA 8082	06/29/10
Aroclor 1232	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1248	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1254	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1260	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1262	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1268	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
OUTSIDE ANALYSIS					
HERBICIDES-CHLORINATED - TA					

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105711 **Sample Collected:** 06/21/10 13:08 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON TRANSECT 1 COMPOSITE
Sample Point Code: SIL_1
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05703
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates. Based on high LCS recovery, the result for Monobutyltin may be a high estimate; MS/MSD analysis for this sample exhibited low recoveries for tetrabutyltin.

Test Parameter	Result	Units	MRL	Method	Analysis Date
2,4,5-T	<0.027	mg/Kg dry wt	0.027	EPA 8151	06/25/10
2,4,5-TP (Silvex)	<0.027	mg/Kg dry wt	0.027	EPA 8151	06/25/10
2,4-D	<0.110	mg/Kg dry wt	0.110	EPA 8151	06/25/10
2,4-DB	<0.110	mg/Kg dry wt	0.110	EPA 8151	06/25/10
Dalapon	<0.12	mg/Kg dry wt	0.12	EPA 8151	06/25/10
Dicamba	<0.055	mg/Kg dry wt	0.055	EPA 8151	06/25/10
Dichlorprop	<0.110	mg/Kg dry wt	0.110	EPA 8151	06/25/10
Dinoseb	<0.016	mg/Kg dry wt	0.016	EPA 8151	06/25/10
MCPA	<11	mg/Kg dry wt	11	EPA 8151	06/25/10
MCPP	<11	mg/Kg dry wt	11	EPA 8151	06/25/10
ORGANOTIN COMPOUNDS - TA					
Dibutyl tin	<1.5	µg/Kg dry wt	1.5	PSEP GC/MS	07/01/10
Monobutyl tin	EST 11	µg/Kg dry wt	1.5	PSEP GC/MS	07/01/10
Tetrabutyl tin	<4.0	µg/Kg dry wt	4.0	PSEP GC/MS	07/01/10
Tributyl tin	4.0	µg/Kg dry wt	1.5	PSEP GC/MS	07/01/10
PESTICIDES BY EPA 8081 - CAS					
4,4'-DDD	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
4,4'-DDE	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
4,4'-DDT	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Aldrin	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Alpha-BHC	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Alpha-Chlordane	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Beta-BHC	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Delta-BHC	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Dieldrin	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Endosulfan I	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Endosulfan II	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Endosulfan Sulfate	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Endrin	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Endrin Aldehyde	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Endrin Ketone	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Gamma-BHC(Lindane)	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Gamma-Chlordane	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105711 **Sample Collected:** 06/21/10 13:08 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON TRANSECT 1 COMPOSITE
Sample Point Code: SIL_1
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05703
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates. Based on high LCS recovery, the result for Monobutyltin may be a high estimate; MS/MSD analysis for this sample exhibited low recoveries for tetrabutyltin.

Test Parameter	Result	Units	MRL	Method	Analysis Date
Heptachlor	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Heptachlor Epoxide	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Methoxychlor	<0.95	µg/Kg dry wt	0.95	EPA 8081A	06/30/10
Toxaphene	<48	µg/Kg dry wt	48	EPA 8081A	06/30/10
POLYNUCLEAR AROMATICS & PHTHALATES - TA					
1-Methylnaphthalene	<15.3	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
2-Methylnaphthalene	<15.3	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Acenaphthene	<15.3	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Acenaphthylene	<15.3	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Anthracene	<15.3	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Benzo(a)anthracene	<15.3	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Benzo(a)pyrene	18.5	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Benzo(b)fluoranthene	16.3	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Benzo(ghi)perylene	18.4	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Benzo(k)fluoranthene	<15.3	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Bis(2-ethylhexyl) phthalate	40.4	µg/Kg dry wt	30.6	EPA8270M-SIM	06/24/10
Butyl benzyl phthalate	37.2	µg/Kg dry wt	30.6	EPA8270M-SIM	06/24/10
Chrysene	16.3	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Dibenzo(a,h)anthracene	<15.3	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Diethyl phthalate	<30.6	µg/Kg dry wt	30.6	EPA8270M-SIM	06/24/10
Dimethyl phthalate	<30.6	µg/Kg dry wt	30.6	EPA8270M-SIM	06/24/10
Di-n-butyl phthalate	<30.6	µg/Kg dry wt	30.6	EPA8270M-SIM	06/24/10
Di-n-octyl phthalate	<30.6	µg/Kg dry wt	30.6	EPA8270M-SIM	06/24/10
Fluoranthene	26.4	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Fluorene	<15.3	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Indeno(1,2,3-cd)pyrene	<15.3	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Naphthalene	<15.3	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Phenanthrene	<15.3	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10
Pyrene	26.4	µg/Kg dry wt	15.3	EPA8270M-SIM	06/24/10

End of Report for Sample ID: FO105711

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105712 **Sample Collected:** 06/21/10 13:36 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON TRANSECT 2 COMPOSITE
Sample Point Code: SIL_2
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05704
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates.

Test Parameter	Result	Units	MRL	Method	Analysis Date
GENERAL					
TOTAL SOLIDS	92.3	% W/W	0.01	SM 2540 G	06/22/10
METALS					
ALUMINUM	15100	mg/Kg dry wt	2.5	EPA 6010	06/24/10
ANTIMONY	0.15	mg/Kg dry wt	0.10	EPA 6020	06/25/10
ARSENIC	1.50	mg/Kg dry wt	0.50	EPA 6020	06/25/10
BARIUM	77.9	mg/Kg dry wt	0.10	EPA 6020	06/25/10
CADMIUM	<0.10	mg/Kg dry wt	0.10	EPA 6020	06/25/10
CHROMIUM	17.5	mg/Kg dry wt	0.50	EPA 6020	06/25/10
COPPER	18.7	mg/Kg dry wt	0.25	EPA 6020	06/25/10
LEAD	5.12	mg/Kg dry wt	0.10	EPA 6020	06/25/10
MERCURY	0.034	mg/Kg dry wt	0.010	EPA 6020	06/25/10
NICKEL	17.1	mg/Kg dry wt	0.25	EPA 6020	06/25/10
SILVER	<0.10	mg/Kg dry wt	0.10	EPA 6020	06/25/10
ZINC	61.9	mg/Kg dry wt	0.50	EPA 6020	06/25/10
GC ANALYSIS					
NWTPH-HCID					
DIESEL	<50	mg/Kg dry wt	50	NWTPH-HCID	06/16/10
GASOLINE	<20	mg/Kg dry wt	20	NWTPH-HCID	06/16/10
LUBE OIL	<100	mg/Kg dry wt	100	NWTPH-HCID	06/16/10
Surrogate Recovery (%)	94	mg/Kg dry wt		NWTPH-HCID	06/16/10
POLYCHLORINATED BIPHENYLS (PCB)					
Aroclor 1016/1242	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1221	<20	µg/Kg dry wt	20	EPA 8082	06/29/10
Aroclor 1232	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1248	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1254	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1260	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1262	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1268	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
OUTSIDE ANALYSIS					
HERBICIDES-CHLORINATED - TA					
2,4,5-T	<0.027	mg/Kg dry wt	0.027	EPA 8151	06/25/10

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105712 **Sample Collected:** 06/21/10 13:36 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON TRANSECT 2 COMPOSITE
Sample Point Code: SIL_2
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05704
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates.

Test Parameter	Result	Units	MRL	Method	Analysis Date
2,4,5-TP (Silvex)	<0.027	mg/Kg dry wt	0.027	EPA 8151	06/25/10
2,4-D	<0.110	mg/Kg dry wt	0.110	EPA 8151	06/25/10
2,4-DB	<0.110	mg/Kg dry wt	0.110	EPA 8151	06/25/10
Dalapon	<0.12	mg/Kg dry wt	0.12	EPA 8151	06/25/10
Dicamba	<0.053	mg/Kg dry wt	0.053	EPA 8151	06/25/10
Dichlorprop	<0.110	mg/Kg dry wt	0.110	EPA 8151	06/25/10
Dinoseb	<0.016	mg/Kg dry wt	0.016	EPA 8151	06/25/10
MCPA	<11	mg/Kg dry wt	11	EPA 8151	06/25/10
MCPP	<11	mg/Kg dry wt	11	EPA 8151	06/25/10
ORGANOTIN COMPOUNDS - TA					
Dibutyl tin	<1.4	µg/Kg dry wt	1.4	PSEP GC/MS	07/01/10
Monobutyl tin	<1.4	µg/Kg dry wt	1.4	PSEP GC/MS	07/01/10
Tetrabutyl tin	<3.8	µg/Kg dry wt	3.8	PSEP GC/MS	07/01/10
Tributyl tin	<1.4	µg/Kg dry wt	1.4	PSEP GC/MS	07/01/10
PESTICIDES BY EPA 8081 - CAS					
4,4'-DDD	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
4,4'-DDE	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
4,4'-DDT	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Aldrin	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Alpha-BHC	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Alpha-Chlordane	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Beta-BHC	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Delta-BHC	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Dieldrin	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Endosulfan I	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Endosulfan II	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Endosulfan Sulfate	<1.1	µg/Kg dry wt	1.1	EPA 8081A	06/30/10
Endrin	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Endrin Aldehyde	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Endrin Ketone	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Gamma-BHC(Lindane)	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Gamma-Chlordane	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Heptachlor	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Heptachlor Epoxide	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: **FO105712** **Sample Collected:** 06/21/10 13:36 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name:	PORTLAND HARBOR INLINE SAMP	**Report Page:**	Page 3 of 3
Address/Location:	END OF SWAN ISLAND LAGOON TRANSECT 2 COMPOSITE	**System ID:**	AO05704
Sample Point Code:	SIL_2	**EID File # :**	1020.001
Sample Type:	COMPOSITE	**LocCode:**	PORTHARI
Sample Matrix:	SEDIMENT	**Collected By:**	JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates.

Test Parameter	Result	Units	MRL	Method	Analysis Date
Methoxychlor	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Toxaphene	<50	µg/Kg dry wt	50	EPA 8081A	06/30/10
POLYNUCLEAR AROMATICS & PHTHALATES - TA					
1-Methylnaphthalene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
2-Methylnaphthalene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Acenaphthene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Acenaphthylene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Anthracene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Benzo(a)anthracene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Benzo(a)pyrene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Benzo(b)fluoranthene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Benzo(ghi)perylene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Benzo(k)fluoranthene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Bis(2-ethylhexyl) phthalate	31.0	µg/Kg dry wt	28.7	EPA8270M-SIM	06/24/10
Butyl benzyl phthalate	<28.7	µg/Kg dry wt	28.7	EPA8270M-SIM	06/24/10
Chrysene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Dibenzo(a,h)anthracene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Diethyl phthalate	<28.7	µg/Kg dry wt	28.7	EPA8270M-SIM	06/24/10
Dimethyl phthalate	<28.7	µg/Kg dry wt	28.7	EPA8270M-SIM	06/24/10
Di-n-butyl phthalate	<28.7	µg/Kg dry wt	28.7	EPA8270M-SIM	06/24/10
Di-n-octyl phthalate	<28.7	µg/Kg dry wt	28.7	EPA8270M-SIM	06/24/10
Fluoranthene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Fluorene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Indeno(1,2,3-cd)pyrene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Naphthalene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Phenanthrene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Pyrene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10

End of Report for Sample ID: FO105712

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105713 **Sample Collected:** 06/21/10 14:09 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name:	PORTLAND HARBOR INLINE SAMP	**Report Page:**	Page 1 of 3
Address/Location:	END OF SWAN ISLAND LAGOON TRANSECT 3 COMPOSITE	**System ID:**	AO05705
Sample Point Code:	SIL_3	**EID File # :**	1020.001
Sample Type:	COMPOSITE	**LocCode:**	PORTHARI
Sample Matrix:	SEDIMENT	**Collected By:**	JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates.

Test Parameter	Result	Units	MRL	Method	Analysis Date
GENERAL					
TOTAL SOLIDS	84.7	% W/W	0.01	SM 2540 G	06/22/10
METALS					
ALUMINUM	15700	mg/Kg dry wt	2.5	EPA 6010	06/24/10
ANTIMONY	0.19	mg/Kg dry wt	0.10	EPA 6020	06/25/10
ARSENIC	2.07	mg/Kg dry wt	0.50	EPA 6020	06/25/10
BARIUM	99.5	mg/Kg dry wt	0.10	EPA 6020	06/25/10
CADMIUM	0.15	mg/Kg dry wt	0.10	EPA 6020	06/25/10
CHROMIUM	21.6	mg/Kg dry wt	0.50	EPA 6020	06/25/10
COPPER	23.0	mg/Kg dry wt	0.25	EPA 6020	06/25/10
LEAD	8.21	mg/Kg dry wt	0.10	EPA 6020	06/25/10
MERCURY	0.024	mg/Kg dry wt	0.010	EPA 6020	06/25/10
NICKEL	19.0	mg/Kg dry wt	0.25	EPA 6020	06/25/10
SILVER	<0.10	mg/Kg dry wt	0.10	EPA 6020	06/25/10
ZINC	85.8	mg/Kg dry wt	0.50	EPA 6020	06/25/10
GC ANALYSIS					
NWTPH-HCID					
DIESEL	<50	mg/Kg dry wt	50	NWTPH-HCID	06/16/10
GASOLINE	<20	mg/Kg dry wt	20	NWTPH-HCID	06/16/10
LUBE OIL	<100	mg/Kg dry wt	100	NWTPH-HCID	06/16/10
Surrogate Recovery (%)	109	mg/Kg dry wt		NWTPH-HCID	06/16/10
POLYCHLORINATED BIPHENYLS (PCB)					
Aroclor 1016/1242	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1221	<20	µg/Kg dry wt	20	EPA 8082	06/29/10
Aroclor 1232	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1248	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1254	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1260	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1262	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1268	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
OUTSIDE ANALYSIS					
HERBICIDES-CHLORINATED - TA					
2,4,5-T	<0.023	mg/Kg dry wt	0.023	EPA 8151	06/25/10

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105713 **Sample Collected:** 06/21/10 14:09 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON
TRANSECT 3 COMPOSITE
Sample Point Code: SIL_3
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05705
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates.

Test Parameter	Result	Units	MRL	Method	Analysis Date
2,4,5-TP (Silvex)	<0.023	mg/Kg dry wt	0.023	EPA 8151	06/25/10
2,4-D	<0.092	mg/Kg dry wt	0.092	EPA 8151	06/25/10
2,4-DB	<0.092	mg/Kg dry wt	0.092	EPA 8151	06/25/10
Dalapon	<0.10	mg/Kg dry wt	0.10	EPA 8151	06/25/10
Dicamba	<0.046	mg/Kg dry wt	0.046	EPA 8151	06/25/10
Dichlorprop	<0.092	mg/Kg dry wt	0.092	EPA 8151	06/25/10
Dinoseb	<0.014	mg/Kg dry wt	0.014	EPA 8151	06/25/10
MCPA	<9.2	mg/Kg dry wt	9.2	EPA 8151	06/25/10
MCPP	<9.2	mg/Kg dry wt	9.2	EPA 8151	06/25/10
ORGANOTIN COMPOUNDS - TA					
Dibutyl tin	<1.6	µg/Kg dry wt	1.6	PSEP GC/MS	07/01/10
Monobutyl tin	<1.6	µg/Kg dry wt	1.6	PSEP GC/MS	07/01/10
Tetrabutyl tin	<4.2	µg/Kg dry wt	4.2	PSEP GC/MS	07/01/10
Tributyl tin	<1.6	µg/Kg dry wt	1.6	PSEP GC/MS	07/01/10
PESTICIDES BY EPA 8081 - CAS					
4,4'-DDD	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
4,4'-DDE	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
4,4'-DDT	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Aldrin	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Alpha-BHC	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Alpha-Chlordane	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Beta-BHC	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Delta-BHC	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Dieldrin	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Endosulfan I	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Endosulfan II	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Endosulfan Sulfate	<3.1	µg/Kg dry wt	3.1	EPA 8081A	06/30/10
Endrin	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Endrin Aldehyde	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Endrin Ketone	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Gamma-BHC(Lindane)	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Gamma-Chlordane	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Heptachlor	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Heptachlor Epoxide	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105713 **Sample Collected:** 06/21/10 14:09 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON TRANSECT 3 COMPOSITE
Sample Point Code: SIL_3
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05705
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates.

Test Parameter	Result	Units	MRL	Method	Analysis Date
Methoxychlor	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Toxaphene	<50	µg/Kg dry wt	50	EPA 8081A	06/30/10
POLYNUCLEAR AROMATICS & PHTHALATES - TA					
1-Methylnaphthalene	<15.9	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
2-Methylnaphthalene	<15.9	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Acenaphthene	<15.9	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Acenaphthylene	<15.9	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Anthracene	<15.9	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Benzo(a)anthracene	18.9	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Benzo(a)pyrene	22.8	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Benzo(b)fluoranthene	22.6	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Benzo(ghi)perylene	20.9	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Benzo(k)fluoranthene	17.9	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Bis(2-ethylhexyl) phthalate	43.9	µg/Kg dry wt	31.8	EPA8270M-SIM	06/24/10
Butyl benzyl phthalate	32.1	µg/Kg dry wt	31.8	EPA8270M-SIM	06/24/10
Chrysene	26.0	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Dibenzo(a,h)anthracene	<15.9	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Diethyl phthalate	<31.8	µg/Kg dry wt	31.8	EPA8270M-SIM	06/24/10
Dimethyl phthalate	<31.8	µg/Kg dry wt	31.8	EPA8270M-SIM	06/24/10
Di-n-butyl phthalate	<31.8	µg/Kg dry wt	31.8	EPA8270M-SIM	06/24/10
Di-n-octyl phthalate	<31.8	µg/Kg dry wt	31.8	EPA8270M-SIM	06/24/10
Fluoranthene	30.5	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Fluorene	<15.9	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Indeno(1,2,3-cd)pyrene	18.6	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Naphthalene	<15.9	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Phenanthrene	<15.9	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10
Pyrene	29.8	µg/Kg dry wt	15.9	EPA8270M-SIM	06/24/10

End of Report for Sample ID: FO105713

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105714 **Sample Collected:** 06/21/10 14:22 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON
TRANSECT 4 COMPOSITE
Sample Point Code: SIL_4
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05706
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates.

Test Parameter	Result	Units	MRL	Method	Analysis Date
GENERAL					
TOTAL SOLIDS	93.0	% W/W	0.01	SM 2540 G	06/22/10
METALS					
ALUMINUM	13200	mg/Kg dry wt	2.5	EPA 6010	06/24/10
ANTIMONY	0.13	mg/Kg dry wt	0.10	EPA 6020	06/25/10
ARSENIC	1.84	mg/Kg dry wt	0.50	EPA 6020	06/25/10
BARIUM	84.8	mg/Kg dry wt	0.10	EPA 6020	06/25/10
CADMIUM	<0.10	mg/Kg dry wt	0.10	EPA 6020	06/25/10
CHROMIUM	18.1	mg/Kg dry wt	0.50	EPA 6020	06/25/10
COPPER	17.9	mg/Kg dry wt	0.25	EPA 6020	06/25/10
LEAD	5.01	mg/Kg dry wt	0.10	EPA 6020	06/25/10
MERCURY	0.025	mg/Kg dry wt	0.010	EPA 6020	06/25/10
NICKEL	17.8	mg/Kg dry wt	0.25	EPA 6020	06/25/10
SILVER	<0.10	mg/Kg dry wt	0.10	EPA 6020	06/25/10
ZINC	61.1	mg/Kg dry wt	0.50	EPA 6020	06/25/10
GC ANALYSIS					
NWTPH-HCID					
DIESEL	<50	mg/Kg dry wt	50	NWTPH-HCID	06/16/10
GASOLINE	<20	mg/Kg dry wt	20	NWTPH-HCID	06/16/10
LUBE OIL	<100	mg/Kg dry wt	100	NWTPH-HCID	06/16/10
Surrogate Recovery (%)	114	mg/Kg dry wt		NWTPH-HCID	06/16/10
POLYCHLORINATED BIPHENYLS (PCB)					
Aroclor 1016/1242	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1221	<20	µg/Kg dry wt	20	EPA 8082	06/29/10
Aroclor 1232	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1248	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1254	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1260	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1262	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1268	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
OUTSIDE ANALYSIS					
HERBICIDES-CHLORINATED - TA					
2,4,5-T	<0.022	mg/Kg dry wt	0.022	EPA 8151	06/25/10

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105714 **Sample Collected:** 06/21/10 14:22 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON TRANSECT 4 COMPOSITE
Sample Point Code: SIL_4
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05706
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates.

Test Parameter	Result	Units	MRL	Method	Analysis Date
2,4,5-TP (Silvex)	<0.022	mg/Kg dry wt	0.022	EPA 8151	06/25/10
2,4-D	<0.089	mg/Kg dry wt	0.089	EPA 8151	06/25/10
2,4-DB	<0.089	mg/Kg dry wt	0.089	EPA 8151	06/25/10
Dalapon	<0.10	mg/Kg dry wt	0.10	EPA 8151	06/25/10
Dicamba	<0.045	mg/Kg dry wt	0.045	EPA 8151	06/25/10
Dichlorprop	<0.089	mg/Kg dry wt	0.089	EPA 8151	06/25/10
Dinoseb	<0.013	mg/Kg dry wt	0.013	EPA 8151	06/25/10
MCPA	<8.9	mg/Kg dry wt	8.9	EPA 8151	06/25/10
MCPP	<8.9	mg/Kg dry wt	8.9	EPA 8151	06/25/10
ORGANOTIN COMPOUNDS - TA					
Dibutyl tin	<1.4	µg/Kg dry wt	1.4	PSEP GC/MS	07/01/10
Monobutyl tin	<1.4	µg/Kg dry wt	1.4	PSEP GC/MS	07/01/10
Tetrabutyl tin	<3.8	µg/Kg dry wt	3.8	PSEP GC/MS	07/01/10
Tributyl tin	<1.4	µg/Kg dry wt	1.4	PSEP GC/MS	07/01/10
PESTICIDES BY EPA 8081 - CAS					
4,4'-DDD	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
4,4'-DDE	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
4,4'-DDT	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Aldrin	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Alpha-BHC	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Alpha-Chlordane	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Beta-BHC	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Delta-BHC	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Dieldrin	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Endosulfan I	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Endosulfan II	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Endosulfan Sulfate	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Endrin	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Endrin Aldehyde	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Endrin Ketone	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Gamma-BHC(Lindane)	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Gamma-Chlordane	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Heptachlor	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Heptachlor Epoxide	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105714 **Sample Collected:** 06/21/10 14:22 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name:	PORTLAND HARBOR INLINE SAMP	**Report Page:**	Page 3 of 3
Address/Location:	END OF SWAN ISLAND LAGOON TRANSECT 4 COMPOSITE	**System ID:**	AO05706
Sample Point Code:	SIL_4	**EID File # :**	1020.001
Sample Type:	COMPOSITE	**LocCode:**	PORTHARI
Sample Matrix:	SEDIMENT	**Collected By:**	JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates.

Test Parameter	Result	Units	MRL	Method	Analysis Date
Methoxychlor	<0.97	µg/Kg dry wt	0.97	EPA 8081A	06/30/10
Toxaphene	<150	µg/Kg dry wt	150	EPA 8081A	06/30/10
POLYNUCLEAR AROMATICS & PHTHALATES - TA					
1-Methylnaphthalene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
2-Methylnaphthalene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Acenaphthene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Acenaphthylene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Anthracene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Benzo(a)anthracene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Benzo(a)pyrene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Benzo(b)fluoranthene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Benzo(ghi)perylene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Benzo(k)fluoranthene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Bis(2-ethylhexyl) phthalate	37.8	µg/Kg dry wt	28.8	EPA8270M-SIM	06/24/10
Butyl benzyl phthalate	<28.8	µg/Kg dry wt	28.8	EPA8270M-SIM	06/24/10
Chrysene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Dibenzo(a,h)anthracene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Diethyl phthalate	<28.8	µg/Kg dry wt	28.8	EPA8270M-SIM	06/24/10
Dimethyl phthalate	<28.8	µg/Kg dry wt	28.8	EPA8270M-SIM	06/24/10
Di-n-butyl phthalate	<28.8	µg/Kg dry wt	28.8	EPA8270M-SIM	06/24/10
Di-n-octyl phthalate	<28.8	µg/Kg dry wt	28.8	EPA8270M-SIM	06/24/10
Fluoranthene	15.5	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Fluorene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Indeno(1,2,3-cd)pyrene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Naphthalene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Phenanthrene	<14.4	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10
Pyrene	16.5	µg/Kg dry wt	14.4	EPA8270M-SIM	06/24/10

End of Report for Sample ID: FO105714

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105715 **Sample Collected:** 06/21/10 14:43 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON
DISCRETE LOCATION COMPOSITE
Sample Point Code: SIL_5
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05707
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates.

Test Parameter	Result	Units	MRL	Method	Analysis Date
GENERAL					
TOTAL SOLIDS	90.6	% W/W	0.01	SM 2540 G	06/22/10
METALS					
ALUMINUM	12700	mg/Kg dry wt	2.5	EPA 6010	06/24/10
ANTIMONY	0.17	mg/Kg dry wt	0.10	EPA 6020	06/25/10
ARSENIC	1.88	mg/Kg dry wt	0.50	EPA 6020	06/25/10
BARIUM	85.0	mg/Kg dry wt	0.10	EPA 6020	06/25/10
CADMIUM	<0.10	mg/Kg dry wt	0.10	EPA 6020	06/25/10
CHROMIUM	17.5	mg/Kg dry wt	0.50	EPA 6020	06/25/10
COPPER	23.0	mg/Kg dry wt	0.25	EPA 6020	06/25/10
LEAD	6.53	mg/Kg dry wt	0.10	EPA 6020	06/25/10
MERCURY	0.026	mg/Kg dry wt	0.010	EPA 6020	06/25/10
NICKEL	16.8	mg/Kg dry wt	0.25	EPA 6020	06/25/10
SILVER	<0.10	mg/Kg dry wt	0.10	EPA 6020	06/25/10
ZINC	67.1	mg/Kg dry wt	0.50	EPA 6020	06/25/10
GC ANALYSIS					
NWTPH-HCID					
DIESEL	<50	mg/Kg dry wt	50	NWTPH-HCID	06/16/10
GASOLINE	<20	mg/Kg dry wt	20	NWTPH-HCID	06/16/10
LUBE OIL	<100	mg/Kg dry wt	100	NWTPH-HCID	06/16/10
Surrogate Recovery (%)	110	mg/Kg dry wt		NWTPH-HCID	06/16/10
POLYCHLORINATED BIPHENYLS (PCB)					
Aroclor 1016/1242	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1221	<20	µg/Kg dry wt	20	EPA 8082	06/29/10
Aroclor 1232	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1248	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1254	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1260	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1262	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1268	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
OUTSIDE ANALYSIS					
HERBICIDES-CHLORINATED - TA					
2,4,5-T	<0.022	mg/Kg dry wt	0.022	EPA 8151	06/25/10

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105715 **Sample Collected:** 06/21/10 14:43 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON
DISCRETE LOCATION COMPOSITE
Sample Point Code: SIL_5
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05707
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates.

Test Parameter	Result	Units	MRL	Method	Analysis Date
2,4,5-TP (Silvex)	<0.022	mg/Kg dry wt	0.022	EPA 8151	06/25/10
2,4-D	<0.089	mg/Kg dry wt	0.089	EPA 8151	06/25/10
2,4-DB	<0.089	mg/Kg dry wt	0.089	EPA 8151	06/25/10
Dalapon	<0.10	mg/Kg dry wt	0.10	EPA 8151	06/25/10
Dicamba	<0.045	mg/Kg dry wt	0.045	EPA 8151	06/25/10
Dichlorprop	<0.089	mg/Kg dry wt	0.089	EPA 8151	06/25/10
Dinoseb	<0.013	mg/Kg dry wt	0.013	EPA 8151	06/25/10
MCPA	<8.9	mg/Kg dry wt	8.9	EPA 8151	06/25/10
MCPP	<8.9	mg/Kg dry wt	8.9	EPA 8151	06/25/10
ORGANOTIN COMPOUNDS - TA					
Dibutyl tin	<1.5	µg/Kg dry wt	1.5	PSEP GC/MS	07/01/10
Monobutyl tin	<1.5	µg/Kg dry wt	1.5	PSEP GC/MS	07/01/10
Tetrabutyl tin	<3.9	µg/Kg dry wt	3.9	PSEP GC/MS	07/01/10
Tributyl tin	5.2	µg/Kg dry wt	1.5	PSEP GC/MS	07/01/10
PESTICIDES BY EPA 8081 - CAS					
4,4'-DDD	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
4,4'-DDE	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
4,4'-DDT	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Aldrin	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Alpha-BHC	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Alpha-Chlordane	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Beta-BHC	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Delta-BHC	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Dieldrin	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Endosulfan I	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Endosulfan II	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Endosulfan Sulfate	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Endrin	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Endrin Aldehyde	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Endrin Ketone	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Gamma-BHC(Lindane)	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Gamma-Chlordane	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Heptachlor	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Heptachlor Epoxide	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105715 **Sample Collected:** 06/21/10 14:43 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON
DISCRETE LOCATION COMPOSITE
Sample Point Code: SIL_5
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05707
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates.

Test Parameter	Result	Units	MRL	Method	Analysis Date
Methoxychlor	<0.99	µg/Kg dry wt	0.99	EPA 8081A	06/30/10
Toxaphene	<50	µg/Kg dry wt	50	EPA 8081A	06/30/10
POLYNUCLEAR AROMATICS & PHTHALATES - TA					
1-Methylnaphthalene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
2-Methylnaphthalene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Acenaphthene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Acenaphthylene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Anthracene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Benzo(a)anthracene	17.1	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Benzo(a)pyrene	30.1	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Benzo(b)fluoranthene	23.6	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Benzo(ghi)perylene	36.2	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Benzo(k)fluoranthene	19.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Bis(2-ethylhexyl) phthalate	33.9	µg/Kg dry wt	29.5	EPA8270M-SIM	06/24/10
Butyl benzyl phthalate	<29.5	µg/Kg dry wt	29.5	EPA8270M-SIM	06/24/10
Chrysene	22.4	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Dibenzo(a,h)anthracene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Diethyl phthalate	<29.5	µg/Kg dry wt	29.5	EPA8270M-SIM	06/24/10
Dimethyl phthalate	<29.5	µg/Kg dry wt	29.5	EPA8270M-SIM	06/24/10
Di-n-butyl phthalate	<29.5	µg/Kg dry wt	29.5	EPA8270M-SIM	06/24/10
Di-n-octyl phthalate	<29.5	µg/Kg dry wt	29.5	EPA8270M-SIM	06/24/10
Fluoranthene	30.1	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Fluorene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Indeno(1,2,3-cd)pyrene	26.2	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Naphthalene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Phenanthrene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Pyrene	36.5	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10

End of Report for Sample ID: FO105715

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105716 **Sample Collected:** 06/21/10 00:00 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON
FIELD DUPLICATE 1
Sample Point Code: DUP
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05708
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates. Based on high LCS recovery, the result for Monobutyltin may be a high estimate.

Test Parameter	Result	Units	MRL	Method	Analysis Date
GENERAL					
TOTAL SOLIDS	91.9	% W/W	0.01	SM 2540 G	06/22/10
METALS					
ALUMINUM	12900	mg/Kg dry wt	2.5	EPA 6010	06/24/10
ANTIMONY	0.20	mg/Kg dry wt	0.10	EPA 6020	06/25/10
ARSENIC	1.85	mg/Kg dry wt	0.50	EPA 6020	06/25/10
BARIUM	108	mg/Kg dry wt	0.10	EPA 6020	06/25/10
CADMIUM	<0.10	mg/Kg dry wt	0.10	EPA 6020	06/25/10
CHROMIUM	17.6	mg/Kg dry wt	0.50	EPA 6020	06/25/10
COPPER	19.1	mg/Kg dry wt	0.25	EPA 6020	06/25/10
LEAD	5.73	mg/Kg dry wt	0.10	EPA 6020	06/25/10
MERCURY	0.021	mg/Kg dry wt	0.010	EPA 6020	06/25/10
NICKEL	17.4	mg/Kg dry wt	0.25	EPA 6020	06/25/10
SILVER	<0.10	mg/Kg dry wt	0.10	EPA 6020	06/25/10
ZINC	61.5	mg/Kg dry wt	0.50	EPA 6020	06/25/10
GC ANALYSIS					
NWTPH-HCID					
DIESEL	<50	mg/Kg dry wt	50	NWTPH-HCID	06/16/10
GASOLINE	<20	mg/Kg dry wt	20	NWTPH-HCID	06/16/10
LUBE OIL	<100	mg/Kg dry wt	100	NWTPH-HCID	06/16/10
Surrogate Recovery (%)	101	mg/Kg dry wt		NWTPH-HCID	06/16/10
POLYCHLORINATED BIPHENYLS (PCB)					
Aroclor 1016/1242	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1221	<20	µg/Kg dry wt	20	EPA 8082	06/29/10
Aroclor 1232	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1248	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1254	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1260	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1262	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
Aroclor 1268	<10	µg/Kg dry wt	10	EPA 8082	06/29/10
OUTSIDE ANALYSIS					
HERBICIDES-CHLORINATED - TA					
2,4,5-T	<0.022	mg/Kg dry wt	0.022	EPA 8151	06/25/10

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105716 **Sample Collected:** 06/21/10 00:00 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON
FIELD DUPLICATE 1
Sample Point Code: DUP
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05708
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates. Based on high LCS recovery, the result for Monobutyltin may be a high estimate.

Test Parameter	Result	Units	MRL	Method	Analysis Date
2,4,5-TP (Silvex)	<0.022	mg/Kg dry wt	0.022	EPA 8151	06/25/10
2,4-D	<0.088	mg/Kg dry wt	0.088	EPA 8151	06/25/10
2,4-DB	<0.088	mg/Kg dry wt	0.088	EPA 8151	06/25/10
Dalapon	<0.099	mg/Kg dry wt	0.099	EPA 8151	06/25/10
Dicamba	<0.044	mg/Kg dry wt	0.044	EPA 8151	06/25/10
Dichlorprop	<0.088	mg/Kg dry wt	0.088	EPA 8151	06/25/10
Dinoseb	<0.013	mg/Kg dry wt	0.013	EPA 8151	06/25/10
MCPA	<8.8	mg/Kg dry wt	8.8	EPA 8151	06/25/10
MCPP	<8.8	mg/Kg dry wt	8.8	EPA 8151	06/25/10
ORGANOTIN COMPOUNDS - TA					
Dibutyl tin	<1.4	µg/Kg dry wt	1.4	PSEP GC/MS	07/01/10
Monobutyl tin	EST 4.0	µg/Kg dry wt	1.4	PSEP GC/MS	07/01/10
Tetrabutyl tin	<3.9	µg/Kg dry wt	3.9	PSEP GC/MS	07/01/10
Tributyl tin	4.4	µg/Kg dry wt	1.4	PSEP GC/MS	07/01/10
PESTICIDES BY EPA 8081 - CAS					
4,4'-DDD	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
4,4'-DDE	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
4,4'-DDT	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Aldrin	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Alpha-BHC	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Alpha-Chlordane	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Beta-BHC	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Delta-BHC	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Dieldrin	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Endosulfan I	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Endosulfan II	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Endosulfan Sulfate	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Endrin	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Endrin Aldehyde	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Endrin Ketone	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Gamma-BHC(Lindane)	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Gamma-Chlordane	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Heptachlor	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Heptachlor Epoxide	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105716 **Sample Collected:** 06/21/10 00:00 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON
FIELD DUPLICATE 1
Sample Point Code: DUP
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05708
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates. Based on high LCS recovery, the result for Monobutyltin may be a high estimate.

Test Parameter	Result	Units	MRL	Method	Analysis Date
Methoxychlor	<0.98	µg/Kg dry wt	0.98	EPA 8081A	06/30/10
Toxaphene	<49	µg/Kg dry wt	49	EPA 8081A	06/30/10
POLYNUCLEAR AROMATICS & PHTHALATES - TA					
1-Methylnaphthalene	<14.3	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
2-Methylnaphthalene	<14.3	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Acenaphthene	<14.3	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Acenaphthylene	<14.3	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Anthracene	<14.3	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Benzo(a)anthracene	<14.3	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Benzo(a)pyrene	17.9	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Benzo(b)fluoranthene	<14.3	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Benzo(ghi)perylene	20.6	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Benzo(k)fluoranthene	<14.3	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Bis(2-ethylhexyl) phthalate	<28.6	µg/Kg dry wt	28.6	EPA8270M-SIM	06/24/10
Butyl benzyl phthalate	<28.6	µg/Kg dry wt	28.6	EPA8270M-SIM	06/24/10
Chrysene	<14.3	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Dibenzo(a,h)anthracene	<14.3	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Diethyl phthalate	<28.6	µg/Kg dry wt	28.6	EPA8270M-SIM	06/24/10
Dimethyl phthalate	<28.6	µg/Kg dry wt	28.6	EPA8270M-SIM	06/24/10
Di-n-butyl phthalate	<28.6	µg/Kg dry wt	28.6	EPA8270M-SIM	06/24/10
Di-n-octyl phthalate	<28.6	µg/Kg dry wt	28.6	EPA8270M-SIM	06/24/10
Fluoranthene	35.1	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Fluorene	<14.3	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Indeno(1,2,3-cd)pyrene	14.9	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Naphthalene	<14.3	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Phenanthrene	24.0	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10
Pyrene	40.4	µg/Kg dry wt	14.3	EPA8270M-SIM	06/24/10

End of Report for Sample ID: FO105716

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105717 **Sample Collected:** 06/21/10 00:00 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON
FIELD DUPLICATE 2
Sample Point Code: DUP
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05709
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates. Based on high LCS recovery, the result for Monobutyltin may be a high estimate.

Test Parameter	Result	Units	MRL	Method	Analysis Date
GENERAL					
TOTAL SOLIDS	90.8	% W/W	0.01	SM 2540 G	06/22/10
METALS					
ALUMINUM	12500	mg/Kg dry wt	2.5	EPA 6010	06/24/10
ANTIMONY	0.15	mg/Kg dry wt	0.10	EPA 6020	06/25/10
ARSENIC	2.09	mg/Kg dry wt	0.50	EPA 6020	06/25/10
BARIUM	77.9	mg/Kg dry wt	0.10	EPA 6020	06/25/10
CADMIUM	<0.10	mg/Kg dry wt	0.10	EPA 6020	06/25/10
CHROMIUM	16.3	mg/Kg dry wt	0.50	EPA 6020	06/25/10
COPPER	22.9	mg/Kg dry wt	0.25	EPA 6020	06/25/10
LEAD	6.37	mg/Kg dry wt	0.10	EPA 6020	06/25/10
MERCURY	0.022	mg/Kg dry wt	0.010	EPA 6020	06/25/10
NICKEL	17.0	mg/Kg dry wt	0.25	EPA 6020	06/25/10
SILVER	<0.10	mg/Kg dry wt	0.10	EPA 6020	06/25/10
ZINC	63.2	mg/Kg dry wt	0.50	EPA 6020	06/25/10
GC ANALYSIS					
NWTPH-Dx					
DIESEL RANGE HYDROCARBONS (C12-C24)	<25	mg/Kg dry wt	25	NWTPH-Dx	06/23/10
OIL RANGE HYDROCARBONS (>C24)	<50	mg/Kg dry wt	50	NWTPH-Dx	06/23/10
NWTPH-HCID					
DIESEL	<50	mg/Kg dry wt	50	NWTPH-HCID	06/16/10
GASOLINE	<20	mg/Kg dry wt	20	NWTPH-HCID	06/16/10
LUBE OIL	DET	mg/Kg dry wt	100	NWTPH-HCID	06/16/10
Surrogate Recovery (%)	112	mg/Kg dry wt		NWTPH-HCID	06/16/10
POLYCHLORINATED BIPHENYLS (PCB)					
Aroclor 1016/1242	<10	µg/Kg dry wt	10	EPA 8082	07/01/10
Aroclor 1221	<20	µg/Kg dry wt	20	EPA 8082	07/01/10
Aroclor 1232	<10	µg/Kg dry wt	10	EPA 8082	07/01/10
Aroclor 1248	<10	µg/Kg dry wt	10	EPA 8082	07/01/10
Aroclor 1254	<10	µg/Kg dry wt	10	EPA 8082	07/01/10
Aroclor 1260	<10	µg/Kg dry wt	10	EPA 8082	07/01/10
Aroclor 1262	<10	µg/Kg dry wt	10	EPA 8082	07/01/10
Aroclor 1268	<10	µg/Kg dry wt	10	EPA 8082	07/01/10

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105717 **Sample Collected:** 06/21/10 00:00 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON
FIELD DUPLICATE 2
Sample Point Code: DUP
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05709
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates. Based on high LCS recovery, the result for Monobutyltin may be a high estimate.

Test Parameter	Result	Units	MRL	Method	Analysis Date
OUTSIDE ANALYSIS					
HERBICIDES-CHLORINATED - TA					
2,4,5-T	<0.022	mg/Kg dry wt	0.022	EPA 8151	06/25/10
2,4,5-TP (Silvex)	<0.022	mg/Kg dry wt	0.022	EPA 8151	06/25/10
2,4-D	<0.088	mg/Kg dry wt	0.088	EPA 8151	06/25/10
2,4-DB	<0.088	mg/Kg dry wt	0.088	EPA 8151	06/25/10
Dalapon	<0.099	mg/Kg dry wt	0.099	EPA 8151	06/25/10
Dicamba	<0.044	mg/Kg dry wt	0.044	EPA 8151	06/25/10
Dichlorprop	<0.088	mg/Kg dry wt	0.088	EPA 8151	06/25/10
Dinoseb	<0.013	mg/Kg dry wt	0.013	EPA 8151	06/25/10
MCPA	<8.8	mg/Kg dry wt	8.8	EPA 8151	06/25/10
MCPP	<8.8	mg/Kg dry wt	8.8	EPA 8151	06/25/10
ORGANOTIN COMPOUNDS - TA					
Dibutyl tin	<1.4	µg/Kg dry wt	1.4	PSEP GC/MS	07/01/10
Monobutyl tin	EST 7.5	µg/Kg dry wt	1.4	PSEP GC/MS	07/01/10
Tetrabutyl tin	<3.9	µg/Kg dry wt	3.9	PSEP GC/MS	07/01/10
Tributyl tin	9.6	µg/Kg dry wt	1.4	PSEP GC/MS	07/01/10
PESTICIDES BY EPA 8081 - CAS					
4,4'-DDD	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
4,4'-DDE	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
4,4'-DDT	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Aldrin	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Alpha-BHC	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Alpha-Chlordane	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Beta-BHC	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Delta-BHC	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Dieldrin	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Endosulfan I	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Endosulfan II	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Endosulfan Sulfate	2.6	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Endrin	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Endrin Aldehyde	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Endrin Ketone	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Gamma-BHC(Lindane)	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10

Report Date: 08/06/10 **Validated By:**

City of Portland
Water Pollution Control Laboratory

6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656

LABORATORY ANALYSIS REPORT

Sample ID: FO105717 **Sample Collected:** 06/21/10 00:00 **Sample Received:** 06/21/10 **Sample Status:** COMPLETE AND VALIDATED

Proj./Company Name: PORTLAND HARBOR INLINE SAMP
Address/Location: END OF SWAN ISLAND LAGOON
FIELD DUPLICATE 2
Sample Point Code: DUP
Sample Type: COMPOSITE
Sample Matrix: SEDIMENT

System ID: AO05709
EID File # : 1020.001
LocCode: PORTHARI
Collected By: JXB/PTB

Comments:
QA/QC: Except as follows, all analytical QA/QC criteria were met for this sample including holding times, calibration, method blanks, laboratory control sample recoveries, duplicate precision, matrix spike recoveries, and surrogate recoveries, as applicable. Batch MS/MSD recoveries for some phthalate compounds were high; detected phthalate analytes may be high estimates. Based on high LCS recovery, the result for Monobutyltin may be a high estimate.

Test Parameter	Result	Units	MRL	Method	Analysis Date
Gamma-Chlordane	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Heptachlor	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Heptachlor Epoxide	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Methoxychlor	<1.0	µg/Kg dry wt	1.0	EPA 8081A	06/30/10
Toxaphene	<53	µg/Kg dry wt	53	EPA 8081A	06/30/10
POLYNUCLEAR AROMATICS & PHTHALATES - TA					
1-Methylnaphthalene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
2-Methylnaphthalene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Acenaphthene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Acenaphthylene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Anthracene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Benzo(a)anthracene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Benzo(a)pyrene	18.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Benzo(b)fluoranthene	15.8	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Benzo(ghi)perylene	21.0	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Benzo(k)fluoranthene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Bis(2-ethylhexyl) phthalate	<29.5	µg/Kg dry wt	29.5	EPA8270M-SIM	06/24/10
Butyl benzyl phthalate	<29.5	µg/Kg dry wt	29.5	EPA8270M-SIM	06/24/10
Chrysene	16.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Dibenzo(a,h)anthracene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Diethyl phthalate	<29.5	µg/Kg dry wt	29.5	EPA8270M-SIM	06/24/10
Dimethyl phthalate	<29.5	µg/Kg dry wt	29.5	EPA8270M-SIM	06/24/10
Di-n-butyl phthalate	<29.5	µg/Kg dry wt	29.5	EPA8270M-SIM	06/24/10
Di-n-octyl phthalate	<29.5	µg/Kg dry wt	29.5	EPA8270M-SIM	06/24/10
Fluoranthene	23.5	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Fluorene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Indeno(1,2,3-cd)pyrene	16.4	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Naphthalene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Phenanthrene	<14.7	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10
Pyrene	27.4	µg/Kg dry wt	14.7	EPA8270M-SIM	06/24/10

End of Report for Sample ID: FO105717

Report Date: 08/06/10 **Validated By:**

PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

ORELAP#: OR100021

July 20, 2010

Jennifer Shackelford
City of Portland Water Pollution Laboratory
6543 N. Burlington Ave.
Portland, OR 97203

RE: Portland Harbor Inline

Enclosed are the results of analyses for samples received by the laboratory on 06/22/10 16:45. The following list is a summary of the Work Orders contained in this report, generated on 07/20/10 14:50.

If you have any questions concerning this report, please feel free to contact me.

Work Order	Project	ProjectNumber
PTF0690	Portland Harbor Inline	36238

TestAmerica Portland

Darrell Auvil, Project Manager

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FO105711	PTF0690-01	Soil	06/21/10 13:08	06/22/10 16:45
FO105712	PTF0690-02	Soil	06/21/10 13:36	06/22/10 16:45
FO105713	PTF0690-03	Soil	06/21/10 14:09	06/22/10 16:45
FO105714	PTF0690-04	Soil	06/21/10 14:22	06/22/10 16:45
FO105715	PTF0690-05	Soil	06/21/10 14:43	06/22/10 16:45
FO105716	PTF0690-06	Soil	06/21/10 00:00	06/22/10 16:45
FO105717	PTF0690-07	Soil	06/21/10 00:00	06/22/10 16:45

TestAmerica Portland

Darrell W. Auvil

Darrell Auvil, Project Manager

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Analytical Case Narrative

TestAmerica - Portland, OR

PTF0690

Seven soils were submitted for Organotins analysis by PSEP method. The original batch had the MS and MSD quality control samples outside of control limits for tetrabutyltin. The associated LCS sample was within recovery criteria for tetrabuytyl tin The LCS failed high at 105% (top of control limits is 99%) for monobutyltin only. Samples that were detected for monobutyltin were re-extracted outside of hold time and both sets of data are reported.

TestAmerica Portland

Darrell W. Auvil

Darrell Auvil, Project Manager

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Polynuclear Aromatic Compounds per EPA 8270M-SIM

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-01 (FO105711)			**Soil**			**Sampled: 06/21/10 13:08**				
1-Methylnaphthalene	EPA 8270m	ND	*3.77*	15.3	ug/kg dry	1x	10F0761	06/24/10 05:35	06/25/10 16:05	
2-Methylnaphthalene	"	ND	*3.77*	15.3	"	"	"	"	"	
Acenaphthene	"	ND	*3.77*	15.3	"	"	"	"	"	
Acenaphthylene	"	ND	*3.77*	15.3	"	"	"	"	"	
Anthracene	"	ND	*3.77*	15.3	"	"	"	"	"	
Benzo (a) anthracene	"	**13.7**	*3.77*	15.3	"	"	"	"	"	**J**
Benzo (a) pyrene	"	**18.5**	*3.77*	15.3	"	"	"	"	"	
Benzo (b) fluoranthene	"	**16.3**	*3.77*	15.3	"	"	"	"	"	
Benzo (ghi) perylene	"	**18.4**	*3.77*	15.3	"	"	"	"	"	
Benzo (k) fluoranthene	"	**14.2**	*3.77*	15.3	"	"	"	"	"	**J**
Chrysene	"	**16.3**	*3.77*	15.3	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	ND	*3.77*	15.3	"	"	"	"	"	
Fluoranthene	"	**26.4**	*3.77*	15.3	"	"	"	"	"	
Fluorene	"	ND	*3.77*	15.3	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	**15.2**	*3.77*	15.3	"	"	"	"	"	**J**
Naphthalene	"	ND	*3.77*	15.3	"	"	"	"	"	
Phenanthrene	"	**12.3**	*3.77*	15.3	"	"	"	"	"	**J**
Pyrene	"	**26.4**	*3.77*	15.3	"	"	"	"	"	
Surrogate(s): *Fluorene-d10*			*88.9%*			*24 - 125 %*	"		"	
Pyrene-d10			*98.1%*			*41 - 141 %*	"		"	
Benzo (a) pyrene-d12			*96.7%*			*38 - 143 %*	"		"	
PTF0690-02 (FO105712)			**Soil**			**Sampled: 06/21/10 13:36**				
1-Methylnaphthalene	EPA 8270m	ND	*3.54*	14.4	ug/kg dry	1x	10F0761	06/24/10 05:35	06/25/10 13:25	
2-Methylnaphthalene	"	ND	*3.54*	14.4	"	"	"	"	"	
Acenaphthene	"	ND	*3.54*	14.4	"	"	"	"	"	
Acenaphthylene	"	ND	*3.54*	14.4	"	"	"	"	"	
Anthracene	"	ND	*3.54*	14.4	"	"	"	"	"	
Benzo (a) anthracene	"	**7.44**	*3.54*	14.4	"	"	"	"	"	**J**
Benzo (a) pyrene	"	**10.0**	*3.54*	14.4	"	"	"	"	"	**J**
Benzo (b) fluoranthene	"	**10.1**	*3.54*	14.4	"	"	"	"	"	**J**
Benzo (ghi) perylene	"	**10.2**	*3.54*	14.4	"	"	"	"	"	**J**
Benzo (k) fluoranthene	"	**7.99**	*3.54*	14.4	"	"	"	"	"	**J**
Chrysene	"	**9.56**	*3.54*	14.4	"	"	"	"	"	**J**
Dibenzo (a,h) anthracene	"	ND	*3.54*	14.4	"	"	"	"	"	
Fluoranthene	"	**12.4**	*3.54*	14.4	"	"	"	"	"	**J**

TestAmerica Portland

Darrell Auvil, Project Manager

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THE LEADER IN ENVIRONMENTAL TESTING

PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
ph: (503) 906.9200 fax: (503) 906.9210

City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Polynuclear Aromatic Compounds per EPA 8270M-SIM

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-02 (FO105712)			**Soil**			**Sampled: 06/21/10 13:36**				
Fluorene	EPA 8270m	ND	*3.54*	14.4	ug/kg dry	1x	10F0761	06/24/10 05:35	06/25/10 13:25	
Indeno (1,2,3-cd) pyrene	"	**8.54**	*3.54*	14.4	"	"	"	"	"	**J**
Naphthalene	"	ND	*3.54*	14.4	"	"	"	"	"	
Phenanthrene	"	**4.06**	*3.54*	14.4	"	"	"	"	"	**J**
Pyrene	"	**13.1**	*3.54*	14.4	"	"	"	"	"	**J**
Surrogate(s): *Fluorene-d10*			*69.9%*			*24 - 125 %*	"		"	
Pyrene-d10			*96.3%*			*41 - 141 %*	"		"	
Benzo (a) pyrene-d12			*96.8%*			*38 - 143 %*	"		"	
PTF0690-03 (FO105713)			**Soil**			**Sampled: 06/21/10 14:09**				
1-Methylnaphthalene	EPA 8270m	ND	*3.92*	15.9	ug/kg dry	1x	10F0761	06/24/10 05:35	06/25/10 16:38	
2-Methylnaphthalene	"	ND	*3.92*	15.9	"	"	"	"	"	
Acenaphthene	"	ND	*3.92*	15.9	"	"	"	"	"	
Acenaphthylene	"	ND	*3.92*	15.9	"	"	"	"	"	
Anthracene	"	ND	*3.92*	15.9	"	"	"	"	"	
Benzo (a) anthracene	"	**18.9**	*3.92*	15.9	"	"	"	"	"	
Benzo (a) pyrene	"	**22.8**	*3.92*	15.9	"	"	"	"	"	
Benzo (b) fluoranthene	"	**22.6**	*3.92*	15.9	"	"	"	"	"	
Benzo (ghi) perylene	"	**20.9**	*3.92*	15.9	"	"	"	"	"	
Benzo (k) fluoranthene	"	**17.9**	*3.92*	15.9	"	"	"	"	"	
Chrysene	"	**26.0**	*3.92*	15.9	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	**4.55**	*3.92*	15.9	"	"	"	"	"	**J**
Fluoranthene	"	**30.5**	*3.92*	15.9	"	"	"	"	"	
Fluorene	"	ND	*3.92*	15.9	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	**18.6**	*3.92*	15.9	"	"	"	"	"	
Naphthalene	"	ND	*3.92*	15.9	"	"	"	"	"	
Phenanthrene	"	**9.69**	*3.92*	15.9	"	"	"	"	"	**J**
Pyrene	"	**29.8**	*3.92*	15.9	"	"	"	"	"	
Surrogate(s): *Fluorene-d10*			*76.7%*			*24 - 125 %*	"		"	
Pyrene-d10			*88.7%*			*41 - 141 %*	"		"	
Benzo (a) pyrene-d12			*86.0%*			*38 - 143 %*	"		"	

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Darrell Auvil, Project Manager

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Polynuclear Aromatic Compounds per EPA 8270M-SIM

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-04 (FO105714)			**Soil**			**Sampled: 06/21/10 14:22**				
1-Methylnaphthalene	EPA 8270m	ND	*3.55*	14.4	ug/kg dry	1x	10F0761	06/24/10 05:35	06/25/10 17:10	
2-Methylnaphthalene	"	ND	*3.55*	14.4	"	"	"	"	"	
Acenaphthene	"	ND	*3.55*	14.4	"	"	"	"	"	
Acenaphthylene	"	ND	*3.55*	14.4	"	"	"	"	"	
Anthracene	"	ND	*3.55*	14.4	"	"	"	"	"	
Benzo (a) anthracene	"	**7.92**	*3.55*	14.4	"	"	"	"	"	**J**
Benzo (a) pyrene	"	**11.5**	*3.55*	14.4	"	"	"	"	"	**J**
Benzo (b) fluoranthene	"	**9.91**	*3.55*	14.4	"	"	"	"	"	**J**
Benzo (ghi) perylene	"	**12.2**	*3.55*	14.4	"	"	"	"	"	**J**
Benzo (k) fluoranthene	"	**7.86**	*3.55*	14.4	"	"	"	"	"	**J**
Chrysene	"	**9.76**	*3.55*	14.4	"	"	"	"	"	**J**
Dibenzo (a,h) anthracene	"	ND	*3.55*	14.4	"	"	"	"	"	
Fluoranthene	"	**15.5**	*3.55*	14.4	"	"	"	"	"	
Fluorene	"	ND	*14.4*	14.4	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	**9.76**	*3.55*	14.4	"	"	"	"	"	**J**
Naphthalene	"	ND	*3.55*	14.4	"	"	"	"	"	
Phenanthrene	"	**6.97**	*3.55*	14.4	"	"	"	"	"	**J**
Pyrene	"	**16.5**	*3.55*	14.4	"	"	"	"	"	
Surrogate(s): *Fluorene-d10*			*78.1%*			*24 - 125 %*	"		"	
Pyrene-d10			*93.6%*			*41 - 141 %*	"		"	
Benzo (a) pyrene-d12			*96.5%*			*38 - 143 %*	"		"	
PTF0690-05 (FO105715)			**Soil**			**Sampled: 06/21/10 14:43**				
1-Methylnaphthalene	EPA 8270m	ND	*3.63*	14.7	ug/kg dry	1x	10F0761	06/24/10 05:35	06/25/10 17:42	
2-Methylnaphthalene	"	ND	*3.63*	14.7	"	"	"	"	"	
Acenaphthene	"	ND	*3.63*	14.7	"	"	"	"	"	
Acenaphthylene	"	**6.09**	*3.63*	14.7	"	"	"	"	"	**J**
Anthracene	"	ND	*3.63*	14.7	"	"	"	"	"	
Benzo (a) anthracene	"	**17.1**	*3.63*	14.7	"	"	"	"	"	
Benzo (a) pyrene	"	**30.1**	*3.63*	14.7	"	"	"	"	"	
Benzo (b) fluoranthene	"	**23.6**	*3.63*	14.7	"	"	"	"	"	
Benzo (ghi) perylene	"	**36.2**	*3.63*	14.7	"	"	"	"	"	
Benzo (k) fluoranthene	"	**19.7**	*3.63*	14.7	"	"	"	"	"	
Chrysene	"	**22.4**	*3.63*	14.7	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	**4.91**	*3.63*	14.7	"	"	"	"	"	**J**
Fluoranthene	"	**30.1**	*3.63*	14.7	"	"	"	"	"	

TestAmerica Portland

Darrell Auvil, Project Manager

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Polynuclear Aromatic Compounds per EPA 8270M-SIM

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-05 (FO105715)			**Soil**			**Sampled: 06/21/10 14:43**				
Fluorene	EPA 8270m	ND	*3.63*	14.7	ug/kg dry	1x	10F0761	06/24/10 05:35	06/25/10 17:42	
Indeno (1,2,3-cd) pyrene	"	**26.2**	*3.63*	14.7	"	"	"	"	"	
Naphthalene	"	ND	*3.63*	14.7	"	"	"	"	"	
Phenanthrene	"	**7.33**	*3.63*	14.7	"	"	"	"	"	**J**
Pyrene	"	**36.5**	*3.63*	14.7	"	"	"	"	"	
Surrogate(s): *Fluorene-d10*			*86.0%*			*24 - 125 %*	"		"	
Pyrene-d10			*97.4%*			*41 - 141 %*	"		"	
Benzo (a) pyrene-d12			*100%*			*38 - 143 %*	"		"	
PTF0690-06 (FO105716)			**Soil**			**Sampled: 06/21/10 00:00**				
1-Methylnaphthalene	EPA 8270m	ND	*3.52*	14.3	ug/kg dry	1x	10F0761	06/24/10 05:35	06/25/10 18:14	
2-Methylnaphthalene	"	ND	*3.52*	14.3	"	"	"	"	"	
Acenaphthene	"	**6.64**	*3.52*	14.3	"	"	"	"	"	**J**
Acenaphthylene	"	ND	*3.52*	14.3	"	"	"	"	"	
Anthracene	"	ND	*3.52*	14.3	"	"	"	"	"	
Benzo (a) anthracene	"	**12.5**	*3.52*	14.3	"	"	"	"	"	**J**
Benzo (a) pyrene	"	**17.9**	*3.52*	14.3	"	"	"	"	"	
Benzo (b) fluoranthene	"	**13.6**	*3.52*	14.3	"	"	"	"	"	**J**
Benzo (ghi) perylene	"	**20.6**	*3.52*	14.3	"	"	"	"	"	
Benzo (k) fluoranthene	"	**12.0**	*3.52*	14.3	"	"	"	"	"	**J**
Chrysene	"	**14.2**	*3.52*	14.3	"	"	"	"	"	**J**
Dibenzo (a,h) anthracene	"	ND	*3.52*	14.3	"	"	"	"	"	
Fluoranthene	"	**35.1**	*3.52*	14.3	"	"	"	"	"	
Fluorene	"	ND	*3.52*	14.3	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	**14.9**	*3.52*	14.3	"	"	"	"	"	
Naphthalene	"	ND	*3.52*	14.3	"	"	"	"	"	
Phenanthrene	"	**24.0**	*3.52*	14.3	"	"	"	"	"	
Pyrene	"	**40.4**	*3.52*	14.3	"	"	"	"	"	
Surrogate(s): *Fluorene-d10*			*81.1%*			*24 - 125 %*	"		"	
Pyrene-d10			*98.8%*			*41 - 141 %*	"		"	
Benzo (a) pyrene-d12			*98.4%*			*38 - 143 %*	"		"	

TestAmerica Portland

Darrell Auvil, Project Manager

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THE LEADER IN ENVIRONMENTAL TESTING

PORTLAND, OR 9405 S.W. NIMBUS AVENUE
BEAVERTON, OR 97008-7132
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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Polynuclear Aromatic Compounds per EPA 8270M-SIM

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-07 (FO105717)		**Soil**				**Sampled: 06/21/10 00:00**				
1-Methylnaphthalene	EPA 8270m	ND	*3.63*	14.7	ug/kg dry	1x	10F0761	06/24/10 05:35	06/25/10 18:46	
2-Methylnaphthalene	"	ND	*3.63*	14.7	"	"	"	"	"	
Acenaphthene	"	ND	*3.63*	14.7	"	"	"	"	"	
Acenaphthylene	"	ND	*3.63*	14.7	"	"	"	"	"	
Anthracene	"	ND	*3.63*	14.7	"	"	"	"	"	
Benzo (a) anthracene	"	**13.6**	*3.63*	14.7	"	"	"	"	"	**J**
Benzo (a) pyrene	"	**18.7**	*3.63*	14.7	"	"	"	"	"	
Benzo (b) fluoranthene	"	**15.8**	*3.63*	14.7	"	"	"	"	"	
Benzo (ghi) perylene	"	**21.0**	*3.63*	14.7	"	"	"	"	"	
Benzo (k) fluoranthene	"	**12.9**	*3.63*	14.7	"	"	"	"	"	**J**
Chrysene	"	**16.7**	*3.63*	14.7	"	"	"	"	"	
Dibenzo (a,h) anthracene	"	**3.93**	*3.63*	14.7	"	"	"	"	"	**J**
Fluoranthene	"	**23.5**	*3.63*	14.7	"	"	"	"	"	
Fluorene	"	ND	*3.63*	14.7	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	"	**16.4**	*3.63*	14.7	"	"	"	"	"	
Naphthalene	"	ND	*3.63*	14.7	"	"	"	"	"	
Phenanthrene	"	**8.61**	*3.63*	14.7	"	"	"	"	"	**J**
Pyrene	"	**27.4**	*3.63*	14.7	"	"	"	"	"	
Surrogate(s):	*Fluorene-d10*		*74.5%*		*24 - 125 %*	"			"	
	Pyrene-d10		*96.4%*		*41 - 141 %*	"			"	
	Benzo (a) pyrene-d12		*98.6%*		*38 - 143 %*	"			"	

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Phthalates per EPA 8270-SIM

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-01 (FO105711)			**Soil**			**Sampled: 06/21/10 13:08**				
Dimethyl phthalate	EPA 8270m	ND	*15.3*	30.6	ug/kg dry	1x	10F0761	06/24/10 05:35	06/25/10 16:17	
Diethyl phthalate	"	ND	*15.3*	30.6	"	"	"	"	"	
Di-n-butyl phthalate	"	ND	*15.3*	30.6	"	"	"	"	"	
Butyl benzyl phthalate	"	**37.2**	*15.3*	30.6	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	"	**40.4**	*15.3*	30.6	"	"	"	"	"	
Di-n-octyl phthalate	"	ND	*15.3*	30.6	"	"	"	"	"	
Surrogate(s): 2-Fluorobiphenyl			*95.9%*			*10 - 150 %*	"		"	
p-Terphenyl-d14			*73.6%*			*10 - 150 %*	"		"	
PTF0690-02 (FO105712)			**Soil**			**Sampled: 06/21/10 13:36**				
Dimethyl phthalate	EPA 8270m	ND	*14.4*	28.7	ug/kg dry	1x	10F0761	06/24/10 05:35	06/25/10 13:55	
Diethyl phthalate	"	ND	*14.4*	28.7	"	"	"	"	"	
Di-n-butyl phthalate	"	ND	*14.4*	28.7	"	"	"	"	"	
Butyl benzyl phthalate	"	**25.2**	*14.4*	28.7	"	"	"	"	"	**J**
Bis(2-ethylhexyl)phthalate	"	**31.0**	*14.4*	28.7	"	"	"	"	"	
Di-n-octyl phthalate	"	ND	*14.4*	28.7	"	"	"	"	"	
Surrogate(s): 2-Fluorobiphenyl			*91.8%*			*10 - 150 %*	"		"	
p-Terphenyl-d14			*78.5%*			*10 - 150 %*	"		"	
PTF0690-03 (FO105713)			**Soil**			**Sampled: 06/21/10 14:09**				
Dimethyl phthalate	EPA 8270m	ND	*15.9*	31.8	ug/kg dry	1x	10F0761	06/24/10 05:35	06/25/10 16:50	
Diethyl phthalate	"	ND	*15.9*	31.8	"	"	"	"	"	
Di-n-butyl phthalate	"	ND	*15.9*	31.8	"	"	"	"	"	
Butyl benzyl phthalate	"	**32.1**	*15.9*	31.8	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	"	**43.9**	*15.9*	31.8	"	"	"	"	"	
Di-n-octyl phthalate	"	ND	*15.9*	31.8	"	"	"	"	"	
Surrogate(s): 2-Fluorobiphenyl			*91.5%*			*10 - 150 %*	"		"	
p-Terphenyl-d14			*70.1%*			*10 - 150 %*	"		"	
PTF0690-04 (FO105714)			**Soil**			**Sampled: 06/21/10 14:22**				
Dimethyl phthalate	EPA 8270m	ND	*14.4*	28.8	ug/kg dry	1x	10F0761	06/24/10 05:35	06/25/10 17:23	
Diethyl phthalate	"	ND	*14.4*	28.8	"	"	"	"	"	
Di-n-butyl phthalate	"	ND	*14.4*	28.8	"	"	"	"	"	
Butyl benzyl phthalate	"	**23.1**	*14.4*	28.8	"	"	"	"	"	**J**
Bis(2-ethylhexyl)phthalate	"	**37.8**	*14.4*	28.8	"	"	"	"	"	
Di-n-octyl phthalate	"	ND	*14.4*	28.8	"	"	"	"	"	

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Phthalates per EPA 8270-SIM

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-04 (FO105714)			**Soil**			**Sampled: 06/21/10 14:22**				
Surrogate(s): 2-Fluorobiphenyl			*97.4%*			*10 - 150 %*	"		"	
p-Terphenyl-d14			*77.5%*			*10 - 150 %*	"		"	
PTF0690-05 (FO105715)			**Soil**			**Sampled: 06/21/10 14:43**				
Dimethyl phthalate	EPA 8270m	ND	*14.7*	29.5	ug/kg dry	1x	10F0761	06/24/10 05:35	06/25/10 17:57	
Diethyl phthalate	"	ND	*14.7*	29.5	"	"	"	"	"	
Di-n-butyl phthalate	"	ND	*14.7*	29.5	"	"	"	"	"	
Butyl benzyl phthalate	"	**21.1**	*14.7*	29.5	"	"	"	"	"	**J**
Bis(2-ethylhexyl)phthalate	"	**33.9**	*14.7*	29.5	"	"	"	"	"	
Di-n-octyl phthalate	"	ND	*14.7*	29.5	"	"	"	"	"	
Surrogate(s): 2-Fluorobiphenyl			*99.9%*			*10 - 150 %*	"		"	
p-Terphenyl-d14			*75.9%*			*10 - 150 %*	"		"	
PTF0690-06 (FO105716)			**Soil**			**Sampled: 06/21/10 00:00**				
Dimethyl phthalate	EPA 8270m	ND	*14.3*	28.6	ug/kg dry	1x	10F0761	06/24/10 05:35	06/28/10 17:38	
Diethyl phthalate	"	ND	*14.3*	28.6	"	"	"	"	"	
Di-n-butyl phthalate	"	ND	*14.3*	28.6	"	"	"	"	"	
Butyl benzyl phthalate	"	**21.8**	*14.3*	28.6	"	"	"	"	"	**J**
Bis(2-ethylhexyl)phthalate	"	**25.5**	*14.3*	28.6	"	"	"	"	"	**J**
Di-n-octyl phthalate	"	ND	*14.3*	28.6	"	"	"	"	"	
Surrogate(s): 2-Fluorobiphenyl			*71.2%*			*10 - 150 %*	"		"	
p-Terphenyl-d14			*55.4%*			*10 - 150 %*	"		"	
PTF0690-07 (FO105717)			**Soil**			**Sampled: 06/21/10 00:00**				
Dimethyl phthalate	EPA 8270m	ND	*14.7*	29.5	ug/kg dry	1x	10F0761	06/24/10 05:35	06/28/10 18:10	
Diethyl phthalate	"	ND	*14.7*	29.5	"	"	"	"	"	
Di-n-butyl phthalate	"	ND	*14.7*	29.5	"	"	"	"	"	
Butyl benzyl phthalate	"	**24.1**	*14.7*	29.5	"	"	"	"	"	**J**
Bis(2-ethylhexyl)phthalate	"	**28.1**	*14.7*	29.5	"	"	"	"	"	**J**
Di-n-octyl phthalate	"	ND	*14.7*	29.5	"	"	"	"	"	
Surrogate(s): 2-Fluorobiphenyl			*63.4%*			*10 - 150 %*	"		"	
p-Terphenyl-d14			*45.5%*			*10 - 150 %*	"		"	

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Percent Dry Weight (Solids) per ASTM D2216-80

TestAmerica Portland

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-01 (FO105711)			**Soil**			**Sampled: 06/21/10 13:08**				
% Solids	ASTM D2216-80	**87.0**	-----	0.0100	% by Weight	1x	10F0747	06/23/10 14:07	06/23/10 14:07	
PTF0690-02 (FO105712)			**Soil**			**Sampled: 06/21/10 13:36**				
% Solids	ASTM D2216-80	**91.9**	-----	0.0100	% by Weight	1x	10F0747	06/23/10 14:07	06/23/10 14:07	
PTF0690-03 (FO105713)			**Soil**			**Sampled: 06/21/10 14:09**				
% Solids	ASTM D2216-80	**84.2**	-----	0.0100	% by Weight	1x	10F0747	06/23/10 14:07	06/23/10 14:07	
PTF0690-04 (FO105714)			**Soil**			**Sampled: 06/21/10 14:22**				
% Solids	ASTM D2216-80	**92.8**	-----	0.0100	% by Weight	1x	10F0747	06/23/10 14:07	06/23/10 14:07	
PTF0690-05 (FO105715)			**Soil**			**Sampled: 06/21/10 14:43**				
% Solids	ASTM D2216-80	**90.1**	-----	0.0100	% by Weight	1x	10F0747	06/23/10 14:07	06/23/10 14:07	
PTF0690-06 (FO105716)			**Soil**			**Sampled: 06/21/10 00:00**				
% Solids	ASTM D2216-80	**92.2**	-----	0.0100	% by Weight	1x	10F0747	06/23/10 14:07	06/23/10 14:07	
PTF0690-07 (FO105717)			**Soil**			**Sampled: 06/21/10 00:00**				
% Solids	ASTM D2216-80	**90.5**	-----	0.0100	% by Weight	1x	10F0747	06/23/10 14:07	06/23/10 14:07	

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Organotins, PSEP (GC/MS)

TestAmerica Seattle

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-01 (FO105711)			**Soil**			**Sampled: 06/21/10 13:08**				
Dibutyltin	Organotins Dry	ND	-----	1.5	ug/Kg dry	1x	66929	07/01/10 12:25	07/06/10 21:32	
Monobutyltin	"	**11**	-----	1.5	"	"	"	"	"	*
Tetra-n-butyltin	"	ND	-----	4.0	"	"	"	"	"	
Tributyltin	"	**4.0**	-----	1.5	"	"	"	"	"	
Surrogate(s): Tripentyltin				*103%*		*42 - 192 %*	"		"	
PTF0690-01RE1 (FO105711)			**Soil**			**Sampled: 06/21/10 13:08**				
Dibutyltin	Organotins Dry	ND	-----	1.5	ug/Kg dry	1x	67448	07/09/10 11:31	07/12/10 23:14	**H**
Monobutyltin	"	**5.7**	-----	1.5	"	"	"	"	"	**H**
Tetra-n-butyltin	"	ND	-----	4.0	"	"	"	"	"	**H**
Tributyltin	"	**3.6**	-----	1.5	"	"	"	"	"	**H**
Surrogate(s): Tripentyltin				*95%*		*42 - 192 %*	"		"	
PTF0690-02 (FO105712)			**Soil**			**Sampled: 06/21/10 13:36**				
Dibutyltin	Organotins Dry	ND	-----	1.4	ug/Kg dry	1x	66929	07/01/10 12:25	07/06/10 21:54	
Monobutyltin	"	ND	-----	1.4	"	"	"	"	"	*
Tetra-n-butyltin	"	ND	-----	3.8	"	"	"	"	"	
Tributyltin	"	ND	-----	1.4	"	"	"	"	"	
Surrogate(s): Tripentyltin				*78%*		*42 - 192 %*	"		"	
PTF0690-03 (FO105713)			**Soil**			**Sampled: 06/21/10 14:09**				
Dibutyltin	Organotins Dry	ND	-----	1.6	ug/Kg dry	1x	66929	07/01/10 12:25	07/06/10 22:15	
Monobutyltin	"	ND	-----	1.6	"	"	"	"	"	*
Tetra-n-butyltin	"	ND	-----	4.2	"	"	"	"	"	
Tributyltin	"	ND	-----	1.6	"	"	"	"	"	
Surrogate(s): Tripentyltin				*73%*		*42 - 192 %*	"		"	
PTF0690-04 (FO105714)			**Soil**			**Sampled: 06/21/10 14:22**				
Dibutyltin	Organotins Dry	ND	-----	1.4	ug/Kg dry	1x	66929	07/01/10 12:25	07/06/10 22:36	
Monobutyltin	"	ND	-----	1.4	"	"	"	"	"	*
Tetra-n-butyltin	"	ND	-----	3.8	"	"	"	"	"	
Tributyltin	"	ND	-----	1.4	"	"	"	"	"	

TestAmerica Portland

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Organotins, PSEP (GC/MS)

TestAmerica Seattle

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-04 (FO105714)			**Soil**			**Sampled: 06/21/10 14:22**				
Surrogate(s): Tripentyltin				*75%*		*42 - 192 %*	*1x*		*07/06/10 22:36*	
PTF0690-05 (FO105715)			**Soil**			**Sampled: 06/21/10 14:43**				
Dibutyltin	Organotins Dry	ND	-----	1.5	ug/Kg dry	1x	66929	07/01/10 12:25	07/06/10 22:57	
Monobutyltin	"	ND	-----	1.5	"	"	"	"	"	*
Tetra-n-butyltin	"	ND	-----	3.9	"	"	"	"	"	
Tributyltin	"	**5.2**	-----	1.5	"	"	"	"	"	
Surrogate(s): Tripentyltin				*79%*		*42 - 192 %*	"		"	
PTF0690-06 (FO105716)			**Soil**			**Sampled: 06/21/10 00:00**				
Dibutyltin	Organotins Dry	ND	-----	1.4	ug/Kg dry	1x	66929	07/01/10 12:25	07/06/10 23:18	
Monobutyltin	"	**4.0**	-----	1.4	"	"	"	"	"	*
Tetra-n-butyltin	"	ND	-----	3.9	"	"	"	"	"	
Tributyltin	"	**4.4**	-----	1.4	"	"	"	"	"	
Surrogate(s): Tripentyltin				*107%*		*42 - 192 %*	"		"	
PTF0690-06RE1 (FO105716)			**Soil**			**Sampled: 06/21/10 00:00**				
Dibutyltin	Organotins Dry	ND	-----	1.5	ug/Kg dry	1x	67448	07/09/10 11:31	07/12/10 23:35	**H**
Monobutyltin	"	**6.6**	-----	1.5	"	"	"	"	"	**H**
Tetra-n-butyltin	"	ND	-----	3.9	"	"	"	"	"	**H**
Tributyltin	"	**4.2**	-----	1.5	"	"	"	"	"	**H**
Surrogate(s): Tripentyltin				*101%*		*42 - 192 %*	"		"	
PTF0690-07 (FO105717)			**Soil**			**Sampled: 06/21/10 00:00**				
Dibutyltin	Organotins Dry	ND	-----	1.4	ug/Kg dry	1x	66929	07/01/10 12:25	07/06/10 23:39	
Monobutyltin	"	**7.5**	-----	1.4	"	"	"	"	"	*
Tetra-n-butyltin	"	ND	-----	3.9	"	"	"	"	"	
Tributyltin	"	**9.6**	-----	1.4	"	"	"	"	"	
Surrogate(s): Tripentyltin				*105%*		*42 - 192 %*	"		"	

TestAmerica Portland

Darrell Auvil, Project Manager

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PORTLAND, OR 9405 S.W. NIMBUS AVENUE
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ph: (503) 906.9200 fax: (503) 906.9210

City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Organotins, PSEP (GC/MS)

TestAmerica Seattle

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-07RE1 (FO105717)		**Soil**				**Sampled: 06/21/10 00:00**				
Dibutyltin	Organotins Dry	ND	-----	1.4	ug/Kg dry	1x	67448	07/09/10 11:31	07/12/10 23:56	**H**
Monobutyltin	"	**5.6**	-----	1.4	"	"	"	"	"	**H**
Tetra-n-butyltin	"	ND	-----	3.9	"	"	"	"	"	**H**
Tributyltin	"	**5.7**	-----	1.4	"	"	"	"	"	**H**
Surrogate(s): Tripentyltin				*69%*		*42 - 192 %*	"			"

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The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.

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6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Percent Moisture

TestAmerica Seattle

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-01 (FO105711)			**Soil**			**Sampled: 06/21/10 13:08**				
Percent Moisture	Moisture	**10**	-----	0.10	%	1x	67301	07/07/10 15:35	07/07/10 15:35	
Percent Solids	"	**90**	-----	0.10	"	"	"	"	"	
PTF0690-02 (FO105712)			**Soil**			**Sampled: 06/21/10 13:36**				
Percent Moisture	Moisture	**6.8**	-----	0.10	%	1x	67301	07/07/10 15:35	07/07/10 15:35	
Percent Solids	"	**93**	-----	0.10	"	"	"	"	"	
PTF0690-03 (FO105713)			**Soil**			**Sampled: 06/21/10 14:09**				
Percent Moisture	Moisture	**16**	-----	0.10	%	1x	67301	07/07/10 15:35	07/07/10 15:35	
Percent Solids	"	**84**	-----	0.10	"	"	"	"	"	
PTF0690-04 (FO105714)			**Soil**			**Sampled: 06/21/10 14:22**				
Percent Moisture	Moisture	**6.4**	-----	0.10	%	1x	67301	07/07/10 15:35	07/07/10 15:35	
Percent Solids	"	**94**	-----	0.10	"	"	"	"	"	
PTF0690-05 (FO105715)			**Soil**			**Sampled: 06/21/10 14:43**				
Percent Moisture	Moisture	**9.3**	-----	0.10	%	1x	67301	07/07/10 15:35	07/07/10 15:35	
Percent Solids	"	**91**	-----	0.10	"	"	"	"	"	
PTF0690-06 (FO105716)			**Soil**			**Sampled: 06/21/10 00:00**				
Percent Moisture	Moisture	**9.3**	-----	0.10	%	1x	67301	07/07/10 15:35	07/07/10 15:35	
Percent Solids	"	**91**	-----	0.10	"	"	"	"	"	
PTF0690-07 (FO105717)			**Soil**			**Sampled: 06/21/10 00:00**				
Percent Moisture	Moisture	**8.6**	-----	0.10	%	1x	67301	07/07/10 15:35	07/07/10 15:35	
Percent Solids	"	**91**	-----	0.10	"	"	"	"	"	

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

2540G_0177040

TestAmerica Pittsburgh

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-01 (FO105711)			**Soil**			**Sampled: 06/21/10 13:08**				
Percent Solids	2540G_01770 40	**73**	-----		%	1x	177040	06/27/10 00:00	06/28/10 08:00	
PTF0690-02 (FO105712)			**Soil**			**Sampled: 06/21/10 13:36**				
Percent Solids	2540G_01770 40	**75.1**	-----		%	1x	177040	06/27/10 00:00	06/28/10 08:00	
PTF0690-03 (FO105713)			**Soil**			**Sampled: 06/21/10 14:09**				
Percent Solids	2540G_01770 40	**87.2**	-----		%	1x	177040	06/27/10 00:00	06/28/10 08:00	
PTF0690-04 (FO105714)			**Soil**			**Sampled: 06/21/10 14:22**				
Percent Solids	2540G_01770 40	**89.7**	-----		%	1x	177040	06/27/10 00:00	06/28/10 08:00	
PTF0690-05 (FO105715)			**Soil**			**Sampled: 06/21/10 14:43**				
Percent Solids	2540G_01770 40	**89.8**	-----		%	1x	177040	06/27/10 00:00	06/28/10 08:00	
PTF0690-06 (FO105716)			**Soil**			**Sampled: 06/21/10 00:00**				
Percent Solids	2540G_01770 40	**91.2**	-----		%	1x	177040	06/27/10 00:00	06/28/10 08:00	
PTF0690-07 (FO105717)			**Soil**			**Sampled: 06/21/10 00:00**				
Percent Solids	2540G_01770 40	**90.5**	-----		%	1x	177040	06/27/10 00:00	06/28/10 08:00	

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

SW846 8151A

TestAmerica Pittsburgh

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-01 (FO105711)			**Soil**				**Sampled: 06/21/10 13:08**			
2,4,5-T	SW846 8151A	ND	-----	27	ug/kg	1x	176319	06/25/10 00:00	06/29/10 23:12	
2,4,5-TP (Silvex)	"	ND	-----	27	"	"	"	"	"	
2,4-D	"	ND	-----	110	"	"	"	"	"	
2,4-DB	"	ND	-----	110	"	"	"	"	"	
Dalapon	"	ND	-----	120	"	"	"	"	"	
Dicamba	"	ND	-----	55	"	"	"	"	"	
Dichlorprop	"	ND	-----	110	"	"	"	"	"	
Dinoseb	"	ND	-----	16	"	"	"	"	"	
MCPA	"	ND	-----	11000	"	"	"	"	"	
MCPP	"	ND	-----	11000	"	"	"	"	"	
Pentachlorophenol	"	ND	-----	15	"	"	"	"	"	
Surrogate(s): DCAA				*76%*		*42 - 140 %*	"			"
PTF0690-02 (FO105712)			**Soil**				**Sampled: 06/21/10 13:36**			
2,4,5-T	SW846 8151A	ND	-----	27	ug/kg	1x	176319	06/25/10 00:00	06/29/10 23:34	
2,4,5-TP (Silvex)	"	ND	-----	27	"	"	"	"	"	
2,4-D	"	ND	-----	110	"	"	"	"	"	
2,4-DB	"	ND	-----	110	"	"	"	"	"	
Dalapon	"	ND	-----	120	"	"	"	"	"	
Dicamba	"	ND	-----	53	"	"	"	"	"	
Dichlorprop	"	ND	-----	110	"	"	"	"	"	
Dinoseb	"	ND	-----	16	"	"	"	"	"	
MCPA	"	ND	-----	11000	"	"	"	"	"	
MCPP	"	ND	-----	11000	"	"	"	"	"	
Pentachlorophenol	"	ND	-----	15	"	"	"	"	"	
Surrogate(s): DCAA				*126%*		*42 - 140 %*	"			"
PTF0690-03 (FO105713)			**Soil**				**Sampled: 06/21/10 14:09**			
2,4,5-T	SW846 8151A	ND	-----	23	ug/kg	1x	176319	06/25/10 00:00	06/29/10 23:57	
2,4,5-TP (Silvex)	"	ND	-----	23	"	"	"	"	"	
2,4-D	"	ND	-----	92	"	"	"	"	"	
2,4-DB	"	ND	-----	92	"	"	"	"	"	
Dalapon	"	ND	-----	100	"	"	"	"	"	
Dicamba	"	ND	-----	46	"	"	"	"	"	

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

SW846 8151A

TestAmerica Pittsburgh

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-03 (FO105713)			**Soil**				**Sampled: 06/21/10 14:09**			
Dichlorprop	SW846 8151A	ND	-----	92	ug/kg	1x	176319	06/25/10 00:00	06/29/10 23:57	
Dinoseb	"	ND	-----	14	"	"	"	"	"	
MCPA	"	ND	-----	9200	"	"	"	"	"	
MCPP	"	ND	-----	9200	"	"	"	"	"	
Pentachlorophenol	"	ND	-----	13	"	"	"	"	"	
Surrogate(s): DCAA				*72%*		*42 - 140 %*	"			"
PTF0690-04 (FO105714)			**Soil**				**Sampled: 06/21/10 14:22**			
2,4,5-T	SW846 8151A	ND	-----	22	ug/kg	1x	176319	06/25/10 00:00	06/30/10 00:20	
2,4,5-TP (Silvex)	"	ND	-----	22	"	"	"	"	"	
2,4-D	"	ND	-----	89	"	"	"	"	"	
2,4-DB	"	ND	-----	89	"	"	"	"	"	
Dalapon	"	ND	-----	100	"	"	"	"	"	
Dicamba	"	ND	-----	45	"	"	"	"	"	
Dichlorprop	"	ND	-----	89	"	"	"	"	"	
Dinoseb	"	ND	-----	13	"	"	"	"	"	
MCPA	"	ND	-----	8900	"	"	"	"	"	
MCPP	"	ND	-----	8900	"	"	"	"	"	
Pentachlorophenol	"	ND	-----	12	"	"	"	"	"	
Surrogate(s): DCAA				*69%*		*42 - 140 %*	"			"
PTF0690-05 (FO105715)			**Soil**				**Sampled: 06/21/10 14:43**			
2,4,5-T	SW846 8151A	ND	-----	22	ug/kg	1x	176319	06/25/10 00:00	06/30/10 00:43	
2,4,5-TP (Silvex)	"	ND	-----	22	"	"	"	"	"	
2,4-D	"	ND	-----	89	"	"	"	"	"	
2,4-DB	"	ND	-----	89	"	"	"	"	"	
Dalapon	"	ND	-----	100	"	"	"	"	"	
Dicamba	"	ND	-----	45	"	"	"	"	"	
Dichlorprop	"	ND	-----	89	"	"	"	"	"	
Dinoseb	"	ND	-----	13	"	"	"	"	"	
MCPA	"	ND	-----	8900	"	"	"	"	"	
MCPP	"	ND	-----	8900	"	"	"	"	"	
Pentachlorophenol	"	**56**	-----	12	"	"	"	"	"	
Surrogate(s): DCAA				*68%*		*42 - 140 %*	"			"

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

SW846 8151A

TestAmerica Pittsburgh

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
PTF0690-06 (FO105716)			**Soil**				**Sampled: 06/21/10 00:00**			
2,4,5-T	SW846 8151A	ND	-----	22	ug/kg	1x	176319	06/25/10 00:00	06/30/10 01:05	
2,4,5-TP (Silvex)	"	ND	-----	22	"	"	"	"	"	
2,4-D	"	ND	-----	88	"	"	"	"	"	
2,4-DB	"	ND	-----	88	"	"	"	"	"	
Dalapon	"	ND	-----	99	"	"	"	"	"	
Dicamba	"	ND	-----	44	"	"	"	"	"	
Dichlorprop	"	ND	-----	88	"	"	"	"	"	
Dinoseb	"	ND	-----	13	"	"	"	"	"	
MCPA	"	ND	-----	8800	"	"	"	"	"	
MCPP	"	ND	-----	8800	"	"	"	"	"	
Pentachlorophenol	"	ND	-----	12	"	"	"	"	"	
Surrogate(s): DCAA				*70%*		*42 - 140 %*	"			"
PTF0690-07 (FO105717)			**Soil**				**Sampled: 06/21/10 00:00**			
2,4,5-T	SW846 8151A	ND	-----	22	ug/kg	1x	176319	06/25/10 00:00	06/30/10 01:28	
2,4,5-TP (Silvex)	"	ND	-----	22	"	"	"	"	"	
2,4-D	"	ND	-----	88	"	"	"	"	"	
2,4-DB	"	ND	-----	88	"	"	"	"	"	
Dalapon	"	ND	-----	99	"	"	"	"	"	
Dicamba	"	ND	-----	44	"	"	"	"	"	
Dichlorprop	"	ND	-----	88	"	"	"	"	"	
Dinoseb	"	ND	-----	13	"	"	"	"	"	
MCPA	"	ND	-----	8800	"	"	"	"	"	
MCPP	"	ND	-----	8800	"	"	"	"	"	
Pentachlorophenol	"	ND	-----	12	"	"	"	"	"	
Surrogate(s): DCAA				*64%*		*42 - 140 %*	"			"

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6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Polynuclear Aromatic Compounds per EPA 8270M-SIM - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 10F0761 **Soil Preparation Method: EPA 3550**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (10F0761-BLK1)									**Extracted: 06/24/10 05:35**					
1-Methylnaphthalene	EPA 8270m	ND	3.27	13.3	ug/kg wet	1x	--	--	--	--	--	--	06/24/10 19:41	
2-Methylnaphthalene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Acenaphthene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Acenaphthylene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Anthracene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Benzo (a) anthracene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Benzo (a) pyrene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Benzo (b) fluoranthene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Benzo (ghi) perylene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Benzo (k) fluoranthene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Chrysene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Dibenzo (a,h) anthracene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Fluoranthene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Fluorene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Indeno (1,2,3-cd) pyrene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Naphthalene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Phenanthrene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Pyrene	"	ND	3.27	13.3	"	"	--	--	--	--	--	--	"	
Surrogate(s): Fluorene-d10		*Recovery: 38.6%*			*Limits: 24-125%*	"							*06/24/10 19:41*	
Pyrene-d10		*85.3%*			*41-141%*	"							"	
Benzo (a) pyrene-d12		*87.6%*			*38-143%*	"							"	
LCS (10F0761-BS1)									**Extracted: 06/24/10 05:35**					
Acenaphthene	EPA 8270m	142	3.25	13.2	ug/kg wet	1x	--	164	86.8%	(33-139)	--	--	06/24/10 19:09	
Benzo (a) pyrene	"	149	3.25	13.2	"	"	--	"	90.7%	(45-149)	--	--	"	
Pyrene	"	142	3.25	13.2	"	"	--	"	86.7%	(39-138)	--	--	"	
Surrogate(s): Fluorene-d10		*Recovery: 36.8%*			*Limits: 24-125%*	"							*06/24/10 19:09*	
Pyrene-d10		*86.2%*			*41-141%*	"							"	
Benzo (a) pyrene-d12		*90.7%*			*38-143%*	"							"	

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Polynuclear Aromatic Compounds per EPA 8270M-SIM - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 10F0761 **Soil Preparation Method: EPA 3550**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Matrix Spike (10F0761-MS1)					**QC Source: PTF0690-02**				**Extracted: 06/24/10 05:35**					
Acenaphthene	EPA 8270m	158	17.9	72.7	ug/kg dry	5x	ND	181	87.5%	(33-139)	--	--	06/25/10 13:57	
Benzo (a) pyrene	"	181	17.9	72.7	"	"	10.0	"	94.5%	(45-149)	--	--	"	
Pyrene	"	183	17.9	72.7	"	"	13.1	"	93.7%	(39-138)	--	--	"	
Surrogate(s): Fluorene-d10		*Recovery: 76.2%*			*Limits: 24-125%*	"							*06/25/10 13:57*	
Pyrene-d10		*101%*			*41-141%*	"							"	
Benzo (a) pyrene-d12		*105%*			*38-143%*	"							"	
Matrix Spike Dup (10F0761-MSD1)					**QC Source: PTF0690-02**				**Extracted: 06/24/10 05:35**					
Acenaphthene	EPA 8270m	176	17.7	71.7	ug/kg dry	5x	ND	178	98.9%	(33-139)	10.8%	(40)	06/25/10 14:29	
Benzo (a) pyrene	"	190	17.7	71.7	"	"	10.0	"	101%	(45-149)	4.67%	"	"	
Pyrene	"	196	17.7	71.7	"	"	13.1	"	102%	(39-138)	6.93%	"	"	
Surrogate(s): Fluorene-d10		*Recovery: 85.7%*			*Limits: 24-125%*	"							*06/25/10 14:29*	
Pyrene-d10		*106%*			*41-141%*	"							"	
Benzo (a) pyrene-d12		*109%*			*38-143%*	"							"	

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Phthalates per EPA 8270-SIM - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 10F0761 **Soil Preparation Method: EPA 3550**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (10F0761-BLK1)									**Extracted: 06/24/10 05:35**					
Dimethyl phthalate	EPA 8270m	ND	13.3	26.5	ug/kg wet	1x	--	--	--	--	--	--	06/25/10 12:49	
Diethyl phthalate	"	ND	13.3	26.5	"	"	--	--	--	--	--	--	"	
Di-n-butyl phthalate	"	ND	13.3	26.5	"	"	--	--	--	--	--	--	"	
Butyl benzyl phthalate	"	ND	13.3	26.5	"	"	--	--	--	--	--	--	"	
Bis(2-ethylhexyl)phthalate	"	ND	13.3	26.5	"	"	--	--	--	--	--	--	"	
Di-n-octyl phthalate	"	ND	13.3	26.5	"	"	--	--	--	--	--	--	"	
Surrogate(s): 2-Fluorobiphenyl		*Recovery: 80.3%*			*Limits: 10-150%*	"							*06/25/10 12:49*	
p-Terphenyl-d14		*78.9%*			*10-150%*	"							"	
LCS (10F0761-BS1)									**Extracted: 06/24/10 05:35**					
Dimethyl phthalate	EPA 8270m	111	13.2	26.4	ug/kg wet	1x	--	131	84.4%	(20-150)	--	--	06/25/10 13:22	
Diethyl phthalate	"	120	13.2	26.4	"	"	--	"	91.4%	"	--	--	"	
Di-n-butyl phthalate	"	135	13.2	26.4	"	"	--	"	103%	"	--	--	"	
Butyl benzyl phthalate	"	109	13.2	26.4	"	"	--	"	83.2%	"	--	--	"	
Bis(2-ethylhexyl)phthalate	"	109	13.2	26.4	"	"	--	"	82.9%	"	--	--	"	
Di-n-octyl phthalate	"	99.7	13.2	26.4	"	"	--	"	76.0%	"	--	--	"	
Surrogate(s): 2-Fluorobiphenyl		*Recovery: 75.6%*			*Limits: 10-150%*	"							*06/25/10 13:22*	
p-Terphenyl-d14		*83.9%*			*10-150%*	"							"	
Matrix Spike (10F0761-MS1)					**QC Source: PTF0690-02**				**Extracted: 06/24/10 05:35**					
Dimethyl phthalate	EPA 8270m	153	72.7	145	ug/kg dry	5x	ND	145	106%	(10-150)	--	--	06/25/10 14:28	
Diethyl phthalate	"	169	72.7	145	"	"	ND	"	117%	"	--	--	"	
Di-n-butyl phthalate	"	203	72.7	145	"	"	ND	"	140%	"	--	--	"	
Butyl benzyl phthalate	"	253	72.7	145	"	"	25.2	"	157%	"	--	--	"	M7
Bis(2-ethylhexyl)phthalate	"	261	72.7	145	"	"	31.0	"	159%	"	--	--	"	M7
Di-n-octyl phthalate	"	264	72.7	145	"	"	ND	"	182%	"	--	--	"	M7
Surrogate(s): 2-Fluorobiphenyl		*Recovery: 71.1%*			*Limits: 10-150%*	"							*06/25/10 14:28*	
p-Terphenyl-d14		*78.4%*			*10-150%*	"							"	
Matrix Spike Dup (10F0761-MSD1)					**QC Source: PTF0690-02**				**Extracted: 06/24/10 05:35**					
Dimethyl phthalate	EPA 8270m	157	71.7	143	ug/kg dry	5x	ND	143	110%	(10-150)	2.66%	(40)	06/25/10 15:44	
Diethyl phthalate	"	172	71.7	143	"	"	ND	"	120%	"	1.53%	"	"	
Di-n-butyl phthalate	"	195	71.7	143	"	"	ND	"	137%	"	3.84%	"	"	
Butyl benzyl phthalate	"	238	71.7	143	"	"	25.2	"	149%	"	6.18%	"	"	
Bis(2-ethylhexyl)phthalate	"	246	71.7	143	"	"	31.0	"	151%	"	6.14%	"	"	M7
Di-n-octyl phthalate	"	250	71.7	143	"	"	ND	"	175%	"	5.56%	"	"	M7
Surrogate(s): 2-Fluorobiphenyl		*Recovery: 104%*			*Limits: 10-150%*	"							*06/25/10 15:44*	
p-Terphenyl-d14		*79.9%*			*10-150%*	"							"	

TestAmerica Portland

Darrell Auvil, Project Manager

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PORTLAND, OR 9405 S.W. NIMBUS AVENUE
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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Percent Dry Weight (Solids) per ASTM D2216-80 - Laboratory Quality Control Results

TestAmerica Portland

QC Batch: 10F0747 **Soil Preparation Method: Dry Weight**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Duplicate (10F0747-DUP1)				**QC Source: PTF0663-11**				**Extracted: 06/23/10 14:07**						
% Solids	ASTM D2216-80	72.2	---	0.0100	% by Weight	1x	73.3	--	--	--	1.40%	(20)	06/23/10 14:07	

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Organotins, PSEP (GC/MS) - Laboratory Quality Control Results

TestAmerica Seattle

QC Batch: 66929 **Soil Preparation Method: Organotin Prep**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Matrix Spike Dup (201651D)					**QC Source: PTF0690-01**				**Extracted: 07/01/10 12:25**					
Monobutyltin	Organotins Dry	53.1	---	1.5	ug/Kg dry	1x	11	92.0	45%	(21-99)	8%	(36)	07/06/10 21:11	
Tetra-n-butyltin	"	44.2	---	4.0	"	"	ND	147	30%	(42-124)	10%	(25)	"	F
Tributyltin	"	63.5	---	1.5	"	"	4.0	131	45%	(29-110)	18%	(28)	"	
Dibutyltin	"	41.8	---	1.5	"	"	ND	113	37%	(32-114)	3%	(30)	"	
Surrogate(s): Tripentyltin		*Recovery: 91%*			*Limits: 42-192%*	"							*07/06/10 21:11*	
Matrix Spike (201651S)					**QC Source: PTF0690-01**				**Extracted: 07/01/10 12:25**					
Dibutyltin	Organotins Dry	43.1	---	1.5	ug/Kg dry	1x	ND	113	38%	(32-114)	--	--	07/06/10 20:50	
Monobutyltin	"	48.8	---	1.5	"	"	11	92.1	41%	(21-99)	--	--	"	
Tetra-n-butyltin	"	48.6	---	4.0	"	"	ND	148	33%	(42-124)	--	--	"	F
Tributyltin	"	75.7	---	1.5	"	"	4.0	132	55%	(29-110)	--	--	"	
Surrogate(s): Tripentyltin		*Recovery: 78%*			*Limits: 42-192%*	"							*07/06/10 20:50*	
LCS (580-67057-10)					**QC Source:**				**Extracted: 07/01/10 12:25**					
Dibutyltin	Organotins Dry	84.7	---	1.3	ug/Kg dry	1x	--	102	83%	(32-114)	--	--	07/06/10 20:29	
Monobutyltin	"	87.4	---	1.3	"	"	--	83.1	105%	(21-99)	--	--	"	*
Tetra-n-butyltin	"	104	---	3.6	"	"	--	133	78%	(42-124)	--	--	"	
Tributyltin	"	115	---	1.3	"	"	--	119	97%	(29-110)	--	--	"	
Surrogate(s): Tripentyltin		*Recovery: 128%*			*Limits: 42-192%*	"							*07/06/10 20:29*	
Blank (580-67057-9)					**QC Source:**				**Extracted: 07/01/10 12:25**					
Tetra-n-butyltin	Organotins Dry	ND	---	3.6	ug/Kg dry	1x	--	--	--	--	--	--	07/06/10 20:08	
Tributyltin	"	ND	---	1.3	"	"	--	--	--	--	--	--	"	
Dibutyltin	"	ND	---	1.3	"	"	--	--	--	--	--	--	"	
Monobutyltin	"	ND	---	1.3	"	"	--	--	--	--	--	--	"	
Surrogate(s): Tripentyltin		*Recovery: 75%*			*Limits: 42-192%*	"							*07/06/10 20:08*	

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Organotins, PSEP (GC/MS) - Laboratory Quality Control Results

TestAmerica Seattle

QC Batch: 67448 **Soil Preparation Method: Organotin Prep**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
LCS (580-67513-10)			**QC Source:**						**Extracted: 07/09/10 11:31**					
Tributyltin	Organotins Dry	73.9	---	1.3	ug/Kg dry	1x	--	119	62%	(29-110)	--	--	07/12/10 22:53	
Tetra-n-butyltin	"	84.4	---	3.6	"	"	--	133	63%	(42-124)	--	--	"	
Dibutyltin	"	56.2	---	1.3	"	"	--	102	55%	(32-114)	--	--	"	
Monobutyltin	"	62.8	---	1.3	"	"	--	83.1	76%	(21-99)	--	--	"	
Surrogate(s): Tripentyltin		*Recovery: 98%*			*Limits: 42-192%*	"							*07/12/10 22:53*	
Blank (580-67513-9)			**QC Source:**						**Extracted: 07/09/10 11:31**					
Tributyltin	Organotins Dry	ND	---	1.3	ug/Kg dry	1x	--	--	--	--	--	--	07/12/10 22:32	
Tetra-n-butyltin	"	ND	---	3.6	"	"	--	--	--	--	--	--	"	
Monobutyltin	"	ND	---	1.3	"	"	--	--	--	--	--	--	"	
Dibutyltin	"	ND	---	1.3	"	"	--	--	--	--	--	--	"	
Surrogate(s): Tripentyltin		*Recovery: 149%*			*Limits: 42-192%*	"							*07/12/10 22:32*	

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Percent Moisture - Laboratory Quality Control Results

TestAmerica Seattle

QC Batch: 67301 **Soil Preparation Method: NA**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Duplicate (201651X)				**QC Source: PTF0690-01**				**Extracted: 07/07/10 15:35**						
Percent Moisture	Moisture	11	---	0.10	%	1x	10	--	--	--	2%	(20)	07/07/10 15:35	
Percent Solids	"	89	---	0.10	"	"	90	--	--	--	0%	"	"	

TestAmerica Portland

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

2540G_0177040 - Laboratory Quality Control Results

TestAmerica Pittsburgh

QC Batch: 177040 **SOLID Preparation Method: NA**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Duplicate (C0F240426003X)				**QC Source: C0F240426003**				**Extracted: 06/27/10 00:00**						
Percent Solids	2540G_0177040	48.3	---	1	%	1x	46.6	--	--	--	--	()	06/28/10 08:00	

TestAmerica Portland

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

SW846 8151A - Laboratory Quality Control Results

TestAmerica Pittsburgh

QC Batch: 176319 **SOLID Preparation Method: 8151A**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (C0F250000319B)			**QC Source:**						**Extracted: 06/25/10 00:00**					
Dicamba	SW846 8151A	ND	---	40	ug/kg	1x	--	--	--	--	--	--	07/01/10 12:27	
Dalapon	"	ND	---	90	"	"	--	--	--	--	--	--	"	
2,4,5-T	"	ND	---	20	"	"	--	--	--	--	--	--	"	
2,4,5-TP (Silvex)	"	ND	---	20	"	"	--	--	--	--	--	--	"	
2,4-D	"	ND	---	80	"	"	--	--	--	--	--	--	"	
Dinoseb	"	ND	---	12	"	"	--	--	--	--	--	--	"	
2,4-DB	"	ND	---	80	"	"	--	--	--	--	--	--	"	
Dichlorprop	"	ND	---	80	"	"	--	--	--	--	--	--	"	
MCPA	"	ND	---	8000	"	"	--	--	--	--	--	--	"	
MCPP	"	ND	---	8000	"	"	--	--	--	--	--	--	"	
Pentachlorophenol	"	ND	---	11	"	"	--	--	--	--	--	--	"	
Surrogate(s): DCAA		*Recovery: 69%*			*Limits: 42-140%*	"							*07/01/10 12:27*	
LCS (C0F250000319C)			**QC Source:**						**Extracted: 06/25/10 00:00**					
MCPP	SW846 8151A	62200	---	8000	ug/kg	1x	--	64000	97%	(50-140)	--	--	06/30/10 02:14	
2,4,5-TP (Silvex)	"	114	---	20	"	"	--	160	71%	(40-130)	--	--	"	
MCPA	"	52900	---	8000	"	"	--	64000	83%	(50-120)	--	--	"	
Dichlorprop	"	547	---	80	"	"	--	640	86%	(50-130)	--	--	"	
Pentachlorophenol	"	74.1	---	11	"	"	--	80.0	93%	(60-140)	--	--	"	
Dicamba	"	289	---	40	"	"	--	320	90%	(50-140)	--	--	"	
Dalapon	"	170	---	90	"	"	--	"	53%	(36-120)	--	--	"	
2,4-DB	"	486	---	80	"	"	--	640	76%	(34-140)	--	--	"	
2,4-D	"	470	---	80	"	"	--	"	74%	(30-140)	--	--	"	
2,4,5-T	"	129	---	20	"	"	--	160	81%	"	--	--	"	
Dinoseb	"	76	---	12	"	"	--	96.0	79%	(10-140)	--	--	"	
Surrogate(s): DCAA		*Recovery: 92%*			*Limits: 42-140%*	"							*06/30/10 02:14*	
LCS Dup (C0F250000319L)			**QC Source:**						**Extracted: 06/25/10 00:00**					
Dicamba	SW846 8151A	263	---	40	ug/kg	1x	--	320	82%	(50-140)	9.4%	(30)	06/30/10 02:37	
MCPP	"	55000	---	8000	"	"	--	64000	86%	"	12%	"	"	
MCPA	"	46200	---	8000	"	"	--	"	72%	(50-120)	14%	"	"	
Dinoseb	"	35.2	---	12	"	"	--	96.0	37%	(10-140)	73%	"	"	p
Dichlorprop	"	486	---	80	"	"	--	640	76%	(50-130)	12%	"	"	
Dalapon	"	170	---	90	"	"	--	320	53%	(36-120)	0.17%	"	"	
2,4-DB	"	453	---	80	"	"	--	640	71%	(34-140)	7.1%	"	"	
2,4-D	"	390	---	80	"	"	--	"	61%	(30-140)	19%	"	"	
2,4,5-TP (Silvex)	"	102	---	20	"	"	--	160	64%	(40-130)	12%	"	"	
Pentachlorophenol	"	69.9	---	11	"	"	--	80.0	87%	(60-140)	5.8%	"	"	

TestAmerica Portland

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City of Portland Water Pollution Laboratory	Project Name:	**Portland Harbor Inline**	
6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

SW846 8151A - Laboratory Quality Control Results

TestAmerica Pittsburgh

QC Batch: 176319 **SOLID Preparation Method: 8151A**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
LCS Dup (C0F250000319L)				**QC Source:**									**Extracted: 06/25/10 00:00**	
2,4,5-T	SW846 8151A	109	---	20	ug/kg	1x	--	160	68%	(30-140)	17%	(30)	06/30/10 02:37	
Surrogate(s): DCAA		*Recovery: 85%*			*Limits: 42-140%*	*"*							*06/30/10 02:37*	

TestAmerica Portland

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6543 N. Burlington Ave.	Project Number:	36238	Report Created:
Portland, OR 97203	Project Manager:	Jennifer Shackelford	07/20/10 14:50

Notes and Definitions

Report Specific Notes:

*	-	LCS or LCSD exceeds the control limits
F	-	MS or MSD exceeds the control limits
H	-	Sample was prepped or analyzed beyond the specified holding time
J	-	Estimated value. Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). The user of this data should be aware that this data is of limited reliability.
M7	-	The MS and/or MSD were above the acceptance limits. See Blank Spike (LCS).
p	-	Relative percent difference (RPD) is outside stated control limits.

Laboratory Reporting Conventions:

DET	-	Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
ND	-	Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
NR/NA	-	Not Reported / Not Available
dry	-	Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.
wet	-	Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.
RPD	-	RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).
MRL	-	METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
MDL*	-	METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.
Dil	-	Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
Reporting Limits	-	Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.
Electronic Signature	-	Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy.* Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

TestAmerica Portland

Darrell Auvil, Project Manager

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9405 SW Nimbus Ave,Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #: PTF0690

CLIENT: City of Portland

REPORT TO: Jennifer Shackelford

ADDRESS:

PHONE: FAX:

INVOICE TO: Charles Lytle

P.O. NUMBER: 36238

PROJECT NAME: Portland Harbor Inline Samp

PROJECT NUMBER:

SAMPLED BY:

TURNAROUND REQUEST in Business Days *

Organic & Inorganic Analyses: 10 (STD.) | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: 5 (STD.) | 4 | 3 | 2 | 1 | <1

OTHER Specify:

* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE	REQUESTED ANALYSES: PAH (*) Phthal.	Herbicides	Organotins	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	F0105711	6/21/10 1308		X	X	X	S	3		
2	F0105712	1336								
3	F0105713	1409								
4	F0105714	1422								
5	F0105715	1443								
6	F0105716	"								
7	F0105717	"								
8										
9										
10										

RELEASED BY: Mackenzie Zark FIRM: City of Portland DATE: 6/22/10 TIME: 1240

RECEIVED BY: [signature] FIRM: TAP DATE: 6/22/10 TIME: 12:40

RELEASED BY: [signature] FIRM: TAP DATE: 6/22/10 TIME: 16:45

RECEIVED BY: Peggy Siegfried FIRM: TAP DATE: 6/22/10 TIME: 1645

ADDITIONAL REMARKS:

(*) PAH/phthal- include 1-2 Methylnaphthalenes please; Low level

TEMP: 2.4

PAGE OF

TAL-1000(0408)

TestAmerica Portland

Sample Receiving Checklist

Work Order # PTF0690 Date/Time Received: 6/22/10 1645

Client Name and Project: City of Portland Portland Harbor

Time Zone:
☐EDT/EST ☐CDT/CST ☐MDT/MST ☒PDT/PST ☐AK ☐OTHER

Unpacking Checks:

Cooler #(s): 1

Temperatures: 2.4

Digi #1 ☐ Digi #2 ☐ IR Gun ☒ (☐Plastic ☒Glass)

Temperature out of Range:

__Not enough or No Ice
__Ice Melted
__W/in 4 Hrs of collection
__Other:

Initials: PS

N/A	Yes	No	
☒	☐	☐	1. If ESI client, were temp blanks received? If no, document on NOD.
☒	☐	☐	2. Cooler Seals intact? (N/A if hand delivered) if no, document on NOD.
	☒	☐	3. Chain of Custody present? If no, document on NOD.
	☒	☐	4. Bottles received intact? If no, document on NOD.
	☒	☐	5. Sample is not multiphasic? If no, document on NOD.
	☒	☐	6. Proper Container and preservatives used? If no, document on NOD.
☒	☐	☐	7. pH of all samples checked and meet requirements? If no, document on NOD.
☒	☐	☐	8. Cyanide samples checked for sulfides and meet requirements? If no, notify PM.
☒	☐	☐	9. HF Dilution required?
	☒	☐	10. Sufficient volume provided for all analysis? If no, document on NOD and consult PM before proceeding.
	☒	☐	11. Did chain of custody agree with samples received? If no, document on NOD.
	☐	☒	12. Is the "Sampled by" section of the COC completed?
☒	☐	☐	13. Were VOA/Oil Syringe samples without headspace?
☒	☐	☐	14. Were VOA vials preserved? ☐HCl ☐Sodium Thiosulfate ☐Ascorbic Acid
	☐	☒	15. Did samples require preservation with sodium thiosulfate?
☒	☐	☐	16. If yes to #15, was the residual chlorine test negative? If no, document on NOD.
☒	☐	☐	17. Are dissolved/field filtered metals bottles sediment-free? If no, document on NOD.
☒	☐	☐	18. Is sufficient volume provided for client requested MS/MSD or matrix duplicates? If no, document on NOD and contact PM before proceeding.
☒	☐	☐	19. Are analyses with short holding times received in hold?
	☒	☐	20. Was Standard Turn Around (TAT) requested?
	☒	☐	21. Receipt date(s) < 48 hours past the collection date(s)? If no, notify PM.

TestAmerica Portland

Sample Receiving Checklist

Work Order #: PTF0690

Login Checks:

Initials: MM

N/A	Yes	No	
	☒	☐	22. Sufficient volume provided for all analysis? If no, document on NOD & contact PM.
☒	☐	☐	23. Sufficient volume provided for client requested MS/MSD or matrix duplicates? If no, document on NOD and contact PM.
	☒	☐	24. Did the chain of custody include "received by" and "relinquished by" signatures, dates and times?
☒	☐	☐	25. Were special log in instructions read and followed?
	☒	☐	26. Were tests logged checked against the COC?
☒	☐	☐	27. Were rush notices printed and delivered?
☒	☐	☐	28. Were short hold notices printed and delivered?
☐	☒	☐	29. Were subcontract COCs printed?
☒	☐	☐	30. Was HF dilution logged?

Labeling and Storage Checks:

Initials: MM

N/A	Yes	No	
☐	☒	☐	31. Were the subcontracted samples/containers put in Sx fridge?
☒	☐	☐	32. Were sample bottles and COC double checked for dissolved/filtered metals?
	☒	☐	33. Did the sample ID, Date, and Time from label match what was logged?
☒	☐	☐	34. Were Foreign sample stickers affixed to each container and containers stored in foreign fridge?
☒	☐	☐	35. Were HF stickers affixed to each container, and containers stored in Sx fridge?
☒	☐	☐	36. Was an NOD for created for noted discrepancies and placed in folder?

Document any problems or discrepancies and the actions taken to resolve them on a Notice of Discrepancy form (NOD).

Columbia Analytical Services™ 1317 S. 13th Avenue, Kelso, WA 98626 360.577.7222 360.636.1068 (fax) www.caslab.com

August 4, 2010 Analytical Report for Service Request No: K1006443

Jennifer Shackelford
Portland, City of
1120 SW Fifth Avenue # 1000
Portland, OR 97204

RE: Portland Harbor Inline Samp

Dear Jennifer:

Enclosed are the results of the samples submitted to our laboratory on June 22, 2010. For your reference, these analyses have been assigned our service request number K1006443.

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

Please call if you have any questions. My extension is 3281. You may also contact me via Email at PDivvela@caslab.com.

Respectfully submitted,

Columbia Analytical Services, Inc.

Pradeep Divvela
Project Chemist

PD/lg

Acronyms

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

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value that was detected outside the quantitation range.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value that was detected outside the quantitation range.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value that was detected outside the quantitation range.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

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

Columbia Analytical Services, Inc.
Kelso, WA
State Certifications, Accreditations, and Licenses

Program	Number
Alaska DEC UST	UST-040
Arizona DHS	AZ0339
Arkansas - DEQ	88-0637
California DHS	2286
Colorado DPHE	-
Florida DOH	E87412
Hawaii DOH	-
Idaho DHW	-
Indiana DOH	C-WA-01
Louisiana DEQ	3016
Louisiana DHH	LA050010
Maine DHS	WA0035
Michigan DEQ	9949
Minnesota DOH	053-999-368
Montana DPHHS	CERT0047
Nevada DEP	WA35
New Jersey DEP	WA005
New Mexico ED	-
North Carolina DWQ	605
Oklahoma DEQ	9801
Oregon - DHS	WA200001
South Carolina DHEC	61002
Utah DOH	COLU
Washington DOE	C1203
Wisconsin DNR	998386840
Wyoming (EPA Region 8)	-

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	City of Portland	**Service Request No.:**	K1006443
Project:	Portland Harbor Inline Sump	**Date Received:**	06/22/10
Sample Matrix:	Soil		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Matrix/Duplicate Matrix Spike (MS/DMS), and Laboratory Control Sample (LCS).

Sample Receipt

Seven soil samples were received for analysis at Columbia Analytical Services on 06/22/10. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Organochlorine Pesticides by EPA Method 8081A

Elevated Detection Limits:
The detection limit was elevated for at least one analytes in all samples. The chromatogram indicated the presence of non-target background components. The matrix interference prevented adequate resolution of the target compounds at the normal limit. The results were flagged to indicate the matrix interference.

No other anomalies associated with the analysis of these samples were observed.

Approved by_____ **Date** 8/4/10

Client: Portland, City of
Project: Portland Harbor Inli
Sample Matrix: Soil

Service Request: K1006443

Total Solids

Prep Method: NONE
Analysis Method: 160.3M
Test Notes:

Units: PERCENT
Basis: Wet

Sample Name	Lab Code	Date Collected	Date Received	Date Analyzed	Result	Result Notes
F0105711	K1006443-001	06/21/2010	06/22/2010	06/26/2010	90.5	
F0105712	K1006443-002	06/21/2010	06/22/2010	06/26/2010	93.3	
F0105713	K1006443-003	06/21/2010	06/22/2010	06/26/2010	85.3	
F0105714	K1006443-004	06/21/2010	06/22/2010	06/26/2010	93.5	
F0105715	K1006443-005	06/21/2010	06/22/2010	06/26/2010	91.4	
F0105716	K1006443-006	06/21/2010	06/22/2010	06/26/2010	92.8	
F0105717	K1006443-007	06/21/2010	06/22/2010	06/26/2010	90.9	

Client:	Portland, City of	**Service Request:**	K1006443
Project:	Portland Harbor Inli	**Date Collected:**	06/21/2010
Sample Matrix:	Soil	**Date Received:**	06/22/2010
		Date Analyzed:	06/26/2010

Duplicate Sample Summary
Total Solids

Prep Method:	NONE	**Units:**	PERCENT
Analysis Method:	160.3M	**Basis:**	Wet
Test Notes:			

Sample Name	Lab Code	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
F0105711	K1006443-001	90.5	90.0	90.3	<1	

Client: Portland, City of
Project: Portland Harbor Inline Samp
Sample Matrix: Soil

Service Request: K1006443
Date Collected: 06/21/2010
Date Received: 06/22/2010

Organochlorine Pesticides

Sample Name: F0105711
Lab Code: K1006443-001

Extraction Method: EPA 3541
Analysis Method: 8081A

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	0.95	0.11	1	06/30/10	07/25/10	KWG1006914	
beta-BHC	ND	U	0.95	0.18	1	06/30/10	07/25/10	KWG1006914	
gamma-BHC (Lindane)	ND	U	0.95	0.080	1	06/30/10	07/25/10	KWG1006914	
delta-BHC	ND	U	0.95	0.074	1	06/30/10	07/25/10	KWG1006914	
Heptachlor	ND	Ui	0.95	0.95	1	06/30/10	07/25/10	KWG1006914	
Aldrin	ND	U	0.95	0.16	1	06/30/10	07/25/10	KWG1006914	
Heptachlor Epoxide	ND	U	0.95	0.084	1	06/30/10	07/25/10	KWG1006914	
gamma-Chlordane†	**0.095**	JP	0.95	0.090	1	06/30/10	07/25/10	KWG1006914	
Endosulfan I	ND	Ui	0.95	0.096	1	06/30/10	07/25/10	KWG1006914	
alpha-Chlordane	ND	Ui	0.95	0.34	1	06/30/10	07/25/10	KWG1006914	
Dieldrin	ND	Ui	0.95	0.24	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDE	ND	Ui	0.95	0.95	1	06/30/10	07/25/10	KWG1006914	
Endrin	ND	U	0.95	0.094	1	06/30/10	07/25/10	KWG1006914	
Endosulfan II	ND	U	0.95	0.14	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDD	ND	Ui	0.95	0.95	1	06/30/10	07/25/10	KWG1006914	
Endrin Aldehyde	ND	U	0.95	0.12	1	06/30/10	07/25/10	KWG1006914	
Endosulfan Sulfate	ND	Ui	0.95	0.95	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDT	ND	Ui	0.95	0.95	1	06/30/10	07/25/10	KWG1006914	
Endrin Ketone	ND	U	0.95	0.093	1	06/30/10	07/25/10	KWG1006914	
Methoxychlor	ND	U	0.95	0.19	1	06/30/10	07/25/10	KWG1006914	
Toxaphene	ND	Ui	48	29	1	06/30/10	07/25/10	KWG1006914	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	73	21-112	07/25/10	Acceptable
Decachlorobiphenyl	84	15-130	07/25/10	Acceptable

† Analyte Comments

gamma-Chlordane	For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments:

Client: Portland, City of
Project: Portland Harbor Inline Samp
Sample Matrix: Soil

Service Request: K1006443
Date Collected: 06/21/2010
Date Received: 06/22/2010

Organochlorine Pesticides

Sample Name: F0105712
Lab Code: K1006443-002

Extraction Method: EPA 3541
Analysis Method: 8081A

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	0.98	0.11	1	06/30/10	07/25/10	KWG1006914	
beta-BHC	ND	U	0.98	0.18	1	06/30/10	07/25/10	KWG1006914	
gamma-BHC (Lindane)	ND	U	0.98	0.080	1	06/30/10	07/25/10	KWG1006914	
delta-BHC	ND	U	0.98	0.074	1	06/30/10	07/25/10	KWG1006914	
Heptachlor	ND	Ui	0.98	0.98	1	06/30/10	07/25/10	KWG1006914	
Aldrin	ND	U	0.98	0.16	1	06/30/10	07/25/10	KWG1006914	
Heptachlor Epoxide	ND	U	0.98	0.084	1	06/30/10	07/25/10	KWG1006914	
gamma-Chlordane†	ND	U	0.98	0.090	1	06/30/10	07/25/10	KWG1006914	
Endosulfan I	ND	U	0.98	0.063	1	06/30/10	07/25/10	KWG1006914	
alpha-Chlordane	ND	U	0.98	0.10	1	06/30/10	07/25/10	KWG1006914	
Dieldrin	ND	U	0.98	0.14	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDE	ND	U	0.98	0.11	1	06/30/10	07/25/10	KWG1006914	
Endrin	ND	U	0.98	0.094	1	06/30/10	07/25/10	KWG1006914	
Endosulfan II	ND	U	0.98	0.14	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDD	ND	Ui	0.98	0.98	1	06/30/10	07/25/10	KWG1006914	
Endrin Aldehyde	ND	U	0.98	0.12	1	06/30/10	07/25/10	KWG1006914	
Endosulfan Sulfate	ND	Ui	1.1	1.1	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDT	**0.23**	JP	0.98	0.17	1	06/30/10	07/25/10	KWG1006914	
Endrin Ketone	ND	U	0.98	0.093	1	06/30/10	07/25/10	KWG1006914	
Methoxychlor	ND	U	0.98	0.19	1	06/30/10	07/25/10	KWG1006914	
Toxaphene	ND	Ui	50	50	1	06/30/10	07/25/10	KWG1006914	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	62	21-112	07/25/10	Acceptable
Decachlorobiphenyl	66	15-130	07/25/10	Acceptable

† Analyte Comments

gamma-Chlordane	For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments:

Client: Portland, City of
Project: Portland Harbor Inline Samp
Sample Matrix: Soil

Service Request: K1006443
Date Collected: 06/21/2010
Date Received: 06/22/2010

Organochlorine Pesticides

Sample Name: F0105713
Lab Code: K1006443-003

Extraction Method: EPA 3541
Analysis Method: 8081A

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	1.0	0.11	1	06/30/10	07/25/10	KWG1006914	
beta-BHC	ND	U	1.0	0.18	1	06/30/10	07/25/10	KWG1006914	
gamma-BHC (Lindane)	ND	U	1.0	0.080	1	06/30/10	07/25/10	KWG1006914	
delta-BHC	ND	U	1.0	0.074	1	06/30/10	07/25/10	KWG1006914	
Heptachlor	ND	Ui	1.0	1.0	1	06/30/10	07/25/10	KWG1006914	
Aldrin	ND	Ui	1.0	0.30	1	06/30/10	07/25/10	KWG1006914	
Heptachlor Epoxide	ND	U	1.0	0.084	1	06/30/10	07/25/10	KWG1006914	
gamma-Chlordane†	**0.11**	JP	1.0	0.090	1	06/30/10	07/25/10	KWG1006914	
Endosulfan I	ND	U	1.0	0.063	1	06/30/10	07/25/10	KWG1006914	
alpha-Chlordane	ND	U	1.0	0.10	1	06/30/10	07/25/10	KWG1006914	
Dieldrin	ND	U	1.0	0.14	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDE	ND	Ui	1.0	1.0	1	06/30/10	07/25/10	KWG1006914	
Endrin	ND	U	1.0	0.094	1	06/30/10	07/25/10	KWG1006914	
Endosulfan II	ND	U	1.0	0.14	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDD	ND	Ui	1.0	1.0	1	06/30/10	07/25/10	KWG1006914	
Endrin Aldehyde	ND	U	1.0	0.12	1	06/30/10	07/25/10	KWG1006914	
Endosulfan Sulfate	ND	Ui	3.1	3.1	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDT	ND	Ui	1.0	0.50	1	06/30/10	07/25/10	KWG1006914	
Endrin Ketone	ND	U	1.0	0.093	1	06/30/10	07/25/10	KWG1006914	
Methoxychlor	ND	U	1.0	0.19	1	06/30/10	07/25/10	KWG1006914	
Toxaphene	ND	Ui	50	50	1	06/30/10	07/25/10	KWG1006914	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	57	21-112	07/25/10	Acceptable
Decachlorobiphenyl	60	15-130	07/25/10	Acceptable

† Analyte Comments

gamma-Chlordane	For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments:

Client: Portland, City of
Project: Portland Harbor Inline Samp
Sample Matrix: Soil

Service Request: K1006443
Date Collected: 06/21/2010
Date Received: 06/22/2010

Organochlorine Pesticides

Sample Name: F0105714
Lab Code: K1006443-004

Extraction Method: EPA 3541
Analysis Method: 8081A

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	0.97	0.11	1	06/30/10	07/25/10	KWG1006914	
beta-BHC	ND	U	0.97	0.18	1	06/30/10	07/25/10	KWG1006914	
gamma-BHC (Lindane)	ND	Ui	0.97	0.11	1	06/30/10	07/25/10	KWG1006914	
delta-BHC	ND	U	0.97	0.074	1	06/30/10	07/25/10	KWG1006914	
Heptachlor	ND	U	0.97	0.12	1	06/30/10	07/25/10	KWG1006914	
Aldrin	ND	Ui	0.97	0.97	1	06/30/10	07/25/10	KWG1006914	
Heptachlor Epoxide	ND	U	0.97	0.084	1	06/30/10	07/25/10	KWG1006914	
gamma-Chlordane†	ND	U	0.97	0.090	1	06/30/10	07/25/10	KWG1006914	
Endosulfan I	ND	U	0.97	0.063	1	06/30/10	07/25/10	KWG1006914	
alpha-Chlordane	ND	U	0.97	0.10	1	06/30/10	07/25/10	KWG1006914	
Dieldrin	ND	U	0.97	0.14	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDE	ND	U	0.97	0.11	1	06/30/10	07/25/10	KWG1006914	
Endrin	ND	U	0.97	0.094	1	06/30/10	07/25/10	KWG1006914	
Endosulfan II	ND	Ui	0.97	0.23	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDD	ND	U	0.97	0.11	1	06/30/10	07/25/10	KWG1006914	
Endrin Aldehyde	ND	U	0.97	0.12	1	06/30/10	07/25/10	KWG1006914	
Endosulfan Sulfate	ND	Ui	0.97	0.58	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDT	**0.52**	J	0.97	0.17	1	06/30/10	07/25/10	KWG1006914	
Endrin Ketone	ND	U	0.97	0.093	1	06/30/10	07/25/10	KWG1006914	
Methoxychlor	ND	U	0.97	0.19	1	06/30/10	07/25/10	KWG1006914	
Toxaphene	ND	Ui	150	150	1	06/30/10	07/25/10	KWG1006914	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	69	21-112	07/25/10	Acceptable
Decachlorobiphenyl	81	15-130	07/25/10	Acceptable

† Analyte Comments

gamma-Chlordane	For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments:

Client: Portland, City of
Project: Portland Harbor Inline Samp
Sample Matrix: Soil

Service Request: K1006443
Date Collected: 06/21/2010
Date Received: 06/22/2010

Organochlorine Pesticides

Sample Name: F0105715
Lab Code: K1006443-005

Extraction Method: EPA 3541
Analysis Method: 8081A

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	0.99	0.11	1	06/30/10	07/25/10	KWG1006914	
beta-BHC	ND	U	0.99	0.18	1	06/30/10	07/25/10	KWG1006914	
gamma-BHC (Lindane)	ND	Ui	0.99	0.99	1	06/30/10	07/25/10	KWG1006914	
delta-BHC	ND	U	0.99	0.074	1	06/30/10	07/25/10	KWG1006914	
Heptachlor	ND	U	0.99	0.12	1	06/30/10	07/25/10	KWG1006914	
Aldrin	ND	U	0.99	0.16	1	06/30/10	07/25/10	KWG1006914	
Heptachlor Epoxide	ND	U	0.99	0.084	1	06/30/10	07/25/10	KWG1006914	
gamma-Chlordane†	ND	U	0.99	0.090	1	06/30/10	07/25/10	KWG1006914	
Endosulfan I	ND	U	0.99	0.063	1	06/30/10	07/25/10	KWG1006914	
alpha-Chlordane	ND	U	0.99	0.10	1	06/30/10	07/25/10	KWG1006914	
Dieldrin	ND	U	0.99	0.14	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDE	ND	U	0.99	0.11	1	06/30/10	07/25/10	KWG1006914	
Endrin	ND	U	0.99	0.094	1	06/30/10	07/25/10	KWG1006914	
Endosulfan II	ND	U	0.99	0.14	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDD	ND	Ui	0.99	0.14	1	06/30/10	07/25/10	KWG1006914	
Endrin Aldehyde	ND	U	0.99	0.12	1	06/30/10	07/25/10	KWG1006914	
Endosulfan Sulfate	ND	Ui	0.99	0.52	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDT	ND	Ui	0.99	0.27	1	06/30/10	07/25/10	KWG1006914	
Endrin Ketone	ND	U	0.99	0.093	1	06/30/10	07/25/10	KWG1006914	
Methoxychlor	ND	U	0.99	0.19	1	06/30/10	07/25/10	KWG1006914	
Toxaphene	ND	Ui	50	26	1	06/30/10	07/25/10	KWG1006914	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	72	21-112	07/25/10	Acceptable
Decachlorobiphenyl	73	15-130	07/25/10	Acceptable

† Analyte Comments

gamma-Chlordane	For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments:

Client: Portland, City of
Project: Portland Harbor Inline Samp
Sample Matrix: Soil

Service Request: K1006443
Date Collected: 06/21/2010
Date Received: 06/22/2010

Organochlorine Pesticides

Sample Name: F0105717
Lab Code: K1006443-007

Extraction Method: EPA 3541
Analysis Method: 8081A

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	1.0	0.11	1	06/30/10	07/25/10	KWG1006914	
beta-BHC	ND	U	1.0	0.18	1	06/30/10	07/25/10	KWG1006914	
gamma-BHC (Lindane)	ND	U	1.0	0.080	1	06/30/10	07/25/10	KWG1006914	
delta-BHC	ND	U	1.0	0.074	1	06/30/10	07/25/10	KWG1006914	
Heptachlor	ND	U	1.0	0.12	1	06/30/10	07/25/10	KWG1006914	
Aldrin	ND	U	1.0	0.16	1	06/30/10	07/25/10	KWG1006914	
Heptachlor Epoxide	ND	U	1.0	0.084	1	06/30/10	07/25/10	KWG1006914	
gamma-Chlordane†	ND	U	1.0	0.090	1	06/30/10	07/25/10	KWG1006914	
Endosulfan I	ND	U	1.0	0.063	1	06/30/10	07/25/10	KWG1006914	
alpha-Chlordane	ND	U	1.0	0.10	1	06/30/10	07/25/10	KWG1006914	
Dieldrin	**0.32**	J	1.0	0.14	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDE	ND	U	1.0	0.11	1	06/30/10	07/25/10	KWG1006914	
Endrin	ND	U	1.0	0.094	1	06/30/10	07/25/10	KWG1006914	
Endosulfan II	ND	U	1.0	0.14	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDD	ND	U	1.0	0.11	1	06/30/10	07/25/10	KWG1006914	
Endrin Aldehyde	ND	U	1.0	0.12	1	06/30/10	07/25/10	KWG1006914	
Endosulfan Sulfate	**2.6**		1.0	0.11	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDT	ND	Ui	1.0	0.18	1	06/30/10	07/25/10	KWG1006914	
Endrin Ketone	ND	U	1.0	0.093	1	06/30/10	07/25/10	KWG1006914	
Methoxychlor	ND	U	1.0	0.19	1	06/30/10	07/25/10	KWG1006914	
Toxaphene	ND	Ui	53	53	1	06/30/10	07/25/10	KWG1006914	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	71	21-112	07/25/10	Acceptable
Decachlorobiphenyl	74	15-130	07/25/10	Acceptable

† Analyte Comments

gamma-Chlordane	For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments:

Client: Portland, City of
Project: Portland Harbor Inline Samp
Sample Matrix: Soil

Service Request: K1006443
Date Collected: NA
Date Received: NA

Organochlorine Pesticides

Sample Name: Method Blank
Lab Code: KWG1006914-2

Units: ug/Kg
Basis: Dry

Extraction Method: EPA 3541
Analysis Method: 8081A

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	0.50	0.11	1	06/30/10	07/25/10	KWG1006914	
beta-BHC	ND	U	0.50	0.18	1	06/30/10	07/25/10	KWG1006914	
gamma-BHC (Lindane)	ND	U	0.50	0.080	1	06/30/10	07/25/10	KWG1006914	
delta-BHC	ND	U	0.50	0.074	1	06/30/10	07/25/10	KWG1006914	
Heptachlor	ND	U	0.50	0.12	1	06/30/10	07/25/10	KWG1006914	
Aldrin	ND	U	0.50	0.16	1	06/30/10	07/25/10	KWG1006914	
Heptachlor Epoxide	ND	U	0.50	0.084	1	06/30/10	07/25/10	KWG1006914	
gamma-Chlordane†	ND	U	0.50	0.090	1	06/30/10	07/25/10	KWG1006914	
Endosulfan I	ND	U	0.50	0.063	1	06/30/10	07/25/10	KWG1006914	
alpha-Chlordane	ND	U	0.50	0.10	1	06/30/10	07/25/10	KWG1006914	
Dieldrin	ND	U	0.50	0.14	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDE	ND	U	0.50	0.11	1	06/30/10	07/25/10	KWG1006914	
Endrin	ND	U	0.50	0.094	1	06/30/10	07/25/10	KWG1006914	
Endosulfan II	ND	U	0.50	0.14	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDD	ND	U	0.50	0.11	1	06/30/10	07/25/10	KWG1006914	
Endrin Aldehyde	ND	U	0.50	0.12	1	06/30/10	07/25/10	KWG1006914	
Endosulfan Sulfate	ND	U	0.50	0.11	1	06/30/10	07/25/10	KWG1006914	
4,4'-DDT	ND	U	0.50	0.17	1	06/30/10	07/25/10	KWG1006914	
Endrin Ketone	ND	U	0.50	0.093	1	06/30/10	07/25/10	KWG1006914	
Methoxychlor	ND	U	0.50	0.19	1	06/30/10	07/25/10	KWG1006914	
Toxaphene	ND	U	25	4.8	1	06/30/10	07/25/10	KWG1006914	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	72	21-112	07/25/10	Acceptable
Decachlorobiphenyl	67	15-130	07/25/10	Acceptable

† Analyte Comments

gamma-Chlordane	For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments:

Client: Portland, City of
Project: Portland Harbor Inline Samp
Sample Matrix: Soil

Service Request: K1006443

Surrogate Recovery Summary
Organochlorine Pesticides

Extraction Method: EPA 3541
Analysis Method: 8081A

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2
F0105711	K1006443-001	73	84
F0105712	K1006443-002	62	66
F0105713	K1006443-003	57	60
F0105714	K1006443-004	69	81
F0105715	K1006443-005	72	73
F0105717	K1006443-007	71	74
Method Blank	KWG1006914-2	72	67
Batch QC	K1006549-003	77	76
Batch QC	K1006549-007	45	54
Batch QCMS	KWG1006914-3	72	72
Batch QCDMS	KWG1006914-4	63	73
Batch QCMS	KWG1006914-8	69	72
Batch QCDMS	KWG1006914-9	71	71
Lab Control Sample	KWG1006914-1	75	77

Surrogate Recovery Control Limits (%)

Sur1 =	Tetrachloro-m-xylene	21-112
Sur2 =	Decachlorobiphenyl	15-130

Results flagged with an asterisk (*) indicate values outside control criteria.
Results flagged with a pound (#) indicate the control criteria is not applicable.

Client:	Portland, City of	**Service Request:**	K1006443
Project:	Portland Harbor Inline Samp	**Date Extracted:**	06/30/2010
Sample Matrix:	Sediment	**Date Analyzed:**	07/25/2010

Matrix Spike/Duplicate Matrix Spike Summary
Organochlorine Pesticides

Sample Name:	Batch QC	**Units:**	ug/Kg
Lab Code:	K1006549-007	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8081A	**Extraction Lot:**	KWG1006914

Analyte Name	Sample Result	Batch QCMS KWG1006914-3 Matrix Spike			Batch QCDMS KWG1006914-4 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Expected	%Rec	Result	Expected	%Rec			
alpha-BHC	ND	10.2	12.9	79	9.16	12.9	71	23-133	11	40
beta-BHC	ND	10.7	12.9	83	9.46	12.9	73	22-142	13	40
gamma-BHC (Lindane)	ND	10.2	12.9	79	9.05	12.9	70	26-135	12	40
delta-BHC	ND	10.5	12.9	82	9.48	12.9	73	25-148	11	40
Heptachlor	ND	9.33	12.9	72	9.60	12.9	74	21-136	3	40
Aldrin	ND	10.3	12.9	79	8.92	12.9	69	22-135	14	40
Heptachlor Epoxide	ND	10.3	12.9	80	9.49	12.9	73	25-129	9	40
gamma-Chlordane	ND	10.3	12.9	79	9.12	12.9	70	24-133	12	40
Endosulfan I	ND	7.53	12.9	58	6.86	12.9	53	15-119	9	40
alpha-Chlordane	ND	10.4	12.9	80	9.57	12.9	74	24-132	8	40
Dieldrin	ND	10.4	12.9	81	9.07	12.9	70	26-133	14	40
4,4'-DDE	ND	11.4	12.9	88	9.73	12.9	75	22-142	15	40
Endrin	ND	10.6	12.9	82	10.1	12.9	78	22-145	5	40
Endosulfan II	ND	7.77	12.9	60	7.64	12.9	59	13-129	2	40
4,4'-DDD	ND	11.3	12.9	87	10.2	12.9	79	19-143	10	40
Endrin Aldehyde	ND	9.48	12.9	73	8.89	12.9	69	10-129	6	40
Endosulfan Sulfate	ND	9.62	12.9	74	10.3	12.9	79	20-134	6	40
4,4'-DDT	ND	10.9	12.9	84	11.5	12.9	89	19-154	5	40

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

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

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

Client:	Portland, City of	**Service Request:**	K1006443
Project:	Portland Harbor Inline Samp	**Date Extracted:**	06/30/2010
Sample Matrix:	Sediment	**Date Analyzed:**	07/25/2010

Matrix Spike/Duplicate Matrix Spike Summary
Organochlorine Pesticides

Sample Name:	Batch QC	**Units:**	ug/Kg
Lab Code:	K1006549-003	**Basis:**	Dry
Extraction Method:	EPA 3541	**Level:**	Low
Analysis Method:	8081A	**Extraction Lot:**	KWG1006914

		Batch QCMS KWG1006914-8 Matrix Spike			Batch QCDMS KWG1006914-9 Duplicate Matrix Spike					
Analyte Name	**Sample Result**	**Result**	**Expected**	**%Rec**	**Result**	**Expected**	**%Rec**	**%Rec Limits**	**RPD**	**RPD Limit**
Toxaphene	ND	173	206	84	197	206	96	20-155	13	40

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

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

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

Client:	Portland, City of	**Service Request:**	K1006443
Project:	Portland Harbor Inline Samp	**Date Extracted:**	06/30/2010
Sample Matrix:	Soil	**Date Analyzed:**	07/25/2010

Lab Control Spike Summary
Organochlorine Pesticides

Extraction Method:	EPA 3541	**Units:**	ug/Kg
Analysis Method:	8081A	**Basis:**	Dry
		Level:	Low
		Extraction Lot:	KWG1006914

	Lab Control Sample KWG1006914-1 Lab Control Spike			
Analyte Name	**Result**	**Expected**	**%Rec**	**%Rec Limits**
alpha-BHC	16.8	20.0	84	36-139
beta-BHC	19.2	20.0	96	38-142
gamma-BHC (Lindane)	16.9	20.0	85	40-142
delta-BHC	17.1	20.0	86	48-145
Heptachlor	16.2	20.0	81	39-135
Aldrin	16.0	20.0	80	37-134
Heptachlor Epoxide	16.8	20.0	84	45-118
gamma-Chlordane	15.8	20.0	79	41-135
Endosulfan I	12.4	20.0	62	35-121
alpha-Chlordane	16.5	20.0	82	41-134
Dieldrin	17.3	20.0	86	46-136
4,4'-DDE	17.5	20.0	88	46-141
Endrin	16.2	20.0	81	40-152
Endosulfan II	13.1	20.0	65	39-128
4,4'-DDD	17.4	20.0	87	46-146
Endrin Aldehyde	16.1	20.0	81	32-132
Endosulfan Sulfate	16.1	20.0	80	43-138
4,4'-DDT	19.1	20.0	96	46-151
Endrin Ketone	17.8	20.0	89	47-135
Methoxychlor	17.4	20.0	87	42-147
Toxaphene	224	200	112	53-133

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

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

Columbia Analytical Services, Inc.
An Employee - Owned Company

CHAIN OF CUSTODY

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

SR#: K1105443

PAGE 1 OF 1 COC #

PROJECT NAME: Portland Harbor Inline Samp
PROJECT NUMBER:
PROJECT MANAGER: Jennifer Shackelford
COMPANY/ADDRESS: City of Portland BES-WPCL
CITY/STATE/ZIP:
E-MAIL ADDRESS:
PHONE #: FAX#:
SAMPLER'S SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Pesticides/Herbicides Low level 608 ☐ 8081A ☐	REMARKS
F0105711	6/21/10	1308		S	1	X	
F0105712		1336					
F0105713		1409					
F0105714		1422					
F0105715		1443					
F0105716		"					
F0105717		"					

Semivolatile Organics by GC/MS 625 ☐ 8270 ☐ 8270LL ☐
Volatile Organics 624 ☐ 8260 ☐ 8021 ☐ BTEX ☐
Hydrocarbons (*see below) Gas ☐ Diesel ☐ Oil ☐
Fuel Fingerprint (FIQ) ☐ NW-HCID Screen ☐
Oil & Grease/TRPH 1664 HEM ☐ 1664 SGT ☐
PCB's Aroclors ☐ Congeners ☐
Chlorophenolics - 8151M Tri ☐ Tetra ☐ PCP ☐
PAHS 8310 ☐ SIM ☐
Metals, Total or Dissolved (See list below)
Cyanide ☐ Hex-Chrom ☐
pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle) NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3
TOX 9020 ☐ AOX 1650 ☐ 506 ☐

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REPORT REQUIREMENTS

- X I. Routine Report: Method Blank, Surrogate, as required
- ___ II. Report Dup., MS, MSD as required
- ___ III. Data Validation Report (includes all raw data)
- ___ IV. CLP Deliverable Report
- ___ V. EDD

INVOICE INFORMATION

P.O. #
Bill To:

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard (10-15 working days)
___ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER:_____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

Please run Low level Pest. thx

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature	Signature	Signature	Signature
Printed Name: Mackenzie Zink	Printed Name	Printed Name	Printed Name
Date/Time: 1032	Date/Time: 6.22.10 10:32	Date/Time: 6-22-10 1:30	Date/Time: 6/22/10 1330
Firm: COP	Firm: CAS	Firm	Firm: CAS

RCOC #1 06/03

Columbia Analytical Services, Inc.
Cooler Receipt and Preservation Form

PC PD

Client / Project: City of Portland Service Request K10 06443

Received: 6-22-10 Opened: 6-22-10 By: DU

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

Cooler Temp °C	Temp Blank °C	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
6.4		257			

7. Packing material used. *Inserts* *Baggies* *Bubble Wrap* (*Gel Packs*) *Wet Ice* *Sleeves* *Other* _____
8. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
9. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA (Y) N
10. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
11. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA (Y) N
12. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
13. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* (NA) Y N
14. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
15. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

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

Notes, Discrepancies, & Resolutions: _____

Columbia Analytical Services
1317 S. 13th Avenue, Kelso, WA 98626 360.577.7222 360.636.1068 (fax) www.caslab.com

August 5, 2010 Analytical Report for Service Request No: K1006443

Jennifer Shackelford
Portland, City of
1120 SW Fifth Avenue # 1000
Portland, OR 97204

RE: Portland Harbor Inline Samp

Dear Jennifer:

Enclosed are the additional pages for the samples submitted to our laboratory on June 22, 2010. For your reference, these analyses have been assigned our service request number K1006443.

Results for sample "F0105716" were inadvertently omitted in the initial submitted report and are enclosed here.

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

We apologize for any inconvenience this may have created.

Please call if you have any questions. My extension is 3281. You may also contact me via Email at PDivvela@caslab.com.

Respectfully submitted,

Columbia Analytical Services, Inc.

Pradeep Divvela
Project Chemist

PD/lb

Client: Portland, City of
Project: Portland Harbor Inline Samp
Sample Matrix: Soil

Service Request: K1006443
Date Collected: 06/21/2010
Date Received: 06/22/2010

Organochlorine Pesticides

Sample Name: F0105716
Lab Code: K1006443-006

Extraction Method: EPA 3541
Analysis Method: 8081A

Units: ug/Kg
Basis: Dry

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
alpha-BHC	ND	U	0.98	0.11	1	06/30/10	07/28/10	KWG1006914	
beta-BHC	ND	U	0.98	0.18	1	06/30/10	07/28/10	KWG1006914	
gamma-BHC (Lindane)	ND	U	0.98	0.080	1	06/30/10	07/28/10	KWG1006914	
delta-BHC	ND	U	0.98	0.074	1	06/30/10	07/28/10	KWG1006914	
Heptachlor	ND	U	0.98	0.12	1	06/30/10	07/28/10	KWG1006914	
Aldrin	ND	U	0.98	0.16	1	06/30/10	07/28/10	KWG1006914	
Heptachlor Epoxide	ND	U	0.98	0.084	1	06/30/10	07/28/10	KWG1006914	
gamma-Chlordane†	ND	U	0.98	0.090	1	06/30/10	07/28/10	KWG1006914	
Endosulfan I	ND	Ui	0.98	0.096	1	06/30/10	07/28/10	KWG1006914	
alpha-Chlordane	ND	Ui	0.98	0.98	1	06/30/10	07/28/10	KWG1006914	
Dieldrin	ND	U	0.98	0.14	1	06/30/10	07/28/10	KWG1006914	
4,4'-DDE	ND	Ui	0.98	0.22	1	06/30/10	07/28/10	KWG1006914	
Endrin	**0.31**	J	0.98	0.094	1	06/30/10	07/28/10	KWG1006914	
Endosulfan II	ND	U	0.98	0.14	1	06/30/10	07/28/10	KWG1006914	
4,4'-DDD	ND	U	0.98	0.11	1	06/30/10	07/28/10	KWG1006914	
Endrin Aldehyde	ND	U	0.98	0.12	1	06/30/10	07/28/10	KWG1006914	
Endosulfan Sulfate	ND	U	0.98	0.11	1	06/30/10	07/28/10	KWG1006914	
4,4'-DDT	ND	U	0.98	0.17	1	06/30/10	07/28/10	KWG1006914	
Endrin Ketone	ND	Ui	0.98	0.57	1	06/30/10	07/28/10	KWG1006914	
Methoxychlor	ND	U	0.98	0.19	1	06/30/10	07/28/10	KWG1006914	
Toxaphene	ND	Ui	49	33	1	06/30/10	07/28/10	KWG1006914	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Tetrachloro-m-xylene	84	21-112	07/28/10	Acceptable
Decachlorobiphenyl	78	15-130	07/28/10	Acceptable

† Analyte Comments

gamma-Chlordane	For this analyte (CAS Registry No. 5103-74-2), USEPA has corrected the name to be beta-Chlordane, also known as trans-Chlordane.

Comments:

Client: Portland, City of
Project: Portland Harbor Inline Samp
Sample Matrix: Soil

Service Request: K1006443

Surrogate Recovery Summary
Organochlorine Pesticides

Extraction Method: EPA 3541
Analysis Method: 8081A

Units: PERCENT
Level: Low

Sample Name	Lab Code	Sur1	Sur2
F0105711	K1006443-001	73	84
F0105712	K1006443-002	62	66
F0105713	K1006443-003	57	60
F0105714	K1006443-004	69	81
F0105715	K1006443-005	72	73
F0105716	K1006443-006	84	78
F0105717	K1006443-007	71	74
Method Blank	KWG1006914-2	72	67
Batch QC	K1006549-003	77	76
Batch QC	K1006549-007	45	54
Batch QC	K1006549-008	75	80
Batch QCMS	KWG1006914-3	72	72
Batch QCDMS	KWG1006914-4	63	73
Batch QCMS	KWG1006914-5	60	59
Batch QCDMS	KWG1006914-6	72	73
Batch QCMS	KWG1006914-8	69	72
Batch QCDMS	KWG1006914-9	71	71
Lab Control Sample	KWG1006914-1	75	77

Surrogate Recovery Control Limits (%)

Sur1 =	Tetrachloro-m-xylene	21-112
Sur2 =	Decachlorobiphenyl	15-130

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

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

APPENDIX D

Former Outfall M-4 Documents (on DVD only)

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APPENDIX E

Water Well Survey

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Well Log Query Results

NEW! GPS points, where available, have been added to the far right of the table. Click link to view on map

Township: 1 N, Range: 1 E, Sections: 17,20, Type of Log: W

Well Log	T-R-S/ QQ-Q	Taxlot	Street of Well	Owner	Company	Special Standards	Well Type	First Water	Completed Depth	Static Water Level	Yield	Completed Date	Received Date	Bonded Constructor	Startcard	Well Id #	New	Abandon	Deepen	Alteration	Conversion	Domestic	Irrigation	Community	Livestock	Industrial	Injection	Thermal	Dewatering	Piezometer	Latitude/ Longitude
MULT_984	1.00N-1.00E-17 SW-SE	52			LYNDEN FARMS 6135 N BASIN PORTLAND OR 97217		W					10/11/1988	11/07/1988	SCHNEIDER, THOMAS A		23119				√						√						
MULT_985	1.00N-1.00E-17 SW-SE	52			LYNDEN FARMS 6135 N BASIN PORTLAND OR 97217		W		172.00	23.0	2960.0	05/26/1988	07/01/1988	SCHNEIDER, STEPHEN J		23119	√									√						
MULT_986	1.00N-1.00E-17 -				PAC PACIFIC INLAND NAVIGATION PO BOX 831 VANCOUVER WA		W	197.00	200.00	22.0	24.0	03/06/1974	03/28/1974	JANNSEN, EDWARD M A M JANNSEN DRILLING CO.			√									√						
MULT_1876	1.00N-1.00E-20 -		5140 N CHANNEL	SHULEVITZ, MEL	INDOOR BILLBOARD/NW INC.; SHULEVITZ FIVE PO BOX 17555 PORTLAND OR 972170555		W	146.00	164.00	29.0	125.0	03/17/1992	03/31/1992	CONNELL, RONALD F STEINMAN BROTHERS DRILLING	28097		√									√						
MULT_60323	1.00N-1.00E-17 SW-SE	52	6135 N BASIN		LYDEN FARMS 6135 N BASIN PORTLAND OR 97217	√	W					02/28/2000	03/16/2000	BRANT, BRADLEY W BRANT WELL DRILLING	113305	23119				√												

Download Data
Return to Well Log Query

APPENDIX F

Excerpts from the Portland Harbor 2013 BHHRA

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especially salmon and Pacific lamprey, are an important food source as well as an integral part of the tribes' cultural, economic, and spiritual heritage.

3.2.8 Potential Future Domestic Water User

According to the City of Portland, the primary domestic water source for the city is the Bull Run watershed, which is supplemented by a groundwater supply from the Columbia South Shore Well Field (City of Portland 2008). In addition, the Willamette River was determined not to be a viable water source for future water demands through 2030 (City of Portland 2008). Although there are currently no known uses of the Lower Willamette River as a source of drinking water, public and private use of the Willamette River as a domestic water source is a designated beneficial use by the State of Oregon. Hence, use of surface water as a source of household water was assessed as a potentially complete pathway. Additionally, although domestic water supply is a designated beneficial use of the Willamette River, OAR 340-041-0340 Table 340A defines the beneficial use only with adequate pretreatment and natural quality that meets drinking water standards. Exposure to surface water could occur via ingestion and dermal contact, as well as volatilization of chemicals to indoor air through household use.

3.3 IDENTIFICATION OF EXPOSURE PATHWAYS

Exposure pathways are defined as the physical ways in which chemicals may enter the human body. A complete exposure pathway consists of the following four elements:

- A source of chemical release
- A release or transport mechanism (or media in cases involving media transfer)
- An exposure point (a point of potential human contact with the contaminated exposure medium)
- An exposure route (e.g., ingestion, dermal contact) at the exposure point.

If any of the above elements is missing, the pathway is considered incomplete and exposure does not occur. The potential exposure pathways to human populations at the Study Area include:

- Incidental ingestion of and dermal contact with beach sediment
- Incidental ingestion and dermal contact with in-water sediment
- Incidental ingestion and dermal contact with surface water
- Incidental ingestion and dermal contact with surface water from seeps
- Consumption of fish and shellfish

- Infant consumption of human milk.

A more detailed discussion of potential exposures in the Study Area under current and future conditions and the rationale for including or eliminating pathways from quantitative evaluation are presented in the following sections. The identified receptors, exposure routes, and exposure pathways, and the rationale for selection are also summarized in Table 3-1.

Exposure pathways are designated in one of the following four ways:

Potentially Complete: There is a source or release from a source, an exposure point where contact can occur, and an exposure route by which contact can occur. Pathways considered potentially complete are quantitatively evaluated in this BHHRA.

Potentially Complete but Insignificant: There is a source or release from a source, an exposure point where contact can occur, and an exposure route by which contact can occur. However, exposure via the pathway is likely to be negligible relative to the overall risk. Pathways considered potentially complete but insignificant were not evaluated further in this BHHRA.

Incomplete: There is no source or release from a source, no exposure point where contact can occur, or no exposure route by which contact can occur for the given receptor. Pathways considered potentially incomplete were not evaluated further in this BHHRA.

Potentially complete pathway, but evaluated for a different receptor: These pathways may be complete for some individuals, but are not evaluated for the identified receptor because the pathways are not considered typical for that receptor. These pathways are evaluated for different receptors where the pathways are considered potentially complete and significant. Overlapping exposures that may occur for the different receptors are discussed further in Section 3.3.8.

The following sections provide a more detailed discussion of the exposure pathways that are quantitatively evaluated in this BHHRA.

3.3.1 Direct Exposure to Beach Sediment

Based on current and future uses within the Study Area, incidental ingestion and dermal contact with beach sediment could occur within natural river beach areas identified as human use areas in the Programmatic Work Plan. These areas were further classified with respect to the type of exposures that could occur, including recreational, fishing, transient, or dockside worker use areas. Human use areas in the Study Area and their associated classifications are shown in Map 2-1. Direct exposure to beach sediments is considered to be a potentially complete pathway for dockside workers, transients, recreational beach users, and fishers.

3.3.2 Direct Exposure to In-Water Sediment

Direct contact with in-water sediment could occur during activities conducted from a boat or other vessel that result in bringing sediment to the surface, during diving, or when fishing as a result of handling anchors, hooks, or crayfish pots. Hence, direct exposure to in-water sediment is considered to be a potentially complete pathway for in-water workers, divers, and fishers. Although recreational beach users may contact in-water sediment while swimming, such exposures are not expected to be significant and were not quantitatively evaluated in the risk assessment. Exposure to in-water sediment was evaluated throughout the Study Area by half-mile river segments for each side of the river rather than at specific areas as was done with exposure to beach sediments.

3.3.3 Direct Exposure to Surface Water

Direct exposure to contaminants in surface water could occur during recreation or occupational activities that occur near or in the water, or from potential future use of the LWR as a domestic water source. Transients may also use surface water as a source of drinking water or for bathing. Accordingly, direct exposure via ingestion and dermal contact with surface water is considered to be a potentially complete pathway for transients, recreational beach users, divers, and potential future domestic water users.

Exposure to contaminants in surface water via dermal absorption and ingestion were considered potentially complete but insignificant pathways for dockside workers, in-water workers, tribal fishers, and fishers. It is unlikely that dockside and in-water workers would have direct contact with surface water on a regular basis, and the potential for significant exposure is considered low while fishing. Additionally, although contaminants may volatilize from water, it is unlikely to result in a significant exposure considering the amount of mixing with ambient air and the relatively low concentrations of VOCs in water. Hence, inhalation of volatiles to ambient air was considered a potentially complete but insignificant exposure pathway for all receptors.

3.3.4 Direct Exposure to Groundwater from Seeps

Direct contact with groundwater is assumed to occur only at seeps where groundwater comes to the surface on a beach above the water line. Direct exposure to groundwater via seeps is considered a potentially complete exposure pathway for transients and recreational beach users. As described in Section 2.1.4, a seep reconnaissance survey identified only Outfall 22B, which is located at approximately RM 7W in an area designated as a potentially used by transients. Therefore, exposure to surface water from the groundwater seep at Outfall 22B was evaluated only for transients.

3.3.5 Consumption of Fish

Many of the contaminants found in Portland Harbor are persistent in the environment and accumulate in the food-chain. Local populations who consume fish caught in Portland Harbor may be exposed to COPCs that bioaccumulate in fish. While the populations evaluated in this BHHRA are described as "fishers," the fish consumption evaluation in this BHHRA includes people who consume fish caught within the Study Area, not just those who catch the fish. Consumption of locally-caught fish is evaluated as a potentially complete exposure pathway for dockside workers, in-water workers, recreational beach users, and divers. Consumption of fish by these populations is evaluated under the recreational and subsistence fisher receptor. By definition, ongoing long-term fish consumption by transients would not be expected to occur, and the evaluation of fish consumption for other receptors is considered to be protective of consumption of fish by transients.

3.3.6 Consumption of Shellfish

Certain contaminants can bioaccumulate in shellfish, and populations may be exposed to COPCs through consumption of shellfish that are collected within the Study Area. The actual extent shellfish harvesting and consumption is presently occurring is not known. The Linnton Community Center project (Wagner 2004) reported that some transients reported eating clams and crayfish, although many of the individuals indicated that they were in the area temporarily, move from location to location frequently, or have variable diets based on what is easily available. While the degree to which consumption of clams currently occurs in Portland Harbor is unknown, the Linnton Community Center project suggests that it does not occur on an ongoing basis within the Study Area. However, the predominant species found in the LWR during sampling events were Asian clams (*Corbicula*), which are an invasive, non-native species. Oregon law (OAR 635–056–0050) prohibits the possession, transportation, and sale of non-native wildlife, and the actual extent to which freshwater clams or other shellfish are currently harvested from Portland Harbor and consumed is not known. The Superfund Health Investigation and Education (SHINE) program in the Oregon Department of Human Services (DHS) stated that is unknown whether or not crayfish are harvested commercially within Portland Harbor (ATSDR 2006). ODFW has records for crayfish collection in the Columbia and Willamette Rivers, but these records do not indicate whether the collection actually occurs within the Study Area. Based on ODFW's data for 2005 to 2007, no commercial crayfish landings were reported for the Willamette River in Multnomah County. DHS had previously received information from ODFW indicating that an average of 4,300 pounds of crayfish were harvested commercially from the portion of the Willamette River within Multnomah County each of the five years from 1997-2001. In addition, DHS occasionally receives calls from citizens who are interested in harvesting crayfish from local waters and are interested in fish advisory information. According to a member of the Oregon Bass and Panfish club, traps are placed in the Portland Harbor Superfund Site boundaries and crayfish collected for bait and possibly for consumption (ATSDR 2006). Although consumption of shellfish was considered a

potentially complete pathway for dockside workers, in-water workers, recreational beach users, divers, and recreational fishers, it was quantitatively evaluated only for subsistence fishers, as they were considered the most likely population to regularly harvest and consume shellfish.

3.3.7 Infant Consumption of Human Milk

Lipid-soluble chemicals can accumulate in body fat, including lipids found in breast-milk. As a result, breast-feeding represents a potentially complete exposure pathway for nursing infants. Accordingly, infant exposures to PCBs, dioxins/furans, DDx, and PBDEs were evaluated as a potentially complete exposure pathway wherever maternal exposure to those compounds was evaluated.

3.3.8 Potentially Overlapping Exposure Scenarios

An estimate of reasonable maximum exposure should not only address exposure for individual pathways, but also exposures that may occur across multiple exposure routes. Examples of overlapping scenarios include in-water workers who fish recreationally, and may also be recreational beach users. Potentially overlapping scenarios are indicated on Figure 3-1, and risks from potentially overlapping scenarios are discussed in Section 5.

3.4 CALCULATION OF EXPOSURE POINT CONCENTRATIONS

The exposure point concentration (EPC) is defined as the average concentration contacted at the exposure point(s) over the duration of the exposure period (EPA, 1992a). EPA recommends using the average concentration to represent "a reasonable estimate of the concentration likely to be contacted over time" (EPA 1989). Use of the average concentration also coincides with EPA toxicity criteria, which are based on lifetime average exposures. Because of the uncertainty associated with estimating the true average concentration at a site, EPA guidance (EPA 1989, 1992) notes that the 95 percent upper confidence limit (UCL) of the arithmetic mean should be used for this variable. The UCL is defined as a value that, when calculated repeatedly for randomly drawn subsets of data, equals or exceeds the true population mean 95 percent of the time. Use of the UCL can also help account for uncertainties that can result from limited sampling data, and more accurately accounts for the uneven spatial distribution of contaminant concentrations. The process to calculate EPCs for tissue and beach sediment was previously described in the Programmatic Work Plan, and Round 1 tissue EPCs were previously presented in *Round 1 Tissue Exposure Point Concentrations* (Kennedy/Jenks Consultants 2004b) and *Salmon, Lamprey, and Sturgeon Tissue Exposure Point Concentrations for Oregon Department of Human Services* (Kennedy/Jenks Consultants 2004c), both of which were approved by EPA. The process for deriving EPCs for in-water sediment, surface water, and groundwater seeps was previously described in *Exposure Point Concentration Calculation Approach and Summary of Exposure Factors* (Kennedy/Jenks Consultants 2006), as approved by EPA.

median values are typically used as inputs. The mean estimate of national per capita fish consumption of 7.5 g/day (EPA 2000b) was used as the consumption rate for recreational fishers, the median consumption rate of 39.2 g/day from the CRITFC study was used for tribal fishers. Using the equation presented above, the target lead concentrations in fish are 5.2 mg/kg for recreational fishers and 1 mg/kg for tribal fishers.

EPA's Integrated Exposure Uptake Biokinetic (IEUBK) model was used to calculate tissue lead concentrations unlikely to result in blood lead concentrations greater than 10 μg/dL in children. Because site-specific values for concentration of lead in soil, house dust, air and drinking water were not readily available, default values were used for those inputs. The ratio of child-to-adult consumption of 0.42 was applied to the median adult consumption rate of 7.5 g/day to obtain a childhood rate of 3.2 g/day for children of recreational fishers. The corresponding lead concentration in fish is 2.6 mg/kg. Assuming a consumption rate of 16.2 g/day for tribal children, representing the 65^{th} percentile consumption rate from the CRITFC survey, the calculated lead concentration in fish is 0.5 mg/kg. Uncertainties associated with the evaluation of lead are discussed further in Section 6.

5.1.5 Cumulative Risk Estimates for Contaminants Analyzed by More Than One Method

In some instances specific contaminants were analyzed by more than one method, and thus more than one EPC calculated for that contaminant. Cumulative risks are presented using the EPC from only one method to avoid double-counting the risks from a given contaminant. When assessing risks associated with sediment exposures, Aroclor data were used because the data set was larger than for congeners. However, because the congener analysis provided lower detection limits, it was preferentially used when available for assessing risks associated with consumption of fish and shellfish. Where metals were analyzed as both total and dissolved fractions in surface water and groundwater seep samples, the EPCs based on total metals were used in the cumulative risk estimates because unfiltered data is generally more representative of typical human exposure.

5.2 RISK CHARACTERIZATION RESULTS

This section presents a summary of the risk characterization results the scenarios described in Section 3. EPA policy (EPA 1991a) states that CERCLA actions are generally warranted when where the baseline risk assessment indicates that a cumulative site risk to an individual using RME assumptions for either current or future land use is greater than the 1×10^{-4} lifetime excess cancer risk end of the cancer risk range of 1×10^{-4} to 1×10^{-6}, or the HI is greater than 1. Accordingly, risk and hazard estimates are generally presented in terms of whether they are greater than the upper end of the cancer risk range of 1×10^{-4} or the HI is greater than 1. Uncertainties associated with the assumptions in each exposure scenario are discussed

in detail in Section 6. Risks from exposures to PBDEs in in-water sediment and tissue were assessed separately, and are presented in Attachment F3.

A summary of risks by exposure medium are presented in Tables 5-18, 5-43, 5-57, 5-60, 5-65, 5-77, and 5-86.

5.2.1 Dockside Workers

Risks to dockside workers were estimated separately for each of the eight beaches designated as a potential dockside worker use areas, shown in Map 2-1.

The estimated CT and RME cancer risks are less than 1×10^{-4} at all beach areas, and the HI is less than 1 for adults and infants. These results are presented in Tables 5-2, 5-3, 5-16, and 5-17.

5.2.2 In-Water Workers

As discussed in Section 3.2.1.2, in-water workers are described as typically working around in-water structures such as docks, and primarily exposed to in-water sediments. In-water sediment exposure by in-water workers was evaluated in half-mile increments along each side of the river. The estimated CT and RME cancer risks are less than 1×10^{-4} at all RM segments, and the RME HIs for adults are less than 1 at any location. The HI for infants at RM 7W is 2 due to dioxins and furans. These results are presented in Tables 5-19, 5-20, 5-32 and 5-33.

5.2.3 Transients

Risks to transients were estimated separately for each beach designated as a potential transient use area, as well as the use of surface water as a source of drinking water and for bathing. Beaches where sediment exposure was evaluated are shown on Map 2-1. Year-round exposure to surface water for four individual transect stations, Willamette Cove, Multnomah Channel, and for the four transects grouped together to represent Study Area-wide exposure are shown on Map 2-3. The CT and RME risk estimates for beach sediment are less than 1×10^{-4} for all locations, and the HI is less than 1. The results of the RME and CT evaluations for exposure to beach sediments are presented in Tables 5-4 and 5-5, respectively.

Estimated CT and RME cancer risks associated with surface water exposures are less than 1×10^{-4} at all individual and transect locations, and the HI is less than 1. The results of the RME and CT evaluations are presented in Tables 5-44 and 5-45, respectively.

As noted in Section 3.3.4, exposure to surface water by transients was also evaluated at the groundwater seep at Outfall 22B. All risk and hazard estimates are less than 1×10^{-4} and 1, respectively, and the results are presented in Tables 5-58 and 5-59.

5.2.4 Divers

Commercial divers were evaluated for exposure to surface water and in-water sediment, and assuming the diver was wearing either a wet or a dry suit. As described in Section 3.4.2, in-water sediment exposure by divers is evaluated in half-mile exposure areas for each side of the river, and on a Study Area-wide basis. Risks associated with exposure to surface water were evaluated for four individual transect stations, and at single-point sampling stations grouped together in one-half mile increments per side of river.

5.2.4.1 Diver in Wet Suit

The estimated CT and RME cancer risk associated with exposure to in-water sediments is less than 1×10^{-4} at all half-mile river segments and for Study Area-wide exposure, and the HI is also less than 1 for adults. The HI for infants is 2 at RM 8.5W for the RME evaluation due to PCBs. The RME and CT estimates for adults are presented in Tables 5-29 and 5-30, respectively. RME and CT risk and hazard estimates for infant exposures are presented in Tables 5-40 and 5-41, respectively.

The estimated CT and RME cancer risk associated with exposure to surface water is less than 1×10^{-4} for all half-mile river segments, and the HI is less than 1. These results are presented in Tables 5-50 and 5-51, respectively, for the RME and CT evaluations. Indirect exposure to contaminants in surface water by infants via breastfeeding was not evaluated.

5.2.4.2 Diver in Dry Suit

The estimated RME cancer risk associated with exposure to in-water sediments is less than 1×10^{-4} at all half-mile river segments and for Study Area-wide exposure, and the HI is also less than 1 for adults and indirect exposures to infants via breastfeeding. The results of the adult RME risk and hazard estimates are presented in Table 5-31, a CT evaluation was not done for a commercial diver in a dry suit. Noncancer hazard for infants is presented in Table 5-42.

The estimated RME cancer risk associated with exposure to surface water is less than 1×10^{-4} for all half-mile river segments, and the HI is less than 1. These results are presented in Tables 5-52. Indirect exposure to contaminants in surface water by infants via breastfeeding was not evaluated.

5.2.5 Recreational Beach Users

Risks associated with exposure to beach sediment were evaluated separately for each beach designated as a potential recreational use area, shown on Map 2-1. Exposure to surface water was evaluated using data collected from three transect locations and three single-point locations (Cathedral Park, Willamette Cove, and Swan Island Lagoon) shown on Map 2-3.

The estimated CT and RME cancer risks associated with exposure to beach sediments are less than 1×10^{-4} at all recreational beach areas, and the HI is also less than 1. These results are presented in Tables 5-6 through 5-9. Indirect exposure to contaminants in beach sediment to infants via breastfeeding was not evaluated.

The estimated CT and RME cancer risks associated with exposure to surface water are less than 1×10^{-4} at all recreational beach areas, and the HI is also less than 1. These results are presented in Tables 5-46 through 5-49. Indirect exposure to contaminants in surface water to infants via breastfeeding was not evaluated.

5.2.6 Recreational/Subsistence Fishers

Recreational and subsistence fishers were evaluated assuming direct exposure to contaminants in sediment and via consumption of fish and shellfish. As discussed in Section 3.2.1.6, exposures associated with beach sediment were assessed at individual beaches designated as potential transient or recreational use areas, in-water sediment exposures were evaluated on a one-half river mile basis per side of the river and as an averaged, Study Area-wide evaluation. Sediment exposures were further assessed as CT and RME evaluations and assuming either a low- or a high-frequency rate of fishing.

5.2.6.1 Sediment - Direct Contact

The estimated CT and RME cancer risks associated with low-frequency fishing exposures to either beach or in-water sediments are less than 1×10^{-4} at all areas evaluated. Noncancer hazards associated with adult exposures to beach or in-water sediment are less than 1 at all locations evaluated, the RME noncancer hazard associated with indirect exposures to infants via breastfeeding is greater than 1 at two locations for in-water sediment: RM 7W (2) due to dioxin/furans and RM 8.5W (2) primarily due to PCBs, with a HQ of 1. These results are presented in Tables 5-14 and 5-15 for beach sediment exposures, and Tables 5-27, 5-28, 5-38, and 5-39 for in-water sediment exposures. Indirect exposure to contaminants in beach sediment to infants via breastfeeding was not evaluated.

The estimated CT and RME cancer risks associated with high-frequency fishing exposures to either beach or in-water sediments are less than 1×10^{-4} at all areas evaluated. For beach sediment, noncancer hazards associated with adult exposure are less than 1 at all locations evaluated. RME noncancer hazards associated with adult exposures to in-water sediment are greater than 1 at RM 7W (2) primarily due to dioxin/furans, with a HQ of 1. The RME noncancer hazard associated with indirect exposures to infants via breastfeeding is also greater than 1 at RM 7W (3) due to dioxin/furans and RM 8.5W (2) due to PCBs. These results are presented in Tables 5-12 and 5-13 for beach sediment exposures, and Tables 5-24, 5-25, 5-26, 5-36, and 5-37 for in-water sediment exposures. Indirect exposure to contaminants in beach sediment to infants via breastfeeding was not evaluated.

5.2.6.2 Consumption Resident Fish

Consumption of resident fish species was evaluated on both a per river mile basis to account for localized fishing practices and heterogeneous contaminant distribution in sediments, as well as averaging consumption over the entire Study Area. Consumption of resident fish species on a river mile basis was evaluated only for recreational fishers, whereas consumption averaged over the entire Study Area was evaluated for both recreational and subsistence fishers. With the exception of RM 5, RME risk estimates for fillet-only consumption on a river mile basis are all greater than 1×10^{-4}, the estimated risk at RM 5 is 9×10^{-5}. CT estimates are greater than 1×10^{-4} at RM 7, Swan Island Lagoon, and RM 11. River miles with the highest estimated RME risks are: RM 2 (2×10^{-4}), RM 4 (3×10^{-4}), RM 7 (6×10^{-4}), Swan Island Lagoon (6×10^{-4}), RM 9 (2×10^{-4}), and RM 11 (1×10^{-3}). RME risk estimates for dioxins/furans are greater than 1×10^{-4} at RM 7. RME risk estimates for PCBs are greater than 1×10^{-4} at RM 2, RM 4, RM 7 and Swan Island Lagoon and are 1×10^{-3} at RM 11. These results are presented in Tables 5-73. Study Area-wide RME risks for recreational and subsistence fishers are 4×10^{-3} and 1×10^{-2}, respectively; the Study Area-wide CT estimate for recreational fishers is 1×10^{-3}. These results are presented in Tables 5-74.

RME and CT hazard estimates for fillet-only consumption are greater than 1 at all river miles. Values for river miles with the highest estimated RME hazard are as follows: RM 4 (20), RM 7 (20), Swan Island Lagoon (50), and RM 11 (100). Study Area-wide RME hazards for recreational and subsistence fishers are 300 and 1000, respectively, the CT estimate for recreational fishers is 100. PCBs and dioxin/furans result in the highest hazard estimates at RM 7, PCBs result in the highest hazard estimates at RM 11. These results are presented in Tables 5-66 through 5-72.

RME and CT noncancer hazard associated with indirect exposure to infants via breastfeeding was also assessed. When evaluated on a river mile scale, the RME hazard estimates associated with fillet-only consumption range from 30 to 1,000. CT estimates range from 10 to 500 when assessed on a river mile scale. Study Area-wide, the hazard estimates for recreational fishers are 2,000 and 4,000 for the CT and RME estimates, respectively, the RME estimate for subsistence fishers is 10,000. River miles with the greatest RME hazard estimates are: RM 2 (200), RM 4 (200), RM 7 (200), Swan Island Lagoon (600), and RM 11 (1,000). The majority of the hazard estimates is attributable to PCBs. These results are presented in Tables 5-75 and 5-76.

As detailed in Section 3.4.5, EPCs on a river mile scale use data from smallmouth bass only to represent contaminant concentrations in all resident fish species, while consumption was assumed to consist primarily of just the fillet, rather than other parts of the fish. However, an evaluation of the data collected from Portland Harbor indicates that PCB concentrations in whole body smallmouth bass are typically an order of magnitude greater than those measured in just the fillet. By contrast, in common carp and brown bullhead, the observed ratio of whole body-to-fillet PCB concentrations is less than noted in smallmouth bass, meaning that given the same

overall PCB concentration in whole body fish, the PCB concentration in smallmouth bass fillet tissue will be less than for carp and bullhead.

Differences among these species is reflected in the EPCs; specifically the use of fillet smallmouth bass data on a river mile scale resulted in a greater relative reduction of PCB concentration than would be seen if fillet data from common carp and brown bullhead were included. As such, a diet that consists of some portion of carp and bullhead could result in relatively greater intake of PCBs, and the associated risk and hazard would be correspondingly greater as well. In addition, as discussed in Section 3.5.10.6, the Columbia Slough survey results indicate that at least some of the fishers in the Portland Harbor area consume more than just the fillet. Consumption of other portions of the fish in addition to the fillet can result in greater relative exposure to PCBs and other persistent bioaccumulative chemicals and thus, greater relative risks.

Using smallmouth bass data as an example, the increased risk associated with consumption of the entire fish could be as much as an order of magnitude greater than associated with consumption of fillet only. However, since the relative increased exposure is directly related to the type of fish consumed, as well as any portions of the fish consumed in addition to just the fillet, it is not possible to assess the increased risks associated with consumption of more than just fillet with any degree of accuracy.

5.2.6.3 Consumption of Clams

The estimated RME cancer risks associated consumption of undepurated clams by subsistence fishers are greater than 1×10^{-4} at 10 of the 22 river mile sections evaluated. Values for river miles with the highest estimated risks are as follows: RM 5W (6×10^{-4}), RM 6E (7×10^{-4}), and RM 6W (7×10^{-4}). Other areas where the estimated risk is equal to or greater than 1×10^{-4} are RM 2E, RM 3E, RM 4E, RM 4W, RM 7W, RM 8W, Swan Island Lagoon, RM 9W, and RM 11E. The estimated risk Study Area-wide is 4×10^{-4}. Carcinogenic PAHs and PCBs pose the highest risks on a Study Area-wide basis. Risk estimates for cPAHs are greater than 1×10^{-4} at RM 5W and RM 6W. At RM 7W, dioxins/furans result in the highest risk estimates. PCBs result in the highest risk estimates in Swan Island Lagoon and at RM 11. No estimated CT cancer risks associated with consumption of undepurated clams are greater than 1×10^{-4}. Risks were also evaluated based on consumption of depurated clams at RM 1E, RM 2W, RM 10W, RM 11E, and RM 12E. None of the estimated CT or RME cancer risks are greater than 1×10^{-4}. These results are presented in Table 5-78.

The estimated RME noncancer hazards associated consumption of undepurated clams by subsistence fishers are greater than 1 at 20 of the 22 river mile sections evaluated. Values for river miles with the highest noncancer hazard are as follows: RM 3E (8), RM 6E (40), RM 9W (8), and RM 11E (10). The estimated noncancer hazard Study Area-wide is 9. PCBs result in the highest hazard estimates at RM 2E, RM 3E, RM 6E, RM 8W, Swan Island Lagoon, RM 9W, and RM 11E. The estimated CT

hazards associated with consumption of undepurated clams is greater than 1 at RM 6E, where the HI is 7, and at RM 11E, where the HI is 2; PCBs result in the highest hazard estimate at both river miles. The estimated RME hazard associated with consumption of depurated clams is 2 at four of the five river miles and is 7 at RM 11E. PCBs result in the highest estimated hazard. These results are presented in Tables 5-78 through 5-80.

RME noncancer hazard associated with indirect exposure to infants via breastfeeding was also assessed, and the estimated hazard is greater than 1 at each river mile evaluated. Values for river miles with the highest estimated hazard due to parental consumption of clams are as follows (for infant children of subsistence fishers): RM 2E (100), RM 3E (200), RM 6E (800), RM 8W (100), Swan Island Lagoon (100), RM 9W (100), and RM 11E (300). These results are presented in Table 5-84.

5.2.6.4 Consumption of Crayfish

The estimated RME cancer risks associated consumption of crayfish by subsistence fishers are greater than 1×10^{-4} at two of the 32 individual stations evaluated: 07R006 (3×10^{-4}) located at RM 7W, and CR11E (3×10^{-4}) located at RM 11E. When evaluated Study Area-wide, the estimated risk is 3×10^{-4}. Risk estimates for dioxins/furans are greater than 1×10^{-4} at 07R006 and risk estimates for PCBs are greater than 1×10^{-4} at CR11E. No estimated CT cancer risks associated with consumption of crayfish are greater than 1×10^{-4}. These results are presented in Table 5-81.

The estimated RME noncancer hazards associated consumption of crayfish by subsistence fishers are greater than 1 at seven of the 32 individual stations. Stations with the highest estimated hazard are 03R005 (4) located at the end of the International Slip, 07R006 (6), and CR11E (10). The estimated noncancer hazard Study Area-wide is 10. PCBs result in the highest noncancer hazard at 03R005 and CR11E, dioxins/furans result in the highest noncancer hazard at 07R006. These results are presented in Tables 5-81 through 5-83.

RME noncancer hazard associated with indirect exposure to infants via breastfeeding is greater than 1 at 23 of the 32 stations evaluated. Values at locations with the highest estimated hazard due to parental consumption of clams are as follows (for infant children of subsistence fishers): 03R003 (20) at RM 3E, 03R005 (60) at RM 3E, 07R006 (20) at RM 7W, 08R001 (20) at RM 8W, 09R001 (20) in Swan Island Lagoon, 09R002 (30) at RM 9W, and CR11E (400) at RM 11E. The hazard is 200 when evaluated Study Area-wide. These results are presented in Table 5-85.

5.2.7 Tribal Fishers

Tribal fishers were evaluated assuming direct exposure to contaminants in sediment and via consumption of fish. Exposures associated with beach sediment were assessed at individual beaches, in-water sediment exposures were evaluated on a one-half river

mile basis per side of the river and as an averaged, Study Area-wide evaluation. Fish consumption was evaluated assuming a multi-species diet consisting of anadromous and resident fish species, and fishing was evaluated on a Study Area-wide basis.

5.2.7.1 Sediment – Direct Contact

The estimated CT and RME cancer risks associated with direct contact to beach sediment is less than 1×10^{-4} at all beaches evaluated. The estimated RME cancer risk associated with exposure to in-water sediment is greater than 1×10^{-4} at two locations: RM 6W (2×10^{-4}) and RM 7W (3×10^{-4}). Risk estimates for cPAHs are greater than 1×10^{-4} at RM 6W, risk estimates for dioxins/furans are greater than 1×10^{-4} at RM 7W. These results are presented in Tables 5-10, 5-11, 5-21, and 5-22.

With the exception of in-water sediment exposure at RM 7W, the estimated non-cancer hazard is less than one at all beach and in-water locations evaluated. The estimated RME hazard is 3 at RM 7W, primarily due to dioxins/furans, with a HQ of 2. These results are presented in Tables 5-10, 5-11, and 5-21 through 5-23.

Noncancer CT and RME hazard estimates associated with indirect exposure to infants via breastfeeding was evaluated assuming maternal exposure to in-water sediment. The estimated RME hazard is greater than 1 at 3 locations, RM 7W (5), RM 8.5 (4), and RM 11E (2). These results are presented in Tables 5-34 and 5-35.

5.2.7.2 Fish Consumption

The estimated RME cancer risks for the combined child and adult exposure is 2×10^{-2} assuming whole body consumption, and 1×10^{-2} assuming consumption of fillets only. Risk estimates for PCBs, dioxins/furans, and arsenic are greater than 1×10^{-4}. These results are presented in Table 5-63.

The RME noncancer hazard associated with childhood consumption of whole body fish is 800, and is 600 assuming consumption of fillets only. PCBs, and to a lesser extent dioxins/furans, result in the highest noncancer hazard estimates. These results are presented in Tables 5-61 and 5-62.

The RME noncancer hazard associated with indirect exposure of tribal infants via breastfeeding assuming maternal consumption of whole body fish is 9,000, and is 8,000 assuming maternal fillet-only consumption. PCBs result in the highest hazard estimates. These results are presented Table 5-64.

5.2.8 Domestic Water Use

Use of surface water as a source of household water for drinking and other domestic uses was evaluated using data from five transect and 15 single point sampling locations, as well as averaged over a Study Area-wide basis. The estimated cancer risk for combined child and adult exposures is greater than 1×10^{-4} at W031 (9×10^{-4}), located at RM 6W. PAHs are the primary contributor to the estimated

cancer risk. However, dermal exposure is the primary pathway contributing to the risk estimate, and as described in EPA 2004, the physical-chemical properties of several PAHs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene), place them outside of the Effective Prediction Domain used to estimate the absorbed dermal dose from water. Although PAHs are direct-acting carcinogens, the risk estimates associated with estimating dermal absorption from water have a greater degree of uncertainty than the other risk estimates presented in this BHHRA. These results are presented in Tables 5-55 and 5-56.

The estimated noncancer hazard based on childhood exposure is equal to or greater than 1 at several sampling locations: W005 (1) at RM 4, W023 (1) at RM 11, W027 (2) near the mouth of Multnomah Channel, and W035 (2) in Swan Island Lagoon. In all instances, MCPP is the primary contributor to the estimated hazard. These results are presented in Tables 5-53 and 5-54.

5.3 CUMULATIVE RISK ESTIMATES

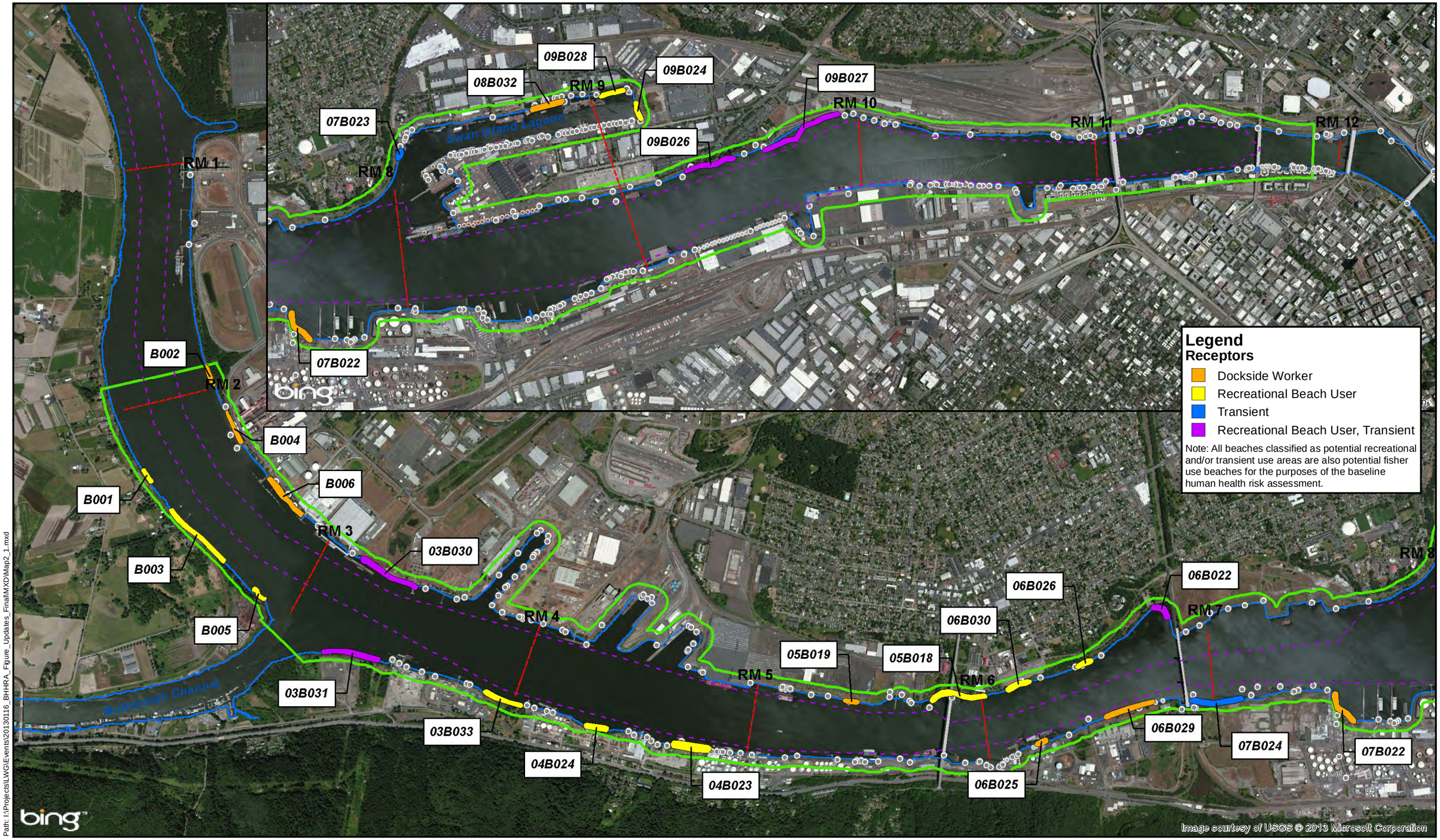
Cumulative risk and hazard estimates were calculated for those populations where concurrent exposure to more than one media was assumed to be plausible. Recreational/subsistence and tribal fishers were further evaluated on the basis of whether they were assumed to fish predominately from the shore or from a boat. Populations for which concurrent exposure to more than one media was considered for are as follows:

- Transients: Beach sediment, surface water
- Divers: In-water sediment, surface water
- Recreational beach users: Beach sediment, surface water
- Recreational fishers (beach): Beach sediment, fish tissue (fillet)
- Recreational fishers (boat): In-water sediment, fish tissue (fillet)
- Subsistence fishers (beach): Beach sediment, fish tissue (fillet), shellfish tissue
- Subsistence fishers (boat): In-water sediment, fish tissue (fillet), shellfish tissue
- Tribal fishers (beach): Beach sediment, fish tissue (fillet and whole body)
- Tribal fishers (boat): In-water sediment, fish tissue (fillet and whole body)

Cumulative risk estimates are generally presented for each one-half river mile per side of the river, and the risk estimates for specific media appropriate to each one-half mile segment were used to calculate the total risk or hazard. For example, cumulative risks for recreational fishers who fish from a boat and consume smallmouth bass would include the risks associated with exposure to in-water sediment at the specific half-mile, shellfish collected within same half-mile and side-of-river specific segment, and smallmouth bass from the larger river mile assessment. The results of the cumulative risk estimates are presented in Tables 5-87 through 5-111. Chemicals that resulted in a cancer risk greater than 1×10^{-6} or an HQ greater than 1 under any of the exposure scenarios for any of the exposure point concentrations evaluated in this BHHRA are presented in Table 5-112.

5.4 SUMMARY OF RISK CHARACTERIZATION

Cancer risk and noncancer hazard from site-related contamination was characterized based on current and potential future uses at Portland Harbor, and a large number of different exposures scenarios were evaluated. Exposure to bioaccumulative contaminants (PCBs, dioxins/furans, and organochlorine pesticides, primarily DDx compounds) via consumption of resident fish consistently poses the greatest potential for human exposure to in-water contamination. In general, the risks associated with consumption of resident fish are greater by an order of magnitude or more than risks associated with exposure to sediment or surface water. The greatest non-cancer hazard estimates are associated with bioaccumulation through the food chain and exposure to infants via breastfeeding. Because the smallest scale over which fish consumption was evaluated was per river mile, the resolution of cumulative risks on a smaller scale is not informative. The highest relative cumulative risk or hazard estimates are at RM 4, RM 7, Swan Island Lagoon, and RM 11. However, assuming exposure to sediment alone, the risk estimates are greater than 1×10^{-4} at RM 6W and 7W for the tribal fisher; the risk estimates for all other locations and scenarios are less than 1×10^{-4}. Assuming shellfish consumption alone, the highest relative cumulative risk or hazard estimates are at RM 3E, RM 5W, RM 6W, RM 6E, RM 7W and RM 11E.



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Lower Willamette Group

FEATURE SOURCES:
Transportation, Property, or Boundaries: Metro RLIS.
Channel & River Miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

0 1,000 2,000 Feet

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Study Area

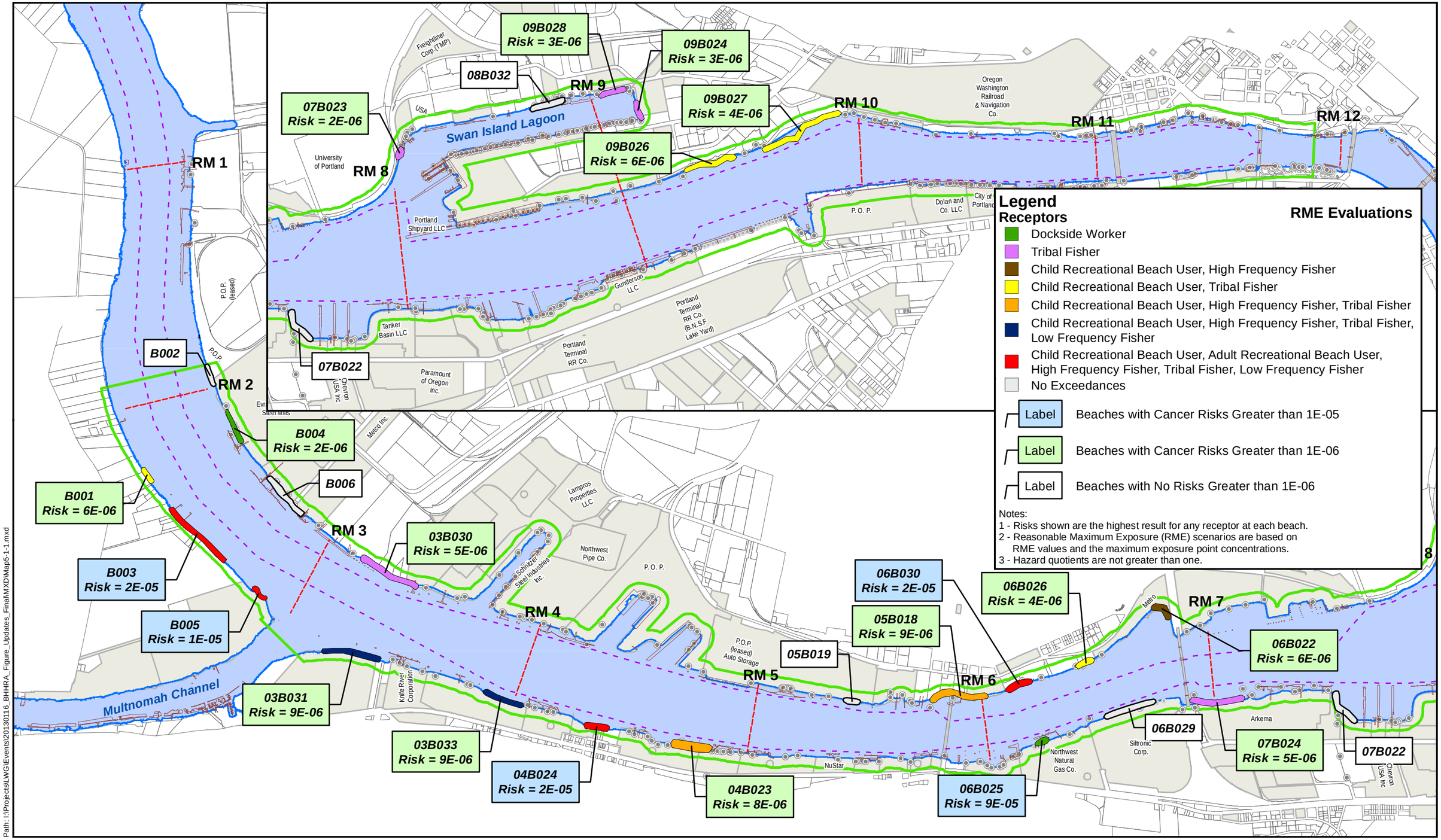
Outfalls

- Outfall
- Dock Drain
- Roof Drain

- Bridges
- Docks and Structures
- Waterfront Taxlots
- Upland ECSI Sites (2008)

Map 2-1
Portland Harbor RI/FS
Final Remedial Investigation Report
Appendix F: BHHRA
March 28, 2013

Designated Potential Human Use Areas and Associated Beach Sediment Sample Locations



Legend

Receptors

RME Evaluations

- Dockside Worker
- Tribal Fisher
- Child Recreational Beach User, High Frequency Fisher
- Child Recreational Beach User, Tribal Fisher
- Child Recreational Beach User, High Frequency Fisher, Tribal Fisher
- Child Recreational Beach User, High Frequency Fisher, Tribal Fisher, Low Frequency Fisher
- Child Recreational Beach User, Adult Recreational Beach User, High Frequency Fisher, Tribal Fisher, Low Frequency Fisher
- No Exceedances

Label — Beaches with Cancer Risks Greater than 1E-05

Label — Beaches with Cancer Risks Greater than 1E-06

Label — Beaches with No Risks Greater than 1E-06

Notes:
1 - Risks shown are the highest result for any receptor at each beach.
2 - Reasonable Maximum Exposure (RME) scenarios are based on RME values and the maximum exposure point concentrations.
3 - Hazard quotients are not greater than one.

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Channel & River Miles: US Army Corps of Engineers.
Bathymetric Information: David Evans and Associates, Inc.

0 1,000 2,000 Feet

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Study Area

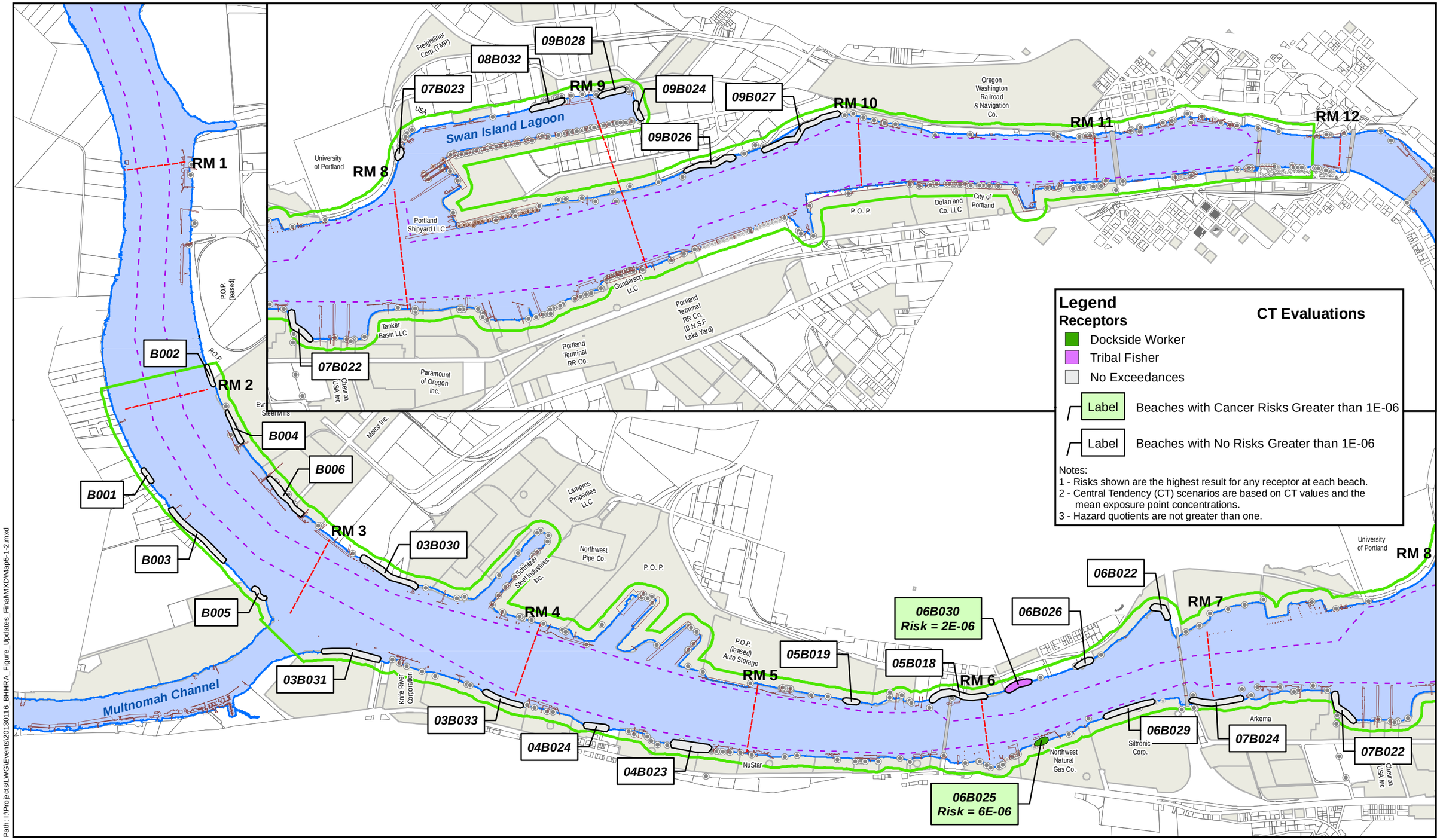
Outfalls

- Outfall
- Dock Drain
- Roof Drain

- Bridges
- Docks and Structures
- Waterfront Taxlots
- Upland ECSI Sites (2008)

Map 5-1-1
Portland Harbor RI/FS
Final Remedial Investigation Report
Appendix F: BHHRA
March 28, 2013

Risks from Direct Contact with Beach Sediment, RME Evaluations



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Bathymetric Information: David Evans and Associates, Inc.

0 1,000 2,000 Feet

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Study Area

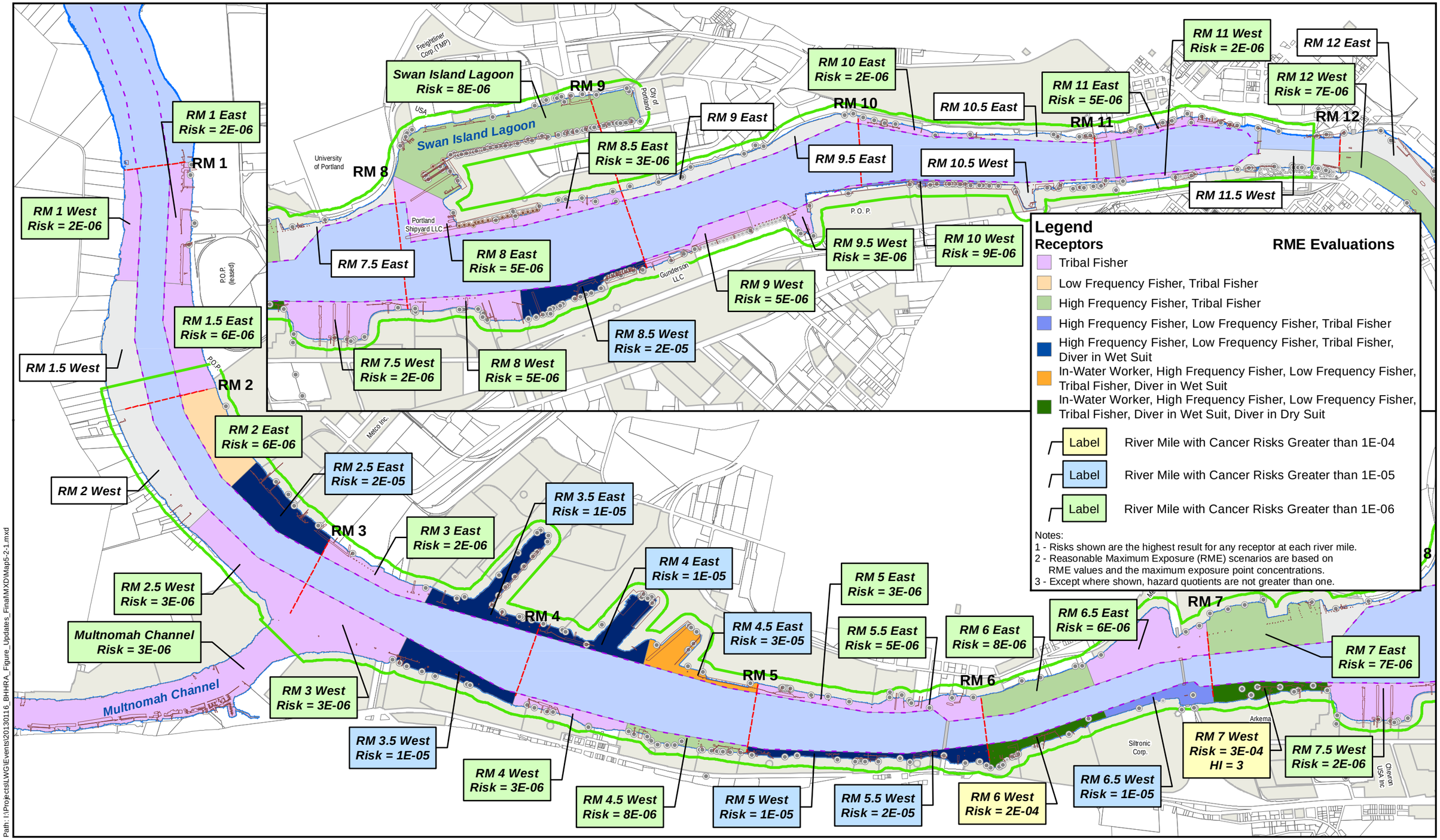
Outfalls

- Outfall
- Dock Drain
- Roof Drain

- Bridges
- Docks and Structures
- Waterfront Taxlots
- Upland ECSI Sites (2008)

Map 5-1-2
Portland Harbor RI/FS
Final Remedial Investigation Report
Appendix F: BHHRA
March 28, 2013

Risks from Direct Contact with Beach Sediment, CT Evaluations



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0 1,000 2,000 Feet

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Study Area

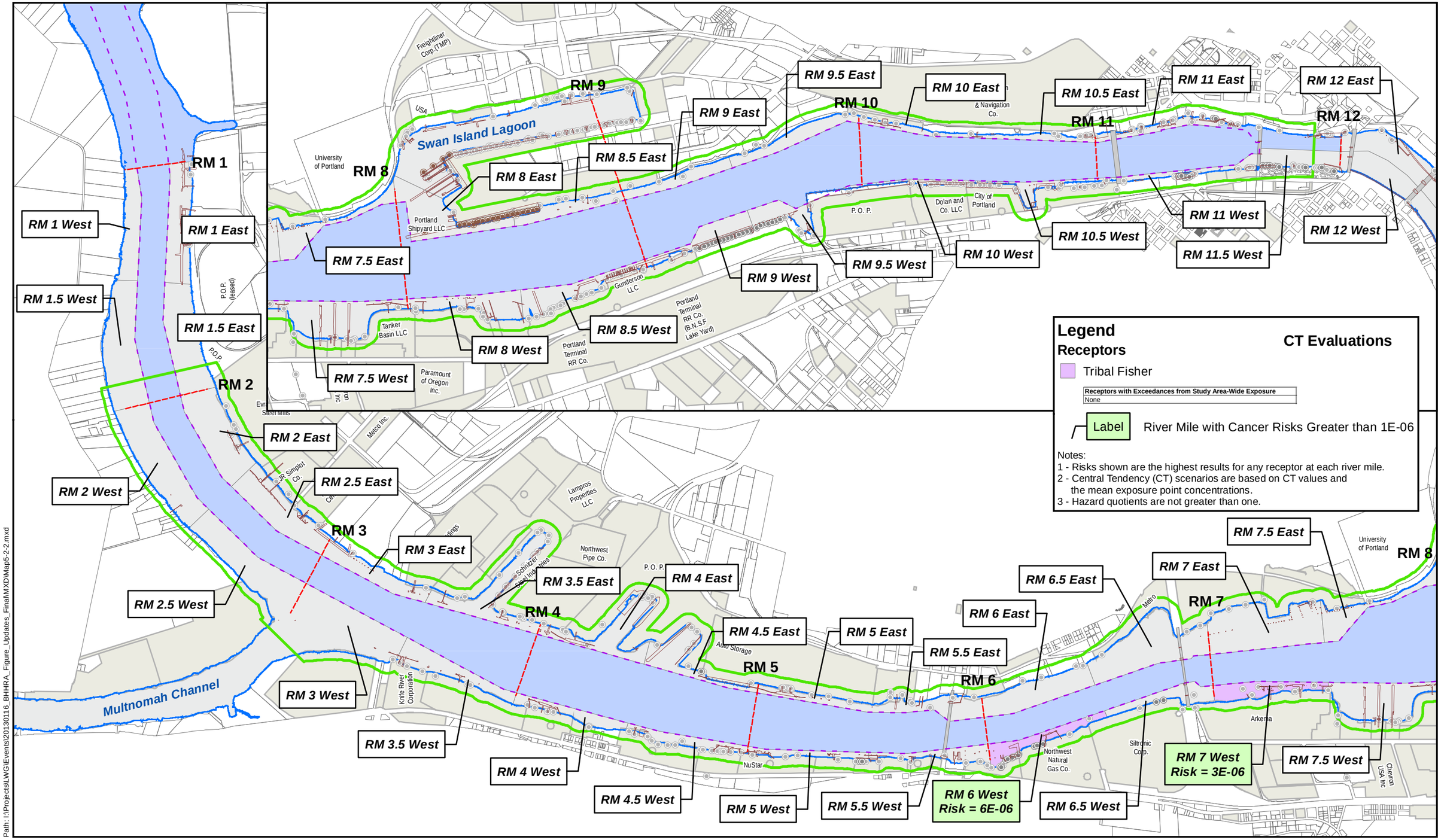
Outfalls

- Outfall
- Dock Drain
- Roof Drain

- Bridges
- Docks and Structures
- Waterfront Taxlots
- Upland ECSI Sites (2008)

Map 5-2-1
Portland Harbor RI/FS
Final Remedial Investigation Report
Appendix F: BHHRA
March 28, 2013

Risks from Direct Contact With In-Water Sediment, RME Evaluations



Legend

Receptors

Tribal Fisher

CT Evaluations

Receptors with Exceedances from Study Area-Wide Exposure
None

Label — River Mile with Cancer Risks Greater than 1E-06

Notes:
1 - Risks shown are the highest results for any receptor at each river mile.
2 - Central Tendency (CT) scenarios are based on CT values and the mean exposure point concentrations.
3 - Hazard quotients are not greater than one.

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0 1,000 2,000 Feet

Map Features

- River Miles
- Navigation Channel
- River Edge +13 ft NAVD
- Study Area

Outfalls

- Outfall
- Dock Drain
- Roof Drain

- Bridges
- Docks and Structures
- Waterfront Taxlots
- Upland ECSI Sites (2008)

Map 5-2-2
Portland Harbor RI/FS
Final Remedial Investigation Report
Appendix F: BHHRA
March 28, 2013

Risks from Direct Contact With In-Water Sediment, CT Evaluations

APPENDIX G

Level 1 Ecological Scoping Risk Assessment

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ATTACHMENT 1
Ecological Scoping Checklist

Site Name	BES Swan Island Lagoon ECSI 3901
Date of Site Visit	9-28-2012
Site Location	Portland, OREGON End of N. Basin Avenue
Site Visit Conducted by	

Part ❶

CONTAMINANTS OF INTEREST Types, Classes, Or Specific Hazardous Substances ‡ Known Or Suspected	Onsite	Adjacent to or in locality of the facility †
metals	✓	
Tributyltin	✓	
Pesticides	✓	
PAHs and phthlates	✓	

‡ As defined by OAR 340-122-115(30) † As defined by OAR 340-122-115(34)

Part ❷

OBSERVED IMPACTS ASSOCIATED WITH THE SITE	Finding
Onsite vegetation (None, Limited, Extensive)	L
Vegetation in the locality of the site (None, Limited, Extensive)	L
Onsite wildlife such as macroinvertebrates, reptiles, amphibians, birds, mammals, other (None, Limited, Extensive)	L
Wildlife such as macroinvertebrates, reptiles, amphibians, birds, mammals, other in the locality of the site (None, Limited, Extensive)	L
Other readily observable impacts (None, Discuss below)	NONE
Discussion: See site visit photographs included in this Appendix.	

ATTACHMENT 1
Ecological Scoping Checklist (cont'd)

Part ❸

SPECIFIC EVALUATION OF ECOLOGICAL RECEPTORS / HABITAT	Finding

SPECIFIC EVALUATION OF ECOLOGICAL RECEPTORS / HABITAT	Finding
Terrestrial - Wooded	
Percentage of site that is wooded	3.5%
Dominant vegetation type (**E**vergreen, **D**eciduous, **M**ixed)	D P *
Prominent tree size at breast height, i.e., four feet (<6", 6" to 12", >12")	6"-12"
Evidence / observation of wildlife (**M**acroinvertebrates, **R**eptiles, **A**mphibians, **B**irds, **M**ammals, **O**ther)	B
Terrestrial - Scrub/Shrub/Grasses	
Percentage of site that is scrub/shrub	19.4%
Dominant vegetation type (**S**crub, **S**hrub, **G**rasses, **O**ther) much of it blackberry	S P
Prominent height of vegetation (<2', 2' to 5', >5')	2' to 5'
Density of vegetation (**D**ense, **P**atchy, **S**parse)	P P
Evidence / observation of wildlife (**M**acroinvertebrates, **R**eptiles, **A**mphibians, **B**irds, **M**ammals, **O**ther)	B
Terrestrial - Ruderal	
Percentage of site that is ruderal	50.1%
Dominant vegetation type (**L**andscaped, **A**griculture, **B**are ground) Mostly grass	— P
Prominent height of vegetation (0', >0' to <2', 2' to 5', >5')	2' to 5'
Density of vegetation (**D**ense, **P**atchy, **S**parse)	D P
Evidence / observation of wildlife (**M**acroinvertebrates, **R**eptiles, **A**mphibians, **B**irds, **M**ammals, **O**ther)	B
Aquatic - Non-flowing (lentic)	
Percentage of site that is covered by lakes or ponds	0%
Type of water bodies (**L**akes, **P**onds, **V**ernal pools, **I**mpoundments, **L**agoon, **R**eservoir, **C**anal)	NA
Size (acres), average depth (feet), trophic status of water bodies	
Source water (**R**iver, **S**tream, **G**roundwater, **I**ndustrial discharge, **S**urface water runoff)	
Water discharge point (**N**one, **R**iver, **S**tream, **G**roundwater, **W**etlands impoundment)	
Nature of bottom (**M**uddy, **R**ocky, **S**and, **C**oncrete, **O**ther)	P
Vegetation present (**S**ubmerged, **E**mergent, **F**loating)	P
Obvious wetlands present (**Y**es / **N**o)	
Evidence / observation of wildlife (**M**acroinvertebrates, **R**eptiles, **A**mphibians, **B**irds, **M**ammals, **O**ther)	
Aquatic - Flowing (lotic)	
Percentage of site that is covered by rivers, streams (brooks, creeks), intermittent streams, dry wash, arroyo, ditches, or channel waterway	0% Swan Island Lagoon Adj to Site
Type of water bodies (**R**ivers, **S**treams, **I**ntermittent Streams, **D**ry wash, **A**rroyo, **D**itches, **C**hannel waterway)	R
Size (acres), average depth (feet), approximate flow rate (cfs) of water bodies	P
Bank environment (cover: **V**egetated, **B**are / slope: **S**teep, **G**radual / height (in feet))	Patchy Vegetation
Source water (**R**iver, **S**tream, **G**roundwater, **I**ndustrial discharge, **S**urface water runoff)	R
Tidal influence (**Y**es / **N**o)	Y
Water discharge point (**N**one, **R**iver, **S**tream, **G**roundwater, **W**etlands impoundment)	N
Nature of bottom (**M**uddy, **R**ocky, **S**and, **C**oncrete, **O**ther) (Swan Island Lagoon S, M)	
Vegetation present (**S**ubmerged, **E**mergent, **F**loating)	— P
Obvious wetlands present (**Y**es / **N**o)	N
Evidence / observation of wildlife (**M**acroinvertebrates, **R**eptiles, **A**mphibians, **B**irds,	B

SPECIFIC EVALUATION OF ECOLOGICAL RECEPTORS / HABITAT	Finding
Mammals, Other)	
Aquatic - Wetlands	
Obvious or designated wetlands present (Yes / No)	N
Wetlands suspected as site is/has (Adjacent to water body, in Floodplain, Standing water, Dark wet soils, Mud cracks, Debris line, Water marks)	NA
Vegetation present (Submerged, Emergent, Scrub/shrub, Wooded)	P
Size (acres) and depth (feet) of suspected wetlands	
Source water (River, Stream, Groundwater, Industrial discharge, Surface water runoff)	
Water discharge point (None, River, Stream, Groundwater, Impoundment)	
Tidal influence (Yes / No)	
Evidence / observation of wildlife (Macroinvertebrates, Reptiles, Amphibians, Birds, Mammals, Other)	

* **P**: Photographic documentation of these features is highly recommended.

Part ❹

ECOLOGICALLY IMPORTANT SPECIES / HABITATS OBSERVED
NONE

ATTACHMENT 2
Evaluation of Receptor-Pathway Interactions

EVALUATION OF RECEPTOR-PATHWAY INTERACTIONS	Y	N	U
Are hazardous substances present or potentially present in surface waters? **AND** **Are ecologically important species or habitats present?** **AND** **Could hazardous substances reach these receptors via surface water?**		X	
When answering the above questions, consider the following: • Known or suspected presence of hazardous substances in surface waters. • Ability of hazardous substances to migrate to surface waters. • Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters. Aquatic receptors may be exposed through osmotic exchange, respiration or ventilation of surface waters. • Contaminants may be taken-up by terrestrial plants whose roots are in contact with surface waters. • Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.			
Are hazardous substances present or potentially present in groundwater? **AND** **Are ecologically important species or habitats present?** **AND** **Could hazardous substances reach these receptors via groundwater?**		X	
When answering the above questions, consider the following: • Known or suspected presence of hazardous substances in groundwater. • Ability of hazardous substances to migrate to groundwater. • Potential for hazardous substances to migrate via groundwater and discharge into habitats and/or surface waters. • Contaminants may be taken-up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone (~1m depth). • Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.			

"Y" = yes; "N" = No, "U" = Unknown (counts as a "Y")

ATTACHMENT 2
Evaluation of Receptor-Pathway Interactions (cont'd)

EVALUATION OF RECEPTOR-PATHWAY INTERACTIONS	Y	N	U
Are hazardous substances present or potentially present in sediments? **AND** **Are ecologically important species or habitats present?** **AND** **Could hazardous substances reach these receptors via contact with sediments?**		X*	
When answering the above questions, consider the following: • Known or suspected presence of hazardous substances in sediment. • Ability of hazardous substances to leach or erode from surface soils and be carried into sediment via surface runoff. • Potential for contaminated groundwater to upwell through, and deposit contaminants in, sediments. • If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods. Aquatic receptors may be directly exposed to sediments or may be exposed through osmotic exchange, respiration or ventilation of sediment pore waters. • Terrestrial plants may be exposed to sediment in an area that is only periodically inundated with water. • If sediments are present in an area that is only periodically inundated with water, terrestrial species may have direct access to sediments for the purposes of incidental ingestion. Aquatic receptors may regularly or incidentally ingest sediment while foraging.			
Are hazardous substances present or potentially present in prey or food items of ecologically important receptors? **AND** **Are ecologically important species or habitats present?** **AND** **Could hazardous substances reach these receptors via consumption of food items?**		X*	
When answering the above questions, consider the following: • Higher trophic level terrestrial and aquatic consumers and predators may be exposed through consumption of contaminated food sources. • In general, organic contaminants with log K_{ow} > 3.5 may accumulate in terrestrial mammals and those with a log K_{ow} > 5 may accumulate in aquatic vertebrates.			

"Y" = yes; "N" = No, "U" = Unknown (counts as a "Y")

* Not applicable. Willamette River sediments are being evaluated through the in-river RI/FS by the Lower Willamette Group (LWG) under EPA oversight.

ATTACHMENT 2
Evaluation of Receptor-Pathway Interactions (cont'd)

EVALUATION OF RECEPTOR-PATHWAY INTERACTIONS	Y	N	U
Are hazardous substances present or potentially present in surficial soils? **AND** **Are ecologically important species or habitats present?** **AND** **Could hazardous substances reach these receptors via incidental ingestion of or dermal contact with surficial soils?**		X	
When answering the above questions, consider the following: • Known or suspected presence of hazardous substances in surficial (~1m depth) soils. • Ability of hazardous substances to migrate to surficial soils. • Significant exposure via dermal contact would generally be limited to organic contaminants which are lipophilic and can cross epidermal barriers. • Exposure of terrestrial plants to contaminants present in particulates deposited on leaf and stem surfaces by rain striking contaminated soils (i.e., rain splash). • Contaminants in bulk soil may partition into soil solution, making them available to roots. • Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil or while grooming themselves clean of soil.			
Are hazardous substances present or potentially present in soils? **AND** **Are ecologically important species or habitats present?** **AND** **Could hazardous substances reach these receptors via vapors or fugitive dust carried in surface air or confined in burrows?**		X	
When answering the above questions, consider the following: • Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant > 10^{-5} atm-m^3/mol and molecular weight < 200 g/mol). • Exposure via inhalation is most important to organisms that burrow in contaminated soils, given the limited amounts of air present to dilute vapors and an absence of air movement to disperse gases. • Exposure via inhalation of fugitive dust is particularly applicable to ground-dwelling species that could be exposed to dust disturbed by their foraging or burrowing activities or by wind movement. • Foliar uptake of organic vapors would be limited to those contaminants with relatively high vapor pressures. • Exposure of terrestrial plants to contaminants present in particulates deposited on leaf and stem surfaces.			

"Y" = yes; "N" = No, "U" = Unknown (counts as a "Y")

September 28. 2012 Site Visit
Level 1 Ecological Risk Assessment Site Visit
End of Swan Island Lagoon Property (ECSI # 3901)

Photo 1. Former temporary parking area.

Photo 2. Vegetation next to former temporary parking area. Photo taken from North Emerson Street facing northwest.

Photo 3. Southwest area. Photo taken from North Emerson Street facing west.

Photo 4. Southwest edge of Lot 1 from the south.

Photo 5. Typical vegetation on undeveloped portion of the site.

Photo 6. Vegetation in Lot 1 from the north.

Photo 7. View of the lagoon from top of bank.

Photo 8. Different view of the lagoon from top of bank.

Photo 9. The boat ramp leading into the lagoon.

Photo 10. View of bank vegetation from boat ramp.

Photo 11. Boat ramp from the beach.

Photo 12. Central part of the beach with the boat ramp in the distance.

Photo 13. South part of beach looking west.

Photo 14. Southern bank along lagoon.

Photo 15. Boat ramp parking lot.

Photo 16. Interpretive Trail.

Photo 17. Conifer along bank.

Photo 18. Woodpecker in tree near boat ramp parking lot.

Photo 19. Madrone in near top of bank.