Intergovernmental Agreement for Remedial Investigation and Source Control Measures

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Outfall Basin 22 Dry-Weather Flow, Inline Solids, and Sediment Investigation

Technical Memorandum No. OF 22-2
City of Portland Outfall Project
ECSI No. 2425

July 2015

PREPARED BY

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
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TECHNICAL MEMORANDUM No. OF22-2

Outfall Basin 22 Dry-Weather Flow, Inline Solids, and Sediment Investigation

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DATE: July 15, 2015

SUBJECT: **Portland Harbor Source Investigations**

Introduction

This technical memorandum presents the results of the City of Portland source investigation, conducted between May 27th and June 3rd, 2015, in Outfall Basin 22. The City's BES Portland Harbor program conducted this investigation in response to recurring reports of oil sheen in the vicinity of Outfall 22 (OF-22) and recent discussions with the USCG, DEQ, BES Pollution Prevention staff, and representatives from industrial sites in the basin.

Basin 22 is located on the west side of the Willamette River in the Willbridge area, which largely consists of bulk fuel terminals that have been in operation since the early 1900s. The basin includes drainage from Forest Park, a small residential and commercial area, Highway 30, and an industrial area between Highway 30 and the river. The majority of the developed area consists of industrial sites that are evaluating contaminant pathways to the river under DEQ Cleanup Program oversight to determine whether additional source controls are needed. Due to the nature and extent of site-related contamination, Cleanup Program work has included evaluation of stormwater and preferential groundwater discharges into and along the Basin 22 conveyance system. Remedial investigation of the bulk fuel terminal area dates to the late 1970s, and has entailed site-specific work under individual agreements with DEQ and collaborative work on the groundwater concerns by three of the terminals under a Consent Order with DEQ for the Willbridge Bulk Fuel Area. In 2013 under an Intergovernmental Agreement (IGA) with DEQ for investigation of sources to City outfalls in Portland Harbor (DEQ, 2003), the City concluded that all major contaminant sources in the basin had been identified and would be controlled by DEQ Cleanup and Water Quality programs (BES, 2013).

Frequent observations of petroleum sheen at OF-22 indicate that current controls at known sources are not adequate and/or that there are unknown sources present. The objective of the investigation described in this memorandum was to identify specific source areas and pathways to the Basin 22 conveyance system that warrant further investigation, control, and/or enforcement under City, state, or federal authority. Other investigations contributing to this specific City investigation include ongoing work by the USCG, the Willbridge-area sites (Sites), and the City to identify an intermittent source of oil sheen to OF-22.

Investigation results indicate that preferential groundwater pathways to the Basin 22 conveyance system are present and that contaminants present in dry-weather flow entering the municipal system are a potential source of sheen observed at the outfall and warrant control. System investigation also identified an area of the system where inline solids indicate that a historical release occurred. Source investigation activities, findings, and recommendations are described in detail below.

Background

Conveyance System Configuration and Drainage Basin

OF-22 discharges to the west side of the Willamette River at approximately River Mile 7.8 (see Figure 1) in an area known as Willbridge Cove, and drains approximately 95 acres. Basin 22 includes a portion of Highway 30 (i.e., major transportation land use). Land use in the basin on the west side of Highway 30 (NW St. Helens Road) is predominantly open space (Forest Park), with a small mixed commercial and residential area. Land use on the east side of NW St. Helens Rd. is heavy industrial.

The U.S. Environmental Protection Agency (EPA) has designated the inriver area in the vicinity of OF-22 as an Area of Potential Concern (AOPC 16) based on elevated concentrations of metals, polycyclic aromatic hydrocarbons (PAHs), and other contaminants in river sediment (EPA, 2010). In addition to OF-22, 11 non-City outfalls also discharge to AOPC 16 in the area of Willbridge Cove, and there are three docks within the cove. Due to a history of releases from Sites to the outfall, the Sites installed and maintain a containment boom around OF-22 as part of ongoing sheen response activities (ARCADIS, 2009a) and constructed a cutoff collar and liner in the portion of the conveyance system between NW Front and the outfall to control preferential migration of contaminated groundwater into and along this segment of Basin 22.

The conveyance system consists of two main branches (i.e., NW Doane Avenue and NW Front Avenue) that combine at a manhole east of NW Front Avenue and discharge to OF-22 via a 60-inch-diameter pipe. Surface drainage from Forest Park passes through a water quality swale before joining with stormwater flow from the developed area west of Highway 30 and drainage from the roadway. This drainage then flows into the NW Doane Avenue branch of the system, which serves the adjacent bulk oil terminals (i.e., Chevron Willbridge Distribution Terminal and Phillips 66 Company). The NW Front Avenue branch extends south from NW Doane Avenue and serves the former Chevron Asphalt facility on the west side of NW Front and the McCall Oil/Brenntag Pacific facilities on the east side of NW Front.

Potential Petroleum Source Areas

Known potential source areas include six DEQ Cleanup Program sites in Basin 22, as listed in DEQ's Environmental Cleanup Site Information (ECSI) database. Four of these sites are bulk fuel and/or chemical storage facilities (Chevron-Willbridge Distribution Terminal, Chevron USA Asphalt, Unocal – Willbridge Terminal/Phillips 66, and McCall Oil). Small portions of the remaining two sites (Oregon Department of Transportation – ODOT and Burlington Northern Santa Fe Willbridge Yard) are included in the basin. General locations of these sites are shown on Figure 1, spatial extent of each site is shown on Figure 2, and known piped connections from each site to the Basin 22 conveyance system are shown on Figure 3.

Two of the six ECSI sites (Chevron USA Asphalt – ECSI #1281 and McCall Oil – ECSI #134) completed a Source Control Evaluation (SCE) under DEQ oversight, and received Source Control Decisions from DEQ (DEQ, 2010 and 2014). These decisions conclude that contamination at these sites has been characterized and controlled to the extent feasible and that these sites are not significant ongoing sources of contaminants to the Willamette River. SCEs are underway at the four remaining ECSI sites to identify all potentially complete pathways to the river, to determine whether site contaminants are migrating offsite via those pathways, and to implement source controls where needed.

Industrial sites that are covered by National Pollutant Discharge Elimination System (NPDES) stormwater regulations also were considered as potential sources of sheen to the City conveyance system, because permit coverage is based on the nature of the industrial operation and the potential for stormwater to be exposed to pollutants associated with industrial operations. Current industrial stormwater permittees within the basin are shown on Figure 1.

The area west of NW St. Helens Rd. is not likely to contain significant sheen sources. The majority of the drainage in this area is from Forest Park, and the developed area is a mix of residential and small commercial properties. City review of stormwater data collected by the Sites (ARCADIS, 2012a) to represent basin stormwater coming into the system upstream of terminal connections did not indicate that significant contaminant sources were present in this portion of the basin (BES, 2012a).

Previous Investigations

- The City completed an inline solids source investigation in Basin 22 in 2006 under an ongoing IGA with DEQ (DEQ, 2003), to determine whether there were major contaminant sources in the basin (BES, 2008). Results indicated that metals (copper and zinc), PAHs, and bis(2-ethylhexyl)phthalate sources were present, but that exceedances of DEQ/EPA Joint Source Control Strategy (JSCS) screening levels were relatively low (DEQ/EPA, 2005).
- In 2007-2008, the Lower Willamette Group collected stormwater and sediment trap data in Basin 22 at a point representing all piped discharges to the basin (Anchor and Integral, 2008), and the City evaluated these data to determine if the results changed the City's conclusions about the need for additional source tracing. Based on the results of these data and site investigation results, the City concluded that sources had been identified, that all identified sources were in an appropriate program for subsequent Site investigation and control, and that further City source tracing in Basin 22 was not needed (BES, 2010).

- In 2010-2011, the Chevron Willbridge and Unocal-Willbridge Terminal (now Phillips 66) sites jointly collected stormwater upgradient and downgradient of the Terminal to meet DEQ Cleanup Program requirements (ARCADIS, 2012a). Results of those evaluations are still under DEQ review.

Recent Sheen Report Response

On April 22, 2015, BES representatives from the Environmental Compliance and Portland Harbor programs met with USCG, DEQ, and Site representatives to discuss the recent history of sheen observations at OF-22. Sites monitor the outfall and surrounding area and report sheens observed at OF-22 to DEQ and the City under the *Outfall Inspection and Sheen Response Plan* (ARCADIS, 2012b) approved by DEQ. The City was not involved in the development or approval of the plan. When sheens are observed, Site representatives investigate possible Site-related source areas. The BES Spill Protection and Citizen Response (SPCR) program also conducts investigations when it receives reports of sheens that may be related to discharges from OF-22. Analytical data have been collected by the USCG, the City SPCR Program, and Sites as part of sheen response and are managed by those respective entities.

As an outcome of the April meeting, BES agreed to coordinate with the USCG on a targeted comprehensive investigation of the Basin 22 system in an effort to identify specific sheen sources.

Sheen Source Investigation

Investigation Overview

As part of the Environmental Compliance sheen response effort, the City conducted video surveys of the NW Doane Avenue branch, the NW Front Avenue branch, and the main line between NW Front Avenue and the outfall in April and May 2015. The purpose of the video surveys was to identify specific segments of the system where further investigation was warranted (e.g., suspicious staining or discharges, inline solids accumulation, etc.). Based on a review of the video surveys, the City developed a sampling plan (see Attachment A) to describe forthcoming sheen source investigation and response plans. The investigation activities summarized in this technical memorandum represent a comprehensive three-day effort to look at a variety of potential sources and pathways to the Basin 22 system. Work conducted for this portion of the sheen investigation included: sampling and analysis of 1) sediments immediately adjacent to the outfall pipe; 2) inline solids; 3) dry-weather flow; and 4) wipes of stained areas within the conveyance system. The City analyzed all samples for total petroleum hydrocarbons (TPH) via the NWTPH-HCID method, with quantification of detected petroleum constituents if sample volume was sufficient. In addition, field crews submitted samples of dry-weather flow for PAH analysis via method SM8270-SIM and collected field readings for conductivity.

Field Activities

Sampling Locations and Procedures

BES field crews investigated the outfall and each manhole along the Doane and Front Avenue branches to identify sampling locations for sediment, inline solids, dry-weather flow, and wipes.

Actual locations were selected based on solids and flow availability, evidence of suspicious stains, and knowledge of drainage areas served by connecting laterals. The City conducted the sampling activities consistent with the City's *Amended Programmatic Quality Assurance Project Plan* (BES, 2007a) and *Amended Programmatic Sampling and Analysis Plan* (BES, 2007b) for collection of water and solids samples for the City of Portland Outfalls Project. At some locations, the USCG requested BES field crews to collect split samples or separate samples (e.g., netted sheen samples and/or wipe samples) for analysis by the USCG. This report does not include the results of the USCG analyses. Sampling locations are summarized by sampling matrix in Table 1 and are shown on Figure 4.

Sample collection took place over three days: May 27th, May 28th, and June 3rd, 2015. Field crews began at the outfall and then worked their way up-the-pipe along each main branch from downstream to upstream. Weather conditions on May 27th and May 28th were dry, with more than two weeks of antecedent dry period (i.e., rainfall < 0.10 inches over each 24-hour period). Shower activity on June 1st and 2nd resulted in 0.18 inches and 0.11 inches of rain being recorded at the BES Water Pollution Control Laboratory (WPCL) rain gage on those days. Recordable rainfall did not occur during sample collection activities on June 3rd. Due to these conditions, flow observations made on June 3rd could reflect both stormwater and preferential groundwater discharges from adjacent upland areas.

A total of one outfall sediment sample, fourteen inline solids samples, fourteen dry-weather flow samples, and eleven wipe samples were collected to investigate possible sheen sources to Basin 22. Field crews also collected an equipment blank sample for quality assurance. Photographs of the sampling locations are provided in Attachment B. Field notes taken during sampling activities are provided in Attachment C. Additional details regarding sample collection and analysis are provided below.

Outfall Sediment Sample

Inspection of OF-22 indicated that the river level was below the elevation of the outfall pipe and that pockets of sandy sediment and iron bacteria were present between the outfall and the river edge (see Photo 2). Chevron maintains multiple booms around the area to which the outfall discharges, and a sheen was evident in the boomed area at the time of sample collection (see Photos 1 and 3). The field crew collected a surface sediment composite sample from the area adjacent to the outfall by collecting three subsamples of approximately equal volume, from three discrete location, homogenizing them into one sample, and filling the sample jars. BES provided a split sample to the USCG.

Conveyance System Samples

Outfall Main

Outfall 22

- Dry-weather flow sample from the outfall (dry-weather flow from the outfall is visible in Photo 2).

Manhole AAM077

This is the junction of the Doane and Front Avenue branches, and the beginning of the lined section of the system (i.e., groundwater not expected to infiltrate directly to the system between this location and the outfall).

- Three dry-weather flow samples: outgoing line, incoming line from Doane, incoming line from Front (see Photos 4-6).

Doane Avenue Branch

Manhole AAM080

- Inline solids from main line upstream of manhole (see Photo 7).
- Dry-weather flow from manhole.

Manhole AAM075

Two site laterals (Chevron #1 and Phillips #1) connect at this location (see Photos 9-10).

- Two inline solids samples: upstream of manhole in main line and on shelf in manhole (see Photos 11-12).
- Two dry-weather flow samples: main line downstream of manhole and from Chevron #1 lateral. Flow observed in Phillips #1 lateral but not enough volume to sample.
- Three wipe samples due to observance of stains and possible sheen: Chevron #1 lateral, Phillips #1 lateral, and shelf near bottom of manhole invert.

Manhole AAM076

- One inline solids sample from outgoing line.
- One wipe sample from small dry stain on underside of sanitary lateral crossing through manhole chamber (see Photos 13-14).

Wye APA018

This is a lateral line (Phillips #2) that enters the main line from the south between manholes AAM076 and AAM086 (see Photo 15).

- One dry-weather flow sample from water entering main from space below the Phillips #2 lateral line (i.e., preferential flow along the underside of the lateral line). Floating and suspended black droplets observed in sample (see Photo 16).
- One wipe sample from a dark stain on the upstream side of the Phillips #2 lateral connection.

Manhole APA016

Three incoming private lines enter this manhole from the Phillips 66 site and discharge to NW Doane via the APA018 wye.

- One dry-weather flow sample from manhole.
- One wipe sample from stained area within manhole chamber (see Photo 17).

Manhole AAM086

- One inline solids sample from outgoing line (see Photo 18).

Private manhole to lateral AQB059

Access point to Chevron #2 lateral that has a blind connection to the Doane Avenue main.

- One dry-weather flow sample from manhole (see Photos 19-20).
- Two wipe samples from stained areas around two inlets to private manhole.

Manhole AAP794

Point of connection for lateral line from south (Phillips #3).

- One inline solids sample from outgoing main line (see Photo 22).
- Two dry-weather flow samples: one from Phillips #3 lateral (see Photo 21) and one from incoming main line to manhole.

Manhole ANV453
Location where two lines from Phillips 66 site converge before discharge to AAP794 (see Photos 23-24).

- Two wipe samples: one from east lateral and one from east side of manhole invert.

Manhole AAP792
Point of connection for lateral line from north (Chevron #3).

- One dry-weather flow sample from Chevron #3 (see Photo 25).

Manhole AAP791
Upstream of all bulk oil terminal connections.

- One inline solids sample upstream of manhole in main line (see Photo 26).
- One dry-weather flow sample in manhole (see Photo 27).

Front Avenue Branch

Manhole AAM078
Downstream of all connections to the Front Avenue branch.

- One inline solids sample from incoming main line (see Photo 28).
- One wipe sample from infiltration area around manhole collar (see Photo 29).

Manhole AAP799
Point of connection for McCall #3 lateral and historical connections from former Chevron Asphalt facility.

- Two inline solids samples: one from outgoing line and one from incoming inactive 15-inch lateral from the west (see Photos 30-31).

Manhole AAP796
Access point on inactive line to which former Chevron Asphalt site had two connections (now abandoned).

- One inline solids sample upstream of manhole in 8-inch lateral from the north (see Photo 32).

Manhole AAP800
Current point of connections for Chevron Asphalt site and McCall #5 lateral. Inline solids observed midway up pipe walls, only upstream of manhole.

- One inline solids sample from material caked on pipe walls, upstream of manhole (see Photo 33).

Unmapped Catch Basin on South Side of NW Front
Located on the south side of the unpaved portion of the right-of-way (i.e., in the gravel area between the curb and the Chevron Asphalt site). Orientation of discharge line suggests connection to Front Avenue branch between manholes AAP799 and AAP800.

- One inline solids sample (see Photos 37-38).

Catch Basin ANF249
Located on the south side of the unpaved portion of the right-of-way, and discharges to catch basin ANF248.

- One inline solids sample (see Photos 39-40).

Summary of Results

Laboratory results are summarized in Tables 2 through 4 and displayed on Figures 5 through 7. Attachment D includes the laboratory reports and accompanying Laboratory Data Quality Assurance/Quality Control (QA/QC) Review memorandum for each of three sample batches.

The TPH scans detected petroleum hydrocarbons in the outfall sediment sample, three of the seven inline solids samples from the Doane Avenue branch, and all seven of the inline solids samples from the Front Avenue branch. The highest concentrations in solids were found in the Front Avenue branch in a sample collected from the walls of the main line upstream of manhole AAP800.

TPH scans of the dry-weather flow samples indicated that petroleum constituents were present at the outfall and in the Doane Avenue branch (seven of eleven samples) but are not present in dry-weather flow from the Front Avenue branch. Subsequent quantification indicated that diesel-range and lube oil-range constituents were present. Quantification of gasoline-range hydrocarbons per the TPH method was not possible in the dry-weather flow samples because separate samples were not collected in the appropriate container for this purpose. However, PAH analysis (per method SM8270-SIM) also was conducted on all dry-weather flow samples. PAHs were detected in all samples, with the highest concentration observed in the Doane Avenue branch at the Phillips #2 lateral connection.

TPH was detected in two of the eleven wipe samples – both on the Doane Avenue branch, and both affiliated with lateral connections from the Phillips 66 facility.

Data Evaluation

The investigation utilized three sample matrices (sediment and inline solids, dry-weather flow, and surface wipes) to evaluate potential sources of sheen to Outfall 22. Results indicate that petroleum sources to the Doane Avenue and Front Avenue branches are present, and sources are not likely to be present between Front Avenue and the outfall. The dry-weather flow pathway is the primary concern on the Doane Avenue branch. On the Front Avenue branch, field observations and inline solids results indicate that contaminated solids are present from an unknown source near the upper end of the branch. Results from the two branches are evaluated in more detail below.

Laboratory analysts noted difficulty in quantifying petroleum hydrocarbon components in the diesel, lube oil, and gasoline ranges (see Attachment D) due to overlaps of peaks with range patterns. Therefore, in some parts of this discussion, quantified hydrocarbon fractions have been summed into a total TPH concentration.

Doane Avenue Branch

Most inline solids samples from this branch did not have detectable levels of TPH, and total TPH concentrations were <300 milligrams per kilogram (mg/Kg) for the three samples in which hydrocarbons were detected. The ten wipe sample locations on this branch primarily were

associated with lateral connections from the Chevron and Phillips 66 facilities. Two samples, both affiliated with lateral connections from the Phillips 66 facility, indicated the presence of diesel-range hydrocarbons.

Dry-weather flow results and observations are compelling, and indicate that this continues to be a significant pathway to the river via OF-22. Figure 8 displays concentrations of total PAHs in dry-weather flow samples collected during this investigation, plotted on the DEQ guidance curve for total PAHs in stormwater discharged from Portland Harbor heavy industrial sites. The knee of this stormwater curve is at approximately 1.0 µg/L (micrograms per liter); concentrations above the curve inflection (i.e., on the rising limb) indicate concentrations that are higher than typical concentrations in stormwater from heavy industrial sites. Although Basin 22 data do not represent stormwater flows (i.e., samples were collected during dry-weather conditions), comparison to this curve is a useful line of evidence in determining whether source controls may be warranted. As shown on the curve, concentrations in the main line to the outfall and the Doane Avenue branch are all on the rising limb of the curve. Concentrations at and around the Phillips #2 lateral (see Figure 3) plot off the chart.

Observations made by field crews in the line indicate the presence of groundwater infiltration at all six of the lateral connections from the Chevron and Phillips 66 facilities. Although infiltration was not observed in the Doane Avenue main line, staining and mineral deposits were observed at joints and seams, which may indicate that groundwater infiltrates directly to this branch under some conditions (e.g., higher groundwater elevation). The highest concentrations (total PAHs of 18 and 67 µg/L respectively) were observed in and adjacent to the Phillips #2 lateral (see Photos 15 and 16 in Attachment B). In 2008 the Phillips 66 site implemented measures to control groundwater infiltration at this lateral, including lining manhole APA016 (see Photo 17), lining the lateral between the manhole and the junction with the Doane Avenue line, and patching the joint between the Phillips #2 lateral and the main line (i.e., at wye APA018).[1] Field crews observed flow discharging to the Doane Avenue line both from the Phillips #2 lateral and from the outside of the lateral where it joins the Doane Avenue line. The sample collected from the outside of the Phillips #2 lateral had the highest concentration of total PAHs and observable suspended material that resembled petroleum product (see Photo 16).

Elevated total PAHs also were observed in the Chevron #1 and Chevron #2 lateral lines. Flow volume in the Phillips #1 lateral line was not sufficient to collect a sample, and total PAHs in the Chevron #3 and Phillips #3 laterals were on the flatter portion of the DEQ curve.

Table 3 also compares individual PAH concentrations to relevant screening level values (SLVs) for groundwater discharges to Portland Harbor (DEQ/EPA, 2005). SLVs were exceeded in every dry-weather flow sample except in the Chevron #3 lateral sample. The SLV exceedances were up to more than two orders-of-magnitude.

In conclusion, Doane Avenue branch dry-weather flow and inline solids data do not indicate that significant sheen sources are present upgradient of the Willbridge terminal facilities. Elevated PAH concentrations in dry-weather flow being discharged to the Doane Avenue branch from the Chevron and Phillips 66 facilities are potential sources of sheen being observed at the outfall. This pathway has been under investigation at both Sites under DEQ oversight. Investigation

[1] Job #EP8554 constructed by Stratus Corporation on behalf of the ConocoPhillips Willbridge Terminal. August 2008.

results indicate that additional source controls are needed to address the preferential pathway to the river via the Basin 22 conveyance system.

Front Avenue Branch

In the Front Avenue branch, one dry-weather flow sample, one wipe sample, and seven inline solids samples were collected and analyzed. The dry-weather flow sample and the wipe sample were both collected at the downstream end of the branch, and neither sample indicated significant presence of petroleum hydrocarbons (see Tables 3 and 4 and Figures 6 and 7). The inline solids results indicate that a petroleum hydrocarbon source (or sources) is present in the upper end of the branch (see Table 2 and Figure 5).

Three inline solids samples were collected from the main line; petroleum hydrocarbons were detected in all three samples, at concentrations ranging from 190 mg/Kg at the manhole downstream of all connections to the branch (manhole AAM078) to 123,000 mg/Kg in a sample collected upstream of manhole AAP800. An elevated concentration (11,400 mg/Kg) was also detected in a sample collected in an inactive lateral connection to manhole AAP799, (downstream of AAP800) but comparison of chromatograms from the TPH analyses confirms that material in the lateral was likely from a similar source as the source to manhole AAP800 (i.e., observed solids were deposited into the lateral from the upstream main line, not from the lateral itself). Chevron confirmed via video surveys that all connections to the storm line between manholes AAM084 and AAP796 have been abandoned with permanent caps (ARCADIS, 2009b). Therefore, because this lateral line is inactive, any solids present in this lateral originated from degradation of the piping and invert materials and/or deposits of solids from flows to manhole AAP799 from points upstream.

At the location where the solids sample with the highest TPH concentration was collected (upstream of manhole AAP800), the solids were caked on the walls of the main line (see Photo 33, Attachment B), rather than being part of the bedload typically found in the bottom of the pipe, such as was observed at manhole AAP799 downstream of this location (see Photo 30). This unique position within the pipe indicates that these solids were likely deposited during a large discharge event. The segment of the main line immediately downstream of manhole AAP800 did not have this same pattern of oily solids on the pipe walls (see Photo 34), and the only other upstream manhole (AAP802) did not have the same solid material present at or downstream of the manhole (see Photos 35 and 36). The pattern on the pipe walls upstream of AAP800 suggests that there may have been floating petroleum product in a higher-volume discharge to the system (e.g., spill, tank release, etc.) that resulted in material adhering to the pipe walls as the flow subsided. City spill records did not indicate recent large releases from the two facilities (McCall/Brenntag and Chevron Asphalt) that discharge at and upstream of this location (see Figure 3); however, not all illicit releases are reported to the City.

The City also investigated two catch basins on the south side of NW Front Avenue, in a gravel portion of the right-of-way between manholes AAP799 and AAP802 (see Figure 4).[2] Trucks have been observed parking in this area (see Photo 41) so these inlets were identified as potential pathways for contaminated solids to enter the storm system on the Front Avenue branch.

[2] A review of construction drawings for the Front Avenue line did not include these catch basins. No record of construction or connection to the Front Avenue line has been found.

Analytical results indicate that petroleum hydrocarbons are present (360 mg/Kg total TPH) but are not at the elevated concentrations similar to those found at main line locations downstream.

The City concludes that the dry-weather flow pathway from the Front Avenue branch does not appear likely to be a significant source of petroleum sheen observed at Outfall 22, but that a significant source or sources of petroleum-contaminated solids is present in the upper portion of this branch. Residual solids in this branch represent a potential future source of sheen to the outfall, but likely did not contribute to the sheen observed at the outfall at the outset of this investigation on May 27, 2015. Dry-weather flow and inline solids samples collected at the downstream end of the branch did not indicate elevated TPH concentrations, and the solids with the highest concentration were deposited on the walls of the pipe above the level of the dry-weather flow.

Recommendations

This investigation was conducted in support of ongoing efforts by the BES Portland Harbor and Pollution Prevention programs to identify and control sources of petroleum contaminants to the Basin 22 conveyance system. The following recommendations are based on these findings and on available information from the DEQ Cleanup Program on work completed to date related to the ECSI sites discharging to Basin 22.

DEQ:

1. **Require the Chevron Willbridge and Phillips 66 facilities to control contaminated groundwater discharges to Basin 22 under DEQ Cleanup Program oversight.** The need for more substantive investigation and possible controls related to preferential pathways to the Doane Avenue branch was identified by the City several years ago (BES, 2012a and 2012b) but no additional work has been done.
2. **Facilitate review and revision of the *Outfall Inspection and Sheen Response Plan* and involve BES Pollution Prevention in that process.** It was noted during the meeting that sheen observations were not always reported to the City in a timely manner and did not meet City Code reporting requirements. City code prohibits discharge of sheen to the municipal stormwater conveyance system. Updates to the plan should include routine monitoring of Site laterals at Site manholes to determine if sheens are present.

City:

3. **Pursue City enforcement action in response to contaminated discharges to the NW Doane Avenue storm line.** Field observations and analytical results indicate that dry-weather flow discharges from the Chevron Willbridge and Phillips 66 facilities warrant referral to the BES Environmental Compliance Officer for potential enforcement under City Code 17.39.040.
4. **Clean the section of the Front Avenue branch between manholes AAP802 and AAM083 to remove contaminated inline solids and conduct post-cleaning video survey to confirm that material in pipe bottom and adhered to pipe sidewalls has been removed.** Because no responsible party has been identified for contaminated solids observed in this

portion of the system, the City should conduct this work and pursue cost recovery if a responsible party is identified at a later date.

5. **Consult with Maintenance Engineering regarding abandonment of the inactive connection from manhole AAP796 to manhole AAP799 on the Front Avenue branch.** Line condition is poor between manholes AAM084 and AAP799 and there are no current or likely future connections to this line.

6. **Consult with Maintenance Engineering regarding abandonment of the two catch basins in the unpaved portion of the right-of-way on the south side of NW Front Avenue, between manholes AAP799 and AAP802.** No record of inlet construction was found, indicating that these inlets may have been installed by a private party without City approval. These inlets are located in an impervious area where stormwater should infiltrate, and represent an obvious source of solids loading to the Basin 22 system. Tanker truck parking has been observed in the immediate vicinity of the inlets, so abandonment will also result in increased protection from releases to Basin 22.

7. **Communicate investigation findings on NW Front Avenue to BES Industrial Stormwater Program inspectors for the McCall/Brenntag and Chevron Asphalt sites for follow up and technical assistance on identifying potential onsite sources to the NW Front Avenue branch.** NPDES industrial stormwater permits are in place at the McCall, Brenntag, and Paramount Petroleum (operator at the former Chevron Asphalt site) facilities and routine inspections occur. Inspectors should confirm that illicit batch discharging to the system of petroleum-contaminated water is not occurring.

8. **Obtain results of USCG samples collected during this investigation to determine if their data indicate any additional potential source areas or pathways.**

9. **Continue to implement sample collection protocols during sheen response events, and consider analyzing water samples for PAHs (at low detection limits) in addition to the TPH scan.** Future data during actual sheen events will help to pinpoint ongoing sheen sources to the system. PAH analyses per method SM8270-SIM can attain lower method reporting limits than the NWTPH quantification methods, and DEQ screening level values for PAHs are available for data evaluation.

This investigation met the objective of identifying potential sources and pathways for petroleum sheen to enter the Basin 22 conveyance system. Response actions by identified sources, DEQ, and the City are needed to address investigation findings.

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Tables

Figures

Attachments

Tables

Table 1. Sampling Locations

System Branch	Sample Location	Sample Code	Description
Outfall Sediment Sample			
Outfall	OF-22	22_8	Composite of 3 subsamples collected between end of outfall pipe and river edge.
Inline Solids Samples			
Doane Ave.	AAM080	22_11	Upstream of manhole in 48" main.
	AAM075	22_14	Shelf in west side of manhole chamber with mineral deposit at seep area.
		22_16	Upstream of manhole in 48" main.
	AAM076	22_18	Downstream of manhole in 48" main.
	AAM086	22_19	Downstream of manhole in 48" main.
	AAP794	22_28	Downstream of manhole in 48" main.
	AAP791	22_33	Upstream of manhole in 27" main.
Front Ave.	AAM078	22_34	Upstream of manhole in 30" main.
	AAP799	22_36	Downstream of manhole in 30" main.
		22_37	Upstream of manhole in 15" lateral line from the southwest.
	AAP796	22_38	Upstream of manhole in 8" lateral from north.
	Unmapped CB	22_41	Catch basin in gravel area connected to main between AAP799 and AAP800.
	AAP800	22_39	Upstream of MH in 18" main.
	ANF249	22_40	Catch basin in gravel area connected to catch basin ANF248.
Dry-Weather Flow Samples			
Outfall	OF-22	22_8W	Discharge from OF-22 (AAM079).
	AAM077	22_9W	Flow in 60" line discharging from manhole.
Doane Ave.	AAM077	22_4W	Flow in 48" line entering manhole from Doane Ave. line.
	AAM080	22_10W	Water pooled in manhole invert.
	AAM075	22_15W	Flow in 48" line discharging from manhole.
		22_13W	Flow in lateral line entering from the north (i.e., 'Chevron #1').
	APA018	22_21W	Flow from beneath lateral line (i.e., between lateral pipe and sidewall of 48" main) entering from the south (i.e., 'Phillips #2').
	APA016	22_22W	Water pooled in manhole invert.
	AQB059	22_24W	'Chevron #2.' Water pooled in manhole invert.
	AAP794	22_27W	Flow in 12" lateral line entering from the south (i.e., 'Phillips #3').
		22_29W	Flow in 36" main line entering manhole (i.e., Doane Ave. main).
	AAP792	22_32W	Flow in 12" lateral line entering from the north (i.e., Chevron #3').
	AAP791	22_6W	Flow in manhole invert.
Front Ave.	AAM077	22_5W	Flow in 30" line entering manhole from Front Ave. line.
Wipe Samples			
Doane Ave.	AAM075	22_14Wipe	Two wet stained areas within manhole invert on elevated shelf.
		22_12Wipe	Wetted underside of lateral entering manhole from south (i.e., 'Phillips #1').
		22_13Wipe	Lateral entering manhole from north (i.e., 'Chevron #1').
	AAM076	22_17Wipe	Stain on underside of sanitary line crossing through manhole chamber.

System Branch	Sample Location	Sample Code	Description
	APA018	22_20Wipe	Stain adjacent to upstream side of lateral entering manhole from south (i.e., 'Phillips #2').
	APA016	22_23Wipe	Stains on surface of manhole chamber below lateral from NE labeled "Scale pit/garage roof drain' (i.e., Phillips #2).
	AQB059	22_25Wipe	Stain on top of 16" lateral line entering manhole from the north (i.e., 'Chevron #2').
		22_26Wipe	Stain below 6" lateral line entering manhole from the NW (i.e., 'Chevron #2').
	ANV453	22_30Wipe	Orange material below perched lateral line entering line from the east (i.e., 'Phillips #3').
		22_31Wipe	Stain on shelf on east side of manhole chamber.
Front Ave.	AAM078	22_35Wipe	Wetted area at manhole collar.

Notes:

The City also collected samples for USCG at highlighted locations.

Table 2
Basin 22 Sediment and Inline Solids Results

			Outfall	NW Doane Avenue							NW Front Avenue						
			Exposed sediments adjacent to end of Outfall 22 22_8 W15E194-01	Manhole AAM080 Upstream in 48" line 22_11 W15E194-08	Manhole AAM075 Solids from shelf 22_14 W15E194-14	Manhole AAM075 Upstream in 48" line 22_16 W15E194-15	Manhole AAM076 Downstream in 48" line 22_18 W15E194-17	Manhole AAM086 Downstream in 48" line 22_19 W15E194-18	Manhole AAP794 Downstream in 48" line 22_28 W15E199-05	Manhole AAP791 Upstream in 27" line 22_33 W15E199-11	Manhole AAM078 Upstream in 30" line 22_34 W15E199-12	Manhole AAP799 Downstream in 30" line 22_36 W15F041-01	Manhole AAP799 Upstream in 15" lateral line 22_37 W15F041-02	Manhole AAP796 Upstream in 8" lateral line 22_38 W15F041-03	Unmapped Catch Basin (Connects upstream of manhole AAP799) Within catch basin 22_41 W15F041-06	Manhole AAP800 Upstream in 18" line 22_39 W15F041-04	Catch Basin ANF249 Within catch basin 22_40 W15F041-05
Class	**Analyte**	**Units**	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/28/2015	5/28/2015	5/28/2015	6/3/2015	6/3/2015	6/3/2015	6/3/2015	6/3/2015	6/3/2015
Total Solids (EPA 160.3M)																	
	TS	%	77.5	79.2	51.4	58.0	80.4	82.5	73.0	81.5	85.0	76.5	72.2	82.4	80.1	58.3	62.9
Total Petroleum Hydrocarbons Scan (NWTPH-HCID)																	
	Diesel	mg/Kg	DET	ND	ND	DET	ND	ND	ND	ND	ND	DET	DET	DET	ND	DET	DET
	Gasoline	mg/Kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	DET J	DET	ND	ND	ND	ND
	Lube oil	mg/Kg	ND	ND	ND	DET	ND	ND	DET	DET	DET	DET	DET	DET	DET	DET	DET
Total Petroleum Hydrocarbons - Diesel & Oil (NWTPH-Dx)																	
	Diesel	mg/Kg	81 J	NA	NA	78	NA	NA	28 U	25 U	26 U	2,100 J	3,100 J	120 J	30 J	37,000 J	33 U
	Lube oil	mg/Kg	110 J	NA	NA	220	NA	NA	200	130	190	4,800	8,300	770	330	86,000 J	360
Total Petroleum Hydrocarbons - Gasoline (NWTPH-Gx)																	
	Gasoline	mg/Kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	156 J	140 J	NA	NA	NA	NA

Notes:

DET = Detected

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

NA = Not analyzed or not applicable

ND = Not detected

U = The analyte was not detected above the reported sample quantification limit.

mg/Kg = Milligrams per kilogram.

Table 3
Basin 22 Dry-Weather Flow Results

			Outfall Main		NW Doane Avenue										NW Front Avenue	JSCS Water SLVs[1]		
			End of outfall (Node AAM079) DWF from outfall 22_8W W15E194-02	Manhole AAM077 DWF downstream in 60" line 22_9W W15E194-03	Manhole AAM077 DWF upstream in 48" line 22_4W W15E194-04	Manhole AAM080 Surface sheen within manhole 22_10W W15E194-06	Manhole AAM075 DWF downstream in 48" line 22_15W W15E194-12	Manhole AAM075 DWF upstream in Chevron #1 lateral line 22_13W W15E194-13	Wye APA018 DWF at connection of Phillips #2 lateral line 22_21W W15E194-20	Manhole APA016 Surface sheen within manhole 22_22W W15E194-21	Manhole AQB059 DWF within manhole on Chevron #2 lateral line 22_24W W15E199-01	Manhole AAP794 DWF upstream in 36" line 22_29W W15E199-06	Manhole AAP794 DWF upstream in Phillips #3 lateral line 22_27W W15E199-04	Manhole AAP792 DWF upstream in Chevron #3 lateral line 22_32W W15E199-09	Manhole AAP791 DWF within manhole 22_6W W15E194-02	Manhole AAM077 DWF upstream in 30" line 22_5W W15E194-05	Human Health Fish Consumption[2]	Human Health Ingestion[3]	Ecological[4]
Class	**Analyte**	**Units**	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/27/2015			
Field Measurements																			
	Conductivity	µmhos/cm	309	NA	NA	322	324	679	482	187	254	184	103	173	194	NA	--	--	--
Polycyclic aromatic hydrocarbons (PAHs) (EPA 8270-SIM LL)																			
	1-Methylnaphthalene	µg/L	0.11	0.18	0.16	0.19	0.14	0.18	2.2 U	2.1	0.040 U	0.079	0.051	0.040 U	0.040 U	0.040 U	--	--	--
	2-Methylnaphthalene	µg/L	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.080 U	2.0 U	0.20	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	0.040 U	--	0.2	--
	Acenaphthene	µg/L	**0.83**	**1.1**	**1.0**	**1.1**	**0.82**	**0.90**	**8.4**	**0.56**	0.020	0.20	0.12	0.020 U	0.020 U	0.020 U	990	0.2	520
	Acenaphthylene	µg/L	0.20 U	0.22 U	0.20 U	0.24 U	0.20 U	0.20 U	2.5 U	0.17	0.060 U	0.060 U	0.060 U	0.020 U	0.020 U	0.020 U	--	0.2	--
	Anthracene	µg/L	0.17	**0.21**	0.19	**0.29**	0.14	0.026	**1.5**	0.20	0.10	0.12	0.075	0.047	**0.23**	0.020 U	40000	0.2	0.73
	Benzo(a)anthracene	µg/L	0.010	**0.021**	0.013	**0.19**	**0.063**	0.010 U	**0.50**	**0.89** J	**0.037**	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.018	0.092	0.027
	Benzo(a)pyrene	µg/L	0.010 U	0.011	0.010 U	**0.13**	**0.09**	0.010 U	**0.32**	**1.1** J	**0.058**	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.018	0.0092	0.014
	Benzo(b)fluoranthene	µg/L	0.010 U	0.014	0.010 U	**0.15**	**0.13**	0.010 U	**0.34**	**1.6** J	**0.11**	0.013	0.010	0.010 U	0.010	0.010 U	0.018	0.092	--
	Benzo(g,h,i)perylene	µg/L	0.010 U	0.010 U	0.010 U	0.11	0.09	0.010 U	**0.27**	**1.3** J	0.15	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	--	0.2	--
	Benzo(k)fluoranthene	µg/L	0.010 U	0.010 U	0.010 U	**0.031**	**0.044**	0.010 U	**0.12**	**0.88** J	**0.037**	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.018	0.2	--
	Chrysene	µg/L	0.013	**0.028**	0.014	**0.26**	**0.097**	0.010 U	**0.73**	**1.4** J	**0.071**	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.018	0.2	--
	Dibenzo(a,h)anthracene	µg/L	0.01 U	0.010 U	0.010 U	**0.030**	**0.020**	0.010 U	**0.080**	**0.54** J	**0.019**	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.018	0.0092	--
	Fluoranthene	µg/L	0.053	0.085	0.058	**0.51**	0.15	0.016	**1.6**	**2.0** J	0.098	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	140	0.2	--
	Fluorene	µg/L	**2.2**	**2.7**	**2.5**	**2.4**	**1.8**	**1.6**	**21**	**0.85**	0.030 U	**0.47**	**0.26**	0.020 U	0.020 U	0.025	5300	0.2	3.9
	Indeno(1,2,3-cd)pyrene	µg/L	0.01 U	0.010 U	0.010 U	**0.054**	**0.070**	0.010 U	**0.14**	**0.99** J	**0.063**	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.018	0.092	--
	Naphthalene	µg/L	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.80 U	4.0 U	1.2 U	0.040 U	0.20 U	0.080 U	0.040 U	0.040 U	0.040 U	--	0.2	620
	Phenanthrene	µg/L	**2.1**	**2.7**	**2.4**	**3.4**	**1.2**	0.16	**29**	**1.3**	0.043	0.11	0.12	0.020 U	0.020 U	0.020 U	--	0.2	--
	Pyrene	µg/L	0.10	0.16	0.11	**0.91**	**0.21**	0.043	**2.8**	**2.1** J	0.20	0.016	0.010	0.010 U	0.010 U	0.010 U	4000	0.2	--
	Total PAHs[5]	µg/L	5.6	7.2	6.4	9.8	5.1	2.9	67	18	1.0	1.0	0.65	0.047	0.24	0.025	--	--	--
Total Petroleum Hydrocarbons Scan (NWTPH-HCID)																			
	Diesel	mg/L	DET J	DET J	DET J	DET J	DET J	DET	DET	DET	DET	ND	ND	ND	ND	ND	--	--	--
	Gasoline	mg/L	ND	ND	ND	ND	ND	ND	DET J	ND	ND	ND	ND	ND	ND	ND	--	--	--
	Lube oil	mg/L	DET J	DET J	DET J	DET J	DET J	ND	DET J	DET	DET	ND	ND	ND	ND	ND	--	--	--
Total Petroleum Hydrocarbons - Diesel & Oil (NWTPH-Dx)																			
	Diesel	mg/L	2.0 J	3.0 J	1.3 J	1.9 J	0.93 J	0.49	130 J	1.7 J	0.48	NA	NA	NA	NA	NA	--	--	--
	Lube oil	mg/L	0.57 J	0.69 J	0.28 J	0.25 J	0.46 J	0.13 U	15 U	2.7 J	1.4	NA	NA	NA	NA	NA	--	--	--

Notes:

DET = Detected
DWF = Dry-weather flow
J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
NA = Not analyzed
ND = Not detected
U = The analyte was not detected above the reported sample quantification limit.
umhos/cm = micromhos per centimeter
µg/L = Micrograms per liter
mg/L = Milligrams per liter

[1] JSCS SLVs = Portland Harbor Joint Source Control Strategy Screening Level Values (DEQ/EPA Final December 2005, Amended July 2007)

[2] The SLVs for chemicals in water taken up by fish for human consumption represent EPA's NRWQC values. If no NRWQC values are available, then DEQ's AWQC values are listed for the constituent.

[3] The SLVs for chemicals in water for human ingestion represent the most conservative value between EPA's MCLs and Region 9 PRGs.

[4] The SLVs for chemicals in water for ecological exposure represent EPA's NRWQC values. If no NRWQC values are available, then DEQ's AWQC values are listed for the constituent. If no AWQC values are available, then Oak Ridge National Laboratory Tier II SCV Technology Benchmark values are listed for the constituent.

[5] Total PAHs are calcualted by assigning "0" to undetected constituents.

"--" = No JSCS screening level available

= Highlighted values have been selected by DEQ for initial upland source control screening evaluations.

bold = Concentration exceeds DEQ's SLV

Table 4
Basin 22 Wipe Sample Results

			NW Doane Avenue										NW Front Avenue
			Manhole AAM075 Sheen on shelf 22_14Wipe W15E194-11	Manhole AAM075 In Chevron #1 lateral line 22_13Wipe W15E194-10	**Manhole AAM075 In Phillips #1 lateral line 22_12Wipe W15E194-09**	Manhole AAM076 Underside of sanitary lateral line 22_17Wipe W15E194-16	Wye APA018 At connection of Phillips#2 lateral line 22_20Wipe W15E194-19	Manhole APA016 Stain below lateral line entering Phillips #2 lateral from northeast 22_23Wipe W15E194-22	Manhole AQB059 Stain above 16" inlet to Chevron #2 lateral 22_25Wipe W15E199-02	Manhole AQB059 Stain below 6" perched inlet to Chevron #2 lateral 22_26Wipe W15E199-03	Manhole ANV453 Stain below east lateral line to Phillips#3 lateral 22_30Wipe W15E199-07	Manhole ANV453 Stain on east shelf of invert in Phillips #3 lateral 22_31Wipe W15E199-08	Manhole AAM078 Manhole collar 22_35Wipe W15E199-13
Class	**Analyte**	**Units**	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/27/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015	5/28/2015
Total Petroleum Hydrocarbons Scan (NWTPH-HCID)													
	Diesel	mg/wipe	ND	ND	ND	ND	DET	ND	ND	ND	ND	DET	ND
	Gasoline	mg/wipe	ND	ND	ND	ND	DET J	ND	ND	ND	ND	DET J	ND
	Lube oil	mg/wipe	ND	ND	ND	ND	DET J	ND	ND	ND	ND	DET J	ND
Total Petroleum Hydrocarbons - Diesel & Oil (NWTPH-Dx)													
	Diesel	mg/wipe	NA	NA	NA	NA	290 J	NA	NA	NA	NA	420 J	NA
	Lube oil	mg/wipe	NA	NA	NA	NA	62 U	NA	NA	NA	NA	110 U	NA

Notes:

DET = Detected

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

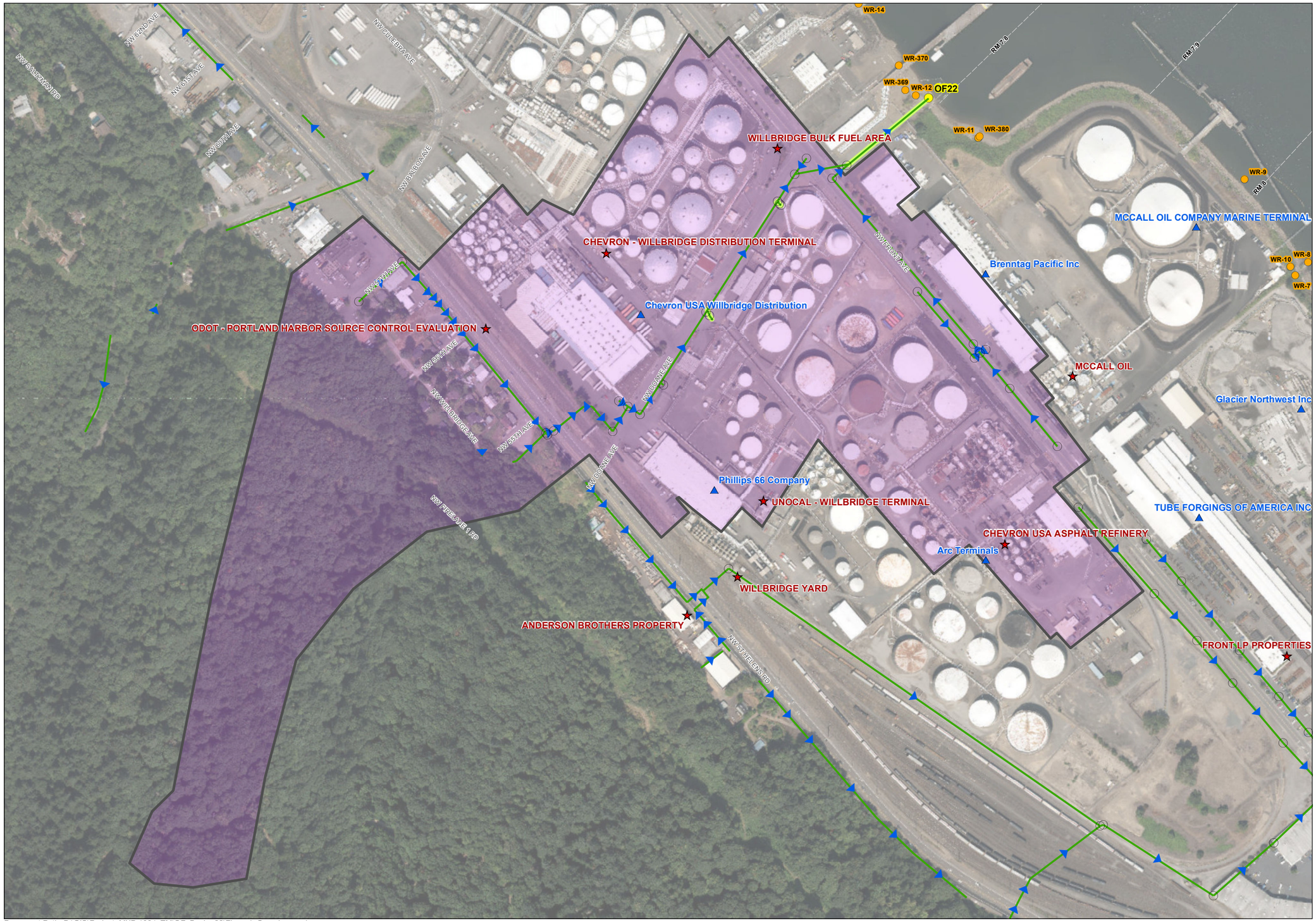
NA = Not analyzed or not applicable

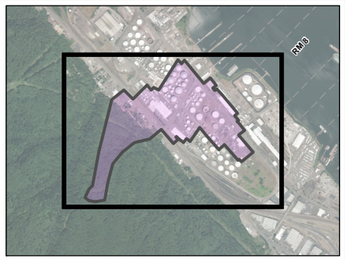
ND = Not detected

U = The analyte was not detected above the reported sample quantification limit.

mg/wipe = Milligrams per wipe

Figures





LEGEND

- Outfall Basin 22
- Storm Line
- Lined Pipe
- DEQ ECSI Site
- Industrial Stormwater Permit
- City Outfall
- Non-City Outfall
- Manhole (MH)
- River Mile Tenths

N

0 175 350
Feet

FIGURE 1

Outfall Basin 22 Overview

MAP NOTES:
Date: July 13, 2015
Data Sources: City of Portland BES, Aerial photo Summer 2014

GSI Water Solutions, Inc.

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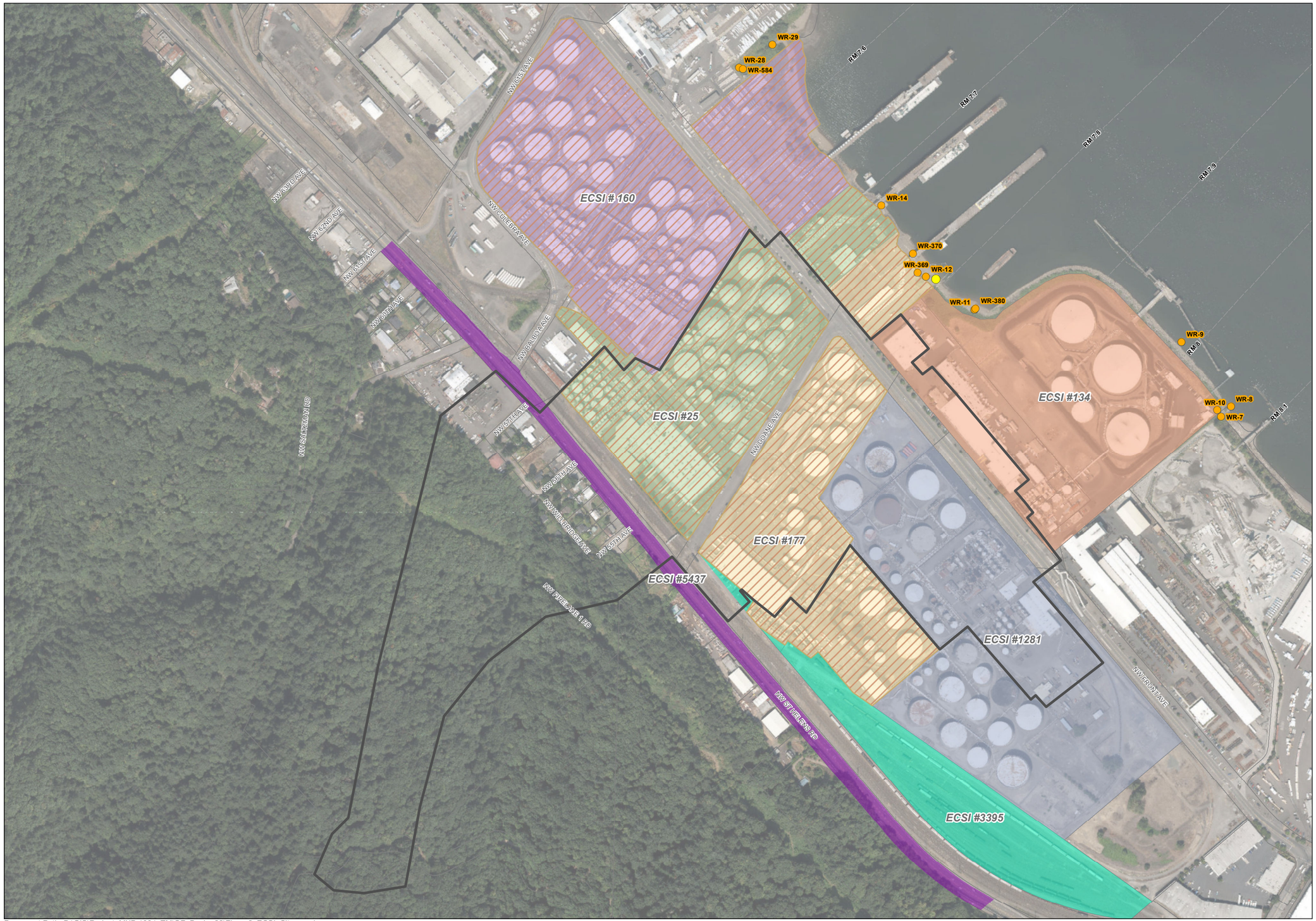

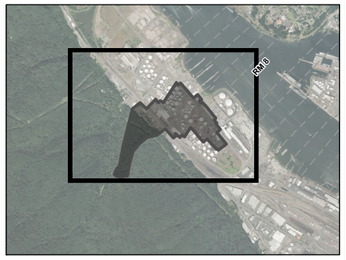

LEGEND

- Outfall Basin 22

ECSI Site Boundary

- Chevron USA Asphalt Refinery, #1281
- Chevron Willbridge Distribution Terminal, #25
- McCall Oil, #134
- ODOT - Portland Harbor Source Control Evaluation, #5437
- Shell Oil Co. - Willbridge Plant, #160
- Phillips 66 (Unocal), #177
- Willbridge Bulk Fuel Area, #1549
- Willbridge Yard, #3395

All Other Data

- Tax Lot
- City Outfall
- Non-City Outfall
- River Mile Tenths

N

0 225 450
Feet

FIGURE 2

Outfall Basin 22
ECSI Site Boundaries

MAP NOTES:
Date: July 14, 2015
Data Sources: City of Portland BES, Aerial photo Summer 2014

GSI Water Solutions, Inc.

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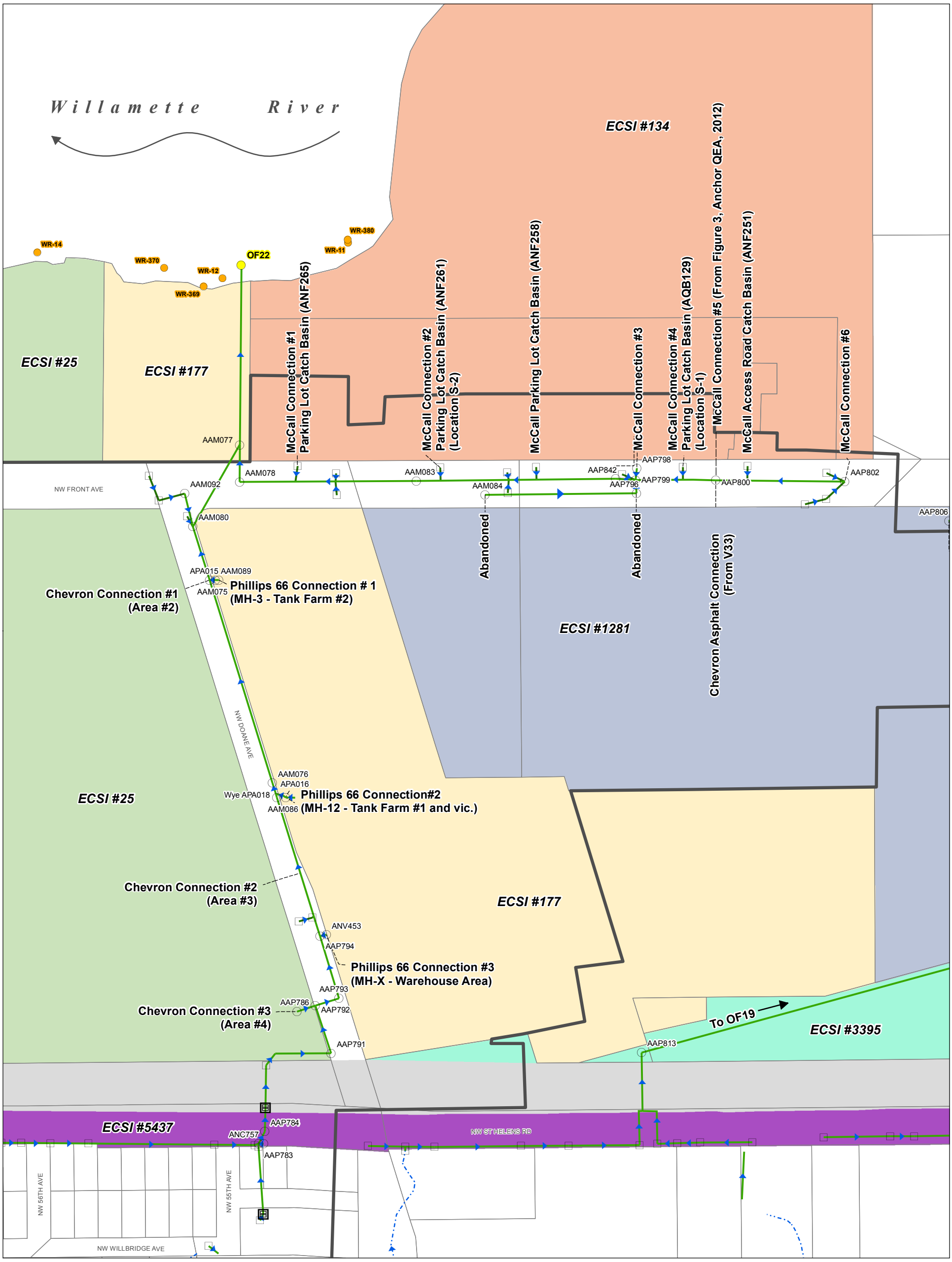

LEGEND

- Outfall Basin 22
- **ECSI Site Boundary**
- Chevron USA Asphalt Refinery, #1281
- Chevron Willbridge Distribution Terminal, #25
- McCall Oil, #134
- ODOT - Portland Harbor Source Control Evaluation, #5437
- Railroad Right of Way
- Phillips 66 (Unocal), #177
- Willbridge Yard, #3395
- City Outfall
- Non-City Outfall
- Manholes
- Trash Rack
- Inlets
- Storm Line
- Natural Channel
- Connections
- Tax Lot

FIGURE 3

Outfall Basin 22
ECSI Site Stormwater Connections

MAP NOTES:
Date: July 14, 2015
Data Sources: City of Portland BES, METRO RLIS

0 100 200 300
Feet

GSI Water Solutions, Inc.

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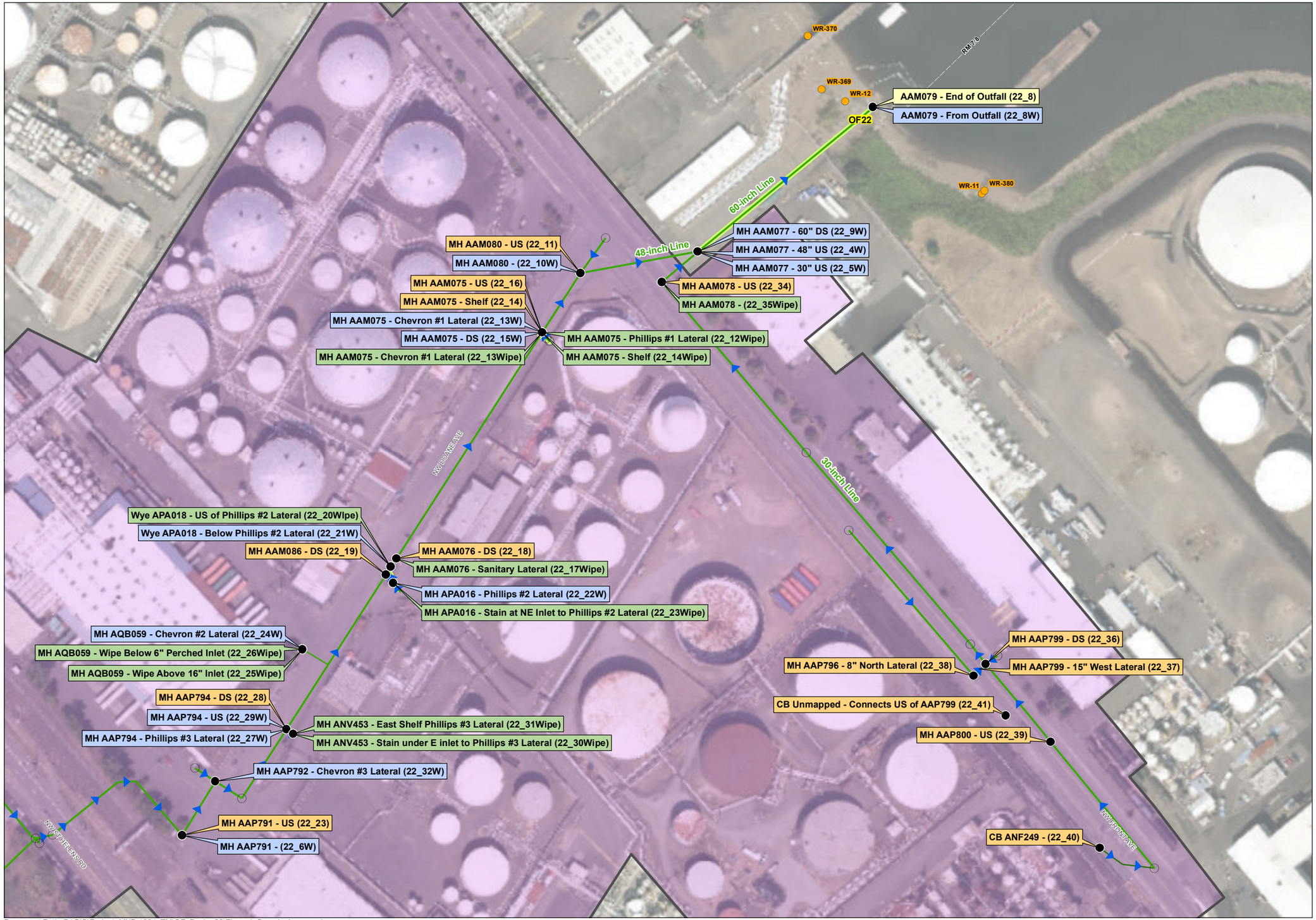
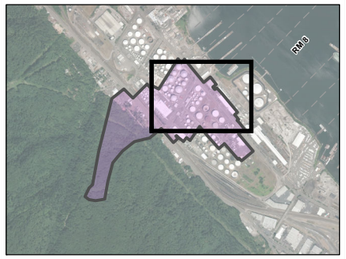




LEGEND

- Sample Location

Sample Type

- Inline Solids
- Dry Weather Flow
- In-River Sediment
- Wipe

All Other Features

- Outfall Basin 22
- Storm Line
- Lined Pipe
- City Outfall
- Non-City Outfall
- Manhole (MH)
- River Mile Tenths

N

0 80 160
Feet

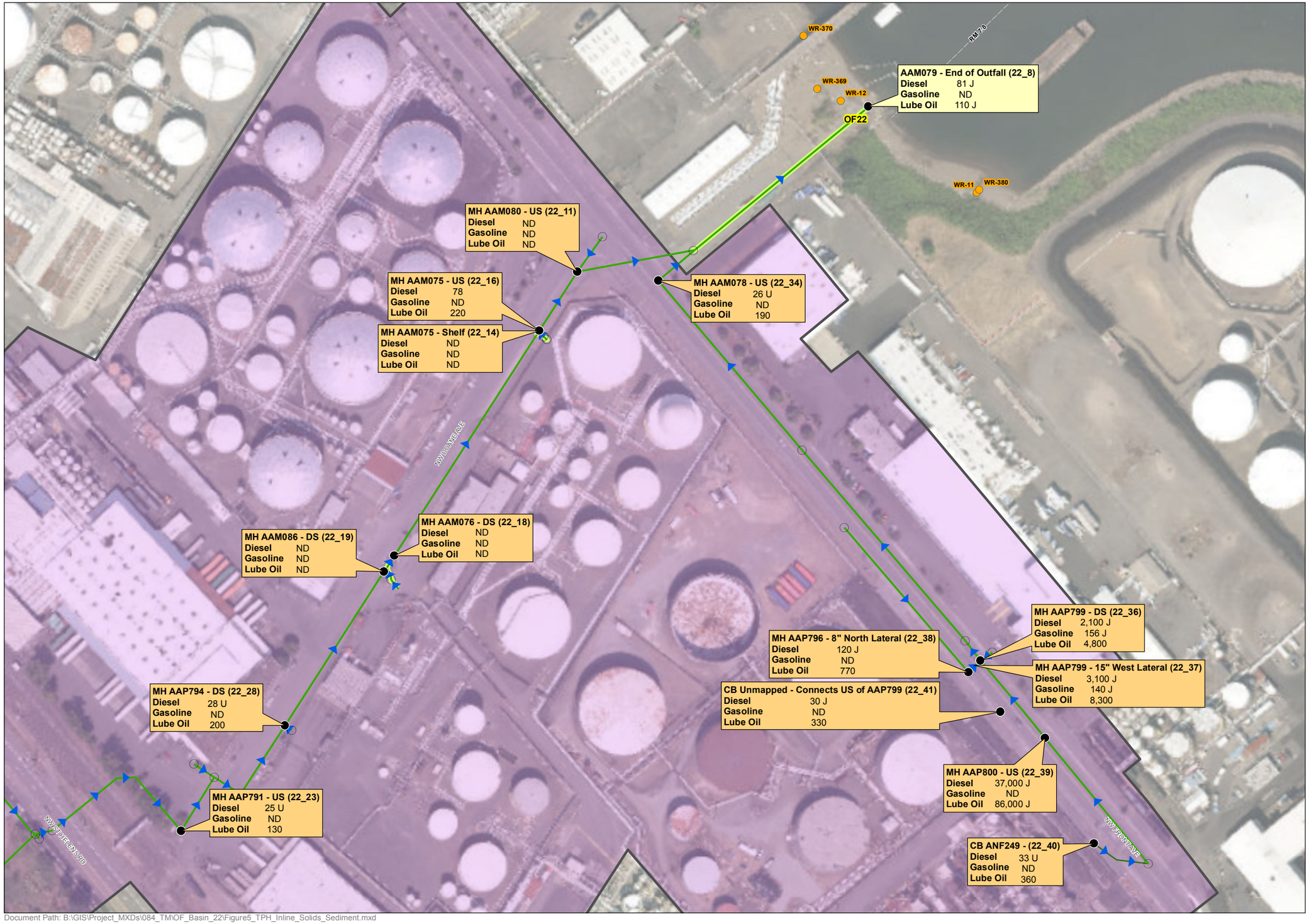
FIGURE 4

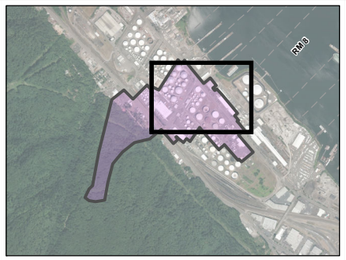
Sample Locations
Basin 22
Dry-Weather Source Investigation

MAP NOTES:
Date: July 14, 2015
Data Sources: City of Portland BES, Aerial photo Summer 2014

GSI Water Solutions, Inc.

Document Path: B:\GIS\Project_MXDs\084_TM\OF_Basin_22\Figure4_Sample_Locs.mxd





LEGEND

- Sample Location

Sample Type

- Inline Solids
- In-River Sediment

All Other Features

- Outfall Basin 22
- Storm Line
- Lined Pipe
- City Outfall
- Non-City Outfall
- Manhole (MH)
- River Mile Tenths

NOTES:

- Presence and range of petroleum hydrocarbons identified by method NWTPH-HCID.
- Quantification of diesel- and heavy oil-range hydrocarbons by method NWTPH-Dx.
- Quantification of gasoline-range hydrocarbons by method NWTPH-Gx.
- Results in mg/Kg

DET: Detected
J: Estimated Value
ND: Not Detected
TPH: Total Petroleum Hydrocarbons
U: Not detected above the reported quantification limit

N

0 80 160
Feet

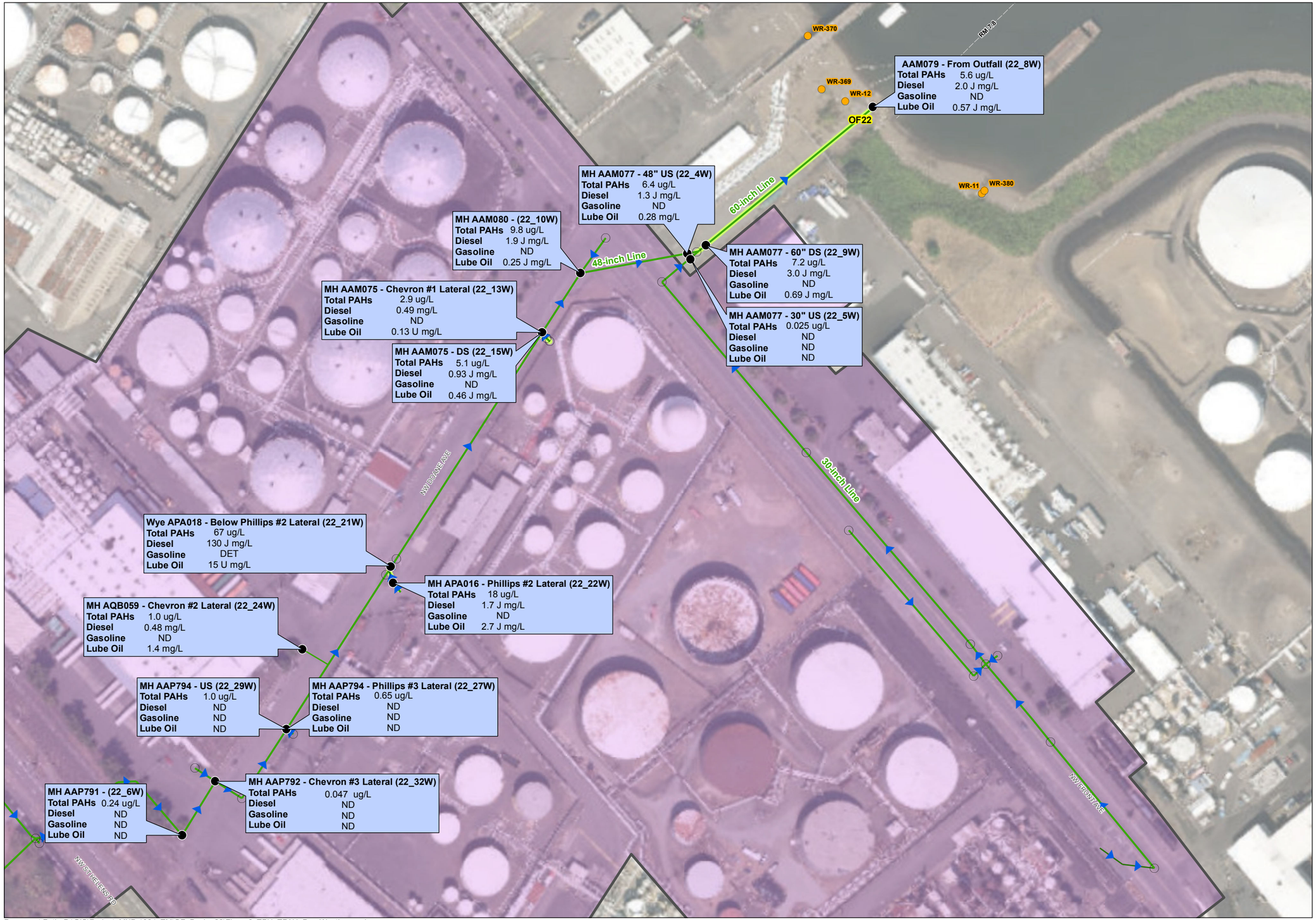
FIGURE 5

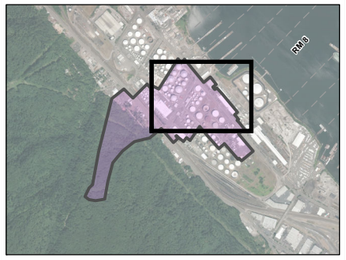
TPH in Basin 22 Inline Solids and Sediment Adjacent to Outfall 22

MAP NOTES:
Date: July 13, 2015
Data Sources: City of Portland BES, Aerial photo Summer 2014

GSI Water Solutions, Inc.

Document Path: B:\GIS\Project_MXDs\084_TM\OF_Basin_22\Figure5_TPH_Inline_Solids_Sediment.mxd





LEGEND

- Sample Location

Sample Type

- Dry Weather Flow

All Other Features

- Outfall Basin 22
- Storm Line
- Lined Pipe
- City Outfall
- Non-City Outfall
- Manhole (MH)
- River Mile Tenths

NOTES:

- Presence and range of petroleum hydrocarbons identified by method NWTPH-HCID.
- Quantification of diesel- and heavy oil-range hydrocarbons by method NWTPH-Dx.

DET: Detected
J: Estimated Value
ND: Not Detected
PAH: Polycyclic Aromatic Hydrocarbon
TPH: Total Petroleum Hydrocarbons
U: Not detected above the reported quantification limit

N

0 80 160
Feet

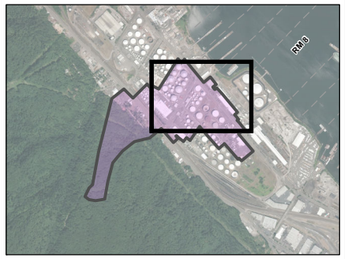
FIGURE 6

TPH and Total PAHs in Basin 22 Dry-Weather Flow

MAP NOTES:
Date: July 14, 2015
Data Sources: City of Portland BES, Aerial photo Summer 2014

GSI Water Solutions, Inc.

Document Path: B:\GIS\Project_MXDs\084_TM\OF_Basin_22\Figure6_TPH_TPAH_Dry_Weather.mxd



LEGEND

- Sample Location

Sample Type

- Wipe

All Other Features

- Outfall Basin 22
- Storm Line
- Lined Pipe
- City Outfall
- Non-City Outfall
- Manhole (MH)
- River Mile Tenths

NOTES:

- Presence and range of petroleum hydrocarbons identified by method NWTPH-HCID.
- Quantification of diesel- and heavy oil-range hydrocarbons by method NWTPH-Dx.
- Results in mg/wipe

DET: Detected
J: Estimated Value
ND: Not Detected
TPH: Total Petroleum Hydrocarbons
U: Not detected above the reported quantification limit

N

0 80 160
Feet

FIGURE 7

TPH in Basin 22 Surface Wipes

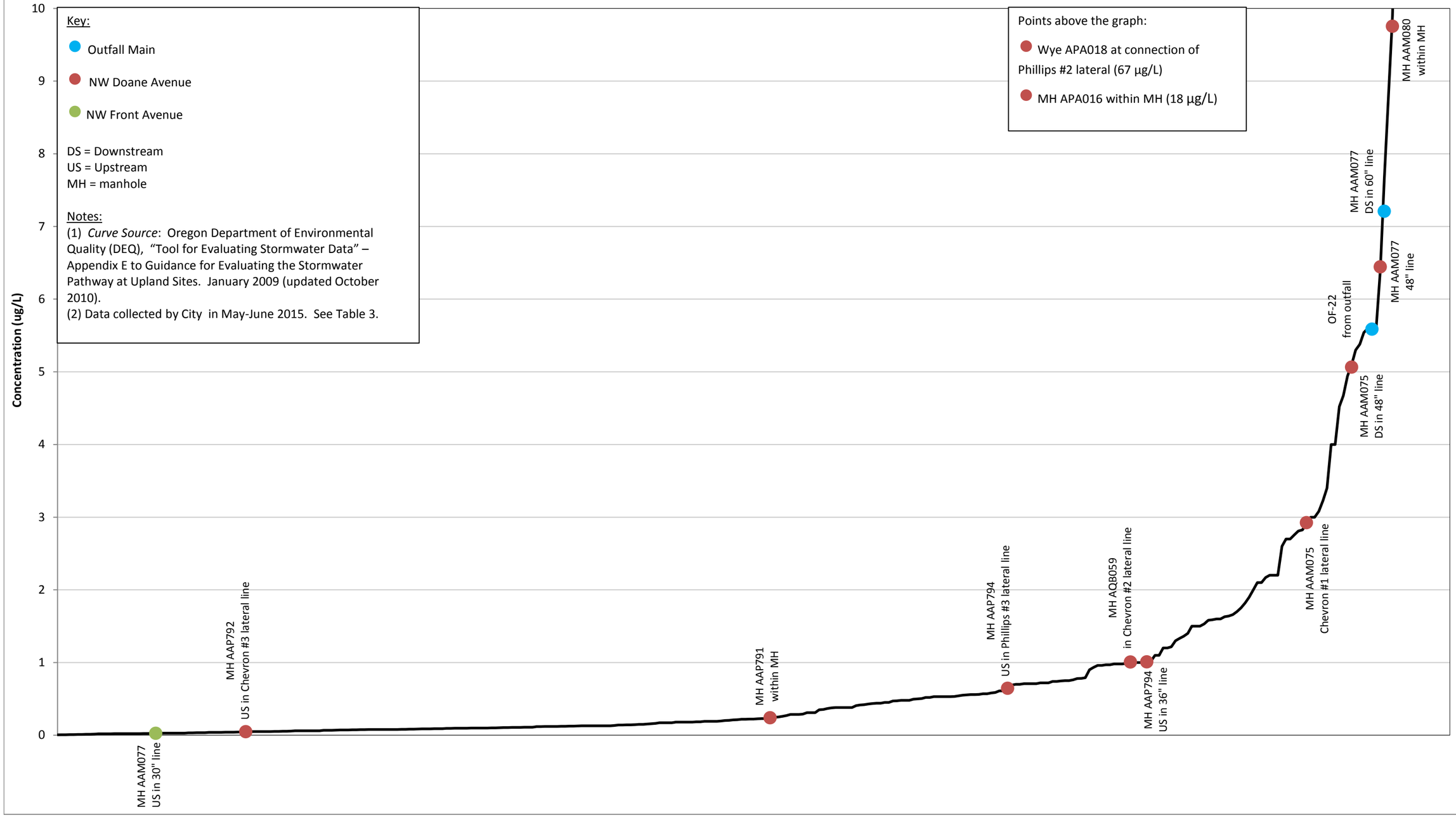
MAP NOTES:
Date: July 13, 2015
Data Sources: City of Portland BES, Aerial photo Summer 2014

GSI Water Solutions, Inc.

Document Path: B:\GIS\Project_MXDs\084_TM\OF_Basin_22\Figure7_TPH_Wipe.mxd

Figure 8

DEQ Guidance Curve for Total PAHs in Stormwater at Portland Harbor Heavy Industrial Sites[(1)] and Basin 22 Dry-Weather Flow Data[(2)]



Attachment A
Outfall 22 Petroleum Sheen Investigation
Sampling Plan

City of Portland Bureau of Environmental Services
Outfall 22 Petroleum Sheen Investigation Sampling Plan
May 20, 2015

Background

A petroleum sheen has been repeatedly observed in the Willamette River in the vicinity of stormwater Outfall 22 (OF-22). OF-22 serves an approximately 95-acre area consisting mainly of Forest Park and the Willbridge industrial area. The industrialized portion of the basin is almost entirely comprised of sites that are being investigated (or were investigated) under the Oregon Department of Environmental Quality (DEQ) Cleanup Program. Although it is not yet known whether or not past sheens resulted from discharges from the outfall, analysis of a samples collected directly from the outfall, in response to a sheen on May 5, 2015, indicated a small amount of diesel and lube oil in the discharge to the river, 1.3 mg/L and 0.52 mg/L respectively. The City, the United States Coast Guard (USGS), DEQ, and representatives from the Willbridge bulk oil terminals recently met to discuss a collaborative approach for identifying and controlling petroleum discharges to the river via OF-22.

Objective

The purpose of this investigation is to collect samples throughout the portion of the Basin 22 conveyance system that serves the Willbridge bulk oil terminals to identify possible sources for the petroleum sheen so that appropriate controls can be selected and implemented. The investigation includes two primary components: 1) a comprehensive dry-weather investigation of the system and connections to it based on review of recent video surveys conducted by the City and 2) sheen-response investigations to trace sheen sources while the sheen is occurring. For the dry-weather investigation, dry-weather water samples, inline sediment samples and wipe samples of dark stains will be collected at numerous locations throughout the basin. In addition, if river levels allow, a composite sample of sediment at the end of the outfall will be collected to help ascertain if observed sheens may be resulting from agitation of contaminated inriver sediment during basin discharge conditions. For the sheen-response investigation, water samples will be collected as needed from Basin 22 and connecting private systems.

USCG Coordination

During the recent meeting regarding the petroleum sheens in the vicinity of OF-22, the USCG indicated that it would like to partner with the City on the investigation. Anticipated coordination for the investigation includes but is not limited to: observing City field investigations, providing and analyzing hydrophilic nets to assist with source tracing, and collecting and analyzing split samples for forensics analysis.

Inline Sediment and Dry-weather Flow Sampling Locations

Figure 1 is an area map of Basin 22, which contains a small portion of NW Front Ave, NW Doane Ave and a portion of NW St Helens Rd. TV inspections conducted by the City of Portland in April and May

2015 identified several areas with inline sediments and infiltration of groundwater. Figure 2 below is a map of the identified locations for potential sampling. Additionally, we will investigate each manhole as we move up the two main branches of the basin (i.e., the Doane Avenue branch and the Front Avenue branch) and will collect samples from other locations based on field observations.

Dark Stain Wipe Sampling Locations

The TV inspections also identified several locations with dark stains on the walls within the storm line. Wipe samples will be collected from the dark stains to determine if there are possible petroleum sources to the basin. Figure 3 below is a map with the identified locations, but again, as we move up the basin we may identify additional dark stains to be sampled or may determine that locations identified in the survey don't actually warrant sampling.

Inriver Sediment Sampling Location

If river levels allow access to the end of the outfall, and sediment is present in the vicinity of the outfall via shoreline access, one composite sample will be collected from a minimum of three points near the end of the outfall.

Analytical Scope

All samples will be analyzed at the City of Portland Water Pollution Control Laboratory for NWTPH-HCID (Hydrocarbon Scan) with NWTPH-Dx (Diesel and Oil Range) and NWTPH-Gx (Gasoline Range) follow-up analysis if detected in the hydrocarbon scan. The dry-weather flow samples will also be analyzed for PAHs by method EPA 8270-SIM.

Field Protocols and Documentation

Inline Sediment sampling and dry-weather flow sampling will done in accordance with the City of Portland Field Operations Standard Operating Procedures (SOP 2.02a - Grab Sample with Bottle, SOP 2.02b - Grab Sample Collection with Stainless Steel Beaker and SOP 5.02a - Inline Sampling of Stormwater Solids). Soil sample collection near the outfall will be done in accordance with the Field Operations SOP 5.01a - Sampling of Soil and Sediment. Currently the City of Portland does not have an SOP for wipe sampling but we have performed a similar sampling for a previous project. City of Portland staff will record and take photos of all observations. Field Data Sheets will be completed documenting the conditions and characteristics of each sample collected.

In addition to collecting samples, field staff will assess locations within the system and at connecting laterals for potential deployment of hydrophilic nets or other oil absorbents to meet sheen response objectives. If suitable locations and deployment methods are identified, deployment may occur at the time of entry or during field activities scheduled at a separate time.

Quality Assurance and Control

To demonstrate that there is no cross-contamination due to equipment decontamination and air-borne inputs two Field Decontamination Blank samples will be collected at a selected location. One sample from the stainless steel bowls used for inline sediment sample homogenization and the other from stainless steel bailers used for dry-weather flow sampling following the City of Portland Field

Operations SOP 7.01c - QC Sample Collection. The WPCL will also analyze an unused wipe to determine if there is any contribution of hydrocarbons from the wipes themselves.

Data Reporting and Evaluation

The WPCL will generate lab reports with results and a qualitative narrative explaining the interpretation of the NWTPH chromatograms. WPCL staff will review chromatograms and generate charts showing comparisons of the Outfall 22 sample with samples collected from points within the basin. The intent is to identify any sources that appear to match the chromatogram pattern that we are seeing at the outfall. If samples are collected and analyzed by other parties (e.g., USCG forensics), these data will be shared with the City to facilitate data evaluation.

Schedule and Target Conditions

The comprehensive investigation will occur on a dry day to avoid dilution of dry-weather flows and to allow for field staff to enter system without lateral discharges and elevated flow in lines. The investigation and sampling is estimated to require two to three days to complete. Due to traffic control issues, investigation of the manholes on NW Front Ave may require additional staff for flagging. The sheen response investigation will be conducted on an as-needed basis regardless of weather conditions.

Project Management

The dry-weather investigation will be directed by Linda Scheffler from the Portland Harbor section. A formalized report summarizing the findings will be disseminated to all of the parties involved. The sheen response investigations will be led and documented by Mark Walla of the Spill Response section and provided to Linda for potential inclusion in the summarized report. Mark Walla will also continue as the contact for coordination with the US Coast Guard.

Figure 1 – Stormwater Basin 22 Area Map

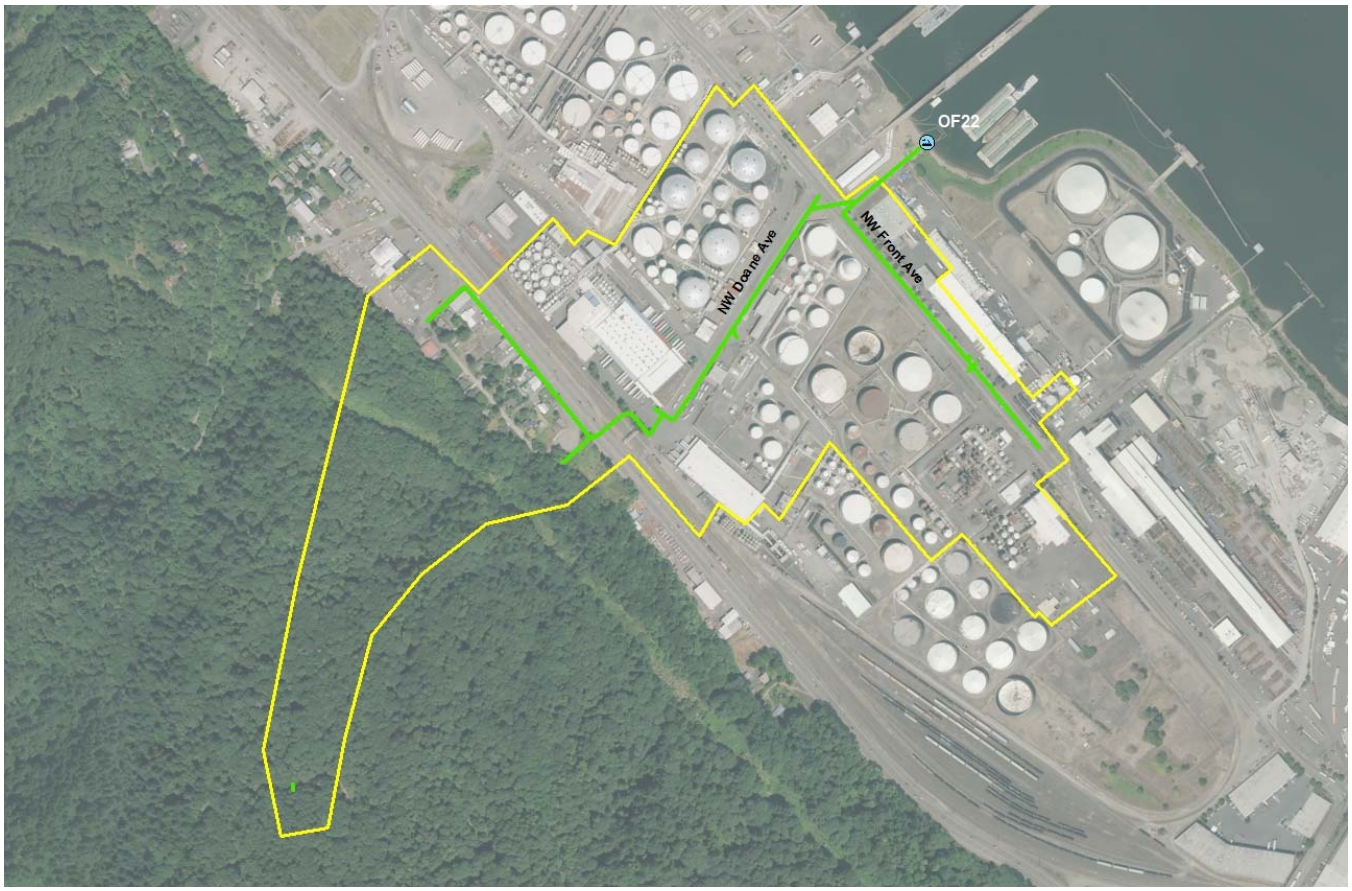


Figure 2 – Dry-Weather Flow, Inline Sediment, and Inriver Sediment Sampling Locations

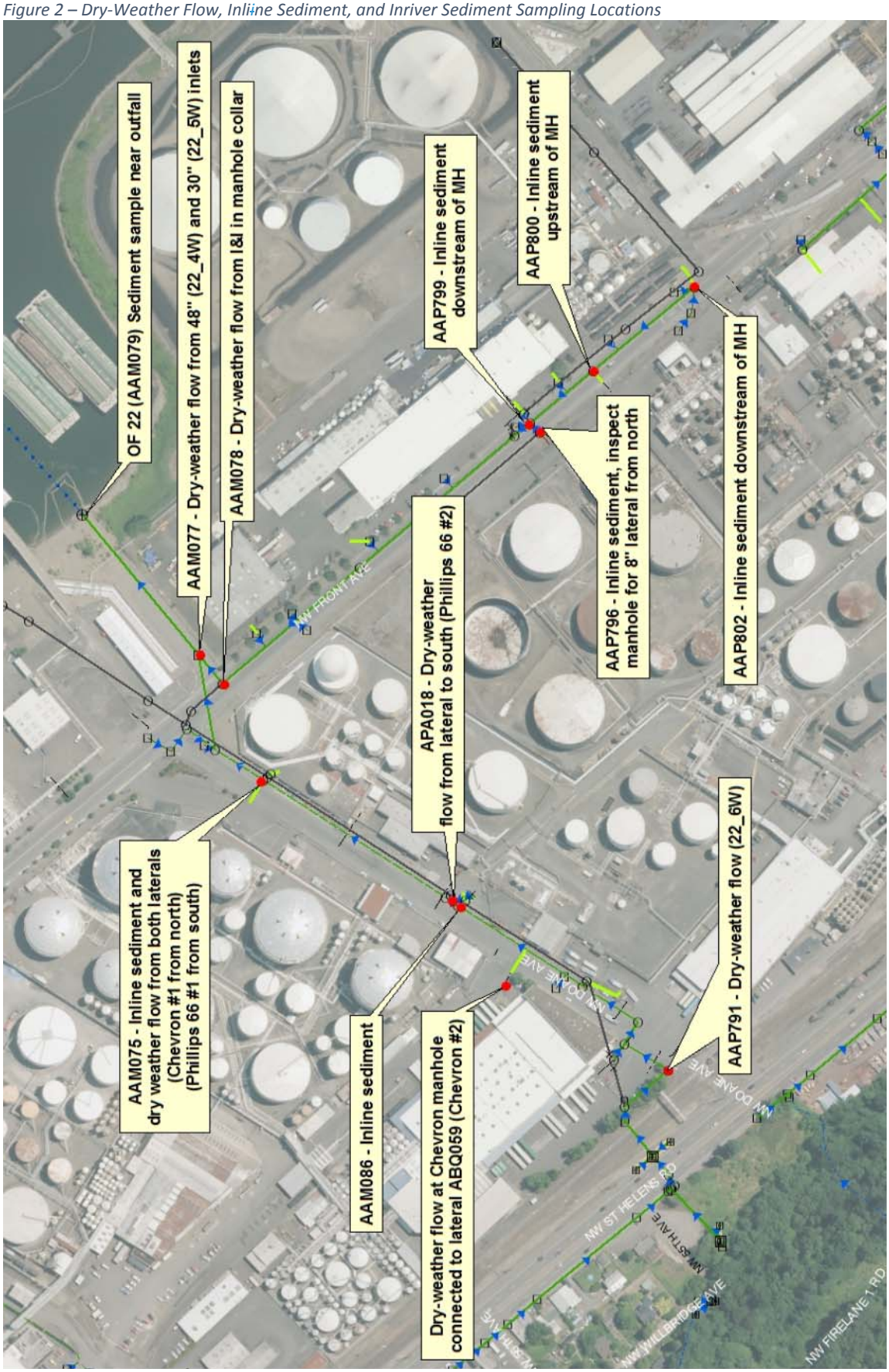
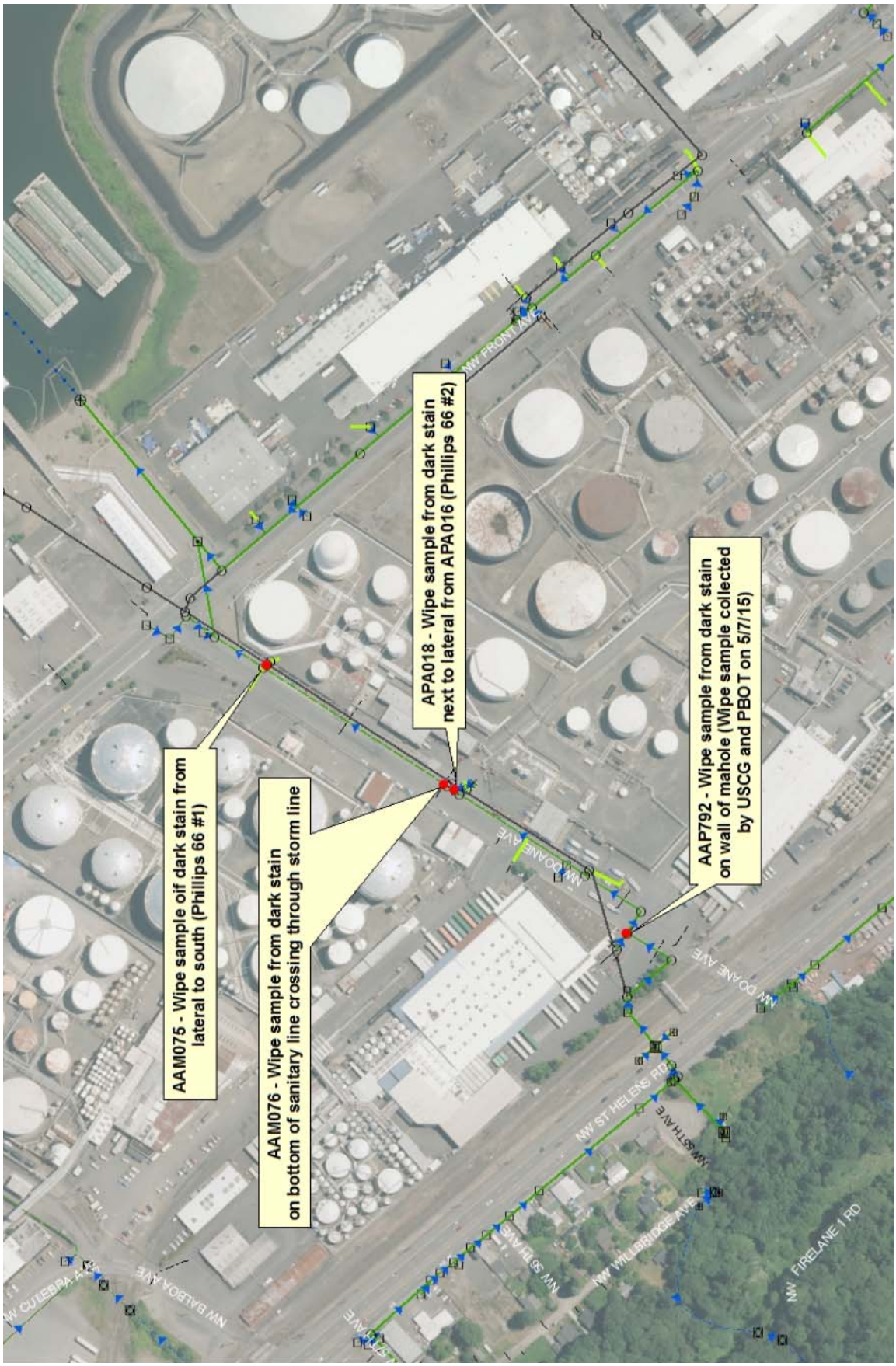


Figure 3 - Dark Stain Wipe Sampling Locations



Attachment B
Field Photographs

Basin 22 Dry-Weather Sheen Investigation

Photo 1 (May 27, 2015). Willbridge Cove and boomed area around Outfall 22.

Photo 2 (May 27, 2015). Sediment sampling at Outfall 22.

Photo 3 (May 27, 2015). Boomed area with sheen around Outfall 22.

Photo 4 (May 27, 2015). Manhole AAM077. Lined 60" discharge pipe.

Photo 5 (May 27, 2015). Manhole AAM077. Incoming 48" line from NW Doane.

Photo 6 (May 27, 2015). Manhole AAM077. Incoming 30" line from NW Front.

Doane Avenue Branch

Photo 7 (May 27, 2015). Manhole AAM080. Incoming 48" line where inline solids sample was collected.

Photo 8 (May 27, 2015). Inline solids collected from AAM080.

Photo 9 (May 27, 2015). Manhole AAM075. Chevron #1 lateral connection with dry-weather flow and staining.

Photo 10 (May 27, 2015). Manhole AAM075. Phillips #1 lateral connection with dry-weather flow and staining.

Photo 11 (May 27, 2015). Manhole AAM075. Inline solids sample location in incoming main line.

Photo 12 (May 27, 2015). Manhole AAM075. Inline solids and seepage on manhole shelf.

Photo 13 (May 27, 2015). Manhole AAM076. Sanitary lateral bisecting invert.

Photo 14 (May 27, 2015). Manhole AAM076. Wipe sample location on sanitary lateral.

Photo 15 (May 27, 2015). Wye APA018. Phillips #2 lateral. Dry-weather flow sample from seep underneath left side of pipe and wipe sample from stain to right of pipe.

Photo 16 (May 27, 2015). Wye APA018. Dry-weather flow sample with suspended droplets from underside of Phillips #2 lateral connection.

Photo 17 (May 27, 2015). Manhole APA016. Wipe sample.

Photo 18 (May 27, 2015). Manhole AAM086. Location of inline solids sample from outgoing line. Phillips #2 lateral on top right.

Photo 19 (May 28, 2015). Private manhole access to lateral AQB059 (Chevron #2). Incoming line at bottom, outgoing line to NW Doane at top.

Photo 20 (May 28, 2015). Private manhole on lateral AQB059 (Chevron #2). Foamy material in manhole invert and boom in outgoing line.

Photo 21 (May 28, 2015). Manhole AAP794. Phillips #3 lateral with dry-weather flow entering main line from south.

Photo 22 (May 28, 2015). Manhole AAP794. Inline solids sample collected from 48" main line downstream of manhole and Phillips #3 connection.

Photo 23 (May 28, 2015). Manhole ANV453. Evidence of groundwater infiltration in Phillips #3 connection.

Photo 24 (May 28, 2015). Manhole ANV453. Location of sample 22_30Wipe in manhole chamber along Phillips #3 lateral.

Photo 25 (May 28, 2015). Manhole AAP792. Dry-weather flow collected from Chevron #3 lateral entering chamber at top of picture.

Photo 26 (May 28, 2015). Manhole AAP791. Inline solids upstream of invert.

Photo 27 (May 28, 2015). Manhole AAP791. Dry-weather flow collected from manhole. Flow direction is from left to right.

Front Avenue Branch

Photo 28 (May 28, 2015). Manhole AAM078. Inline solids upstream of manhole in 30-inch line.

Photo 29 (May 28, 2015). Manhole AAM078. Wipe sample location in manhole collar.

Photo 30 (June 3, 2015). Manhole AAP799. Inline solids downstream of manhole.

Photo 31 (June 3, 2015). Manhole AAP799. Inline solids in 15" lateral from west.

Photo 32 (June 3, 2015). Manhole AAP796. Inline solids in 8" lateral from north. Chevron confirmed that all connections to this line have been abandoned.

Photo 33 (June 3, 2015). Manhole AAP800. Inline solids caked on sidewalls upstream of manhole. Similar solids not present in bottom of line. Sample collected from walls.

Photo 34 (June 3, 2015). Manhole AAP800. Inline solids not present on pipe walls or bottom downstream of manhole.

Photo 35 (June 3, 2015). Manhole AAP802. Inline solids present in small quantity, but gravelly and not similar to solids observed upstream of AAP800.

Photo 36 (June 3, 2015). Manhole AAP802. Inline solids not present in significant quantity in downstream main line.

Photo 37 (June 3, 2015). Unnamed catch basin on south side of NW Front between manholes AAP799 and AAP800.

Photo 38 (June 3, 2015). Unnamed NW Front catch basin with solids and debris.

Photo 39 (May 27, 2015). Catch basin ANF249.

Photo 40 (June 3, 2015). Catch basin ANF249. Solids and debris prior to sampling.

Photo 41 (May 27, 2015). Evidence of truck parking and erodible soil dragout in vicinity of catch basin ANF249 and unnamed catch basin on south side of NW Front Avenue.

Attachment C
Field Notes

City of Portland
Environmental Services

DAILY FIELD REPORT

Project Portland Harbor | Project No. —
Location Basin 22 | Date 5/27/15
Subject Basin 22 Dry-weather petroleum sheen inv. | By MJS, WCR, JFG

0900 - Met with LAS, PHA, Mark Walla and Coast guard representatives at Phillips 66 office to access OF22.

0923 - OF22 - arrive at AAM079 to collect sediment composite sample from near outfall and dry-weather flow sample

0929 - Sed sample collected (22-8)

0930 - Dry weather flow sample collected from outfall, light petroleum odor, light yellow color (22-SW)
- Iron bacteria and slight petroleum sheen visible in flow outside of outfall.
- Slight sheen visible in sample bailer and in stainless steel bowl.
- Split sediment sample with USCG.

0948 - Arrive at AAM077, visible iron bacteria coming from 48" line from Doane Ave. Slight petroleum odor coming from manhole. Gas meter did not detect anything.
- Small amount of T&T at start of liner on outlet 60".

1004 - Sample collected of dry-weather from AAM077 outlet 60" line. Slight petroleum odor and light yellow color. (22-9W)

1009 - Sample collected of dry-weather flow from 48" inlet from Doane Ave. (22-4W) Has a yellow color and petroleum odor. No visible T&T upstream in 48" line.

1013 - Sample collected of dry-weather flow from 30" inlet from Front Ave. (22-5W) Very small amount of flow. Flow is clear and no odor. small crack with stain upstream in 30" line, deemed not worth wipe sampling

Attachments

City of Portland
Environmental Services

DAILY FIELD REPORT

Project Portland Harbor
Location OF22 Weather Petroleum
Subject OF22 Oil Sheen Investigation

Project No.
Date 3/27/15
By PHH/MJS/WCR/JFG

1031 - Arrived at AAM080 - Stagnant flow with iron bacteria color. Found lateral to east that did not have staining at flow. Oily sheen floating on surface of standing water.

1044 - Collected sheen ref. for USCG from sheen on surface of standing water sample

1049 - Collected water sample of sheen material on surface of standing water. Petroleum odor in sample. Approx. 1" of flow. (22-10W)

- Flow appears to pick-up downstream of manhole and there are no solids
- Sediment extends upstream as far as the eye can see. Avg. depth is 2".

1105 - Collected in-line sed sample from upstream of AAM080. (22-11)

1110 - Arrived at AAM075, standing water in mh with orange iron bacteria visible. No obvious flow coming from APA018

1121 - Collected Field Decon Blank prior to entry at AAM075.

1127 - SLIGHT FLOW FROM around the lateral to south towards APA015. Slight flow from Chevron lateral to north. No solids in either line. Sheen on ledge may be coming from joint with incoming lateral line.

Attachments

City of Portland
Environmental Services

DAILY FIELD REPORT

Project Portland Harbor
Location OF22
Subject OF22 Dry-weather Petroleum Sheen Inv

Project No.
Date 5/27/15
By PHA/MJS/WCR/JFG

AAM075 - lateral to south

1140 - Collected wipe sample from wetted underside of PVC lateral from south (Phillips 66 #1) from APA015. Also collected wipe sample for USCG. No flow in lateral. Appears to clean water. (22-12Wipe)

1147 - AAM075. lateral to north - collected wipe sample from lateral to north from Chevron #1 at the end of the pipe at manhole chamber. Collected wipe sample for USCG. (22-13Wipe)

1153 - AAM075 - material on shelf below ladder - Collected wipe sample from material on shelf that has a sheen. There is a second spot with I&I on shelf with dark staining. Wipe sample collected from both spots on single wipe. Collected similar wipe sample for USCG. (22-14wipe)

1154 - AAM075 - DS - collected dry-weather water sample from downstream in main 48" line. (22-15W)

1201 - AAM075 - lateral to north - collected dry-weather flow sample (22-13W)

1209 - ~~AAM078~~ AAM075 - shelf - collected sediment sample from five subsamples across shelf. Orange color, mineral precipitate (22-14)

1212 - Sediment is US and on ~~Pipes~~ S. shoulder of pipe. Collected sample of sediment US of manhole. 4" strip on south side extends US as far as can see. Appears like cleaning cleared middle of pipe. Dark brown/black seds, ~~Shiny~~ lots of fines. Seds were exposed on side by about 1". There was 3" of water in invert (22-16)

Attachments

City of Portland
Environmental Services

DAILY FIELD REPORT

Project Portland Harbor
Location OF22
Subject OF22 Dry-weather Petroleum sheen Inv.

Project No.
Date 5/27/15
By PMA/MJS/WCR JFG

1238 - AAM076 - Arrived on site. Standing water, slight flow, orange iron bacteria. Sanitary lateral crosses through manhole.
- only one spot on bottom of sanitary line. There is sediment in main

1249 - AAM076 Collected dark Wipe sample from bottom of sanitary line. Not much material coming off on to wipe, appears to be thick material. Attempted to wipe as much as possible (22-17 Wipe)

1253 - AAM076 Collected in-line sediment sample downstream at manhole, 7" of solids with 1" of water above. Seds up and downstream as far as can see. Sediment is mostly sand and gravel (22-18)

1300 - Arrive at AAM086. Sediments found downstream of manhole. Flow is stagnant with obvious chunky organic sheen. Appears that there is flow coming from around lateral from south downstream of MH.

1315 - AAM086 Collected sediment sample from downstream of manhole. Approx 7" of sediment and 1/2" of water, very coarse material, no smell, similar to last in-line sed sample from AAM076. (22-19)

1322 - AAM086 - Collected wipe sample from dark stain on upstream side of lateral from south. Collected wipe sample for VSCG. (22-20 Wipe)

1327 - AAM086 - Collected sample from flow on downstream side of lateral to south. Strong petroleum odor and visible product on surface. Small brown spots of oil on surface. Cond = 482 (22-21W)

Attachments

City of Portland
Environmental Services

DAILY FIELD REPORT

Project Portland Harbor
Location OF22
Subject OF22 Dry-Weather Petroleum Sheen Inv.

Project No.
Date 5/27/15
By PHA/MSS/WCR/JFG

1333 - Arrive at APA016 - standing water with a sheen.

1341 APA016 - Collected sheen wet sample of sheen on surface of flow for OSCG. Sheen appears to be fracturing similar to organic sheen.

1345 APA016 - Collected water sample from sheen on surface of standing water. Samples appear to be cloudy with iron Bacteria Cond = 187 (22-22W)

- No sediment to sample in main line. Dark stain on wall below small lateral coming from NE near top of manhole from ~~weigh station~~ scale pit/George Rooftop

1351 - Collected wipe sample from beneath lateral from NE (22-23Wipe)

Attachments

CITY OF PORTLAND
ENVIRONMENTAL SERVICES
Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET

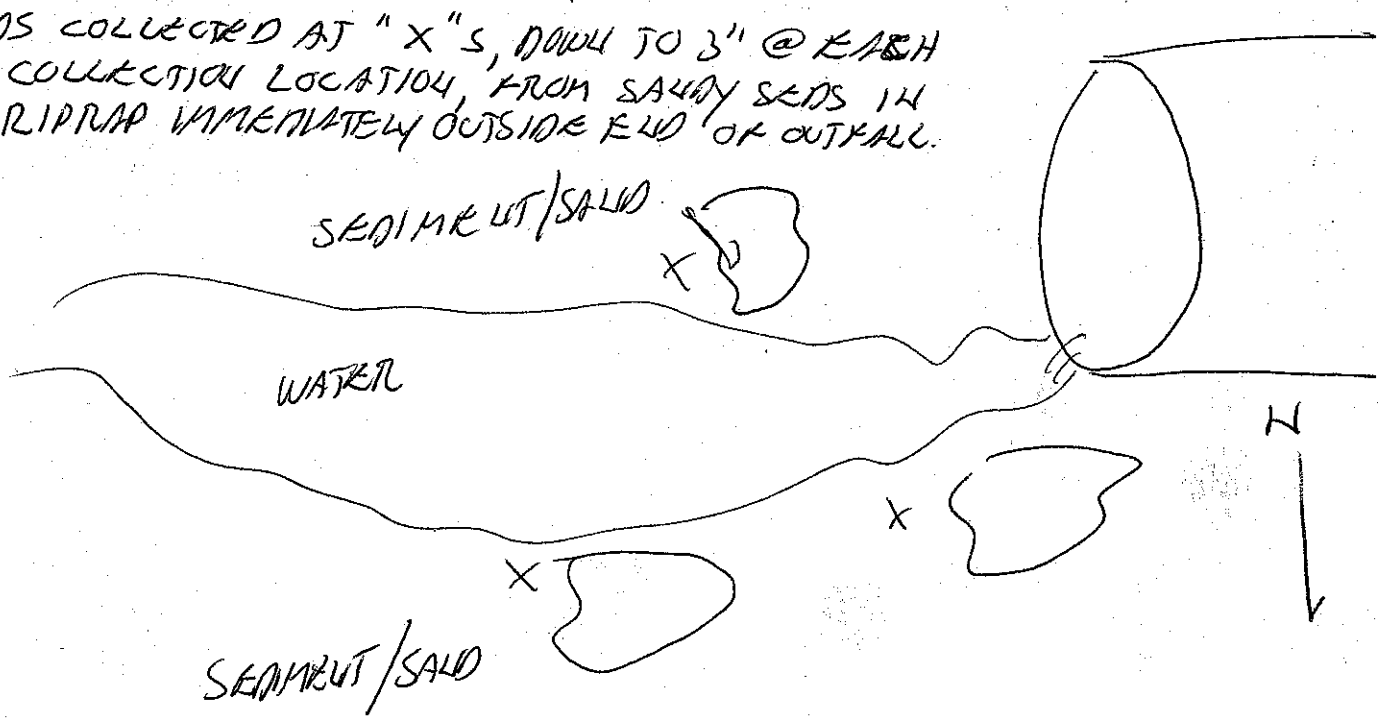
Project Name: PORTLAND HARBOR: BASIN 22 DRY WEATHER PETROLEUM			Sample ID: If collected
Sampling Team: WCR, MSS, JFG, PHA, LAS	Date: 5-27-15	Arrival Time: 0925	Point Code: 22_8, 228W
Basin: 22	Node: AAM 079 (OF22)		Address:
Current weather: COOL, DRY, CLOUDY			
Date and time of last known rainfall: 5/24/15 trace			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No	If present, water is: (Flowing) or Standing Depth of water = 0.25 in Rate of flow = 2 fps
Does river back up to this location? (Yes) or No	If river is backed up: Water Color ☐ Brown ☐ Grey ☑ Clear Water Odor ☑ Hydrocarbon ☐ Sanitary ☐ Other _____
Are sediments observed in the line? Yes or No	Are recoverable quantities of sediments present in the line? Yes or No
If sediments present: Avg Depth of seds = _____ in	Sed Depth Range = _____ in. to _____ in.
Estimated dimensions of sediment deposit: _____ in. by _____ in. OR ☐ As far as can be seen	

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.

SEDS COLLECTED AT "X"S, DOWN TO 3" @ EACH COLLECTION LOCATION, FROM SANDY SEDS IN RIPRAP IMMEDIATELY OUTSIDE END OF OUTFALL.



Date: 5-27-15	SECTION 2 - SAMPLE COLLECTION REPORT	Node: AAM079	Point Code: 22-8

Sampling Equipment: ☑ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe)

Equipment Decontamination process: ☑ Per SOP 7.01a ☐ Deviations (Describe)

Sample date:	Sample time:	Sample Identification Code (IL-XX-NNNNNN-mmyy)
5-27-15	0929	AAM079 OUTFALL

Sample location: ☐ From MH chamber ☐ From line END OF OUTFALL | If from line, segment is From Node_____ To Node _____

Sample collection technique: ☑ Per SOP5.01b ☐ Deviations (describe below)

Visual and olfactory observations: ☐ Odor ☑ Sheen ☐ Discoloration

Color of sample ☑ Brown ☐ Grey ☐ Other (describe)

Sample composition/particle size distribution (estimated percentages): Silt/Clay 10% Sand 90% Fine Gravel ____ Coarse Gravel ____ Debris ____ Decomposed Organics ____ Other (describe) NO DEBRIS

If present, type of debris in sample ☐ Wood ☐ Large rocks ☐ Metal ☐ Plastic ☐ Organics ☐ Paper

Removed debris? ☐ Yes (Type & Amount) _____ ☑ No

Compositing notes ☑ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)? 1

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).

Jar Size	Amount Full	Target Analyses

Lab ID Here

Duplicate sample collected? Y/N

Duplicate sample identification # on COC: Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND
ENVIRONMENTAL SERVICES
Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET

Project Name: PORTLAND HARBOR DRY WEATHER PETROLEUM SHEEN INVESTIGATION			Sample ID: If collected
Sampling Team: WCR, MSS, JAG, PHA, LAS	Date: 5-27-15	Arrival Time: 0944	Point Code: 22-9W (60"), 22-4W (48"), 22-5W (30")
Basin: 22	Node: AAM 077		Address:
Current weather: COOL, DRY, CLOUDY			
Date and time of last known rainfall: 5/24/15 trace			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No | If present, water is: (Flowing) or Standing | Depth of water = _____ in | Rate of flow = _____ fps

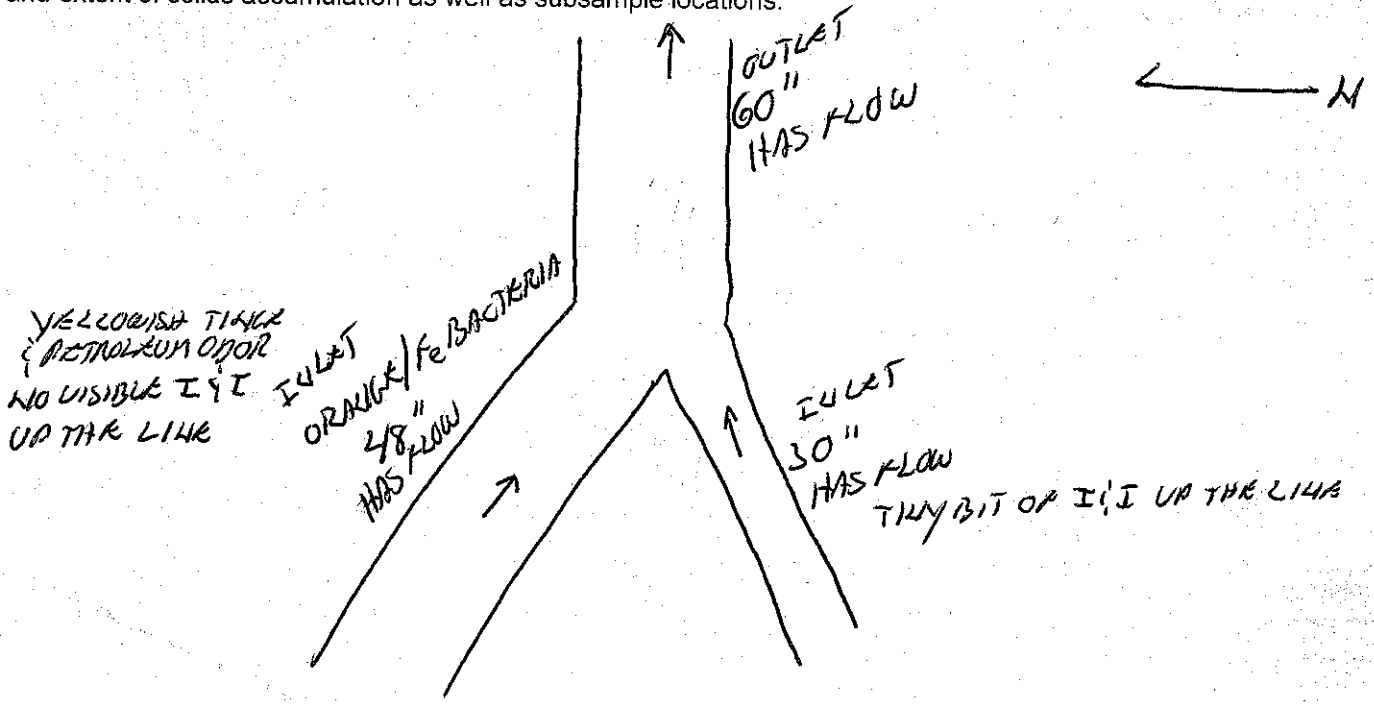
Does river back up to this location? Yes or No | If river is backed up: | Water Color: ☐ Brown ☐ Grey ☐ Clear | Water Odor: ☐ Hydrocarbon ☐ Sanitary ☐ Other _____

Are sediments observed in the line? Yes or (No) | Are recoverable quantities of sediments present in the line? Yes or No

If sediments present: Avg Depth of seds = _____ in | Sed Depth Range = _____ in. to _____ in.

Estimated dimensions of sediment deposit: _____ in. by _____ in. OR ☐ As far as can be seen

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.



Date: 5-27-15	SECTION 2 - SAMPLE COLLECTION REPORT	Node: AAM077	Point Code: 22_9W

Sampling Equipment: ☑ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe) 22_4W 22_5W

Equipment Decontamination process: ☑ Per SOP 7.01a ☐ Deviations (Describe)

Sample date:	Sample time:	Sample Identification Code (IL-XX-NNNNNN-mmyy)
5-27-15	1004	AAM077 60" OUTLET

Sample location: ☐ From MH chamber ☑ From line | If from line, segment is From Node_____ To Node _____

Sample collection technique: ☐ Per SOP5.01b ☐ Deviations (describe below)

_____

Visual and olfactory observations: ☐ Odor _____ ☑ Sheen Ø ☐ Discoloration _____

Color of sample ☐ Brown ☐ Grey ☑ Other (describe) LIGHT yellow

Sample composition/particle size distribution (estimated percentages): Silt/Clay _____ Sand _____ Fine Gravel ____ Coarse Gravel ____ Debris ____ Decomposed Organics _____ Other (describe)_____

If present, type of debris in sample ☐ Wood ☐ Large rocks ☐ Metal ☐ Plastic ☐ Organics ☐ Paper

Removed debris? ☐ Yes (Type & Amount) _____ ☐ No

Compositing notes ☐ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)?

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).

Jar Size	Amount Full	Target Analyses

Lab ID Here | Duplicate sample collected? Y/N

Duplicate sample identification # on COC: | Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND

ENVIRONMENTAL SERVICES

Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

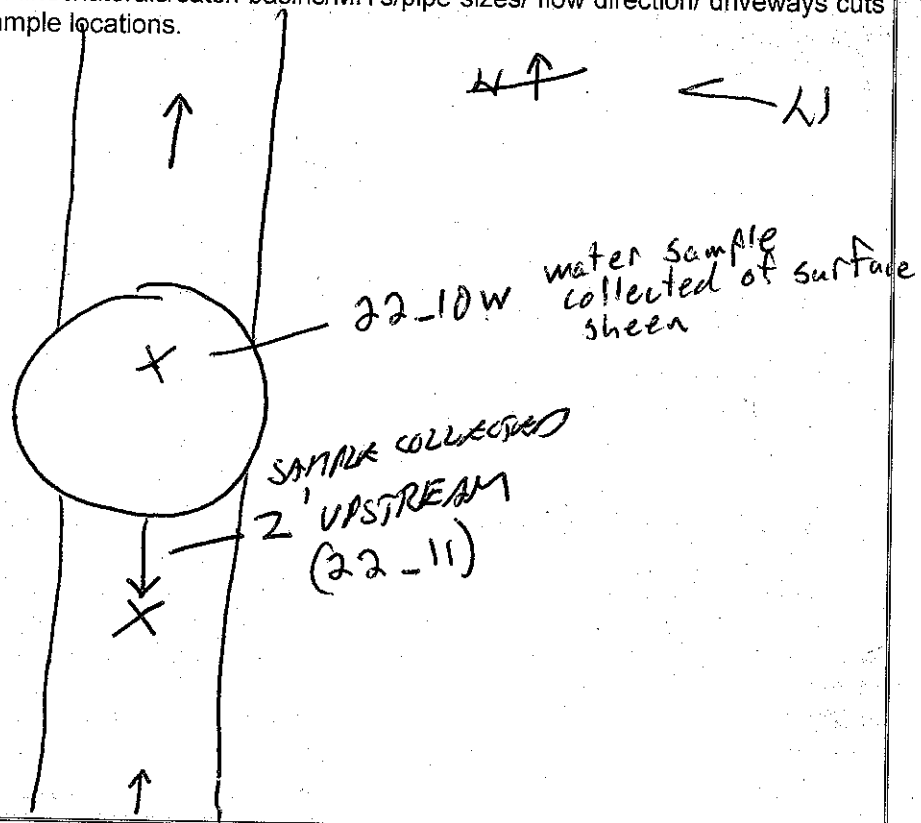
INLINE SEDIMENT SAMPLING FIELD DATA SHEET

Project Name: PORTLAND HARBOR DRY WEATHER PETRO-LEUM SHEEN INVEST.			Sample ID: if collected AAM 080 US
Sampling Team: WCR, MSS JKG, AHA, LAS	Date: 5-27-15	Arrival Time: 1029	Point Code: 22-11 (22_10W) (water)
Basin: 22	Node: AAM 080		Address:
Current weather: WARM, DRY, SUNNY			
Date and time of last known rainfall: 5/24/15 trace			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No	If present, water is: Flowing or Standing Depth of water = 1 in Rate of flow = 1 fps
Does river back up to this location? ~~Yes or No~~ ?	If river is backed up: Water Color ☐ Brown ☐ Grey ☑ Clear Water Odor ☑ Hydrocarbon ☐ Sanitary ☐ Other _____
Are sediments observed in the line? (Yes) or No	Are recoverable quantities of sediments present in the line? (Yes) or No
If sediments present: Avg Depth of seds = 2.0 in	Sed Depth Range = 0.5 in. to 3.0 in.
Estimated dimensions of sediment deposit: 16 in. by UP PIPE AS FAR AS VISIBLE in. OR	☑ As far as can be seen

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.



Date: 5-27-15	SECTION 2 - SAMPLE COLLECTION REPORT	Node: AAM080	Point Code: 22-11

Sampling Equipment: ☑ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe) 22-10W

Equipment Decontamination process: ☑ Per SOP 7.01a ☐ Deviations (Describe)

Sample date:	Sample time:	Sample Identification Code (IL-XX-NNNNNN-mmyy)
5-27-15	1105	AAM 080 - US

Sample location: ☐ From MH chamber ☑ From line 2' US OF CULVERT If from line, segment is From Node AAM 080 To Node AAM 075

Sample collection technique: ☐ Per SOP5.01b ☐ Deviations (describe below)

3" WIDE ACROSS PIPE

Visual and olfactory observations:	Color of sample
☐ Odor _____ ☐ Sheen _____ ☐ Discoloration _____	☐ Brown ☐ Grey ☐ Other (describe) _____

Sample composition/particle size distribution (estimated percentages): Silt/Clay 15 Sand 30 Fine Gravel 20 Coarse Gravel 30 Debris 5 Decomposed Organics _____ Other (describe) _____

If present, type of debris in sample	Removed debris?
☐ Wood ☐ Large rocks ☐ Metal ☐ Plastic ☐ Organics ☐ Paper	☑ Yes (Type & Amount) COARSE GRAVEL ☐ No

Compositing notes ☑ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)? 1 - 4oz. FULL

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).

Jar Size	Amount Full	Target Analyses

Lab ID Here | Duplicate sample collected? Y/N

Duplicate sample identification # on COC: | Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND
ENVIRONMENTAL SERVICES
Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET

Project Name: PORTLAND HARBOR DRY WEATHER PETROLEUM SHEEN INVESTIGATION			Sample ID: If collected 22_12 wipe, 22_13wipe 22_13w (water)
Sampling Team: WCR, MSS SFG, PHA, LAS	Date: 5-27-15	Arrival Time: 1115	Point Code: SEDIMENT FROM SHELF 22-14 wipe; 22_14
Basin: 22	Node: AAM 075		Address: 22_15w 22_16
Current weather: WARM, DRY, SUNNY			
Date and time of last known rainfall: 5/24/15 trace			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No

If present, water is (Low Flowing) or (Standing) Depth of water = 3 in Rate of flow = 1 fps

Does river back up to this location? Yes or No

If river is backed up: Water Color ☐ Brown ☐ Grey ☑ Clear Water Odor ☐ Hydrocarbon ☐ Sanitary ☐ Other _____

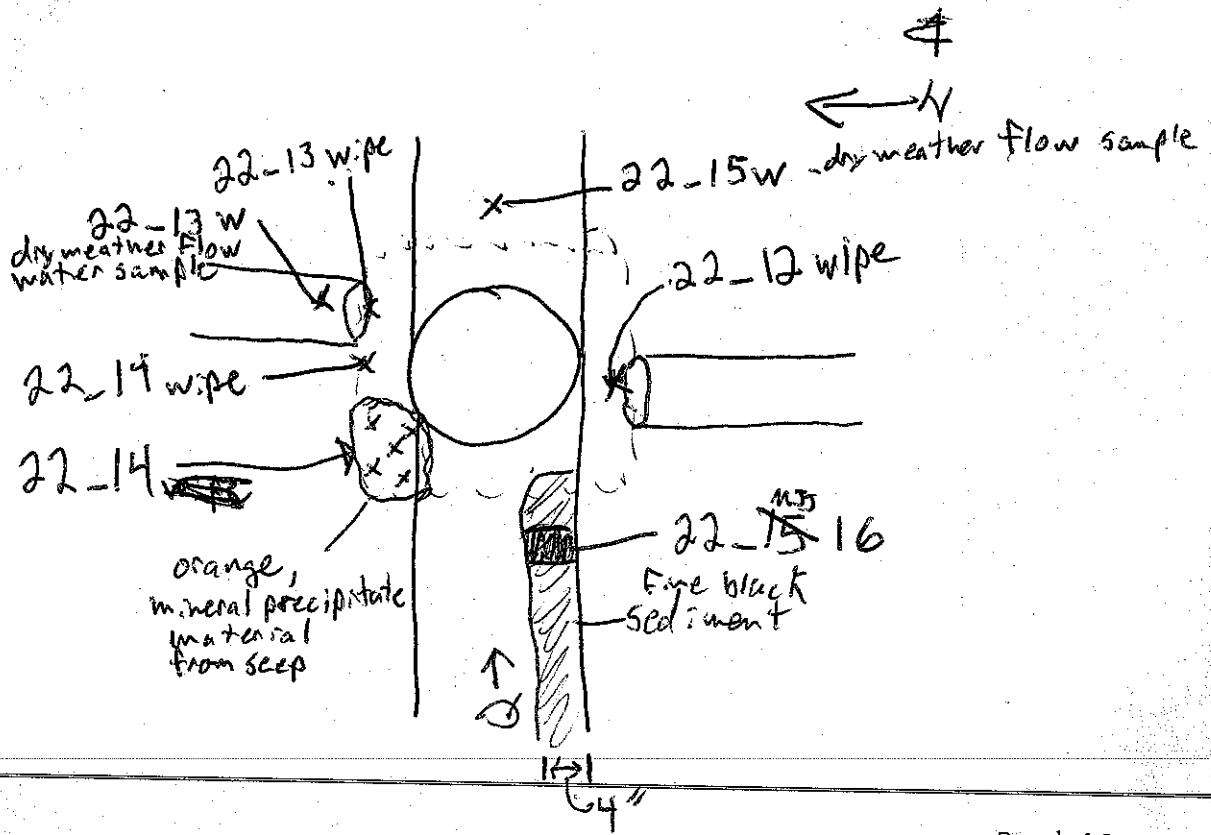
Are sediments observed in the line? (Yes) or No

Are recoverable quantities of sediments present in the line? (Yes) or No

If sediments present: Avg Depth of seds = 3 in Sed Depth Range = ~~1~~ in. to 4 in.

Estimated dimensions of sediment deposit: 4 in. by ~~in.~~ OR ☑ As far as can be seen

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.



Date: 5-27-15	SECTION 2 - SAMPLE COLLECTION REPORT	Node: AA1075	Point Code: 22-14 SHELF SEDIMENT

Sampling Equipment: ☑ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe)

Equipment Decontamination process: ☑ Per SOP 7.01a ☐ Deviations (Describe)

Sample date:	Sample time:	Sample Identification Code (IL-XX-NNNNNN-mmyy)
5-27-15	1209	

Sample location: ☑ From MH chamber 22-14 SHELF ☑ From line 22-16 | If from line, segment is ~~From Node~~ upstream of AA1075 ~~To Node~~

Sample collection technique: ☑ Per SOP5.01b ☐ Deviations (describe below)

Visual and olfactory observations: ☐ Odor ☐ Sheen ☐ Discoloration

Color of sample ☑ Brown 22-16 ☐ Grey ☑ Other (describe) ORANGE-ISH 22-14

Sample composition/particle size distribution (estimated percentages): Silt/Clay 100% Sand ____ Fine Gravel ____ Coarse Gravel ____ Debris ____ Decomposed Organics ____ Other (describe) ____

If present, type of debris in sample ☐ Wood ☐ Large rocks ☐ Metal ☐ Plastic ☐ Organics ☐ Paper

Removed debris? ☐ Yes (Type & Amount) ____ ☐ No

Compositing notes ☑ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)? 1- 4oz

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).

Jar Size	Amount Full	Target Analyses

Lab ID Here | Duplicate sample collected? Y/N

Duplicate sample identification # on COC: | Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND
ENVIRONMENTAL SERVICES
Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET

Project Name: Portland Harbor Basin 22 green Inv			Sample ID: collected
Sampling Team: MJS, WCR, JFG, PHA	Date: 5/27/15	Arrival Time: 1238	Point Code: 22-18, 22-17 wipe
Basin: 22	Node: AAM 076		Address:
Current weather: Sunny			
Date and time of last known rainfall: 5/24/15 trace			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No — If present, water is: (Flowing) or Standing — Depth of water = 3 in — Rate of flow = 0.5 fps

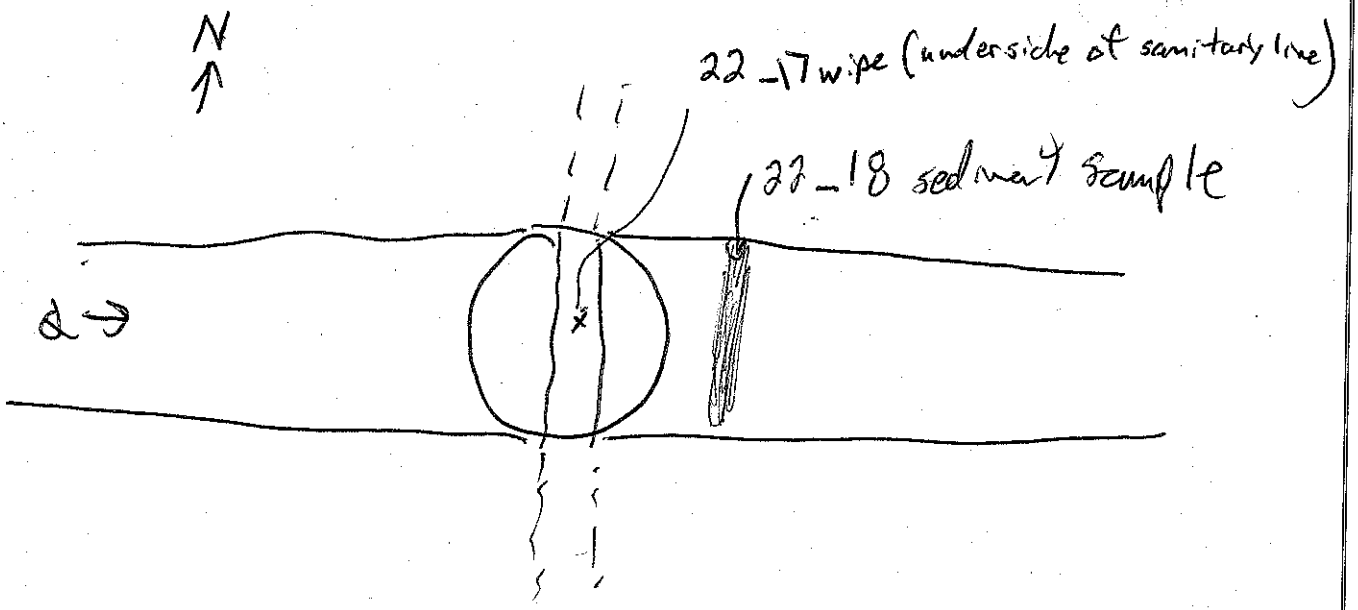
Does river back up to this location? Yes or (No) — If river is backed up: Water Color ☐ Brown ☐ Grey ☐ Clear — Water Odor ☐ Hydrocarbon ☐ Sanitary ☐ Other _____

Are sediments observed in the line? (Yes) or No — Are recoverable quantities of sediments present in the line? (Yes) or No

If sediments present: Avg Depth of seds = 2 in — Sed Depth Range = — in. to — in.

Estimated dimensions of sediment deposit: _____ in. by _____ in. OR ☑ As far as can be seen

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.



Date: 5/27/15	SECTION 2 - SAMPLE COLLECTION REPORT	Node: AAM076	Point Code: 22-17 wipe 22-18

Sampling Equipment: ☑ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe)

Equipment Decontamination process: ☑ Per SOP 7.01a ☐ Deviations (Describe)

Sample date:	Sample time:	Sample Identification Code (IL-XX-NNNNNN-mmyy)

Sample location: ☐ From MH chamber ☑ From line | If from line, segment is From ~~Node~~ Downstream of AAM076 ~~To Node~~ _____

Sample collection technique: ☑ Per SOP5.01b ☐ Deviations (describe below)

_____

Visual and olfactory observations:		Color of sample	
☐ Odor _____		☐ Brown	
☐ Sheen _____		☑ Grey	
☐ Discoloration _____		☐ Other (describe) _____	

Sample composition/particle size distribution (estimated percentages): Silt/Clay _____ Sand 50 Fine Gravel 25 Coarse Gravel 25 Debris _____ Decomposed Organics _____ Other (describe) _____

If present, type of debris in sample			Removed debris?	
☐ Wood	☑ Large rocks		☑ Yes (Type & Amount) _____	☐ No
☐ Metal	☐ Plastic			
☐ Organics	☐ Paper			

Compositing notes ☑ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)?

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).	Jar Size	Amount Full	Target Analyses
	4oz	Full	

Lab ID Here | Duplicate sample collected? Y/N

Duplicate sample identification # on COC: | Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND

ENVIRONMENTAL SERVICES

Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET

Project Name: Portland Harbor - OF22 sheen Inv.			Sample ID: If collected
Sampling Team: MJS, WLR, JFG, PHA	Date: 5/27/15	Arrival Time: 1300	Point Code: 22_19, 22_20wipe
Basin: 22	Node: AAM086		Address: 22_21w,
Current weather: Sunny			
Date and time of last known rainfall: 5/24/15: trace			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No | If present, water is: (Flowing) or Standing | Depth of water = 75 in | Rate of flow = .05 fps

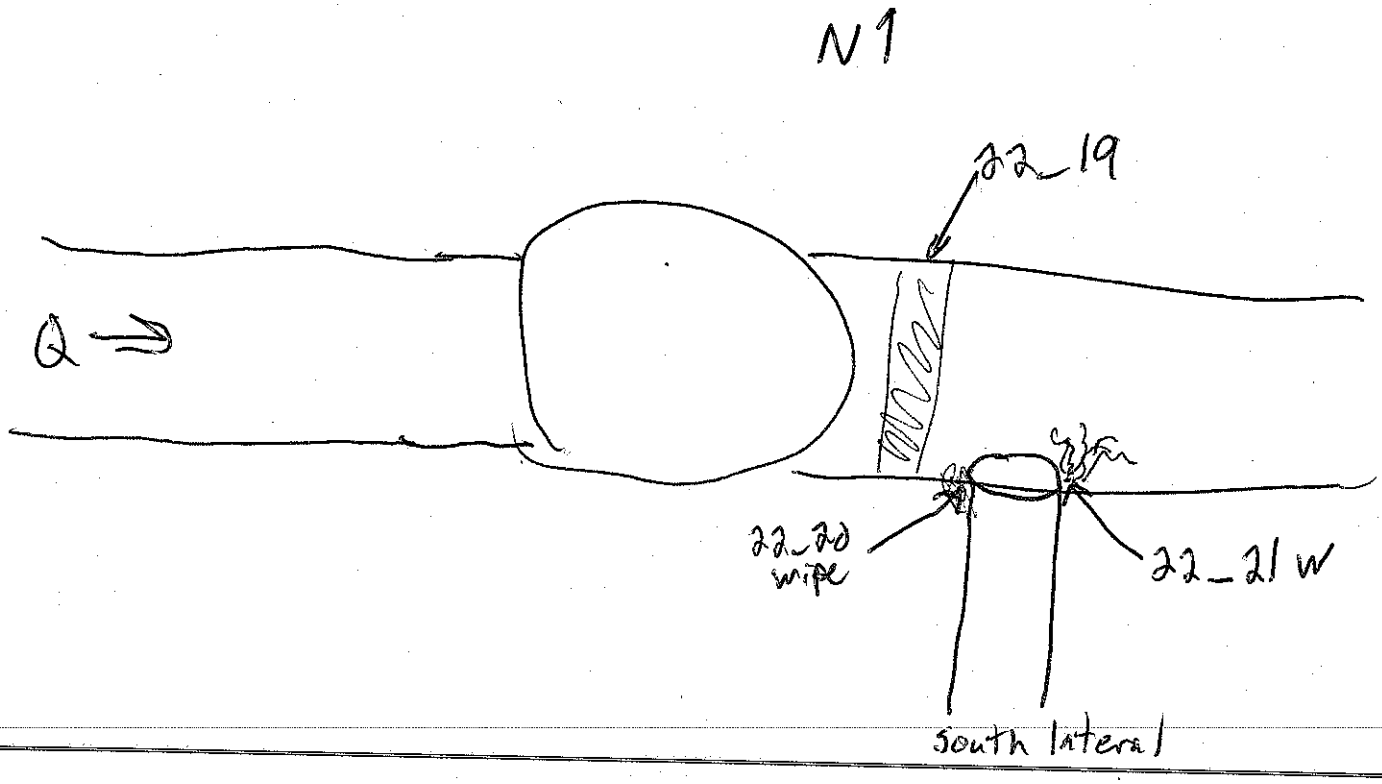
Does river back up to this location? Yes or (No) | If river is backed up: Water Color ☐ Brown ☐ Grey ☑ Clear | Water Odor ☑ Hydrocarbon ☐ Sanitary ☐ Other _____

Are sediments observed in the line? (Yes) or No | Are recoverable quantities of sediments present in the line? (Yes) or No

If sediments present: Avg Depth of seds = 7 in | Sed Depth Range = 7 in. to 5 in.

Estimated dimensions of sediment deposit: ~~4~~ 12 in. by _____ in. OR ☒ As far as can be seen

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.



Date: 5/27/15	SECTION 2 - SAMPLE COLLECTION REPORT	Node: AAM086	Point Code: 22_19

Sampling Equipment: ☐ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe) 22_20wipe 22_21w

Equipment Decontamination process: ☑ Per SOP 7.01a ☐ Deviations (Describe)

Sample date:	Sample time:	Sample Identification Code (IL-XX-NNNNNN-mmyy)

Sample location: ☐ From MH chamber ☑ From line | If from line, segment is From Node downstream of AAM086 To Node ____

Sample collection technique: ☑ Per SOP5.01b ☐ Deviations (describe below)

Visual and olfactory observations: ☑ Odor petroleum ☐ Sheen ____ ☐ Discoloration ____

Color of sample ☐ Brown ☑ Grey ☐ Other (describe) ____

Sample composition/particle size distribution (estimated percentages): Silt/Clay ____ Sand 25 Fine Gravel 50 Coarse Gravel 25 Debris ____ Decomposed Organics ____ Other (describe) ____

If present, type of debris in sample: ☐ Wood ☑ Large rocks ☐ Metal ☐ Plastic ☐ Organics ☐ Paper

Removed debris? ☑ Yes (Type & Amount) large rocks/gravel ☐ No

Compositing notes ☑ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)?

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).	Jar Size	Amount Full	Target Analyses
	4oz	Full	

Lab ID Here | Duplicate sample collected? Y/N

Duplicate sample identification # on COC: | Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
Sample Custodian: (503) 823-5696
General Lab: (503) 823-5681

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 5/27/15

Work Order #: WSE794

Collected By: MJS, WCR, JFG, PHA

Client Name: Director's Office

Project Name: Portland Harbor

Requested Analyses

Special Instructions:

Basin 22 Petroleum Sheen Investigation

[1] Run NWTPH-Dx and NWTPH-Gx if detected

Turn-Around-Time Request:

- ☐ Standard (10 business days)
- ☐ Rush (5 business days)
- ☐ Other: _____

Lab Number	Location ID	Sample Date	Sample Time	Grab or Comp	Sample Matrix	NWTPH-HCID[1]	PAHs (low-Level)	Conductivity (umhos/cm) Meter: Comba S	# of Containers	Remarks
01	22_8	5/27/2015	0929	C	Sed	●			1	AAM079 (OF22) Sediment Composite
2	22_8W	5/27/2015	0930	G	Water	●	●	309	2	AAM079 (OF22) Dry-weather Flow
3	22_9W	5/27/2015	1004	G	Water	●	●		2	AAM077-E 60" Dry-weather Flow
4	22_4W	5/27/2015	1009	G	Water	●	●		2	AAM077-W 48" Dry-weather Flow
5	22_5W	5/27/2015	1013	G	Water	●	●		2	AAM077-SW 30" Dry-weather Flow
6	22_10W	5/27/2015	1049	G	Water	●	●	322	2	AAM080 Surface Sheen
7	FDBLANK	5/27/2015	1121	G	Water	●	●		2	Field Decon Blank of Bowl and Bailer
8	22_11	5/27/2015	1105	C G obtain sample from	Sed	●			1	AAM080-SW Inline Sediment
9	22_12Wipe	5/27/2015	1140	G	Wipe	●			1	AAM075-S Wipe under lateral
10	22_13Wipe	5/27/2015	1147	G	Wipe	●			1	AAM075-N Wipe from end of pipe

Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Matt Sullivan	Signature:	Signature:	Signature:
Printed Name: Matt Sullivan	Printed Name:	Printed Name:	Printed Name:
Date: 5/27/15	Date: 5/27/15	Date:	Date:
Time: 1551	Time: 1551	Time:	Time:

Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
Sample Custodian: (503) 823-5696
General Lab: (503) 823-5681

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 5/27/15

Work Order #: WSE 194

Collected By: MJS, WCR, JEG, PHA

Client Name:	Director's Office
Project Name:	Portland Harbor

Requested Analyses

Special Instructions:

Basin 22 Petroleum Sheen Investigation

[1] Run NWTPH-Dx and NWTPH-Gx if detected

Turn-Around-Time Request:

- ☐ Standard (10 business days)
- ☐ Rush (5 business days)
- ☐ Other: _____

Lab Number	Location ID	Sample Date	Sample Time	Grab or Comp	Sample Matrix	NWTPH-HCID[1]	PAHs (low-Level)	Conductivity (umhos/cm) Meter: Lamb05	# of Containers	Remarks
#1	22_14Wipe	5/27/2015	1153	G	Wipe	●			1	AAM075-Shelf Wipe from Shelf
12	22_15W	5/27/2015	1159	G	Water	●	●	324	2	AAM075 - DS Dry-weather Flow
13	22_13W	5/27/2015	1201	G	Water	●	●	679	2	AAM075-N Dry-weather Flow
14	22_14	5/27/2015	1209	C G	Sed	●			1	AAM075-Shelf Inline Sediment
15	22_16	5/27/2015	1212	C G	Sed	●			1	AAM075-US Inline Sediment
16	22_17Wipe	5/27/2015	1249	G	Wipe	●			1	AAM076-Sanitary Line Wipe from bottom
17	22_18	5/27/2015	1253	C G	Sed	●			1	AAM076-DS Inline Sediment
18	22_19	5/27/2015	1315	C G	Sed	●			1	AAM086-DS Inline Sediment
19	22_20Wipe	5/27/2015	1322	G	Wipe	●			1	AAM086-S Wipe on US side of Lat
20	22_21W	5/27/2015	1327	G	Water	●	●	482	2	AAM086-S Flow on DS side of Lat

Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Matt Sullivan	Signature:	Signature:	Signature:
Date: 5/27/15	Date: 5/27/15	Date:	Date:
Printed Name: Matt Sullivan	Printed Name: Lisa Madsen	Printed Name:	Printed Name:
Time: 1551	Time: 1551	Time:	Time:

Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
Sample Custodian: (503) 823-5696
General Lab: (503) 823-5681

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 5/27/15

Work Order #: W1SE194

Collected By: MJS, WCR, JFG, PHA

Client Name: Director's Office

Project Name: Portland Harbor

Requested Analyses

Special Instructions:

Basin 22 Petroleum Sheen Investigation

[1] Run NWTPH-Dx and NWTPH-Gx if detected

Lab Number	Location ID	Sample Date	Sample Time	Grab or Comp	Sample Matrix	NWTPH-HCID[1]	PAHs (low-Level)	Conductivity (umhos/cm) Meter: Combo 5	# of Containers	Remarks
21	22_22W	5/27/2015	1345	G	Water	●	●	187	2	APA016 Surface Sheen
22	22_23Wipe	5/27/2015	1351	G	Wipe	●			1	APA016 Wipe under lat from NE

Turn-Around-Time Request:

- ☐ Standard (10 business days)
- ☐ Rush (5 business days)
- ☐ Other: _____

Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Matt Sullivan	Signature:	Signature:	Signature:
Date: 5/27/15	Date: 5/27/15	Date:	Date:
Printed Name: Matt Sullivan	Printed Name: Elizabeth Hedges	Printed Name:	Printed Name:
Time: 1551	Time: 1551	Time:	Time:

City of Portland
Environmental Services

DAILY FIELD REPORT

Project Portland Harbor
Location OF22
Subject OF22 Dry Weather Petroleum Sheen Inv

Project No.
Date 5/28/15
By PHH/MJS/WCR/ECH

QBW
1000 - ABQ059 (lateral) - Arrived at manhole to lateral. Small amount of flow leaving manhole. Standing water and debris in manhole. Slight sheen on surface of water. brown foam
- entrant confirms there is brown foam on surface in manhole. Also noted black stain on top side of inlet pipe from north. There is one perched lateral that also has black stain below the outlet on wall. The perched lateral appears to be coming from loading dock. (NW) Main inlet is 16" and perched lateral is 6". Boom is hanging from rung in to outlet.

QBW
1013 ABQ059 - Collected water sample from surface within manhole. Unable (22-24W) to collect sample leaving manhole. Sample has a sheen but not much odor. Cond = 254

QBW
1018 ABQ059 - Collected wipe sample from dark stain above 16" main inlet. (22-25wipe) Material appears to be oily. Was a trace of liquid seeping out.

QBW
1021 ABQ059 - Collected wipe sample from dark stain under 6" lateral from NW. (22-26wipe) Appeared to be greasy, degraded material.

1033 AAP794 - Arrived at manhole. Stagnant orange flow in main line. Can see small amount of flow coming from lateral to south. Opened manhole ANV453 and observed flow passing through manhole towards AAP794. Pipe has a 36" inlet and 48" outlet. 12" lateral from south has a boom in the pipe that extends from the upstream manhole ANV453. 10" of water 3" of sediment in main, barely flowing. 7" depth of water away from lateral at 1/2 fps.

Attachments

City of Portland
Environmental Services

DAILY FIELD REPORT

Project Portland Harbor
Location OF22
Subject OF22 Dry-weather Petroleum Sheen Inv

Project No.
Date 5/28/15
By PPH/MJS/WCR/ECH

AAP794
1043- Collected dry-weather Flow sample from 12" lateral to south. No visible (22-27W) sheen, slight petroleum odor. Cond=103

1050, AAP794- Collected sediment sample from just downstream of manhole, (22-28) No visible sheen, no odor.

1056 AAP794- Collected dry-weather Flow sample from upstream of manhole (22-29W) Slight yellow color, no odor. Cond=184 u/

1104 ANV453- Orange flow moving through manhole, ~approx. 1" Dark staining on shelf on east side of manhole. Obvious I&I and iron bacteria on shelf on west side of manhole. Perched lateral to east with orange material on shelf below outlet. Small amount of I&I above inlet line. Main inlet is 12" from SE. Outlet is also 12".

1116- ANV453- Collected wipe sample from orange material below perched (22-30wipe) lateral From East.

1119- ANV453- Collected wipe sample from shelf on east side with (22-31wipe) dark stain.

1128- AAP793- Small amount of flow, no orange iron bacteria. I&I entering manhole on shelf to west. Appears to be clear water in small amount, Flow appears to start backing up 5ft. downstream of manhole

Attachments

City of Portland
Environmental Services

DAILY FIELD REPORT

Project Post Hand Harbor
Location OF22
Subject OF22 Dry-weather Petroleum Sheen Inv.

Project No.
Date 5/28/15
By PHA/MSS/WCR/ECH

1141 - AAP792 - Arrived at manhole. Small amount of flow coming from lateral to ~~south~~ north. Lateral is 12". Main inlet 27" and outlet is 27" also.

1148 - AAP792 - Collected dry-weather flow sample from lateral. From North. Approx 0.1gpm of flow. Slow collection due to low flow. Cond = 173, clear water, no odor (22-32W)

1200 - AAP791 - Arrived at manhole, small amount of flow. I&I entering manhole on either side of incoming pipe. I&I is minor and appears to be clear. There appears to be some settleable solids upstream of manhole.

1209 - AAP791 - Collected dry weather flow sample from within manhole ~~(22-33W)~~ Cond = 194 (22-6W)

1216 - AAP791 - Collected ~~dry weather~~ inline sediment from upstream ~~(22-34)~~ of manhole. Avg Sed depth is 0.5". No sheen or odors. (22-33)

1345 - AAM078 - Arrived at site, begin setting up traffic control. Small amount of flow, no orange color, no odor. Evidence of I&I entering just below collar of manhole. Sediment in line but coarse and loose.

(22-34)
(22-35) 1408 - AAM078 - Collected inline sediment sample from upstream, approx 2' of manhole. No odor or sheen.

(~~22-36~~ wipe) 1412 - AAM078 - Collected ~~dry~~ wipe sample from wetted area at collar of manhole. (22-35 wipe)

Attachments

CITY OF PORTLAND
ENVIRONMENTAL SERVICES
Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET

Project Name: **Portland Harbor – Basin 22 Dry Weather Sheen Investigation**			Sample ID: If collected 22-24W
Sampling Team: **MJS, ECH, WCR, PHA, +**	Date: **5/28/15**	Arrival Time: 1000	Point Code: 22-25wipe
Basin: **22**	Node: ~~ABQ~~ QBR 059 (lateral not MH)		Address: 22-26wipe
Current weather: **Sunny, 60s in morning – 80s in afternoon**			
Date and time of last known rainfall: **~¼" on 5/11/15, ~1/10" on 5/12/15**			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No | If present, water is: (Flowing) or Standing | Depth of water = 1/2 in | Rate of flow = 1.0 fps

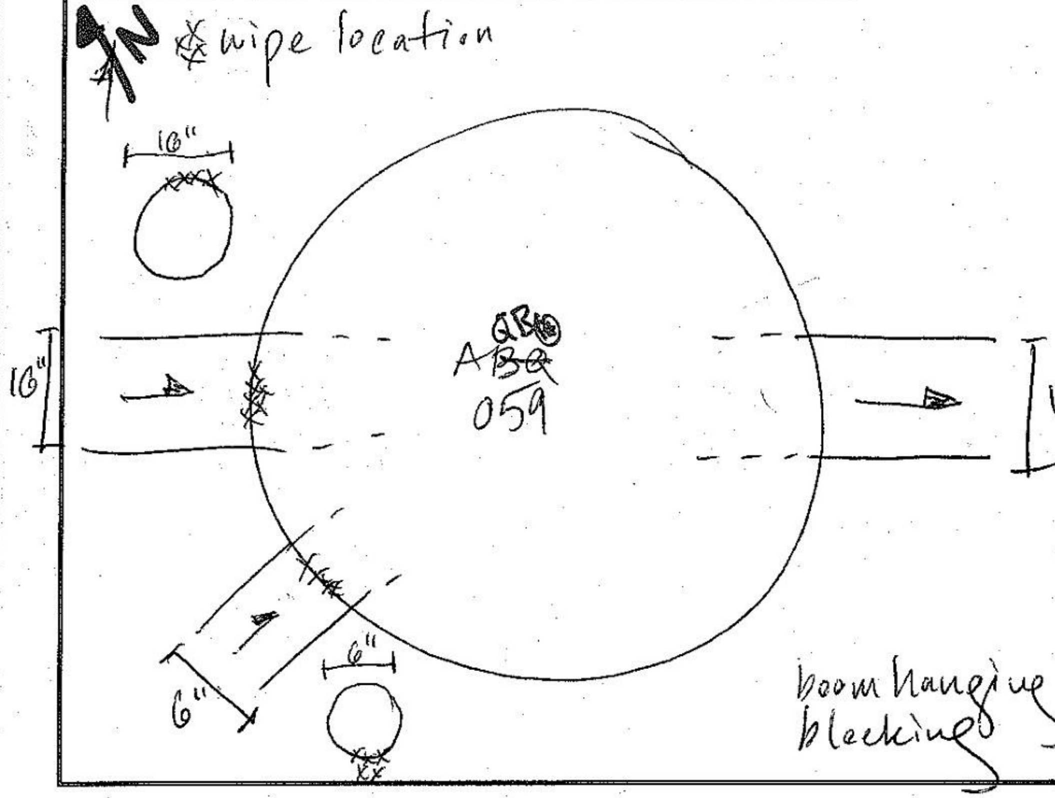
Does river back up to this location? Yes or (No) | If river is backed up: Water Color ☐ Brown ☐ Grey ☐ Clear | Water Odor ☐ Hydrocarbon ☐ Sanitary ☐ Other ________

Are sediments observed in the line? Yes or (No) | Are recoverable quantities of sediments present in the line? Yes or (No)

If sediments present: Avg Depth of seds = ________ in Sed Depth Range = ________ in. to ________ in.

Estimated dimensions of sediment deposit: ________ in. by ________ in. OR ☐ As far as can be seen

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.



1013 water sample 22-24W
1018 wipe from above inlet 22-25wipe
1021 wipe from below 6" inlet 22-26wipe

boom hanging in outlet but not blocking

Date: 5/28/15	SECTION 2 - SAMPLE COLLECTION REPORT	Node:	Point Code:

Sampling Equipment: ☐ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe)

Equipment Decontamination process: ☐ Per SOP 7.01a ☐ Deviations (Describe)

Sample date: 5/28/15	Sample time: 1013 (water sample)	Sample Identification Code (IL-XX-NNNNNN-mmyy)

Sample location: ☐ From MH chamber ☐ From line | If from line, segment is From Node______ To Node _____

Sample collection technique: ☐ Per SOP5.01b ☐ Deviations (describe below)

____

Visual and olfactory observations:	☒ Odor light ☒ Sheen ____ ☒ Discoloration ____	Color of sample	☐ Brown ☐ Grey ☐ Other (describe) ____

Sample composition/particle size distribution (estimated percentages): Silt/Clay _____ Sand _____ Fine Gravel ____ Coarse Gravel ____ Debris ____ Decomposed Organics _____ Other (describe)____________

If present, type of debris in sample	☐ Wood ☐ Large rocks ☐ Metal ☐ Plastic ☐ Organics ☐ Paper	Removed debris?	☐ Yes (Type & Amount) ________ ☐ No

Compositing notes ☐ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)? (2) 500 mL ambers, full (each)

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).	Jar Size	Amount Full	Target Analyses

Lab ID Here	Duplicate sample collected? Y/N
Duplicate sample identification # on COC:	Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND
ENVIRONMENTAL SERVICES
Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET

Project Name: **Portland Harbor – Basin 22 Dry Weather Sheen Investigation**			Sample ID: If collected 22-27W
Sampling Team: **MJS, ECH, WCR, PHA, +**	Date: **5/28/15**	Arrival Time: 1031	Point Code: 22-28
Basin: **22**	Node: AAP 794		Address: 22-29W
Current weather: **Sunny, 60s in morning – 80s in afternoon**			
Date and time of last known rainfall: **~¼" on 5/11/15, ~1/10" on 5/12/15**			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No

If present, water is: (Flowing) or Standing — Depth of water = main 10 in, lateral – 2" — Rate of flow = < ¼ fps, ½ fps

Does river back up to this location? Yes or (No)

If river is backed up: Water Color ☐ Brown ☐ Grey ☐ Clear — Water Odor ☐ Hydrocarbon ☐ Sanitary ☐ Other ________

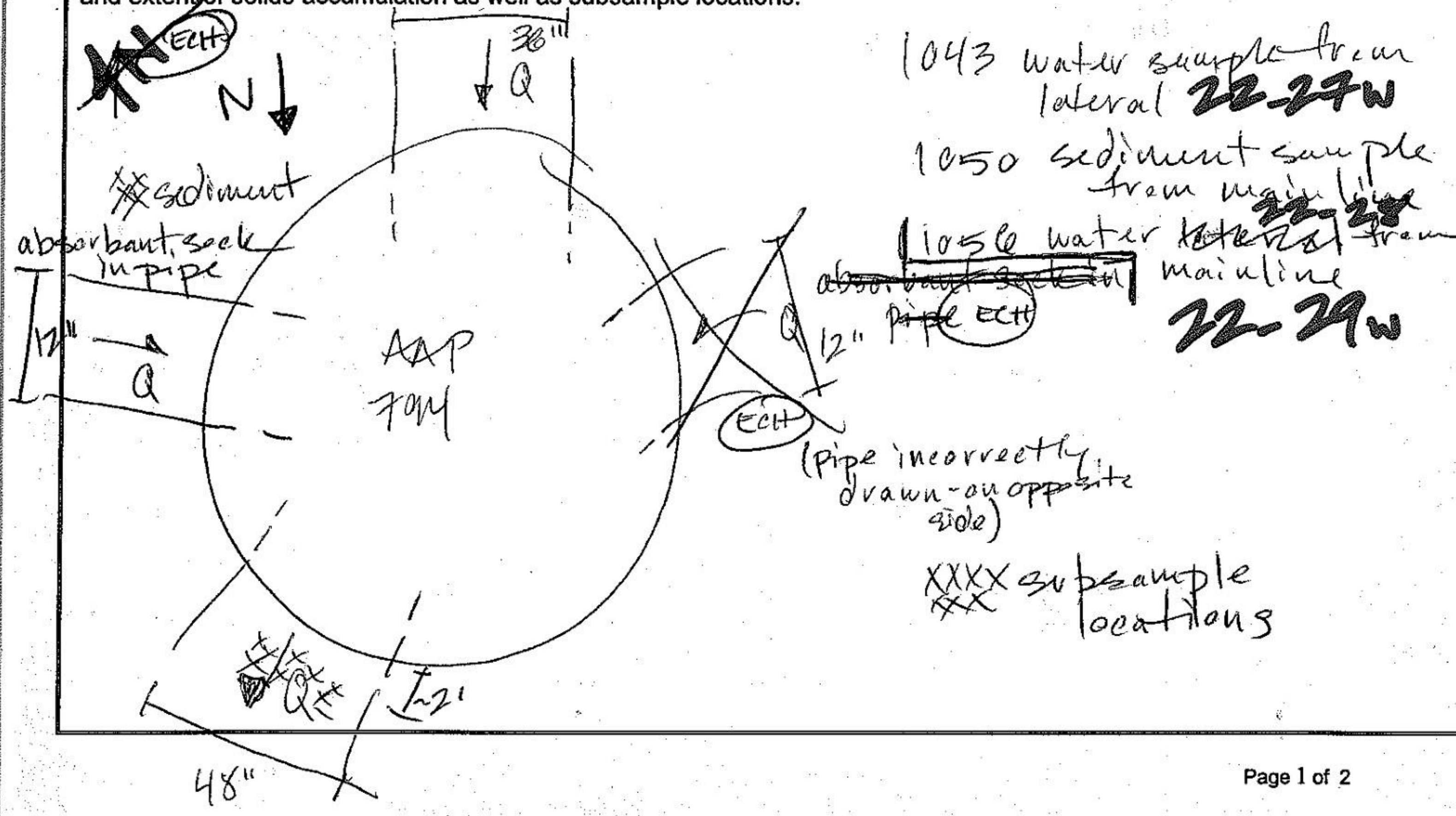
Are sediments observed in the line? (Yes) or No — in main

Are recoverable quantities of sediments present in the line? (Yes) or No — *No seds in lateral

If sediments present: Avg Depth of seds = 3 in — Sed Depth Range = consistently 3 in. to ________ in.

Estimated dimensions of sediment deposit: 2 ft ~~upstream of outlet~~ (ECH) downstream of MH in. by 24" wide in. OR ☒ ~~As far as can be seen~~

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.



Date: 5/28/15	SECTION 2 - SAMPLE COLLECTION REPORT	Node:	Point Code:

Sampling Equipment: ☒ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe)

Equipment Decontamination process: ☒ Per SOP 7.01a ☐ Deviations (Describe)

Sample date: 5/28/15	Sample time: 1050	Sample Identification Code (IL-XX-NNNNNN-mmyy): 22-28

Sample location: ☐ From MH chamber ☒ From line — right at the beginning of chamber where line exits chamber of water

If from line, segment is From Node _____ To Node _____

Sample collection technique: ☒ Per SOP5.01b ☐ Deviations (describe below)

Visual and olfactory observations: ☐ Odor _____ ☒ Sheen very slight ☐ Discoloration _____

Color of sample ☐ Brown ☒ Grey ☐ Other (describe) _____

Sample composition/particle size distribution (estimated percentages): Silt/Clay 0 Sand 85 Fine Gravel 10 Coarse Gravel 2 Debris 3 Decomposed Organics 0 Other (describe) _____

If present, type of debris in sample: ☒ Wood ☐ Large rocks ☒ Metal ☐ Plastic ☒ Organics ☐ Paper

Removed debris? ☒ Yes (Type & Amount) wood chunks, grave as much as possible ☐ No

Compositing notes ☒ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)? (1) 4 oz full

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).

Jar Size	Amount Full	Target Analyses

Lab ID Here

Duplicate sample collected? Y/N (N)

Duplicate sample identification # on COC: Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND

ENVIRONMENTAL SERVICES

Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET

Project Name: **Portland Harbor – Basin 22 Dry Weather Sheen Investigation**			Sample ID: If collected 22-30 wipe
Sampling Team: **MJS, ECH, WCR, PHA, +**	Date: **5/28/15**	Arrival Time: 1102	Point Code: 22-31 wipe
Basin: **22**	Node: ANV 453		Address:
Current weather: **Sunny, 60s in morning – 80s in afternoon**			
Date and time of last known rainfall: **~¼" on 5/11/15, ~1/10" on 5/12/15**			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? Yes or No (ECH) | If present, water is: Flowing or Standing | Depth of water = 1 in | Rate of flow = 2.0 fps

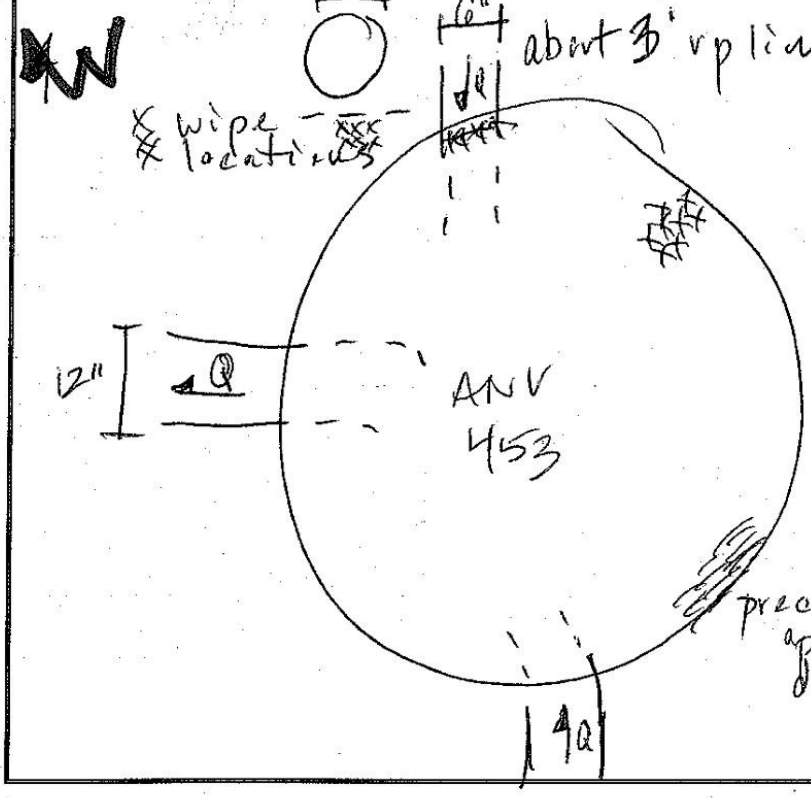
Does river back up to this location? Yes or No | If river is backed up: Water Color ☐ Brown ☐ Grey ☐ Clear | Water Odor ☐ Hydrocarbon ☐ Sanitary ☐ Other _____

Are sediments observed in the line? Yes or No | Are recoverable quantities of sediments present in the line? Yes or No

If sediments present: Avg Depth of seds = _____ in | Sed Depth Range = _____ in. to _____ in.

Estimated dimensions of sediment deposit: _____ in. by _____ in. OR ☐ As far as can be seen

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.



about 3' upline, pipe takes a bend towards Philips 66 property

1116 wipe ~~from~~ below 6" lateral and chamber seam - orange color 22-30 wipe

1119 wipe from chamber floor seep - dark 22-31 wipe

precipitate on wall appears mineral in nature, dry unable to wipe.

Date:	SECTION 2 - SAMPLE COLLECTION REPORT	Node:	Point Code:

Sampling Equipment: ☐ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe)

Equipment Decontamination process: ☐ Per SOP 7.01a ☐ Deviations (Describe)

Sample date:	Sample time:	Sample Identification Code (IL-XX-NNNNNN-mmyy)

Sample location: ☐ From MH chamber ☐ From line | If from line, segment is From Node_____ To Node _____

Sample collection technique: ☐ Per SOP5.01b ☐ Deviations (describe below)

_____

Visual and olfactory observations: ☐ Odor _____ ☐ Sheen _____ ☐ Discoloration _____

Color of sample ☐ Brown ☐ Grey ☐ Other (describe) _____

Sample composition/particle size distribution (estimated percentages): Silt/Clay _____ Sand _____ Fine Gravel ____ Coarse Gravel ____ Debris ____ Decomposed Organics _____ Other (describe)_____

If present, type of debris in sample ☐ Wood ☐ Large rocks ☐ Metal ☐ Plastic ☐ Organics ☐ Paper

Removed debris? ☐ Yes (Type & Amount) _____ ☐ No

Compositing notes ☐ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)?

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).	Jar Size	Amount Full	Target Analyses

Lab ID Here	Duplicate sample collected? Y/N
Duplicate sample identification # on COC:	Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND

ENVIRONMENTAL SERVICES

Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET

Project Name: **Portland Harbor – Basin 22 Dry Weather Sheen Investigation**			Sample ID: If collected 22-32W
Sampling Team: **MJS, ECH, WCR, PHA, +**	Date: **5/28/15**	Arrival Time: 1140	Point Code:
Basin: **22**	Node: AAP 792		Address:
Current weather: **Sunny, 60s in morning – 80s in afternoon**			
Date and time of last known rainfall: **~¼" on 5/11/15, ~1/10" on 5/12/15**			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No — If present, water is: (Flowing) or Standing — 12" inlet trace ~0.1 gpm — Depth of water = _____ in — Rate of flow = _____ fps

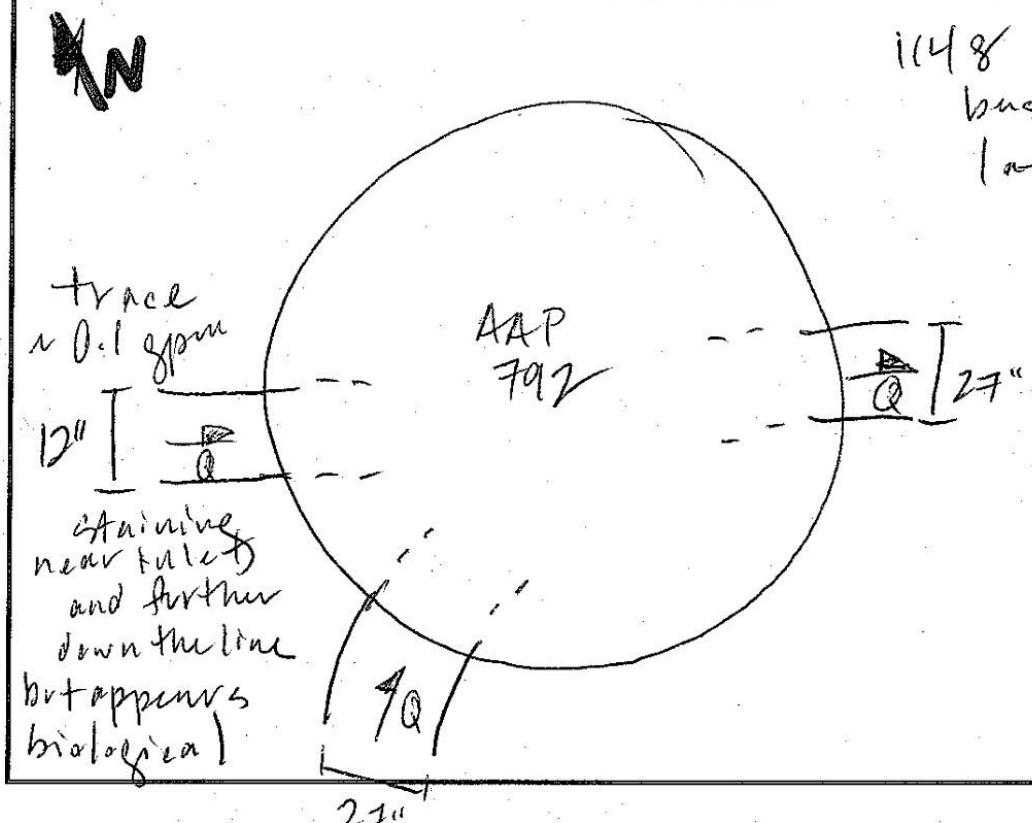
Does river back up to this location? Yes or (No) — If river is backed up: Water Color ☐ Brown ☐ Grey ☐ Clear — Water Odor ☐ Hydrocarbon ☐ Sanitary ☐ Other _____

Are sediments observed in the line? Yes or (No) — Are recoverable quantities of sediments present in the line? Yes or (No)

If sediments present: Avg Depth of seds = _____ in — Sed Depth Range = _____ in. to _____ in.

Estimated dimensions of sediment deposit: _____ in. by _____ in. OR ☐ As far as can be seen

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.



Date:	SECTION 2 - SAMPLE COLLECTION REPORT	Node:	Point Code:

Sampling Equipment: ☐ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe)

Equipment Decontamination process: ☐ Per SOP 7.01a ☐ Deviations (Describe)

Sample date:	Sample time:	Sample Identification Code (IL-XX-NNNNNN-mmyy)

Sample location: ☐ From MH chamber ☐ From line | If from line, segment is From Node_____ To Node _____

Sample collection technique: ☐ Per SOP5.01b ☐ Deviations (describe below)

_____

Visual and olfactory observations: ☐ Odor _____ ☐ Sheen _____ ☐ Discoloration _____

Color of sample ☐ Brown ☐ Grey ☐ Other (describe) _____

Sample composition/particle size distribution (estimated percentages): Silt/Clay _____ Sand _____ Fine Gravel ____ Coarse Gravel ____ Debris ____ Decomposed Organics _____ Other (describe)_____

If present, type of debris in sample ☐ Wood ☐ Large rocks ☐ Metal ☐ Plastic ☐ Organics ☐ Paper

Removed debris? ☐ Yes (Type & Amount) _____ ☐ No

Compositing notes ☐ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)?

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).	Jar Size	Amount Full	Target Analyses

Lab ID Here	Duplicate sample collected? Y/N
Duplicate sample identification # on COC:	Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND
ENVIRONMENTAL SERVICES
Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET

22-GW

Project Name: **Portland Harbor – Basin 22 Dry Weather Sheen Investigation**			Sample ID: If collected ~~22-33~~ → 22-GW
Sampling Team: **MJS, ECH, WCR, PHA, +**	Date: **5/28/15**	Arrival Time: 1202	Point Code: ~~22-34~~ → 2233
Basin: **22**	Node: AAP 791		Address:
Current weather: **Sunny, 60s in morning – 80s in afternoon**			
Date and time of last known rainfall: **~¼" on 5/11/15, ~1/10" on 5/12/15**			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No — If present, water is: (Flowing) or Standing — Depth of water = 0.5 in — Rate of flow = 1.5 fps

Does river back up to this location? Yes or (No) — If river is backed up: Water Color ☐ Brown ☐ Grey ☐ Clear — Water Odor ☐ Hydrocarbon ☐ Sanitary ☐ Other _____

Are sediments observed in the line? (Yes) or No — Are recoverable quantities of sediments present in the line? Yes or (No)

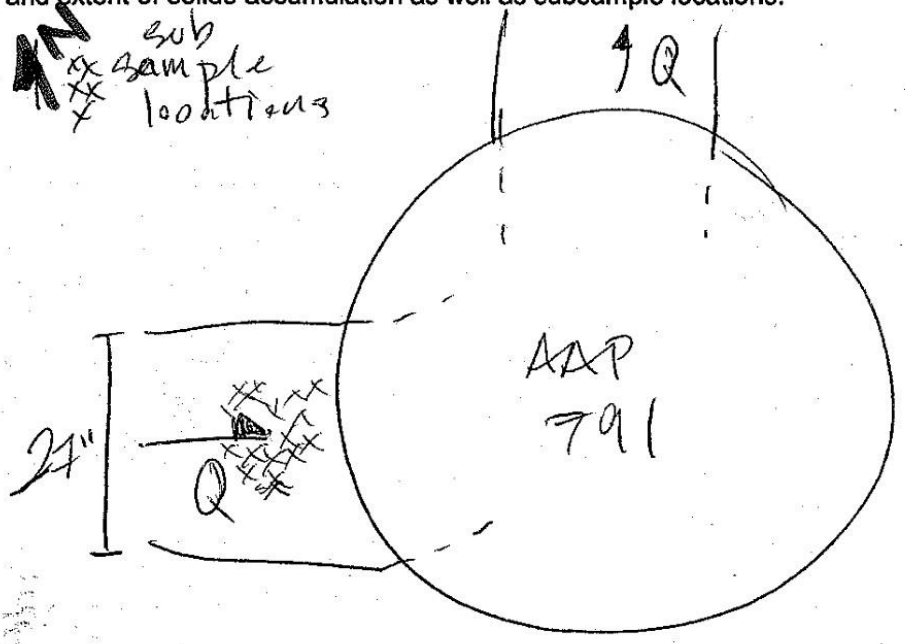
sediment in line is gravel

If sediments present: Avg Depth of seds = 1/2 in — Sed Depth Range = 1/4 in. to 1 in. — and unsampleable

Estimated dimensions of sediment deposit: 10 in. by 30 in. OR ☐ As far as can be seen

27"

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.



manhole is surrounded by gravel - not asphalt

1209 water sample (EcH) ~~12-33~~ → 22-GW

1210 sediment sample ~~22-34~~ → 22-33

Date: 5/28/15	SECTION 2 - SAMPLE COLLECTION REPORT	Node:	Point Code:

Sampling Equipment: ☒ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe)

Equipment Decontamination process: ☒ Per SOP 7.01a ☐ Deviations (Describe)

Sample date: 5/28/15	Sample time: 1216	Sample Identification Code (IL-XX-NNNNNN-mmyy) 22-SH-22-33

Sample location: ☐ From MH chamber ☒ From line | If from line, segment is From Node _____ To Node _____

Sample collection technique: ☒ Per SOP5.01b ☐ Deviations (describe below)

as invert coarse gravel and small cobbles removed prior to compositing

Visual and olfactory observations: NONE
☐ Odor _____
☐ Sheen _____
☐ Discoloration _____

Color of sample: ☒ Brown ☐ Grey ☐ Other (describe) _____

Sample composition/particle size distribution (estimated percentages): Silt/Clay 10 Sand 30 Fine Gravel 30 Coarse Gravel 30 Debris 0 Decomposed Organics 0 Other (describe) _____

If present, type of debris in sample: ☐ Wood ☐ Large rocks ☐ Metal ☐ Plastic ☐ Organics ☐ Paper

Removed debris? ☐ Yes (Type & Amount) _____ ☒ No

Compositing notes ☒ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)? (1) 4 oz full

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).

Jar Size	Amount Full	Target Analyses

Lab ID Here | Duplicate sample collected? Y/N

Duplicate sample identification # on COC: | Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND

ENVIRONMENTAL SERVICES

Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET 22-34

Project Name: **Portland Harbor – Basin 22 Dry Weather Sheen Investigation**			Sample ID: ~~22-34~~ 22-35,
Sampling Team: **MJS, ECH, WCR, PHA, +**	Date: **5/28/15**	Arrival Time: 1355	Point Code: ~~22-36 wipe~~
Basin: **22**	Node: AAM 078		Address: 22-35 wip
Current weather: **Sunny, 60s in morning – 80s in afternoon**			
Date and time of last known rainfall: **~¼" on 5/11/15, ~1/10" on 5/12/15**			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No | If present, water is: (Flowing) or Standing | Depth of water = 3 in | Rate of flow = 0.25 fps

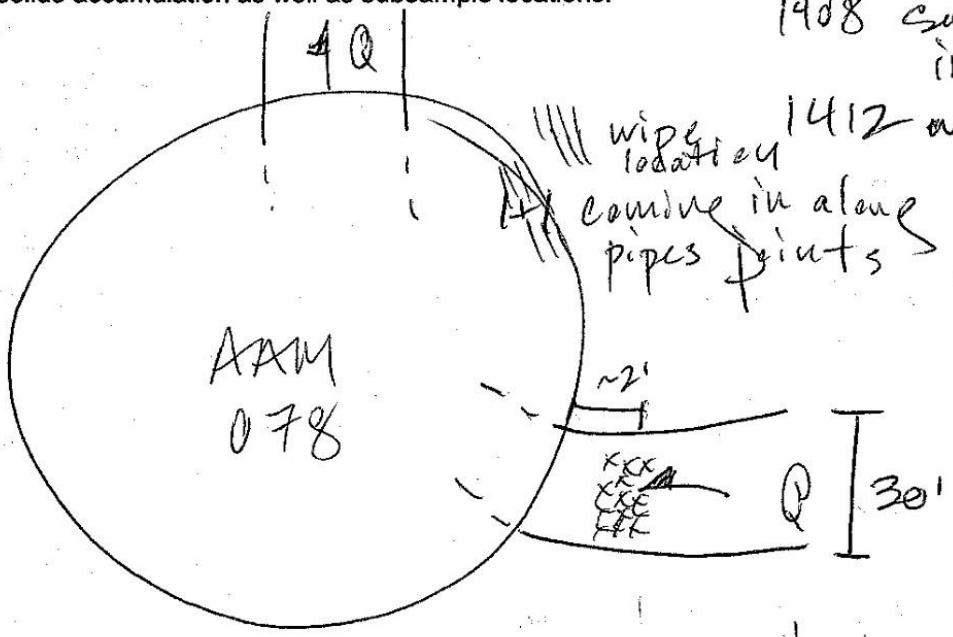
Does river back up to this location? Yes or (No) | If river is backed up: Water Color ☐ Brown ☐ Grey ☐ Clear | Water Odor ☐ Hydrocarbon ☐ Sanitary ☐ Other _____

Are sediments observed in the line? (Yes) or No | Are recoverable quantities of sediments present in the line? (Yes) or No

If sediments present: Avg Depth of seds = 3 in | Sed Depth Range = 2 in. to 3 in.

Estimated dimensions of sediment deposit: 10 (30') in. by _____ in. OR ☒ As far as can be seen

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.



1408 sampled sed in inlet 22-35

1412 wiped lt 1 22-34

22-36 wipe

22-35 wipe

Date: 5/28/15	SECTION 2 - SAMPLE COLLECTION REPORT	Node:	Point Code:

Sampling Equipment: ☒ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe)

Equipment Decontamination process: ☒ Per SOP 7.01a ☐ Deviations (Describe)

Sample date: 5/28/15	Sample time: 1408	Sample Identification Code (IL-XX-NNNNNN-mmyy) 22-35 → 22-34

Sample location: about ~2' US of chamber ☐ From MH chamber ☒ From line If from line, segment is From Node_____ To Node _____

Sample collection technique: ☒ Per SOP5.01b ☐ Deviations (describe below)

Visual and olfactory observations: NONE ☐ Odor _____ ☐ Sheen _____ ☐ Discoloration _____

Color of sample ☐ Brown ☒ Grey ☐ Other (describe) _____

Sample composition/particle size distribution (estimated percentages): Silt/Clay 3 Sand 80 Fine Gravel 10 Coarse Gravel 5 Debris 2 Decomposed Organics _____ Other (describe)_____

If present, type of debris in sample ☐ Wood ☐ Large rocks ☒ Metal ☐ Plastic ☐ Organics ☐ Paper (rebar) paint chips

Removed debris? ☐ Yes (Type & Amount) ☒ No unable to remove - too small

Compositing notes ☒ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)? (1) 4 oz jars

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).	Jar Size	Amount Full	Target Analyses

Lab ID Here

Duplicate sample collected? Y/(N)

Duplicate sample identification # on COC: Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
Sample Custodian: (503) 823-5696
General Lab: (503) 823-5681

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 5/28/15

Work Order #: W15E199

Collected By: MJS, WCR, ELH, PHA

Client Name: Director's Office

Project Name: Portland Harbor

Requested Analyses

Special Instructions:

Basin 22 Petroleum Sheen Investigation

[1] Run NWTPH-Dx and NWTPH-Gx if detected

Lab Number	Location ID	Sample Date	Sample Time	Grab or Comp	Sample Matrix	NWTPH-HCID[1]	PAH (low-Level)	Conductivity (umhos/cm) Meter: Combo 5	# of Containers	Remarks
01	22_24W	5/28/2015	1013	G	Water	●	●	254	2	AQB059 ~~ABQ059~~ Surface Sheen Water
2	22_25Wipe	5/28/2015	1018	G	Wipe	●			1	AQB059 ~~ABQ059~~ Wipe above 16" inlet
3	22_26Wipe	5/28/2015	1021	G	Wipe	●			1	AQB059 ~~ABQ059~~ Wipe below 6" inlet
4	22_27W	5/28/2015	1043	G	Water	●	●	103	2	AAP794 Dry Flow from 12" Lat
5	22_28	5/28/2015	1050	C G	Sed	●			1	AAP794 Inline Sediment DS
6	22_29W	5/28/2015	1056	G	Water	●	●	184	2	AAP794 Dry Flow from US
7	22_30Wipe	5/28/2015	1116	G	Wipe	●			1	ANV453 Wipe under east Lat
8	22_31Wipe	5/28/2015	1119	G	Wipe	●			1	ANV543 Wipe from east shelf
9	22_32W	5/28/2015	1148	G	Water	●	●	173	2	AAP792 N Dry Flow from S Lat
10	22_~~33W~~ GW	5/28/2015	1209	G	Water	●	●	194	2	AAP791 Dry Flow

Turn-Around-Time Request:

- ☐ Standard (10 business days)
- ☐ Rush (5 business days)
- ☐ Other: _____

Relinquished By:	Date:	Received By:	Date:	Relinquished By:	Date:	Received By:	Date:
Signature: Matt Sullivan	5/28/14	Signature:	5-28-15	Signature:		Signature:	
Printed Name: Matt Sullivan	Time: 1515	Printed Name: Nicholas Jennings	Time: 15:15	Printed Name:	Time:	Printed Name:	Time:

Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
Sample Custodian: (503) 823-5696
General Lab: (503) 823-5681

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 5/28/15

Work Order #: W15E199

Collected By: MJS, WCR, ECH, PHA

Client Name:	Director's Office
Project Name:	Portland Harbor

Requested Analyses

Special Instructions:

Basin 22 Petroleum Sheen Investigation

[1] Run NWTPH-Dx and NWTPH-Gx if detected

Lab Number	Location ID	Sample Date	Sample Time	Grab or Comp	Sample Matrix	NWTPH-HCID[1]	PAHs (low-Level)	Conductivity (umhos/cm) Meter: Combo 5	# of Containers	Remarks
11	22_34 33	5/28/2015	1216	C G	Sed	●				AAP791 Inline Sediment US
12	22_~~35~~ 34	5/28/2015	1408	C G	Sed	●				AAM078 Inline Sediment US
13	22_~~35Wipe~~ 35Wipe	5/28/2015	1412	G	Wipe	●				AAM078 Wipe from MH Collar

Turn-Around-Time Request:

- ☐ Standard (10 business days)
- ☐ Rush (5 business days)
- ☐ Other: _____

Relinquished By:	Date:	Received By:	Date:	Relinquished By:	Date:	Received By:	Date:
Signature: Matt Sullivan	5/28/15	Signature:	5-28-15	Signature:		Signature:	
Printed Name: Matt Sullivan	Time: 1515	Printed Name: Nicholas Serrano	Time: 1515	Printed Name:	Time:	Printed Name:	Time:

City of Portland
Environmental Services

DAILY FIELD REPORT

Page 1 of 3

Project Portland Harbor
Location OF22
Subject OF22 Dry Weather Petroleum Sheen Inv.

Project No.
Date 6/3/15
By PHA/MJS/WRC/ECH

950 - AAP799 - Arrived on site, slight petroleum odor, water stagnant small flow from lateral to east. Approx. 0.2" of rain yesterday so flow may be due to recent rain. Visible solids in line, only a trace in main. Inlet is 18", east lateral is 15", west lateral is 15", outlet is 30" More solids visible downstream approx. 5', downstream of 2 laterals from catch basins, only one is mapped (ANF255 on east side of NW Front Ave.) Both catchbasin inlets are 10". Visible solids in the two 15" laterals at manhole.

1014 - AAP799 - In line sediment sample collected DS of manhole approx. 5' (MJS (22-34)) Mixture of coarse and fine material. Avg. depth is 3" stretches as far as can see downstream. Visible sheen on surface most likely (22-36) due to disturbing the sediments. Petroleum odor increased after disturbing seds.

AAP799: About 1 inch of seds in west 15" lateral.

1020 - Collected in line sediment from west 15" lateral. material is (MJS (22-38)) sandy near node then gets more fine. Maybe effected by backdrop flow (22-37)

1037 - AAP796 - Arrived on site. Visible solids in line, Manhole deteriorated, no rungs. Plug in lateral from west is visible, ~~not~~ north ~~lateral from north but~~ there is a cylindrical hole coming in to main from ~~west~~ 5" in diameter. ~~The~~ It appears to be a 8" concrete pipe that extends as far as can see, Does appear to have flow based on sediment deposition at end. Approx. 3" of seds extend upstream as far as can see. No seds upstream in plugged 15" line.

Attachments

City of Portland
Environmental Services

DAILY FIELD REPORT

Project Portland Harbor
Location OFZZ
Subject OFZZ Dry Weather Petroleum Sheen Inv.

Project No.
Date 6/3/15
By PHA/MJS/WER/ECH

1058 - AAP796 - Collected inline sediment sample from 8" lateral from north. (MJS 22-39) (22-38)

1122 - AAP800 - Arrived on site; no flow or sediment visible from above. Light petroleum odor, trace of sediment upstream, may be sampleable. 18" upstream main, 18" downstream main, lateral from west is 10"

1133 - AAP800 - Collected inline sediment sample upstream of manhole. Due to small sediment volume sample collected directly into sample jar. Dark buildup of solids on wall of pipe included in sample. Material is on both sides of line, approx 9" up the sides of pipe. Appears to extend upstream approx. 30". There is no buildup on walls of downstream line. The material is clay-like and has slight petroleum odor. Sheen on water in sample. (MJS 22-40) (22-39)

1153 AAP802 - Arrived on site. Lateral From east perched lateral from north, and lateral from NW. Some visible coarse solids in manhole. No active flow. Lateral From north bends east towards catch basin ANF250. Lateral From NW appears to come from catch basin ANF248. No sampleable solids in any lateral. solids in manhole are coarse and don't appear contaminated.

1224 - ANF249 - Arrived on Site, catch basin located in gravel west of NW Front Ave, main outlet to south. Small perched lateral, 3", appears to be a weephole that doesn't go anywhere. Outlet is 12". Approx. sediment depth is 15". Plastics, organics, metal, styrofoam debris in CB. Catch basin is 30" deep

Attachments

City of Portland
Environmental Services

DAILY FIELD REPORT

Project Portland Harbor
Location OF22
Subject OF22 Dry Weather Petroleum Sheen Inv.

Project No.
Date 6/3/15
By PHA/MJS/LCR/ECH

1234-ANF249 (cont.) - Outlet to south may connect with catch basin ANF248 on west side of NW Front Ave. Outlet from ANF248 exits to the west, assume to catch basins join into one line that drains to AAP802 to NW lateral.

MJJ
~~22-4~~ (22-40)
1230-ANF249-Collected inline sediment sample near outlet from catch basin.

1239-Unmapped catch basin in gravel on west side of NW Front Ave. Outlet drains to east and appears to join main midway between AAP799 and AAP800. Catch basin is the same size as ANF249, but has no creosote tales. Sediment is dry and does not appear to get much flow. Outlet is 10", also 30" deep.

1246 - Collected inline sediment sample near catch basin outlet. Plastic, metals, organics, styrofoam, trash debris.

MJJ
~~22-42~~ (22-41)

Attachments

CITY OF PORTLAND

ENVIRONMENTAL SERVICES

Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET 22-36

Project Name: Portland Harbor – Basin 22 Sheen Investigation			Sample ID: ~~22-37~~ MJS
Sampling Team: MJS, ECH, WCR, PHA	Date: 6/3/15	Arrival Time: 0952	Point Code: (see additional FDS for observat and collection report for ~~22-36~~ (22-37) MJS
Basin: 22	Node: AAP 799		Address:
Current weather: Overcast, upwards of mid 60s			
Date and time of last known rainfall: ~0.2" 6/1/2015-6/2/2015			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No — If present, water is: (Flowing) or Standing — Depth of water = 1.5 in — Rate of flow = 0.25 fps

Does river back up to this location? Yes or (No) — If river is backed up: Water Color ☐ Brown ☐ Grey ☐ Clear — Water Odor ☐ Hydrocarbon ☐ Sanitary ☐ Other _____

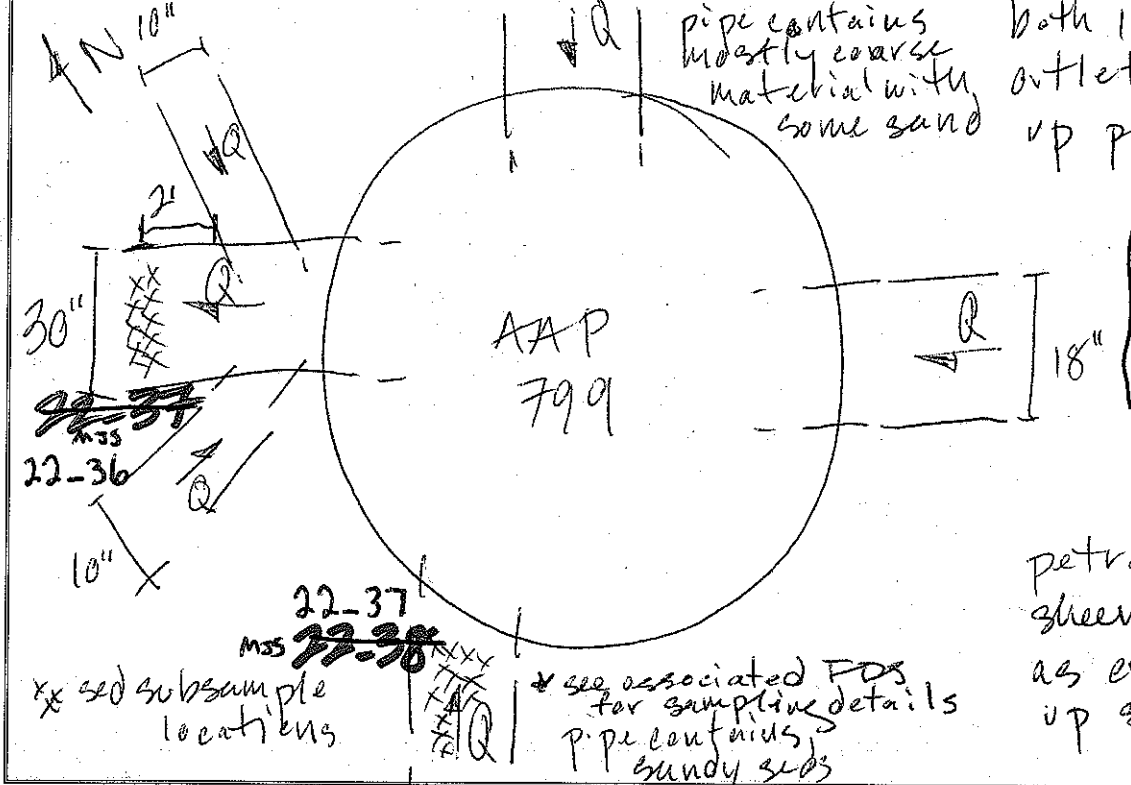
Are sediments observed in the line? (Yes) or No — Are recoverable quantities of sediments present in the line? (Yes) or No

Sediment starts to accum about 1' DS of where 2 CB inlets enter outlet line

If sediments present: Avg Depth of seds = 3 in — Sed Depth Range = _____ in. to _____ in. — uniform

Estimated dimensions of sediment deposit: 18 in. by _____ in. OR ☒ As far as can be seen

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.



Date: 6/3/15	**SECTION 2 - SAMPLE COLLECTION REPORT**	Node:	Point Code:

Sampling Equipment: ☒ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe)

Equipment Decontamination process: ☒ Per SOP 7.01a ☐ Deviations (Describe)

Sample date:	Sample time:	Sample Identification Code (IL-XX-NNNNNN-mmyy)
6/3/15	1014	~~22-37~~ MJS 22_36

Sample location: ☐ From MH chamber ☒ From line

If from line, segment is From Node ~~AAP7@~~ ECH To Node AAP799 to NW

Sample collection technique: ☒ Per SOP5.01b ☐ Deviations (describe below)

Collected seds about 2' DS of where CB enter outlet pipe. seds start about 1' DS.

Visual and olfactory observations: ☒ Odor ☒ Sheen ☒ Discoloration

Color of sample ☐ Brown ☒ Grey ☐ Other (describe)

Sample composition/particle size distribution (estimated percentages): Silt/Clay 23 Sand 25 Fine Gravel 20 Coarse Gravel 30 Debris 2 Decomposed Organics ____ Other (describe) ____

If present, type of debris in sample: ☐ Wood ☐ Large rocks ☒ Metal ☐ Plastic ☐ Organics ☐ Paper

Removed debris? ☒ Yes (Type & Amount) metal cobbles and coarse gravel ☐ No

Compositing notes ☒ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)? (1) 4 oz jar, full

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).	Jar Size	Amount Full	Target Analyses

Lab ID Here

Duplicate sample collected? Y (N)

Duplicate sample identification # on COC: Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND

ENVIRONMENTAL SERVICES

Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET

Project Name: Portland Harbor – Basin 22 Sheen Investigation			Sample ID: ~~22-38~~ MJS
Sampling Team: MJS, ECH, WCR, PHA	Date: 6/3/15	Arrival Time: 0952	Point Code: 22-37
Basin: 22	Node: AAP 799 - laterall to AAP796		Address:
Current weather: Overcast, upwards of mid 60s			
Date and time of last known rainfall: ~0.2" 6/1/2015-6/2/2015			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No	If present, water is: Flowing or (Standing)	Depth of water = 1 in	Rate of flow = _____ fps
Does river back up to this location? Yes or (No)	If river is backed up: Water Color ☐ Brown ☐ Grey ☐ Clear	Water Odor ☐ Hydrocarbon ☐ Sanitary ☐ Other _____	
Are sediments observed in the line? (Yes) or No	Are recoverable quantities of sediments present in the line? (Yes) or No		
If sediments present: Avg Depth of seds = 1 in	Sed Depth Range = _____ in. to _____ in. Uniform		
Estimated dimensions of sediment deposit: 6 in. by _____ in. OR ☒ As far as can be seen			

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.

see map for AAP 799

Date: 6/3/15	SECTION 2 - SAMPLE COLLECTION REPORT	Node:	Point Code:

Sampling Equipment: ☒ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe)

Equipment Decontamination process: ☒ Per SOP 7.01a ☐ Deviations (Describe)

Sample date: 6/3/15	Sample time: 1020	Sample Identification Code (IL-XX-NNNNNN-mmyy) 22-38 MS 22-37

Sample location: ☐ From MH chamber ☒ From line | If from line, segment is From Node AAP799 To Node AAP796

Sample collection technique: ☒ Per SOP5.01b ☐ Deviations (describe below)

Visual and olfactory observations: ☒ Odor organic decomp ☒ Sheen ☒ Discoloration appears brown/dark grey | Color of sample ☐ Brown ☒ Grey ☐ Other (describe)

Sample composition/particle size distribution (estimated percentages): Silt/Clay ~~75~~ 50 (est) Sand 70 Fine Gravel 0 Coarse Gravel 20 Debris 0 Decomposed Organics 5 Other (describe)

If present, type of debris in sample: ☐ Wood ☐ Large rocks ☐ Metal ☐ Plastic ☐ Organics ☐ Paper | Removed debris? ☐ Yes (Type & Amount) ☒ No

Compositing notes ☒ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)? (1) 4oz, full

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).

Jar Size	Amount Full	Target Analyses

Lab ID Here | Duplicate sample collected? Y/N

Duplicate sample identification # on COC: Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND

ENVIRONMENTAL SERVICES

Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET

Project Name: Portland Harbor – Basin 22 Sheen Investigation			Sample ID: ~~22-39~~ 22-38 MJS
Sampling Team: MJS, ECH, WCR, PHA	Date: 6/3/15	Arrival Time: 1037	Point Code: 22_38
Basin: 22	Node: AAP79B		Address:
Current weather: Overcast, upwards of mid 60s			
Date and time of last known rainfall: ~0.2" 6/1/2015-6/2/2015			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? Yes or No trace in 15" none in 8" | If present, water is: Flowing or (Standing) Depth of water = trace in Rate of flow = 0 fps

Does river back up to this location? Yes or (No) | If river is backed up: Water Color ☐ Brown ☐ Grey ☐ Clear | Water Odor ☐ Hydrocarbon ☐ Sanitary ☐ Other _____

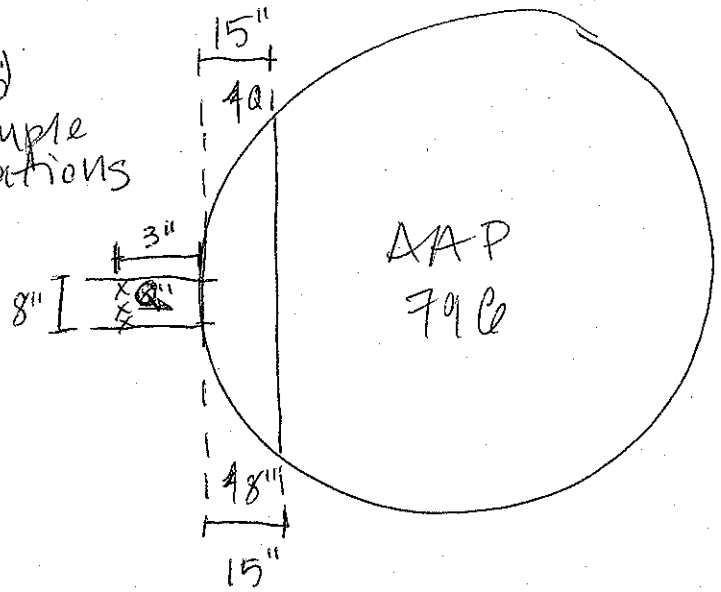
Are sediments observed in the line? Yes or No no sediment in 15" line above 8" inlet sediment in 8" | Are recoverable quantities of sediments present in the line? (Yes) or No yes, recoverable for 8"

If sediments present: Avg Depth of seds = 1.5 in Sed Depth Range = uniform in. to _____ in.

Estimated dimensions of sediment deposit: 3 in. by _____ in. OR ☒ As far as can be seen

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.

N



xxx sed subsample locations

1058 sampled sed from 8" inlet, about 3" upstream from MH chamber.

~~22-39~~ MJS
22-38

Date: 6/3/15	SECTION 2 - SAMPLE COLLECTION REPORT	Node:	Point Code:

Sampling Equipment: ☒ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe)

Equipment Decontamination process: ☒ Per SOP 7.01a ☐ Deviations (Describe)

Sample date:	Sample time:	Sample Identification Code (IL-XX-NNNNNN-mmyy)
6/3/15	1058	~~22-39~~ MSS 22-38

Sample location: ☐ From MH chamber ☒ From line 8" US | If from line, segment is From Node AAP 796 To Node ____

Sample collection technique: ☒ Per SOP5.01b ☐ Deviations (describe below)

Visual and olfactory observations: ~~☒ Odor~~ ____ ~~☒ Sheen~~ ____ ☒ Discoloration appears really dark grey

Color of sample ☐ Brown ☒ Grey ☐ Other (describe) ____

Sample composition/particle size distribution (estimated percentages): Silt/Clay 15 Sand 60 Fine Gravel 0 Coarse Gravel 20 Debris 5 Decomposed Organics 0 Other (describe) ____

If present, type of debris in sample: ☐ Wood ☐ Large rocks ☐ Metal ☒ Plastic ☐ Organics ☐ Paper — roofing aq? paint flecks?

Removed debris? ☒ Yes (Type & Amount) as much as possible ☐ No

Compositing notes ☒ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)? (1) 4 oz, full

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).

Jar Size	Amount Full	Target Analyses

Lab ID Here | Duplicate sample collected? Y/N

Duplicate sample identification # on COC: Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND
ENVIRONMENTAL SERVICES
Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET

Project Name: Portland Harbor – Basin 22 Sheen Investigation			Sample ID: ~~22-40~~ MJS
Sampling Team: MJS, ECH, WCR, PHA	Date: 6/3/15	Arrival Time: 1122	Point Code: 22-39
Basin: 22	Node: ~~AAP08~~ ECH AAP800		Address:
Current weather: Overcast, upwards of mid 60s			
Date and time of last known rainfall: ~0.2" 6/1/2015-6/2/2015			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No | If present, water is: Flowing or (Standing) Depth of water = trace in Rate of flow = 0 fps

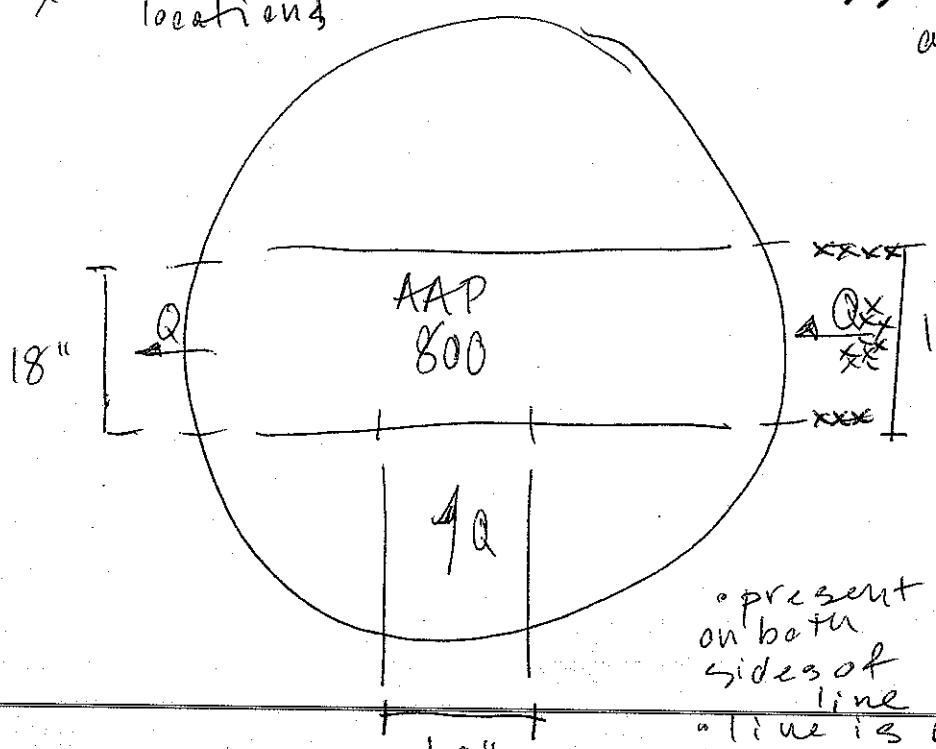
Does river back up to this location? Yes or (No) | If river is backed up: Water Color ☐ Brown ☐ Grey ☐ Clear | Water Odor ☐ Hydrocarbon ☐ Sanitary ☐ Other _____

Are sediments observed in the line? (Yes) or No trace upstream, no sediment down | Are recoverable quantities of sediments present in the line? Yes or No upstream

If sediments present: Avg Depth of seds = trace in Sed Depth Range = _____ in. to _____ in.

Estimated dimensions of sediment deposit: 3 in. by 12 in. OR ☐ As far as can be seen
starts about 3' upstream of sample

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.



Date: 8/3/15	SECTION 2 - SAMPLE COLLECTION REPORT	Node:	Point Code:

Sampling Equipment: ☒ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe)

Equipment Decontamination process: ☒ Per SOP 7.01a ☐ Deviations (Describe)

Sample date: 8/3/15	Sample time: 1133	Sample Identification Code (IL-XX-NNNNNN-mmyy): ~~22-40~~ MJS 22_39

Sample location: ☐ From MH chamber ☒ From line | If from line, segment is From Node _____ To Node _____ AAP800 upstream

Sample collection technique: ☐ Per SOP5.01b ☒ Deviations (describe below)
direct fill from scrs in pipe and 'FOG' on pipe walls due to low volume

Visual and olfactory observations: ☒ Odor petroleum ☒ Sheen _____ ☒ Discoloration _____

Color of sample: ☐ Brown ☒ Grey ☐ Other (describe) _____

Sample composition/particle size distribution (estimated percentages): Silt/Clay 100 Sand _____ Fine Gravel _____ Coarse Gravel _____ Debris _____ Decomposed Organics _____ Other (describe) _____

If present, type of debris in sample: ☐ Wood ☐ Large rocks ☐ Metal ☐ Plastic ☐ Organics ☐ Paper

Removed debris? ☐ Yes (Type & Amount) _____ ☐ No

Compositing notes ☐ Per SOP5.01b ☒ Deviations (describe) See above

Sample Jars Collected (number, size, full or partial)? (1) 4 oz, full

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).

Jar Size	Amount Full	Target Analyses

Lab ID Here

Duplicate sample collected? Y/(N)

Duplicate sample identification # on COC: Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND

ENVIRONMENTAL SERVICES

Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

INLINE SEDIMENT SAMPLING FIELD DATA SHEET

Project Name: PORTLAND HARBOR - BASIN 22 SHEEN INVESTIGATION			Sample ID: NO SAMPLE
Sampling Team: MDG, ECH, WCR, PHA	Date: 6/3/15	Arrival Time: 1153	Point Code:
Basin: 22	Node: AAP 802		Address:
Current weather: Overcast; upwards of mid 60s			
Date and time of last known rainfall: ~0.2" 6/1/15 - 6/2/15			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Is there water inline? (Yes) or No — If present, water is: Flowing or (Standing) — Depth of water = trace in — Rate of flow = 0 fps

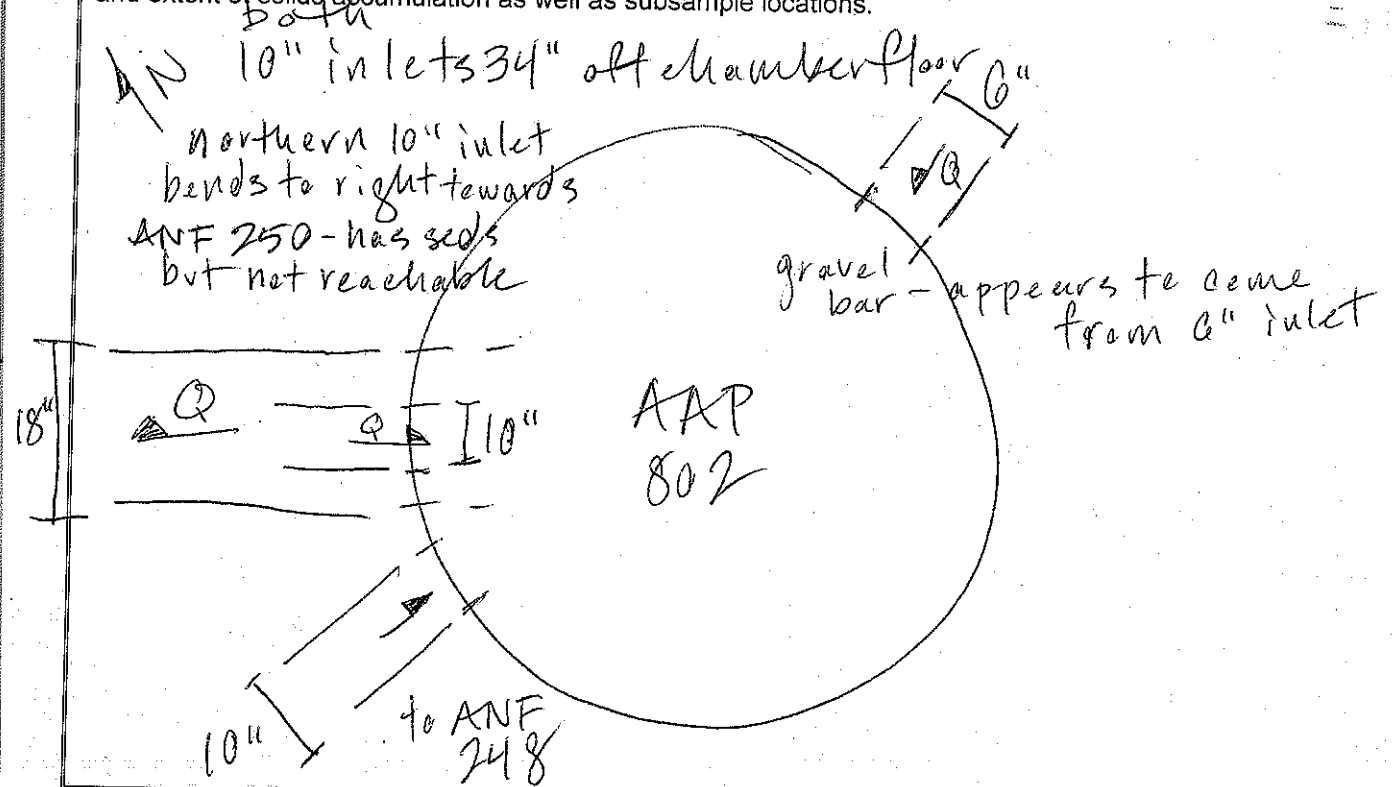
Does river back up to this location? Yes or (No) — If river is backed up: Water Color ☐ Brown ☐ Grey ☐ Clear — Water Odor ☐ Hydrocarbon ☐ Sanitary ☐ Other _____

Are sediments observed in the line? (Yes) or No — Are recoverable quantities of sediments present in the line? (Yes) or No — but coarse and appear clean

If sediments present: Avg Depth of seds = 1.5 in — Sed Depth Range = uniform in. to _____ in.

Estimated dimensions of sediment deposit: concentrated around 6" on manhole floor near 6" inlet in. by 1 in. OR ☐ As far as can be seen

SITE DIAGRAM: Include street intersections/main lines/laterals/catch basins/MH's/pipe sizes/ flow direction/ driveways cuts and extent of solids accumulation as well as subsample locations.



Date:	SECTION 2 - SAMPLE COLLECTION REPORT	Node:	Point Code:

Sampling Equipment: ☐ Stainless steel utensil & stainless steel receptacle ☐ Other (Describe)

Equipment Decontamination process: ☐ Per SOP 7.01a ☐ Deviations (Describe)

Sample date:	Sample time:	Sample Identification Code (IL-XX-NNNNNN-mmyy)

Sample location: ☐ From MH chamber ☐ From line | If from line, segment is From Node_____ To Node _____

Sample collection technique: ☐ Per SOP5.01b ☐ Deviations (describe below)

_____

Visual and olfactory observations: ☐ Odor _____ ☐ Sheen _____ ☐ Discoloration _____

Color of sample ☐ Brown ☐ Grey ☐ Other (describe) _____

Sample composition/particle size distribution (estimated percentages): Silt/Clay _____ Sand _____ Fine Gravel ____ Coarse Gravel ____ Debris ____ Decomposed Organics _____ Other (describe)_____

If present, type of debris in sample ☐ Wood ☐ Large rocks ☐ Metal ☐ Plastic ☐ Organics ☐ Paper

Removed debris? ☐ Yes (Type & Amount) _____ ☐ No

Compositing notes ☐ Per SOP5.01b ☐ Deviations (describe)

Sample Jars Collected (number, size, full or partial)?

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).

Jar Size	Amount Full	Target Analyses

Lab ID Here | Duplicate sample collected? Y/N

Duplicate sample identification # on COC: | Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of node showing drainage area	Filename(s):
Plan view of sediments inline	Filename:
Homogenized sample (sediment in bowl)	Filename:
Other?	Filename(s):

CITY OF PORTLAND
ENVIRONMENTAL SERVICES
Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

CATCH BASIN SOLIDS SAMPLING
FIELD DATA SHEET

Project Name: Portland Harbor – Basin 22 Sheen Investigation		Sample ID: ~~22-41~~ MJS 22-40	
Sampling Team: MJS, ECH, WCR, PHA	Date: 6/3/15	Arrival Time: 1724	Point Code:
Basin: 22	Node: ANF249	Address:	
Current weather: Overcast, upwards of mid 60s			
Date and time of last known rainfall: ~0.2" 6/1/2015-6/2/2015		sprinkled about 10 min, didn't produce runoff (~1730)	

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Indicate observed erodible solids or adjacent operations that could impact catch basin: ☐ Construction Activities ☐ Materials Storage ☐ On-site Processes ____ ☐ Erosion ☒ Heavy Truck Traffic ☐ Other ____

Percent of catch basin grate clogged = 5 %

Type of debris clogging catch basin grate: ☒ Fine Seds ☐ Wood ☐ Plastic ☒ Gravel ☐ Leaf debris ☐ Other ____

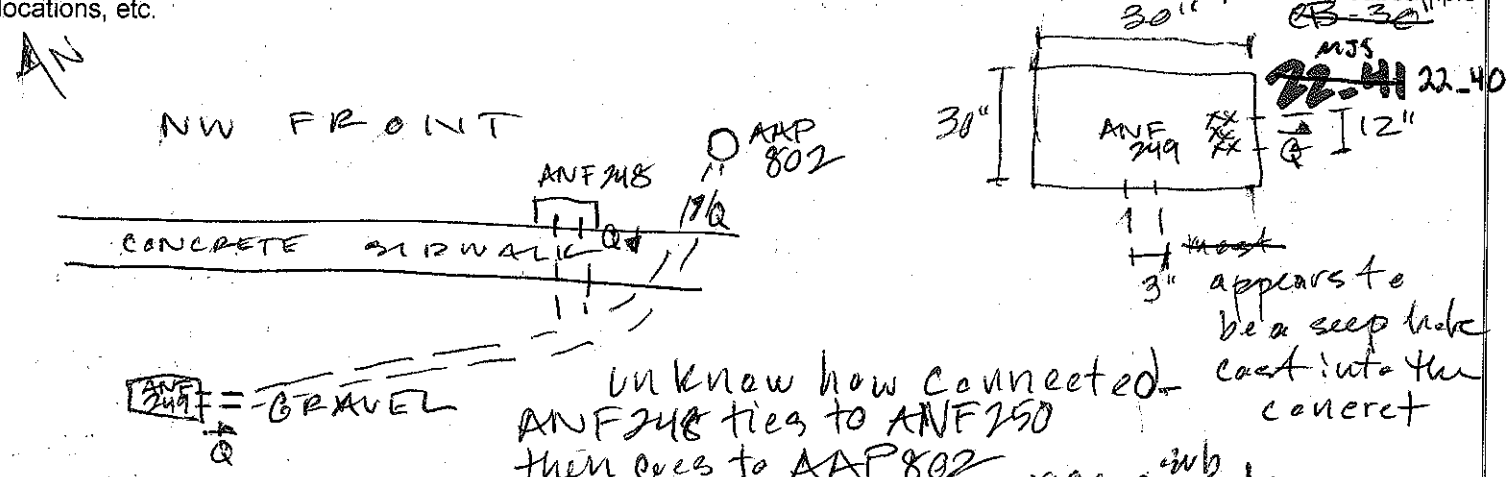
Is there standing water in catch basin? ☐ Yes ☒ No

Depth of standing water, if present = ____ in

Note visual or olfactory observations: ☒ Plastics ☐ Oily Sheen/Discolored Sediment ☒ Organics ☒ Metals ☒ Paper ☐ Cigarette butts ☐ Hydrocarbon odor ☐ Solvent odor ☒ Other: styrofoam

Total depth of catch basin = 30 in | Average sediment depth = 15 in | Sed depth range = 12 in to 18 in

SITE DIAGRAM: Include street intersections, inlets and outlets, catch basin dimensions, sediment depth detail, subsample locations, etc.



Date: 6/3/15	**SECTION 2 - SAMPLE COLLECTION REPORT**	Node:	Point Code:

Sampling Equipment: ☒ Stainless steel utensil & stainless steel receptacle ☐ Other (describe)

Equipment decontamination procedure: ☒ Per SOP7.01a ☐ Deviations (describe)

Sample Date:	Sample Time:	Sample Identification Code (IL-XX-NNNNNN-mmyy)
6/3/15	1730	~~22-41~~ MS5 22_40

Sample collection technique: ~~☒ Per 2003 CH2M Hill SOP – Guidance for Sampling of Catch Basin Solids~~ EGH

☐ Per SOP5.02a – Inline Sampling of Stormwater Solids ☒ Deviations (describe below)

Sampled directly into jar and homogenized in jar due to abundance of material

Visual or olfactory evidence of contamination in composite sample		Color of sample	
	☒ Odor earthy		☒ Brown
	☐ Sheen		☐ Grey
	☐ Discoloration		☐ Other (describe)

Sample composition/particle size distribution (estimated percentages): Silt/Clay 10 Sand 30 Fine Gravel ____ Coarse Gravel ____ Debris ____ Decomposed Organics 60 Other (describe) ____

If present, type of debris in sample			Removed debris?
	☐ Wood	☐ Large rocks	☒ Yes (Type & Amount) ☐ No
	☐ Metal	☐ Plastic	trash excluded prior to collection
	☐ Organics	☐ Paper	

Compositing notes ☒ Per SOP5.01a ☐ Deviations (describe)

Sample jars collected (number, size, full or partial)? (1) 4oz, full

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).	Jar Size	Amount Full	Target Analyses

Lab ID Here

Duplicate sample collected? Y/N

Duplicate sample identification # on COC: Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of CB showing drainage area	Filename(s):
Catch basin plan view prior to sampling showing solids	Filename:
Pipe connections to/from CB	Filename(s):
Homogenized sample (sediment in bowl)	Filename:

CITY OF PORTLAND

ENVIRONMENTAL SERVICES

Water Pollution Control Laboratory
6543 N. Burlington Ave.,
Portland, OR 97203-5452

CATCH BASIN SOLIDS SAMPLING
FIELD DATA SHEET

22-41

Project Name: PORTLAND HARBOR - BASIN 22 SHEEN INVESTIGATION		Sample ID: ~~22-42~~ MJS	
Sampling Team: MJS, ECH, WJR, PHA	Date: 6/3/15	Arrival Time: 1239	Point Code:
Basin: 22	Node: unmapped CB between AAP-7aC and AAP808	Address:	
Current weather: Overcast, upwards of mid 60s			
Date and time of last known rainfall: ~0.2" 6/1-6/2/15, light sprinkle but no runoff while on site			

SECTION 1 - PRE-SAMPLING VISUAL OBSERVATION REPORT

Indicate observed erodible solids or adjacent operations that could impact catch basin: ☐ Construction Activities ☐ Materials Storage ☐ On-site Processes ____ ☐ Erosion ☒ Heavy Truck Traffic ☐ Other ____

Percent of catch basin grate clogged = 5 %

Type of debris clogging catch basin grate: ☒ Fine Seds ☐ Wood ☐ Plastic ☒ Gravel ☐ Leaf debris ☐ Other ____

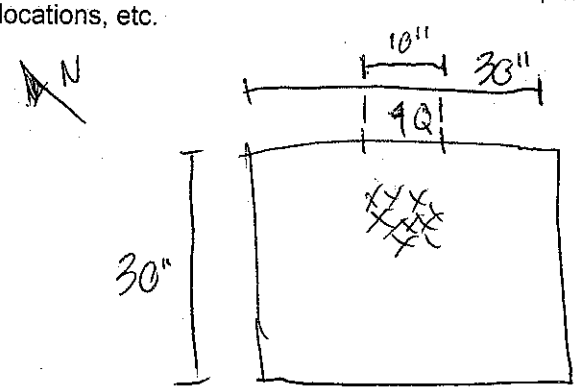
Is there standing water in catch basin? ☐ Yes ☒ No

Depth of standing water, if present = ____ in

Note visual or olfactory observations: ☒ Plastics ☐ Oily Sheen/Discolored Sediment ☒ Organics ☒ Metals ☒ Paper ☐ Cigarette butts ☐ Hydrocarbon odor ☐ Solvent odor ☒ Other: Styrefoam

Total depth of catch basin = 30 in | Average sediment depth = 15 in | Sed depth range = 6 in to 18 in

SITE DIAGRAM: Include street intersections, inlets and outlets, catch basin dimensions, sediment depth detail, subsample locations, etc.



124 C - sampled seds from catch basin just prior to 10" outlet

~~22-42~~ MJS
22-41

XXX sed subsample locations

Date: 6/3/15	SECTION 2 - SAMPLE COLLECTION REPORT	Node:	Point Code:

Sampling Equipment: ☒ Stainless steel utensil & stainless steel receptacle ☐ Other (describe)

Equipment decontamination procedure: ☒ Per SOP7.01a ☐ Deviations (describe)

Sample Date: 6/3/15	Sample Time: 1246	Sample Identification Code (IL-XX-NNNNNN-mmyy) 22-42 MJS 22-41

Sample collection technique: ☐ Per 2003 CH2M Hill SOP – Guidance for Sampling of Catch Basin Solids

☐ Per SOP5.02a – Inline Sampling of Stormwater Solids ☒ Deviations (describe below)

Sampled directly into jar and homogenized in jar due to abundance of material

Visual or olfactory evidence of contamination in composite sample	Color of sample
☒ Odor earthy ☐ Sheen ☐ Discoloration	☒ Brown ☐ Grey ☐ Other (describe)

Sample composition/particle size distribution (estimated percentages): Silt/Clay 10 Sand 30 Fine Gravel ____ Coarse Gravel ____ Debris ____ Decomposed Organics 60 Other (describe)____

If present, type of debris in sample	Removed debris?
☐ Wood ☐ Large rocks ☐ Metal ☐ Plastic ☐ Organics ☐ Paper	☒ Yes (Type & Amount) ☐ No trash excluded prior to collection

Compositing notes ☒ Per SOP5.01a ☐ Deviations (describe)

Sample jars collected (number, size, full or partial)? (1) 4oz, full

If not enough sample to fill all of the jars, list jars collected and related analytes sampled (as per analyte priority list in work order).	Jar Size	Amount Full	Target Analyses

Lab ID Here | Duplicate sample collected? Y/N

Duplicate sample identification # on COC: Dup ID Here

SECTION 3 - PHOTOGRAPH LOG

Overview of CB showing drainage area	Filename(s):
Catch basin plan view prior to sampling showing solids	Filename:
Pipe connections to/from CB	Filename(s):
Homogenized sample (sediment in bowl)	Filename:

Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
Sample Custodian: (503) 823-5696
General Lab: (503) 823-5681

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 6/3/15

Work Order #: W15F041

Collected By: MJS, PHA, ECH, WCR

Client Name: Director's Office

Project Name: Portland Harbor

Requested Analyses

Special Instructions:

Basin 22 Petroleum Sheen Investigation

[1] Run NWTPH-Dx and NWTPH-Gx if detected

Lab Number	Location ID	Sample Date	Sample Time	Grab or Comp	Sample Matrix	NWTPH-HCID[1]	# of Containers	Remarks
01	22_37 36	6/3/2015	1014	C G	Sed	●	1	AAP799 Inline Sediment DS
2	22_38 37	6/3/2015	1020	C G	Sed	●	1	AAP799 Inline Sed - 15" W Lat
3	22_39 38	6/3/2015	1058	C G	Sed	●	1	AAP796 Inline Sed - 8" N Lat
4	22_40 39	6/3/2015	1133	C G	Sed	●	1	AAP800 Inline Sediment - US
5	22_41 40	6/3/2015	1230	C G	Sed	●	1	ANF249 Inline Sed - CB Outlet
6	22_42 41	6/3/2015	1246	C G	Sed	●	1	CB to AAP799 AAP800 Inline Sed - CB Outlet

Turn-Around-Time Request:

- [x] Standard (10 business days)
- [ ] Rush (5 business days)
- [ ] Other: _____

Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Matt Sullivan	Signature:	Signature:	Signature:
Printed Name: Matt Sullivan	Printed Name: Gabriel McEgan	Printed Name:	Printed Name:
Date: 6/3/15	Date: 6/3/15	Date:	Date:
Time: 1457	Time: 1457	Time:	Time:

Attachment D
Laboratory Results

Investigation Day One
May 27, 2015

GSI Water Solutions, Inc.
55 SW Yamhill Street, Suite 400 Portland, OR 97204
P: 503.239.8799 F: 503.239.8940
info@gsiwatersolutions.com www.gsiwatersolutions.com

Laboratory Data QA/QC Review
Petroleum Sheen Investigation
Outfall Basin 22

To: File

From: Andrew Davidson, GSI

Date: June 23, 2015

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during a source control investigation sampling event conducted by the City of Portland (City). Six composite inline solids samples, nine dry weather flow (DWF) grab samples, six wipe samples, and one field decontamination blank sample were collected in Outfall Basin 22 on May 27, 2015 and submitted for analyses.

The laboratory analyses for these source control program samples were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and included the following analyses:

- BES WPCL
    - Total Solids – SM 2540 G (Inline solids samples only)
    - Field Conductivity – FO SOP 1.03a
    - Hydrocarbon Analysis – NWTPH-HCID (NWTPH-Dx if detected)
    - Polycyclic Aromatic Hydrocarbons (PAHs) – EPA 8270-SIM (DWF samples only)

The WPCL summary report for all analyses associated with this sampling event is attached for review.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and available:

- Chain-of-custody for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method blanks and/or field decontamination blanks

- Internal standard recoveries within laboratory control limits
- Surrogate recoveries within laboratory control limits
- Matrix spike/matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control/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

The samples were extracted and analyzed within the recommended method-specific holding times.

Method Blanks

Method blanks were processed during the hydrocarbon scan analysis (NWTPH-HCID) and the analysis of diesel/oil hydrocarbons (NWTPH-Dx) for wipe, DWF, and inline solids samples. No analytes were detected in any of the blank samples processed during the analysis of hydrocarbons in wipe, DWF, or inline solids samples. One method blank sample was processed during the analysis of PAHs. No analytes were detected in the method blank sample.

Field Decontamination Blanks

One field decontamination blank was collected during the sampling event and analyzed for petroleum hydrocarbons and PAHs. No target analytes were detected in the field decontamination blank.

Surrogate Recoveries

Surrogate recoveries were processed during the laboratory analyses of hydrocarbons and PAHs. Surrogate recoveries were within control limits with the following exceptions:

- High concentrations of hydrocarbons in samples W15E194-19 and W15E194-20 prevented determination of surrogate recoveries during the initial hydrocarbon scan (NWTPH-HCID). Despite the sample undergoing silica gel-cleanup, associated surrogate recoveries could not be determined in these same samples during the diesel/oil analysis (NWTPH-Dx) due to required dilutions of the sample extract. Accordingly, diesel/oil hydrocarbon results for these samples are qualified as estimates and flagged “J” due to

unacceptable surrogate recovery "SR"; that is there is a degree of uncertainty associated with the values due to the high dilutions that prevented acceptable recovery of the surrogate compound 2-Fluorobiphenyl.

- Recovery of the surrogate compound 2-Fluorobiphenyl was below acceptance limits for the DWF sample W15E194-21 during the NWTPH-Dx analysis. WPCL reports that the sample results may be low estimates. Accordingly, diesel/oil hydrocarbon results for this sample are qualified as estimates and flagged "J" due to unacceptable surrogate recovery "SR".
- Recovery of the surrogate compound fluoranthene-d10 was below acceptance criteria during the analysis of PAHs for the DWF sample W15E194-21. WPCL reports that associated sample results may be low estimates. Accordingly, associated target compounds for fluoranthene-d10 (fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene) are flagged as estimates "J" due to surrogate recovery outside acceptance limits "SR".

Matrix Spike/Matrix Spike Duplicate

MS/MSD samples were prepared using aliquots of DWF sample W15E194-05 and processed during the laboratory analysis of PAHs in DWF samples. MS/MSD recoveries and RPDs were within acceptance limits for all spiked analytes.

Laboratory Control Samples/Duplicate Laboratory Control Samples

LCS samples were processed during the analyses of hydrocarbons in wipe, DWF, and inline solids samples and during the analyses of PAHs in DWF samples. DLC samples were processed during the analyses of hydrocarbons in DWF samples. All laboratory control sample recoveries and RPDs were within laboratory control limits.

Duplicate Samples

Duplicate samples were processed during the analyses of total solids and hydrocarbons (NWTPH-HCID and NWTPH-Dx) for inline solids samples. All RPDs were within acceptance criteria.

Additional Information

WPCL reports the following additional information regarding wipe, DWF, and inline solids samples:

- For samples where hydrocarbons were detected by the initial hydrocarbon scan (NWTPH-HCID), additional analyses NWTPH-Dx and NWTPH-Gx were to be run. WPCL reports that no VOAs were available for follow-up analysis of NWTPH-Gx on water samples; no extra jars were available for follow-up analysis of NWTPH-Gx on inline solids; no additional sample available for follow-up analysis of NWTPH-Gx on the wipe samples. Accordingly, only NWTPH-Dx analyses were conducted for the samples where hydrocarbons were detected by NWTPH-HCID.

- All samples analyzed by NWTPH-Dx underwent silica gel clean-up.
- WPCL reports that detections quantified as Diesel and Lube Oil in samples W15E194-01, W15E194-02, W15E194-03, W15E194-04, W15E194-05, W15E194-06, and W15E194-12 actually appear to be a single petroleum product that is heavier than Diesel #2 and lighter than the reference lube oil. The data are qualified as estimates "J" due to inadequate matching with the reference compounds "RC".
- WPCL reports that the fuel pattern in samples W15E194-01, W15E194-02, W15E194-03, W15E194-04, W15E194-05, W15E194-06, W15E194-12, and W15E194-15 most closely resembles transformer oil. Specifically, WPCL reports that samples W15E194-02, W15E194-03, W15E194-04, W15E194-06, and W15E194-12 resemble a non-Aroclor transformer oil.
- WPCL reports that during the initial hydrocarbon scan, results for gasoline and lube oil in samples W15E194-19 and W15E194-20 were primarily due to overlap from diesel-range hydrocarbons. These detections are qualified as estimates "J" in subsequent tables to indicate matrix interference "MI".
- WPCL qualifies that reported analytes for the hydrocarbon analyses of wipe samples (quantified in mg/Wipe) are not certified under the National Environmental Laboratory Accreditation Program (NELAP).

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

June 17, 2015

Linda Scheffler
Director's Office

Work Order	Project	Received
W15E194	**Portland Harbor**	05/27/15 15:51

Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford
Laboratory Coordinator QA/QC

City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656
ORELAP Certification ID 4023

LABORATORY ANALYSIS REPORT

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Project Mgr:	Linda Scheffler
Received:	5/27/15 15:51		
Submitted By:	Field Operations		

Sample	Laboratory ID	Matrix	Type	Sample Collection Date Start	End	Qualifier
22_8	W15E194-01	Sediment	Grab	05/27/15 09:29	05/27/15 09:29	
22_8W	W15E194-02	Water	Grab	05/27/15 09:30	05/27/15 09:30	
22_9W	W15E194-03	Water	Grab	05/27/15 10:04	05/27/15 10:04	
22_4W	W15E194-04	Water	Grab	05/27/15 10:09	05/27/15 10:09	
22_5W	W15E194-05	Water	Grab	05/27/15 10:13	05/27/15 10:13	
22_10W	W15E194-06	Water	Grab	05/27/15 10:49	05/27/15 10:49	
FDBLANK	W15E194-07	Water	Grab	05/27/15 11:21	05/27/15 11:21	
22_11	W15E194-08	Sediment	Composite	05/27/15 11:05	05/27/15 11:05	
22_12Wipe	W15E194-09	Wipe	Grab	05/27/15 11:40	05/27/15 11:40	
22_13Wipe	W15E194-10	Wipe	Grab	05/27/15 11:47	05/27/15 11:47	
22_14Wipe	W15E194-11	Wipe	Grab	05/27/15 11:53	05/27/15 11:53	
22_15W	W15E194-12	Water	Grab	05/27/15 11:59	05/27/15 11:59	
22_13W	W15E194-13	Water	Grab	05/27/15 12:01	05/27/15 12:01	
22_14	W15E194-14	Sediment	Composite	05/27/15 12:09	05/27/15 12:09	
22_16	W15E194-15	Sediment	Composite	05/27/15 12:12	05/27/15 12:12	
22_17Wipe	W15E194-16	Wipe	Grab	05/27/15 12:49	05/27/15 12:49	
22_18	W15E194-17	Sediment	Composite	05/27/15 12:53	05/27/15 12:53	
22_19	W15E194-18	Sediment	Composite	05/27/15 13:15	05/27/15 13:15	
22_20Wipe	W15E194-19	Wipe	Grab	05/27/15 13:22	05/27/15 13:22	
22_21W	W15E194-20	Water	Grab	05/27/15 13:27	05/27/15 13:27	
22_22W	W15E194-21	Water	Grab	05/27/15 13:45	05/27/15 13:45	
22_23Wipe	W15E194-22	Wipe	Grab	05/27/15 13:51	05/27/15 13:51	

Case Narrative

PAH/phthalates by 8270-SIM Analysis: Only PAH analysis was requested. Phthalates are not reported.

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Field Parameters										
Field conductivity										
22_8W : W15E194-02										
Conductivity*	**309**	umhos/cm			1	B15E421	05/27/15	05/27/15	FO SOP 1.03a	

Reported: 06/17/15 13:47

The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.

Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656
ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Field Parameters										
Field conductivity										
22_10W : W15E194-06										
Conductivity*	**322**	umhos/cm			1	B15E421	05/27/15	05/27/15	FO SOP 1.03a	
22_15W : W15E194-12										
Conductivity*	**324**	umhos/cm			1	B15E421	05/27/15	05/27/15	FO SOP 1.03a	
22_13W : W15E194-13										
Conductivity*	**679**	umhos/cm			1	B15E421	05/27/15	05/27/15	FO SOP 1.03a	
22_21W : W15E194-20										
Conductivity*	**482**	umhos/cm			1	B15E421	05/27/15	05/27/15	FO SOP 1.03a	
22_22W : W15E194-21										
Conductivity*	**187**	umhos/cm			1	B15E421	05/27/15	05/27/15	FO SOP 1.03a	
General Chemistry										
Total Solids										
22_8 : W15E194-01										
Total solids	**77.5**	% W/W	0.01			B15E432	05/28/15	05/29/15	SM 2540G	
22_11 : W15E194-08										
Total solids	**79.2**	% W/W	0.01			B15E432	05/28/15	05/29/15	SM 2540G	
22_14 : W15E194-14										
Total solids	**51.4**	% W/W	0.01			B15E432	05/28/15	05/29/15	SM 2540G	
22_16 : W15E194-15										
Total solids	**58.0**	% W/W	0.01			B15E432	05/28/15	05/29/15	SM 2540G	
22_18 : W15E194-17										
Total solids	**80.4**	% W/W	0.01			B15E432	05/28/15	05/29/15	SM 2540G	
22_19 : W15E194-18										
Total solids	**82.5**	% W/W	0.01			B15E432	05/28/15	05/29/15	SM 2540G	

Reported: 06/17/15 13:47

Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

The results in this report apply only to the samples analyzed. Qualifiers and case narrative comments are essential to interpretation of the analytical results. Report reproductions and/or data summaries without qualifiers and comments are incomplete.

City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656
ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Fuels										
Diesel/Oil Hydrocarbons by GC-FID										
22_8 : W15E194-01										F7
Diesel	**81**	mg/kg dry	26		1	B15F046	06/03/15	06/03/15	NWTPH-Dx	F0, F8
Lube oil	**110**	mg/kg dry	51		1	B15F046	06/03/15	06/03/15	NWTPH-Dx	F0, F8
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*18.7*	mg/kg dry	*20.6*	*91%*	*50-150*	*B15F046*	*06/03/15*	*06/03/15*	*NWTPH-Dx*	
22_8W : W15E194-02										F7
Diesel	**2.0**	mg/L	0.066		1	B15F001	06/01/15	06/03/15	NWTPH-Dx	F0, F8
Lube oil	**0.57**	mg/L	0.13		1	B15F001	06/01/15	06/03/15	NWTPH-Dx	F0, F8
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0955*	mg/L	*0.105*	*91%*	*50-150*	*B15F001*	*06/01/15*	*06/03/15*	*NWTPH-Dx*	
22_9W : W15E194-03										F7
Diesel	**3.0**	mg/L	0.069		1	B15F001	06/01/15	06/03/15	NWTPH-Dx	F0, F8
Lube oil	**0.69**	mg/L	0.14		1	B15F001	06/01/15	06/03/15	NWTPH-Dx	F0, F8
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.112*	mg/L	*0.111*	*100%*	*50-150*	*B15F001*	*06/01/15*	*06/03/15*	*NWTPH-Dx*	
22_4W : W15E194-04										F7
Diesel	**1.3**	mg/L	0.070		1	B15F001	06/01/15	06/03/15	NWTPH-Dx	F0, F8
Lube oil	**0.28**	mg/L	0.14		1	B15F001	06/01/15	06/03/15	NWTPH-Dx	F0, F8
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0993*	mg/L	*0.112*	*88%*	*50-150*	*B15F001*	*06/01/15*	*06/03/15*	*NWTPH-Dx*	
22_10W : W15E194-06										F7
Diesel	**1.9**	mg/L	0.066		1	B15F001	06/01/15	06/03/15	NWTPH-Dx	F0, F8
Lube oil	**0.25**	mg/L	0.13		1	B15F001	06/01/15	06/03/15	NWTPH-Dx	F0, F8
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0831*	mg/L	*0.106*	*78%*	*50-150*	*B15F001*	*06/01/15*	*06/03/15*	*NWTPH-Dx*	
22_15W : W15E194-12										F7
Diesel	**0.93**	mg/L	0.066		1	B15F001	06/01/15	06/03/15	NWTPH-Dx	F0, F8
Lube oil	**0.46**	mg/L	0.13		1	B15F001	06/01/15	06/03/15	NWTPH-Dx	F0, F8
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0790*	mg/L	*0.105*	*75%*	*50-150*	*B15F001*	*06/01/15*	*06/03/15*	*NWTPH-Dx*	
22_13W : W15E194-13										F7
Diesel	**0.49**	mg/L	0.066		1	B15F057	06/03/15	06/09/15	NWTPH-Dx	
Lube oil	ND	mg/L	0.13		1	B15F057	06/03/15	06/09/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0901*	mg/L	*0.106*	*85%*	*50-150*	*B15F057*	*06/03/15*	*06/09/15*	*NWTPH-Dx*	
22_16 : W15E194-15										F7
Diesel	**78**	mg/kg dry	34		1	B15F046	06/03/15	06/03/15	NWTPH-Dx	F0
Lube oil	**220**	mg/kg dry	68		1	B15F046	06/03/15	06/03/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*26.2*	mg/kg dry	*27.1*	*97%*	*50-150*	*B15F046*	*06/03/15*	*06/03/15*	*NWTPH-Dx*	
22_20Wipe : W15E194-19										F7

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City of Portland
Water Pollution Control Laboratory
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ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Fuels										
Diesel/Oil Hydrocarbons by GC-FID										
22_20Wipe : W15E194-19										F7
Diesel*	**290**	mg/Wipe	31		25	B15E430	05/29/15	06/03/15	NWTPH-Dx	
Lube oil*	ND	mg/Wipe	62		25	B15E430	05/29/15	06/03/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.00*	mg/Wipe	*0.100*	*%*	*50-150*	*B15E430*	*05/29/15*	*06/03/15*	*NWTPH-Dx*	*SU5*
22_21W : W15E194-20										F7
Diesel	**130**	mg/L	7.3		100	B15F057	06/03/15	06/09/15	NWTPH-Dx	
Lube oil	ND	mg/L	15		100	B15F057	06/03/15	06/09/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.00*	mg/L	*0.116*	*%*	*50-150*	*B15F057*	*06/03/15*	*06/09/15*	*NWTPH-Dx*	*SU5*
22_22W : W15E194-21										F7
Diesel	**1.7**	mg/L	0.12		1	B15F057	06/03/15	06/09/15	NWTPH-Dx	
Lube oil	**2.7**	mg/L	0.25		1	B15F057	06/03/15	06/09/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0828*	mg/L	*0.200*	*41%*	*50-150*	*B15F057*	*06/03/15*	*06/09/15*	*NWTPH-Dx*	*SU1*
Hydrocarbon Scan by GC-FID										
22_8 : W15E194-01										
Gasoline	ND	mg/kg dry	23		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Diesel	**DET**	mg/kg dry	58		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Lube oil	ND	mg/kg dry	115		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*9.89*	mg/kg dry	*11.5*	*86%*	*50-150*	*B15E420*	*05/28/15*	*05/28/15*	*NWTPH-HCID*	
22_8W : W15E194-02										
Gasoline	ND	mg/L	0.26		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	
Diesel	**DET**	mg/L	0.53		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	F0a, F8
Lube oil	**DET**	mg/L	0.53		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	F0a, F8
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0963*	mg/L	*0.105*	*92%*	*50-150*	*B15F001*	*06/01/15*	*06/01/15*	*NWTPH-HCID*	
22_9W : W15E194-03										
Gasoline	ND	mg/L	0.28		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	
Diesel	**DET**	mg/L	0.56		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	F0a, F8
Lube oil	**DET**	mg/L	0.56		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	F0a, F8
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.107*	mg/L	*0.111*	*96%*	*50-150*	*B15F001*	*06/01/15*	*06/01/15*	*NWTPH-HCID*	
22_4W : W15E194-04										
Gasoline	ND	mg/L	0.28		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	
Diesel	**DET**	mg/L	0.56		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	F0a, F8
Lube oil	**DET**	mg/L	0.56		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	F0a, F8
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0978*	mg/L	*0.112*	*87%*	*50-150*	*B15F001*	*06/01/15*	*06/01/15*	*NWTPH-HCID*	
22_5W : W15E194-05										
Gasoline	ND	mg/L	0.28		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	

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Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Fuels										
Hydrocarbon Scan by GC-FID										
22_5W : W15E194-05										
Diesel	ND	mg/L	0.56		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	
Lube oil	ND	mg/L	0.56		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0863*	mg/L	*0.112*	*77%*	*50-150*	*B15F001*	*06/01/15*	*06/01/15*	*NWTPH-HCID*	
22_10W : W15E194-06										
Gasoline	ND	mg/L	0.27		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	
Diesel	**DET**	mg/L	0.53		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	F0a, F8
Lube oil	**DET**	mg/L	0.53		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	F0a, F8
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0943*	mg/L	*0.106*	*89%*	*50-150*	*B15F001*	*06/01/15*	*06/01/15*	*NWTPH-HCID*	
FDBLANK : W15E194-07										
Gasoline	ND	mg/L	0.27		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	
Diesel	ND	mg/L	0.55		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	
Lube oil	ND	mg/L	0.55		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0721*	mg/L	*0.110*	*66%*	*50-150*	*B15F001*	*06/01/15*	*06/01/15*	*NWTPH-HCID*	
22_11 : W15E194-08										
Gasoline	ND	mg/kg dry	22		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Diesel	ND	mg/kg dry	56		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Lube oil	ND	mg/kg dry	112		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*7.48*	mg/kg dry	*11.2*	*67%*	*50-150*	*B15E420*	*05/28/15*	*05/28/15*	*NWTPH-HCID*	
22_12Wipe : W15E194-09										
Gasoline*	ND	mg/Wipe	1		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Lube oil*	ND	mg/Wipe	2		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Diesel*	ND	mg/Wipe	2		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0902*	mg/Wipe	*0.100*	*90%*	*50-150*	*B15E430*	*05/28/15*	*05/28/15*	*NWTPH-HCID*	
22_13Wipe : W15E194-10										
Gasoline*	ND	mg/Wipe	1		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Lube oil*	ND	mg/Wipe	2		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Diesel*	ND	mg/Wipe	2		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0878*	mg/Wipe	*0.100*	*88%*	*50-150*	*B15E430*	*05/28/15*	*05/28/15*	*NWTPH-HCID*	
22_14Wipe : W15E194-11										
Gasoline*	ND	mg/Wipe	1		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Lube oil*	ND	mg/Wipe	2		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Diesel*	ND	mg/Wipe	2		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0885*	mg/Wipe	*0.100*	*88%*	*50-150*	*B15E430*	*05/28/15*	*05/28/15*	*NWTPH-HCID*	
22_15W : W15E194-12										

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ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Fuels										
Hydrocarbon Scan by GC-FID										
22_15W : W15E194-12										
Gasoline	ND	mg/L	0.26		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	
Diesel	**DET**	mg/L	0.53		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	F0a, F8
Lube oil	**DET**	mg/L	0.53		1	B15F001	06/01/15	06/01/15	NWTPH-HCID	F0a, F8
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0775*	mg/L	*0.105*	*74%*	*50-150*	*B15F001*	*06/01/15*	*06/01/15*	*NWTPH-HCID*	
22_13W : W15E194-13										
Gasoline	ND	mg/L	0.27		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Diesel	**DET**	mg/L	0.53		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	F0
Lube oil	ND	mg/L	0.53		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0958*	mg/L	*0.106*	*90%*	*50-150*	*B15F057*	*06/03/15*	*06/04/15*	*NWTPH-HCID*	
22_14 : W15E194-14										
Gasoline	ND	mg/kg dry	35		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Diesel	ND	mg/kg dry	88		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Lube oil	ND	mg/kg dry	176		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*14.2*	mg/kg dry	*17.6*	*81%*	*50-150*	*B15E420*	*05/28/15*	*05/28/15*	*NWTPH-HCID*	
22_16 : W15E194-15										
Gasoline	ND	mg/kg dry	31		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Diesel	**DET**	mg/kg dry	77		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Lube oil	**DET**	mg/kg dry	154		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*15.5*	mg/kg dry	*15.4*	*100%*	*50-150*	*B15E420*	*05/28/15*	*05/28/15*	*NWTPH-HCID*	
22_17Wipe : W15E194-16										
Gasoline*	ND	mg/Wipe	1		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Lube oil*	ND	mg/Wipe	2		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Diesel*	ND	mg/Wipe	2		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0928*	mg/Wipe	*0.100*	*93%*	*50-150*	*B15E430*	*05/28/15*	*05/28/15*	*NWTPH-HCID*	
22_18 : W15E194-17										
Gasoline	ND	mg/kg dry	22		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Diesel	ND	mg/kg dry	56		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Lube oil	ND	mg/kg dry	112		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*9.33*	mg/kg dry	*11.2*	*83%*	*50-150*	*B15E420*	*05/28/15*	*05/28/15*	*NWTPH-HCID*	
22_19 : W15E194-18										
Gasoline	ND	mg/kg dry	21		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Diesel	ND	mg/kg dry	52		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Lube oil	ND	mg/kg dry	105		1	B15E420	05/28/15	05/28/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*9.80*	mg/kg dry	*10.5*	*94%*	*50-150*	*B15E420*	*05/28/15*	*05/28/15*	*NWTPH-HCID*	

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Project:	**Portland Harbor**	Client:	Director's Office
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Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Fuels										
Hydrocarbon Scan by GC-FID										
22_20Wipe : W15E194-19										
Gasoline*	**DET**	mg/Wipe	1		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	F4
Lube oil*	**DET**	mg/Wipe	2		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	F2
Diesel*	**DET**	mg/Wipe	2		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	F0b
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.00*	mg/Wipe	*0.100*	*%*	*50-150*	*B15E430*	*05/28/15*	*05/28/15*	*NWTPH-HCID*	*F6*
22_21W : W15E194-20										
Gasoline	**DET**	mg/L	0.29		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	F4
Diesel	**DET**	mg/L	0.58		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Lube oil	**DET**	mg/L	0.58		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	F2
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.00*	mg/L	*0.116*	*%*	*50-150*	*B15F057*	*06/03/15*	*06/04/15*	*NWTPH-HCID*	*F6*
22_22W : W15E194-21										
Gasoline	ND	mg/L	0.50		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Diesel	**DET**	mg/L	1.00		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Lube oil	**DET**	mg/L	1.00		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0982*	mg/L	*0.200*	*49%*	*50-150*	*B15F057*	*06/03/15*	*06/04/15*	*NWTPH-HCID*	*SU1*
22_23Wipe : W15E194-22										
Gasoline*	ND	mg/Wipe	1		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Lube oil*	ND	mg/Wipe	2		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Diesel*	ND	mg/Wipe	2		1	B15E430	05/28/15	05/28/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.100*	mg/Wipe	*0.100*	*100%*	*50-150*	*B15E430*	*05/28/15*	*05/28/15*	*NWTPH-HCID*	

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Project:	**Portland Harbor**	Client:	Director's Office
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Semivolatile Organics - SIM

Polynuclear Aromatics & Phthalates by GCMS-SIM

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
22_8W : W15E194-02										
Acenaphthene	**0.83**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.20	0.20	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Anthracene	**0.17**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)anthracene	**0.010**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Chrysene	**0.013**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluoranthene	**0.053**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluorene	**2.2**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
1-Methylnaphthalene	**0.11**	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.40	0.40	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Phenanthrene	**2.1**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Pyrene	**0.10**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Methylnaphthalene-d10	*0.25*	ug/L	*0.229*	*108%*	*60.4-153*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
Fluoranthene-d10	*0.25*	ug/L	*0.229*	*110%*	*69-149*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
22_9W : W15E194-03										
Acenaphthene	**1.1**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.22	0.22	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Anthracene	**0.21**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)anthracene	**0.021**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)pyrene	**0.011**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(b)fluoranthene	**0.014**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Chrysene	**0.028**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluoranthene	**0.085**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluorene	**2.7**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
1-Methylnaphthalene	**0.18**	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.40	0.40	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Phenanthrene	**2.7**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Pyrene	**0.16**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Methylnaphthalene-d10	*0.25*	ug/L	*0.229*	*111%*	*60.4-153*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
Fluoranthene-d10	*0.26*	ug/L	*0.229*	*115%*	*69-149*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	

Reported: 06/17/15 13:47

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City of Portland
Water Pollution Control Laboratory
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ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Semivolatile Organics - SIM

Polynuclear Aromatics & Phthalates by GCMS-SIM

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
22_4W : W15E194-04										
Acenaphthene	**1.0**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.20	0.20	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Anthracene	**0.19**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)anthracene	**0.013**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Chrysene	**0.014**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluoranthene	**0.058**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluorene	**2.5**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
1-Methylnaphthalene	**0.16**	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.40	0.40	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Phenanthrene	**2.4**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Pyrene	**0.11**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Methylnaphthalene-d10	*0.27*	ug/L	*0.229*	*116%*	*60.4-153*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
Fluoranthene-d10	*0.24*	ug/L	*0.229*	*103%*	*69-149*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
22_5W : W15E194-05										
Acenaphthene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Chrysene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluorene	**0.025**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Phenanthrene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Methylnaphthalene-d10	*0.23*	ug/L	*0.229*	*100%*	*60.4-153*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
Fluoranthene-d10	*0.23*	ug/L	*0.229*	*103%*	*69-149*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	

Reported: 06/17/15 13:47

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Water Pollution Control Laboratory
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ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Semivolatile Organics - SIM										
Polynuclear Aromatics & Phthalates by GCMS-SIM										
22_10W : W15E194-06										
Acenaphthene	**1.1**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.24	0.24	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Anthracene	**0.29**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)anthracene	**0.19**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)pyrene	**0.13**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(b)fluoranthene	**0.15**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	**0.11**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(k)fluoranthene	**0.031**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Chrysene	**0.26**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	**0.030**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluoranthene	**0.51**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluorene	**2.4**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	**0.054**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
1-Methylnaphthalene	**0.19**	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.40	0.40	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Pyrene	**0.91**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Methylnaphthalene-d10	*0.29*	ug/L	*0.229*	*125%*	*60.4-153*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
Fluoranthene-d10	*0.21*	ug/L	*0.229*	*91%*	*69-149*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
22_10W : W15E194-06RE1										
Phenanthrene	**3.4**	ug/L	0.10	0.10	5	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
FDBLANK : W15E194-07										
Acenaphthene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Anthracene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Chrysene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Phenanthrene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					

Reported: 06/17/15 13:47

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Jennifer Shackelford, Laboratory Coordinator QA/QC

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ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier

Semivolatile Organics - SIM

Polynuclear Aromatics & Phthalates by GCMS-SIM

FDBLANK : W15E194-07

Surrogate	*Result*		*Expected*	*%Rec*	*Limits(%)*				
2-Methylnaphthalene-d10	*0.23*	ug/L	*0.229*	*102%*	*60.4-153*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*
Fluoranthene-d10	*0.24*	ug/L	*0.229*	*104%*	*69-149*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*

22_15W : W15E194-12

Acenaphthene	**0.82**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Acenaphthylene	ND	ug/L	0.20	0.20	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Anthracene	**0.14**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Benzo(a)anthracene	**0.063**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Benzo(a)pyrene	**0.090**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Benzo(b)fluoranthene	**0.13**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Benzo(g,h,i)perylene	**0.090**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Benzo(k)fluoranthene	**0.044**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Chrysene	**0.097**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Dibenzo(a,h)anthracene	**0.020**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Fluoranthene	**0.15**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Fluorene	**1.8**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Indeno(1,2,3-cd)pyrene	**0.070**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
1-Methylnaphthalene	**0.14**	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Naphthalene	ND	ug/L	0.40	0.40	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Phenanthrene	**1.2**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Pyrene	**0.21**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM

Surrogate	*Result*		*Expected*	*%Rec*	*Limits(%)*				
2-Methylnaphthalene-d10	*0.30*	ug/L	*0.229*	*132%*	*60.4-153*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*
Fluoranthene-d10	*0.23*	ug/L	*0.229*	*100%*	*69-149*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*

22_13W : W15E194-13

Acenaphthene	**0.90**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Acenaphthylene	ND	ug/L	0.20	0.20	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Anthracene	**0.026**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Chrysene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Fluoranthene	**0.016**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Fluorene	**1.6**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
1-Methylnaphthalene	**0.18**	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
2-Methylnaphthalene	ND	ug/L	0.080	0.080	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM
Naphthalene	ND	ug/L	0.80	0.80	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM

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ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Semivolatile Organics - SIM										
Polynuclear Aromatics & Phthalates by GCMS-SIM										
22_13W : W15E194-13										
Phenanthrene	**0.16**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Pyrene	**0.043**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Methylnaphthalene-d10	*0.34*	ug/L	*0.229*	*148%*	*60.4-153*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
Fluoranthene-d10	*0.24*	ug/L	*0.229*	*104%*	*69-149*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
22_21W : W15E194-20RE1										
Acenaphthene	**8.4**	ug/L	0.10	0.10	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	2.5	2.5	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Anthracene	**1.5**	ug/L	0.10	0.10	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Benzo(a)anthracene	**0.50**	ug/L	0.050	0.050	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Benzo(a)pyrene	**0.32**	ug/L	0.050	0.050	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Benzo(b)fluoranthene	**0.34**	ug/L	0.050	0.050	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	**0.27**	ug/L	0.050	0.050	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Benzo(k)fluoranthene	**0.12**	ug/L	0.050	0.050	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Chrysene	**0.73**	ug/L	0.050	0.050	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	**0.080**	ug/L	0.050	0.050	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Fluoranthene	**1.6**	ug/L	0.050	0.050	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	**0.14**	ug/L	0.050	0.050	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	2.2	2.2	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	2.0	2.0	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Naphthalene	ND	ug/L	4.0	4.0	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Pyrene	**2.8**	ug/L	0.050	0.050	5	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Methylnaphthalene-d10	*0.30*	ug/L	*0.229*	*130%*	*60.4-153*	*B15E414*	*05/28/15*	*06/02/15*	*EPA 8270-SIM*	
Fluoranthene-d10	*0.24*	ug/L	*0.229*	*106%*	*69-149*	*B15E414*	*05/28/15*	*06/02/15*	*EPA 8270-SIM*	
22_21W : W15E194-20RE2										
Fluorene	**21**	ug/L	0.50	0.50	25	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
Phenanthrene	**29**	ug/L	0.50	0.50	25	B15E414	05/28/15	06/02/15	EPA 8270-SIM	
22_22W : W15E194-21										
Acenaphthene	**0.56**	ug/L	0.040	0.040	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Acenaphthylene	**0.17**	ug/L	0.040	0.040	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Anthracene	**0.20**	ug/L	0.040	0.040	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)anthracene	**0.89**	ug/L	0.020	0.020	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)pyrene	**1.1**	ug/L	0.020	0.020	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(b)fluoranthene	**1.6**	ug/L	0.020	0.020	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	**1.3**	ug/L	0.020	0.020	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(k)fluoranthene	**0.88**	ug/L	0.020	0.020	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Chrysene	**1.4**	ug/L	0.020	0.020	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	**0.54**	ug/L	0.020	0.020	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluoranthene	**2.0**	ug/L	0.020	0.020	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluorene	**0.85**	ug/L	0.040	0.040	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	**0.99**	ug/L	0.020	0.020	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	

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Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Semivolatile Organics - SIM										
Polynuclear Aromatics & Phthalates by GCMS-SIM										
22_22W : W15E194-21										
1-Methylnaphthalene	**2.1**	ug/L	0.080	0.080	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
2-Methylnaphthalene	**0.20**	ug/L	0.080	0.080	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Naphthalene	ND	ug/L	1.2	1.2	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Phenanthrene	**1.3**	ug/L	0.040	0.040	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Pyrene	**2.1**	ug/L	0.020	0.020	2	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Methylnaphthalene-d10	*0.33*	ug/L	*0.229*	*146%*	*60.4-153*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
Fluoranthene-d10	*0.15*	ug/L	*0.229*	*64%*	*69-149*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	*SU1*

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Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Quality Control Report

General Chemistry - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec *(Limits)*	RPD *(Limit)*	Prepared: Analyzed	Qualifier
Total Solids - Batch B15E432										
Duplicate (B15E432-DUP1)				**Source: W15E194-01**						
Total solids	**76.7**	% W/W	0.01			77.5		1 (5)	05/28/15 :05/29/15	

Fuels - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec *(Limits)*	RPD *(Limit)*	Prepared: Analyzed	Qualifier
Diesel/Oil Hydrocarbons by GC-FID - Batch B15E430										
Blank (B15E430-BLK2)										**F7**
Diesel	ND	mg/Wipe	1.2						05/28/15 :06/03/15	
Lube oil	ND	mg/Wipe	2.5						05/28/15 :06/03/15	
Surrogate										
2-Fluorobiphenyl	*0.0831*	mg/Wipe			*0.100*		83% *(50-150)*		05/28/15 :06/03/15	
Diesel/Oil Hydrocarbons by GC-FID - Batch B15F001										
Blank (B15F001-BLK2)										**F7**
Diesel	ND	mg/L	0.062						06/01/15 :06/03/15	
Lube oil	ND	mg/L	0.12						06/01/15 :06/03/15	
Surrogate										
2-Fluorobiphenyl	*0.0668*	mg/L			*0.100*		67% *(50-150)*		06/01/15 :06/03/15	
LCS (B15F001-BS2)										**F7**
Diesel	**0.907**	mg/L	0.062		1.00		91% *(50-150)*		06/01/15 :06/03/15	
Lube oil	**0.673**	mg/L	0.12		1.00		67% *(50-150)*		06/01/15 :06/03/15	
Surrogate										
2-Fluorobiphenyl	*0.0764*	mg/L			*0.100*		76% *(50-150)*		06/01/15 :06/03/15	
LCS Dup (B15F001-BSD2)										**F7**
Diesel	**0.947**	mg/L	0.062		1.00		95% *(50-150)*	4 (200)	06/01/15 :06/03/15	
Lube oil	**0.765**	mg/L	0.12		1.00		76% *(50-150)*	13 (200)	06/01/15 :06/03/15	
Surrogate										
2-Fluorobiphenyl	*0.0807*	mg/L			*0.100*		81% *(50-150)*		06/01/15 :06/03/15	
Diesel/Oil Hydrocarbons by GC-FID - Batch B15F046										
Blank (B15F046-BLK1)										**F7**
Diesel	ND	mg/kg wet	21						06/03/15 :06/03/15	
Lube oil	ND	mg/kg wet	42						06/03/15 :06/03/15	
Surrogate										

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Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Fuels - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Diesel/Oil Hydrocarbons by GC-FID - Batch B15F046										
Blank (B15F046-BLK1)										F7
Surrogate										
2-Fluorobiphenyl	*14.0*	mg/kg wet			*16.7*		84% *(50-150)*		06/03/15 :06/03/15	
LCS (B15F046-BS1)										F7
Diesel	**190**	mg/kg wet	25		200		95% *(50-150)*		06/03/15 :06/03/15	
Lube oil	**111**	mg/kg wet	50		200		55% *(50-150)*		06/03/15 :06/03/15	
Surrogate										
2-Fluorobiphenyl	*22.0*	mg/kg wet			*20.0*		110% *(50-150)*		06/03/15 :06/03/15	
Duplicate (B15F046-DUP1)			**Source: W15E199-05**							F7
Diesel	ND	mg/kg dry	32			ND		(50)	06/03/15 :06/03/15	
Lube oil	**310**	mg/kg dry	58			201		43 (50)	06/03/15 :06/03/15	
Surrogate										
2-Fluorobiphenyl	*23.8*	mg/kg dry			*23.4*		102% *(50-150)*		06/03/15 :06/03/15	
Diesel/Oil Hydrocarbons by GC-FID - Batch B15F057										
Blank (B15F057-BLK2)										F7
Diesel	ND	mg/L	0.12						06/03/15 :06/09/15	
Lube oil	ND	mg/L	0.062						06/03/15 :06/09/15	
Surrogate										
2-Fluorobiphenyl	*0.0334*	mg/L			*0.0500*		67% *(50-150)*		06/03/15 :06/09/15	
LCS (B15F057-BS2)										F7
Diesel	**0.304**	mg/L	0.031		0.500		61% *(50-150)*		06/03/15 :06/09/15	
Lube oil	**0.403**	mg/L	0.062		0.500		81% *(50-150)*		06/03/15 :06/09/15	
Surrogate										
2-Fluorobiphenyl	*0.0324*	mg/L			*0.0500*		65% *(50-150)*		06/03/15 :06/09/15	
LCS Dup (B15F057-BSD2)										F7
Diesel	**0.303**	mg/L	0.031		0.500		61% *(50-150)*	0.2 (200)	06/03/15 :06/09/15	
Lube oil	**0.384**	mg/L	0.062		0.500		77% *(50-150)*	5 (200)	06/03/15 :06/09/15	
Surrogate										
2-Fluorobiphenyl	*0.0346*	mg/L			*0.0500*		69% *(50-150)*		06/03/15 :06/09/15	
Hydrocarbon Scan by GC-FID - Batch B15E420										
Blank (B15E420-BLK1)										
Gasoline	ND	mg/kg wet	18						05/28/15 :05/28/15	
Diesel	ND	mg/kg wet	45						05/28/15 :05/28/15	
Lube oil	ND	mg/kg wet	91						05/28/15 :05/28/15	
Surrogate										
2-Fluorobiphenyl	*8.65*	mg/kg wet			*9.09*		95% *(50-150)*		05/28/15 :05/28/15	
Duplicate (B15E420-DUP1)			**Source: W15E194-14**							

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Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Fuels - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Hydrocarbon Scan by GC-FID - Batch B15E420										
Duplicate (B15E420-DUP1)			**Source: W15E194-14**							
Gasoline	ND	mg/kg dry	38			ND			05/28/15 :05/28/15	
Diesel	ND	mg/kg dry	95			ND			05/28/15 :05/28/15	
Lube oil	ND	mg/kg dry	190			ND			05/28/15 :05/28/15	
Surrogate										
2-Fluorobiphenyl	*17.1*	mg/kg dry			*19.0*		90% *(50-150)*		05/28/15 :05/28/15	
Hydrocarbon Scan by GC-FID - Batch B15E430										
Blank (B15E430-BLK1)										
Gasoline	ND	mg/Wipe	1						05/28/15 :05/28/15	
Lube oil	ND	mg/Wipe	2						05/28/15 :05/28/15	
Diesel	ND	mg/Wipe	2						05/28/15 :05/28/15	
Surrogate										
2-Fluorobiphenyl	*0.0867*	mg/Wipe			*0.100*		87% *(50-150)*		05/28/15 :05/28/15	
Hydrocarbon Scan by GC-FID - Batch B15F001										
Blank (B15F001-BLK1)										
Gasoline	ND	mg/L	0.25						06/01/15 :06/01/15	
Diesel	ND	mg/L	0.50						06/01/15 :06/01/15	
Lube oil	ND	mg/L	0.50						06/01/15 :06/01/15	
Surrogate										
2-Fluorobiphenyl	*0.0672*	mg/L			*0.100*		67% *(50-150)*		06/01/15 :06/01/15	
LCS (B15F001-BS1)										
Gasoline	**DET**	mg/L	0.25		0.400		74% *(50-150)*		06/01/15 :06/01/15	
Diesel	**DET**	mg/L	0.50		1.00		91% *(50-150)*		06/01/15 :06/01/15	
Lube oil	**DET**	mg/L	0.50		1.00		83% *(50-150)*		06/01/15 :06/01/15	
Surrogate										
2-Fluorobiphenyl	*0.0692*	mg/L			*0.100*		69% *(50-150)*		06/01/15 :06/01/15	
LCS Dup (B15F001-BSD1)										
Gasoline	**DET**	mg/L	0.25		0.400		79% *(50-150)*		06/01/15 :06/01/15	
Diesel	**DET**	mg/L	0.50		1.00		95% *(50-150)*		06/01/15 :06/01/15	
Lube oil	**DET**	mg/L	0.50		1.00		85% *(50-150)*		06/01/15 :06/01/15	
Surrogate										
2-Fluorobiphenyl	*0.0736*	mg/L			*0.100*		74% *(50-150)*		06/01/15 :06/01/15	
Hydrocarbon Scan by GC-FID - Batch B15F057										
Blank (B15F057-BLK1)										
Gasoline	ND	mg/L	0.12						06/03/15 :06/04/15	
Diesel	ND	mg/L	0.25						06/03/15 :06/04/15	
Lube oil	ND	mg/L	0.25						06/03/15 :06/04/15	

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Fuels - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec *(Limits)*	RPD *(Limit)*	Prepared: Analyzed	Qualifier
Hydrocarbon Scan by GC-FID - Batch B15F057										
Blank (B15F057-BLK1)										
Surrogate										
2-Fluorobiphenyl	*0.0333*	mg/L			*0.0500*		67% *(50-150)*		06/03/15 :06/04/15	
LCS (B15F057-BS1)										
Gasoline	**DET**	mg/L	0.06		0.200		42% *(50-150)*		06/03/15 :06/04/15	
Diesel	**DET**	mg/L	0.25		0.500		66% *(50-150)*		06/03/15 :06/04/15	
Lube oil	**DET**	mg/L	0.25		0.500		66% *(50-150)*		06/03/15 :06/04/15	
Surrogate										
2-Fluorobiphenyl	*0.0296*	mg/L			*0.0500*		59% *(50-150)*		06/03/15 :06/04/15	
LCS Dup (B15F057-BSD1)										
Gasoline	**DET**	mg/L	0.05		0.200		29% *(50-150)*		06/03/15 :06/04/15	
Diesel	**DET**	mg/L	0.25		0.500		66% *(50-150)*		06/03/15 :06/04/15	
Lube oil	**DET**	mg/L	0.25		0.500		61% *(50-150)*		06/03/15 :06/04/15	
Surrogate										
2-Fluorobiphenyl	*0.0325*	mg/L			*0.0500*		65% *(50-150)*		06/03/15 :06/04/15	

Reported: 06/17/15 13:47

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Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656
ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Semivolatile Organics - SIM - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec *(Limits)*	RPD *(Limit)*	Prepared: Analyzed	Qualifier
Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15E414										
Blank (B15E414-BLK1)										
Acenaphthene	ND	ug/L	0.020	0.020					05/28/15 :06/01/15	
Acenaphthylene	ND	ug/L	0.020	0.020					05/28/15 :06/01/15	
Anthracene	ND	ug/L	0.020	0.020					05/28/15 :06/01/15	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Chrysene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Fluoranthene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Fluorene	ND	ug/L	0.020	0.020					05/28/15 :06/01/15	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					05/28/15 :06/01/15	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					05/28/15 :06/01/15	
Naphthalene	ND	ug/L	0.040	0.040					05/28/15 :06/01/15	
Phenanthrene	ND	ug/L	0.020	0.020					05/28/15 :06/01/15	
Pyrene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					05/28/15 :06/01/15	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					05/28/15 :06/01/15	
Diethyl phthalate	ND	ug/L	1.0	0.50					05/28/15 :06/01/15	
Dimethyl phthalate	ND	ug/L	1.0	0.50					05/28/15 :06/01/15	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					05/28/15 :06/01/15	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					05/28/15 :06/01/15	
Surrogate										
2-Methylnaphthalene-d10	*0.23*	ug/L			*0.229*		102% *(60.4-153*		05/28/15 :06/01/15	
Fluoranthene-d10	*0.25*	ug/L			*0.229*		108% *(69-149)*		05/28/15 :06/01/15	
LCS (B15E414-BS1)										
Acenaphthene	**0.112**	ug/L	0.020	0.020	0.114		98% *(58.8-155)*		05/28/15 :06/01/15	
Acenaphthylene	**0.115**	ug/L	0.020	0.020	0.114		100% *(64-155)*		05/28/15 :06/01/15	
Anthracene	**0.117**	ug/L	0.020	0.020	0.114		102% *(76.2-129*		05/28/15 :06/01/15	
Benzo(a)anthracene	**0.119**	ug/L	0.010	0.010	0.114		104% *(72.9-138*		05/28/15 :06/01/15	
Benzo(a)pyrene	**0.122**	ug/L	0.010	0.010	0.114		106% *(75.5-137*		05/28/15 :06/01/15	
Benzo(b)fluoranthene	**0.117**	ug/L	0.010	0.010	0.114		102% *(59.9-160*		05/28/15 :06/01/15	
Benzo(g,h,i)perylene	**0.106**	ug/L	0.010	0.010	0.114		93% *(70.1-134)*		05/28/15 :06/01/15	
Benzo(k)fluoranthene	**0.119**	ug/L	0.010	0.010	0.114		104% *(61.1-157*		05/28/15 :06/01/15	
Chrysene	**0.123**	ug/L	0.010	0.010	0.114		108% *(76.7-146*		05/28/15 :06/01/15	
Dibenzo(a,h)anthracene	**0.117**	ug/L	0.010	0.010	0.114		102% *(63.9-140*		05/28/15 :06/01/15	
Fluoranthene	**0.119**	ug/L	0.010	0.010	0.114		104% *(77.5-134*		05/28/15 :06/01/15	
Fluorene	**0.118**	ug/L	0.020	0.020	0.114		103% *(61.2-157*		05/28/15 :06/01/15	

Reported: 06/17/15 13:47

Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

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City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656
ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Semivolatile Organics - SIM - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec *(Limits)*	RPD *(Limit)*	Prepared: Analyzed	Qualifier
Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15E414										
LCS (B15E414-BS1)										
Indeno(1,2,3-cd)pyrene	**0.112**	ug/L	0.010	0.010	0.114		98% *(68.4-135)*		05/28/15 :06/01/15	
1-Methylnaphthalene	**0.131**	ug/L	0.040	0.040	0.114		114% *(79.6-158*		05/28/15 :06/01/15	
2-Methylnaphthalene	**0.125**	ug/L	0.040	0.040	0.114		109% *(76-161)*		05/28/15 :06/01/15	
Naphthalene	**0.117**	ug/L	0.040	0.040	0.114		103% *(60.6-164*		05/28/15 :06/01/15	
Phenanthrene	**0.111**	ug/L	0.020	0.020	0.114		97% *(77.4-140)*		05/28/15 :06/01/15	
Pyrene	**0.127**	ug/L	0.010	0.010	0.114		111% *(81.1-141)*		05/28/15 :06/01/15	
Surrogate										
2-Methylnaphthalene-d10	*0.23*	ug/L			*0.229*		102% *(60.4-153*		05/28/15 :06/01/15	
Fluoranthene-d10	*0.24*	ug/L			*0.229*		105% *(69-149)*		05/28/15 :06/01/15	
Matrix Spike (B15E414-MS1)			**Source: W15E194-05**							
Acenaphthene	**0.325**	ug/L	0.020	0.020	0.286	ND	114% *(58.8-155*		05/28/15 :06/01/15	
Acenaphthylene	**0.319**	ug/L	0.020	0.020	0.286	ND	112% *(64-155)*		05/28/15 :06/01/15	
Anthracene	**0.328**	ug/L	0.020	0.020	0.286	ND	115% *(76.2-129*		05/28/15 :06/01/15	
Benzo(a)anthracene	**0.302**	ug/L	0.010	0.010	0.286	ND	106% *(72.9-138*		05/28/15 :06/01/15	
Benzo(a)pyrene	**0.300**	ug/L	0.010	0.010	0.286	ND	105% *(75.5-137*		05/28/15 :06/01/15	
Benzo(b)fluoranthene	**0.288**	ug/L	0.010	0.010	0.286	ND	101% *(59.9-160*		05/28/15 :06/01/15	
Benzo(g,h,i)perylene	**0.259**	ug/L	0.010	0.010	0.286	ND	91% *(70.1-134)*		05/28/15 :06/01/15	
Benzo(k)fluoranthene	**0.291**	ug/L	0.010	0.010	0.286	ND	102% *(61.1-157*		05/28/15 :06/01/15	
Chrysene	**0.315**	ug/L	0.010	0.010	0.286	ND	110% *(76.7-146*		05/28/15 :06/01/15	
Dibenzo(a,h)anthracene	**0.282**	ug/L	0.010	0.010	0.286	ND	99% *(63.9-140)*		05/28/15 :06/01/15	
Fluoranthene	**0.319**	ug/L	0.010	0.010	0.286	ND	112% *(77.5-134*		05/28/15 :06/01/15	
Fluorene	**0.345**	ug/L	0.020	0.020	0.286	0.0251	112% *(61.2-157*		05/28/15 :06/01/15	
Indeno(1,2,3-cd)pyrene	**0.274**	ug/L	0.010	0.010	0.286	ND	96% *(68.4-135)*		05/28/15 :06/01/15	
1-Methylnaphthalene	**0.367**	ug/L	0.040	0.040	0.286	ND	129% *(79.6-159*		05/28/15 :06/01/15	
2-Methylnaphthalene	**0.350**	ug/L	0.040	0.040	0.286	ND	123% *(76-161)*		05/28/15 :06/01/15	
Naphthalene	**0.325**	ug/L	0.040	0.040	0.286	ND	114% *(60.6-164*		05/28/15 :06/01/15	
Phenanthrene	**0.313**	ug/L	0.020	0.020	0.286	ND	109% *(77.4-140*		05/28/15 :06/01/15	
Pyrene	**0.341**	ug/L	0.010	0.010	0.286	ND	119% *(81.1-141*		05/28/15 :06/01/15	
Surrogate										
2-Methylnaphthalene-d10	*0.25*	ug/L			*0.229*		109% *(60.4-153*		05/28/15 :06/01/15	
Fluoranthene-d10	*0.25*	ug/L			*0.229*		110% *(69-149)*		05/28/15 :06/01/15	
Matrix Spike Dup (B15E414-MSD1)			**Source: W15E194-05**							
Acenaphthene	**0.322**	ug/L	0.020	0.020	0.286	ND	113% *(58.8-155* 0.7 (50)		05/28/15 :06/01/15	
Acenaphthylene	**0.320**	ug/L	0.020	0.020	0.286	ND	112% *(64-155)* 0.2 (50)		05/28/15 :06/01/15	
Anthracene	**0.324**	ug/L	0.020	0.020	0.286	ND	113% *(76.2-129* 1 (50)		05/28/15 :06/01/15	
Benzo(a)anthracene	**0.310**	ug/L	0.010	0.010	0.286	ND	108% *(72.9-138* 3 (50)		05/28/15 :06/01/15	
Benzo(a)pyrene	**0.310**	ug/L	0.010	0.010	0.286	ND	108% *(75.5-137* 3 (50)		05/28/15 :06/01/15	
Benzo(b)fluoranthene	**0.293**	ug/L	0.010	0.010	0.286	ND	103% *(59.9-160* 2 (50)		05/28/15 :06/01/15	
Benzo(g,h,i)perylene	**0.271**	ug/L	0.010	0.010	0.286	ND	95% *(70.1-134)* 4 (50)		05/28/15 :06/01/15	
Benzo(k)fluoranthene	**0.303**	ug/L	0.010	0.010	0.286	ND	106% *(61.1-157* 4 (50)		05/28/15 :06/01/15	

Reported: 06/17/15 13:47

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Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656
ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E194**	Received:	05/27/15 15:51

Semivolatile Organics - SIM - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec *(Limits)*	RPD *(Limit)*	Prepared: Analyzed	Qualifier
Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15E414										
Matrix Spike Dup (B15E414-MSD1)					**Source: W15E194-05**					
Chrysene	**0.324**	ug/L	0.010	0.010	0.286	ND	113% *(76.7-146* 3 (50)		05/28/15 :06/01/15	
Dibenzo(a,h)anthracene	**0.297**	ug/L	0.010	0.010	0.286	ND	104% *(63.9-140* 5 (50)		05/28/15 :06/01/15	
Fluoranthene	**0.317**	ug/L	0.010	0.010	0.286	ND	111% *(77.5-134)* 0.7 (50)		05/28/15 :06/01/15	
Fluorene	**0.351**	ug/L	0.020	0.020	0.286	0.0251	114% *(61.2-157* 2 (50)		05/28/15 :06/01/15	
Indeno(1,2,3-cd)pyrene	**0.287**	ug/L	0.010	0.010	0.286	ND	101% *(68.4-135* 5 (50)		05/28/15 :06/01/15	
1-Methylnaphthalene	**0.364**	ug/L	0.040	0.040	0.286	ND	127% *(79.6-159* 0.9 (50)		05/28/15 :06/01/15	
2-Methylnaphthalene	**0.350**	ug/L	0.040	0.040	0.286	ND	122% *(76-161)* 0.2 (50)		05/28/15 :06/01/15	
Naphthalene	**0.320**	ug/L	0.040	0.040	0.286	ND	112% *(60.6-164* 2 (50)		05/28/15 :06/01/15	
Phenanthrene	**0.315**	ug/L	0.020	0.020	0.286	ND	110% *(77.4-140* 0.9 (50)		05/28/15 :06/01/15	
Pyrene	**0.337**	ug/L	0.010	0.010	0.286	ND	118% *(81.1-141* 1 (50)		05/28/15 :06/01/15	
Surrogate										
2-Methylnaphthalene-d10	*0.25*	ug/L			*0.229*		108% *(60.4-153*		05/28/15 :06/01/15	
Fluoranthene-d10	*0.25*	ug/L			*0.229*		108% *(69-149)*		05/28/15 :06/01/15	

Qualifiers

F0	Fuel pattern most closely resembles transformer oil.
F0a	Result most closely resembles non-Aroclor transformer oil.
F0b	Results resembles most closely non-PCB transformer oil.
F2	Result for heavy oil is primarily due to overlap from diesel-range hydrocarbons.
F4	Result for gasoline is primarily overlap from diesel-range hydrocarbons.
F6	Surrogate recovery could not be determined due to the high concentration of hydrocarbons in the sample.
F7	This sample underwent silica gel clean-up.
F8	Hydrocarbons quantified as Diesel and Lube Oil appear to be a single petroleum product that is heavier than Diesel #2 and lighter than the reference Lube Oil.
SU1	Recovery for one or more surrogate compounds was outside the acceptance range (low). Sample results may be low estimates.
SU5	Surrogate recovery could not be determined due to required dilution of the sample extract.

Definitions

DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

Reported: 06/17/15 13:47

Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

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Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
Sample Custodian: (503) 823-5696
General Lab: (503) 823-5681

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 5/27/15
Work Order #: WSE794
Collected By: MJS, WCR, JFG, PHA

Client Name: **Director's Office**
Project Name: **Portland Harbor**

Requested Analyses

Special Instructions:

Basin 22 Petroleum Sheen Investigation

[1] Run NWTPH-Dx and NWTPH-Gx if detected

Turn-Around-Time Request:
- ☐ Standard (10 business days)
- ☐ Rush (5 business days)
- ☐ Other: ______

Lab Number	Location ID	Sample Date	Sample Time	Grab or Comp	Sample Matrix	NWTPH-HCID[1]	PAHs (low-Level)	Conductivity (umhos/cm) Meter: Combo5	# of Containers	Remarks
01	22_8	5/27/2015	0929	C	Sed	●			1	AAM079 (OF22) Sediment Composite
2	22_8W	5/27/2015	0930	G	Water	●	●	309	2	AAM079 (OF22) Dry-weather Flow
3	22_9W	5/27/2015	1004	G	Water	●	●		2	AAM077-E 60" Dry-weather Flow
4	22_4W	5/27/2015	1009	G	Water	●	●		2	AAM077-W 48" Dry-weather Flow
5	22_5W	5/27/2015	1013	G	Water	●	●		2	AAM077-SW 30" Dry-weather Flow
6	22_10W	5/27/2015	1049	G	Water	●	●	322	2	AAM080 Surface Sheen
7	FDBLANK	5/27/2015	1121	G	Water	●	●		2	Field Decon Blank of Bowl and Bailer
8	22_11	5/27/2015	1105	~~G~~ C (060415 per PHA)	Sed	●			1	AAM080-SW Inline Sediment
9	22_12Wipe	5/27/2015	1140	G	Wipe	●			1	AAM075-S Wipe under lateral
10	22_13Wipe	5/27/2015	1147	G	Wipe	●			1	AAM075-N Wipe from end of pipe

Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Matt Sullivan Date: 5/27/15	Signature: [signature] Date: 5/27/15	Signature: Date:	Signature: Date:
Printed Name: Matt Sullivan Time: 1551	Printed Name: [illegible] Time: 1551	Printed Name: Time:	Printed Name: Time:

Portland Harbor - Basin 22 Petroleum Sheen COC #1 (5-27-15)

Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
Sample Custodian: (503) 823-5696
General Lab: (503) 823-5681

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 5/27/15

Work Order #: WSE194

Collected By: MJS, WCR, JFG, PHA

Client Name:	**Director's Office**
Project Name:	**Portland Harbor**

Requested Analyses

Special Instructions:

Basin 22 Petroleum Sheen Investigation

[1] **Run NWTPH-Dx and NWTPH-Gx if detected**

Turn-Around-Time Request:

- ☐ Standard (10 business days)
- ☐ Rush (5 business days)
- ☐ Other: ____

Lab Number	Location ID	Sample Date	Sample Time	Grab or Comp	Sample Matrix	NWTPH-HCID[1]	PAHs (low-Level)	Conductivity (umhos/cm) Meter: Combo5	# of Containers	Remarks
11	22_14Wipe	5/27/2015	1153	G	Wipe	●			1	AAM075-Shelf Wipe from Shelf
12	22_15W	5/27/2015	1159	G	Water	●	●	324	2	AAM075 - DS Dry-weather Flow
13	22_13W	5/27/2015	1201	G	Water	●	●	679	2	AAM075-N Dry-weather Flow
14	22_14	5/27/2015	1209	~~G~~ C	Sed	●			1	AAM075-Shelf Inline Sediment
15	22_16	5/27/2015	1212	~~G~~ C	Sed	●			1	AAM075-US Inline Sediment
16	22_17Wipe	5/27/2015	1249	G	Wipe	●			1	AAM076-Sanitary Line Wipe from bottom
17	22_18	5/27/2015	1253	~~G~~ C	Sed	●			1	AAM076-DS Inline Sediment
18	22_19	5/27/2015	1315	~~G~~ C	Sed	●			1	AAM086-DS Inline Sediment
19	22_20Wipe	5/27/2015	1322	G	Wipe	●			1	AAM086-S Wipe on US side of Lat
20	22_21W	5/27/2015	1327	G	Water	●	●	482	2	AAM086-S Flow on DS side of Lat

06/04/15 per PHA

Relinquished By:		Received By:		Relinquished By:		Received By:	
Signature: Matt Sullivan	Date: 5/27/15	Signature: [signature]	Date: 5/27/15	Signature:	Date:	Signature:	Date:
Printed Name: Matt Sullivan	Time: 1551	Printed Name: [illegible]	Time: 1551	Printed Name:	Time:	Printed Name:	Time:

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Portland, Oregon 97203-4552
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General Lab: (503) 823-5681

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 5/27/15

Work Order #: WSE194

Collected By: MJS, WCR, JFG, PMA

Client Name: **Director's Office**

Project Name: **Portland Harbor**

Requested Analyses

Special Instructions:

Basin 22 Petroleum Sheen Investigation

[1] **Run NWTPH-Dx and NWTPH-Gx if detected**

Lab Number	Location ID	Sample Date	Sample Time	Grab or Comp	Sample Matrix	NWTPH-HCID[1]	PAHs (low-Level)	Conductivity (umhos/cm) Meter: Combo 5	# of Containers	Remarks
21	22_22W	5/27/2015	1345	G	Water	●	●	187	2	APA016 Surface Sheen
22	22_23Wipe	5/27/2015	1351	G	Wipe	●			1	APA016 Wipe under lat from NE

Turn-Around-Time Request:

- ☐ Standard (10 business days)
- ☐ Rush (5 business days)
- ☐ Other: _____

Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Matt Sullivan	Signature:	Signature:	Signature:
Date: 5/27/15	Date: 5/27/15	Date:	Date:
Printed Name: Matt Sullivan	Printed Name:	Printed Name:	Printed Name:
Time: 1551	Time: 1551	Time:	Time:

WPCL Cooler Receipt Form

Work Order Number: WISE194 Cooler Receipt Form Filled Out By: (KW) / KT

Project: PDX Harbor

Sample transport: Samples received on ice____ Courier_____

Directly from field_____

Temperature (°C) 14

	Yes	No	NA
Is the COC present and signed?	✓		
Are sample bottles intact?	✓		
Do the COC and sample labels match?	✓		
Are the appropriate containers used?	✓ *		
Are samples appropriately preserved?			✓
Do VOA vials have Headspace?			✓
Are samples received within holding times?	✓		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	HNO_3 (1:1) to pH <2		0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	H_2SO_4 (18N) to pH <2		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	HCl (1:1) to pH <2	1500678	1.0mL/500mL; 2.0mL/1000mL
4	HCl (1:1) to pH 2-3		For TOC: 2-5 drops/250mL
5	NaOH (pellets) to pH >12		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
5/29/15	0955	KT	WISE194-02→07, 12, 13, 20, 21	A	3	

Comments: * 052915 kn: no VOAs available for 6x followups on B water samples; no extra jars available for 6x followups on sediments; no sample available for 6x followups on wipes.

S:\LAB\Forms\WPCL Cooler Receipt Form Nov 2013.doc

Investigation Day Two
May 28, 2015

GSI Water Solutions, Inc.
55 SW Yamhill Street, Suite 400 Portland, OR 97204
P: 503.239.8799 F: 503.239.8940
info@gsiwatersolutions.com www.gsiwatersolutions.com

Laboratory Data QA/QC Review
Petroleum Sheen Investigation
Outfall Basin 22

To: File

From: Andrew Davidson, GSI

Date: June 28, 2015

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during a source control investigation sampling event conducted by the City of Portland (City). Three inline solids samples, five dry weather flow (DWF) grab samples, and five wipe samples were collected in Outfall Basin 22 on May 28, 2015 and submitted for analyses.

The laboratory analyses for these source control program samples were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and included the following analyses:

- BES WPCL
    - Total Solids – SM 2540 G (Inline solids samples only)
    - Field Conductivity – FO SOP 1.03a
    - Hydrocarbon Analysis – NWTPH-HCID (NWTPH-Dx if detected)
    - Polycyclic Aromatic Hydrocarbons (PAHs) – EPA 8270-SIM (DWF samples only)

The WPCL summary report for all analyses associated with this sampling event is attached for review.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and available:

- Chain-of-custody for completeness and continuous custody.
- Analysis conducted within holding times.
- Chemicals of interest detected in method blanks and/or field decontamination blanks.

- Internal standard recoveries within laboratory control limits.
- Surrogate recoveries within laboratory control limits.
- Matrix spike/matrix spike duplicate (MS/MSD) sample results within laboratory control limits.
- Laboratory control/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

The samples were extracted and analyzed within the recommended method-specific holding times.

Method Blanks

Method blanks were processed during the hydrocarbon scan analysis (NWTPH-HCID) and the analysis of diesel/oil hydrocarbons (NWTPH-Dx) for wipe, DWF, and inline solids samples. Blank samples were free of target analytes with one exception:

- WPCL reports that lube oil was detected in the method blank associated with the hydrocarbon scan of DWF samples at a concentration greater than one half of the reporting level, but less than the reporting level. Lube oil was not detected in any of the associated DWF samples, and the data are not further qualified.

One method blank sample was processed during the analysis of PAHs. No analytes were detected in the method blank sample.

Surrogate Recoveries

Surrogate recoveries were processed during the laboratory analyses of hydrocarbons and PAHs. Surrogate recoveries were within control limits with the following exception:

- High concentrations of hydrocarbons in sample W15E199-08 prevented determination of surrogate recoveries during the initial hydrocarbon scan (NWTPH-HCID). Despite the sample undergoing silica gel-cleanup, associated surrogate recoveries could not be determined during the diesel/oil analysis (NWTPH-Dx) due to high dilution (25X) of the sample extract. The associated result for diesel is qualified as an estimate and flagged “J” due to unacceptable surrogate recovery “SR”; that is there is a degree of uncertainty

associated with the value due to the high dilution that prevented acceptable recovery of the surrogate compound 2-Fluorobiphenyl.

Matrix Spike/Matrix Spike Duplicate

MS/MSD samples were prepared using aliquots of DWF sample W15E194-05 and processed during the laboratory analysis of PAHs in DWF samples. MS/MSD recoveries and RPDs were within acceptance limits for all spiked analytes.

Laboratory Control Samples/Duplicate Laboratory Control Samples

LCS samples were processed during the analyses of hydrocarbons in DWF and inline solids samples and during the analyses of PAHs in DWF samples. DLC samples were processed during the analyses of hydrocarbons in DWF samples. All laboratory control sample recoveries and RPDs were within laboratory control limits.

Duplicate Samples

Duplicate samples were processed during the analyses of total solids and hydrocarbons (NWTPH-HCID and NWTPH-Dx) for inline solids samples. All RPDs were within acceptance criteria.

Additional Information

WPCL reports the following additional information regarding wipe, DWF, and inline solids samples:

- For samples where hydrocarbons were detected by the initial hydrocarbon scan (NWTPH-HCID), additional analyses NWTPH-Dx and NWTPH-Gx were to be run. WPCL reports that no VOAs were available for follow-up analysis of NWTPH-Gx on water samples; no extra jars were available for follow-up analysis of NWTPH-Gx on inline solids; no additional sample available for follow-up analysis of NWTPH-Gx on the wipe samples. Accordingly, only NWTPH-Dx analyses were conducted for the samples where hydrocarbons were detected by NWTPH-HCID.
- All samples analyzed by NWTPH-Dx underwent silica gel clean-up.
- WPCL reports that the fuel pattern in sample W15E199-01 most closely resembles transformer oil, and the fuel pattern in sample W15E199-08 most closely resembles non-PCB transformer oil.
- WPCL reports that during the initial hydrocarbon scan, results for gasoline and lube oil in sample W15E199-08 were primarily due to overlap from diesel-range hydrocarbons. These detections are qualified as estimates “J” in subsequent tables to indicate matrix interference “MI”.
- WPCL qualifies that reported analytes for the hydrocarbon analyses of wipe samples (quantified in mg/Wipe) are not certified under the National Environmental Laboratory Accreditation Program (NELAP).

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

June 17, 2015

Linda Scheffler
Director's Office

Work Order	Project	Received
W15E199	**Portland Harbor**	05/28/15 15:15

Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford
Laboratory Coordinator QA/QC

City of Portland
Water Pollution Control Laboratory
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ORELAP Certification ID 4023

LABORATORY ANALYSIS REPORT

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E199**	Project Mgr:	Linda Scheffler
Received:	5/28/15 15:15		
Submitted By:	Field Operations		

Sample	Laboratory ID	Matrix	Type	Sample Collection Date Start	End	Qualifier
22_24W	W15E199-01	Water	Grab	05/28/15 10:13	05/28/15 10:13	
22_25Wipe	W15E199-02	Wipe	Grab	05/28/15 10:18	05/28/15 10:18	
22_26Wipe	W15E199-03	Wipe	Grab	05/28/15 10:21	05/28/15 10:21	
22_27W	W15E199-04	Water	Grab	05/28/15 10:43	05/28/15 10:43	
22_28	W15E199-05	Sediment	Composite	05/28/15 10:50	05/28/15 10:50	
22_29W	W15E199-06	Water	Grab	05/28/15 10:56	05/28/15 10:56	
22_30Wipe	W15E199-07	Wipe	Grab	05/28/15 11:16	05/28/15 11:16	
22_31Wipe	W15E199-08	Wipe	Grab	05/28/15 11:19	05/28/15 11:19	
22_32W	W15E199-09	Water	Grab	05/28/15 11:48	05/28/15 11:48	
22_6W	W15E199-10	Water	Grab	05/28/15 12:09	05/28/15 12:09	
22_33	W15E199-11	Sediment	Composite	05/28/15 12:16	05/28/15 12:16	
22_34	W15E199-12	Sediment	Composite	05/28/15 14:08	05/28/15 14:08	
22_35Wipe	W15E199-13	Wipe	Grab	05/28/15 14:12	05/28/15 14:12	

Case Narrative

PAH/phthalates by 8270-SIM Analysis: Only PAH analysis was requested. Phthalates are not reported.

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Field Parameters										
Field conductivity										
22_24W : W15E199-01										
Conductivity*	**254**	umhos/cm			1	B15E440	05/28/15	05/28/15	FO SOP 1.03a	
22_27W : W15E199-04										
Conductivity*	**103**	umhos/cm			1	B15E440	05/28/15	05/28/15	FO SOP 1.03a	
22_29W : W15E199-06										
Conductivity*	**184**	umhos/cm			1	B15E440	05/28/15	05/28/15	FO SOP 1.03a	
22_32W : W15E199-09										
Conductivity*	**173**	umhos/cm			1	B15E440	05/28/15	05/28/15	FO SOP 1.03a	
22_6W : W15E199-10										

Reported: 06/17/15 12:54

Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

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ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E199**	Received:	05/28/15 15:15

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Field Parameters										
Field conductivity										
22_6W : W15E199-10										
Conductivity*	**194**	umhos/cm			1	B15E440	05/28/15	05/28/15	FO SOP 1.03a	
General Chemistry										
Total Solids										
22_28 : W15E199-05										
Total solids	**73.0**	% W/W	0.01			B15E448	05/29/15	05/30/15	SM 2540G	
22_33 : W15E199-11										
Total solids	**81.5**	% W/W	0.01			B15E448	05/29/15	05/30/15	SM 2540G	
22_34 : W15E199-12										
Total solids	**85.0**	% W/W	0.01			B15E448	05/29/15	05/30/15	SM 2540G	

Reported: 06/17/15 12:54

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Jennifer Shackelford, Laboratory Coordinator QA/QC

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Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E199**	Received:	05/28/15 15:15

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Fuels										
Diesel/Oil Hydrocarbons by GC-FID										
22_24W : W15E199-01										F7
Diesel	**0.48**	mg/L	0.068		1	B15F057	06/03/15	06/09/15	NWTPH-Dx	
Lube oil	**1.4**	mg/L	0.14		1	B15F057	06/03/15	06/09/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0901*	mg/L	*0.109*	*83%*	*50-150*	*B15F057*	*06/03/15*	*06/09/15*	*NWTPH-Dx*	
22_28 : W15E199-05										F7
Diesel	ND	mg/kg dry	28		1	B15F046	06/03/15	06/03/15	NWTPH-Dx	
Lube oil	**200**	mg/kg dry	56		1	B15F046	06/03/15	06/03/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*22.1*	mg/kg dry	*22.4*	*99%*	*50-150*	*B15F046*	*06/03/15*	*06/03/15*	*NWTPH-Dx*	
22_31Wipe : W15E199-08										F7
Diesel*	**420**	mg/Wipe	31		25	B15E430	05/29/15	06/03/15	NWTPH-Dx	
Lube oil*	ND	mg/Wipe	110		25	B15E430	05/29/15	06/03/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.00*	mg/Wipe	*0.100*	*%*	*50-150*	*B15E430*	*05/29/15*	*06/03/15*	*NWTPH-Dx*	*SU5*
22_33 : W15E199-11										F7
Diesel	ND	mg/kg dry	25		1	B15F046	06/03/15	06/03/15	NWTPH-Dx	
Lube oil	**130**	mg/kg dry	51		1	B15F046	06/03/15	06/03/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*20.9*	mg/kg dry	*20.3*	*103%*	*50-150*	*B15F046*	*06/03/15*	*06/03/15*	*NWTPH-Dx*	
22_34 : W15E199-12										F7
Diesel	ND	mg/kg dry	26		1	B15F046	06/03/15	06/03/15	NWTPH-Dx	
Lube oil	**190**	mg/kg dry	47		1	B15F046	06/03/15	06/03/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*19.6*	mg/kg dry	*18.8*	*105%*	*50-150*	*B15F046*	*06/03/15*	*06/03/15*	*NWTPH-Dx*	
Hydrocarbon Scan by GC-FID										
22_24W : W15E199-01										
Gasoline	ND	mg/L	0.27		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Diesel	**DET**	mg/L	0.54		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	F0a
Lube oil	**DET**	mg/L	0.54		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0911*	mg/L	*0.109*	*84%*	*50-150*	*B15F057*	*06/03/15*	*06/04/15*	*NWTPH-HCID*	
22_25Wipe : W15E199-02										
Gasoline*	ND	mg/Wipe	1		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	
Lube oil*	ND	mg/Wipe	5		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	
Diesel*	ND	mg/Wipe	2		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0972*	mg/Wipe	*0.100*	*97%*	*50-150*	*B15E430*	*05/29/15*	*05/29/15*	*NWTPH-HCID*	
22_26Wipe : W15E199-03										
Gasoline*	ND	mg/Wipe	1		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	
Lube oil*	ND	mg/Wipe	5		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	

Reported: 06/17/15 12:54

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Jennifer Shackelford, Laboratory Coordinator QA/QC

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Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E199**	Received:	05/28/15 15:15

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Fuels										
Hydrocarbon Scan by GC-FID										
22_26Wipe : W15E199-03										
Diesel*	ND	mg/Wipe	2		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0901*	mg/Wipe	*0.100*	*90%*	*50-150*	*B15E430*	*05/29/15*	*05/29/15*	*NWTPH-HCID*	
22_27W : W15E199-04										
Gasoline	ND	mg/L	0.27		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Diesel	ND	mg/L	0.54		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Lube oil	ND	mg/L	0.54		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0855*	mg/L	*0.109*	*79%*	*50-150*	*B15F057*	*06/03/15*	*06/04/15*	*NWTPH-HCID*	
22_28 : W15E199-05										
Gasoline	ND	mg/kg dry	24		1	B15E437	05/29/15	05/29/15	NWTPH-HCID	
Diesel	ND	mg/kg dry	60		1	B15E437	05/29/15	05/29/15	NWTPH-HCID	
Lube oil	**DET**	mg/kg dry	121		1	B15E437	05/29/15	05/29/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*11.2*	mg/kg dry	*12.1*	*93%*	*50-150*	*B15E437*	*05/29/15*	*05/29/15*	*NWTPH-HCID*	
22_29W : W15E199-06										
Gasoline	ND	mg/L	0.27		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Diesel	ND	mg/L	0.54		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Lube oil	ND	mg/L	0.54		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0924*	mg/L	*0.109*	*85%*	*50-150*	*B15F057*	*06/03/15*	*06/04/15*	*NWTPH-HCID*	
22_30Wipe : W15E199-07										
Gasoline*	ND	mg/Wipe	1		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	
Lube oil*	ND	mg/Wipe	5		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	
Diesel*	ND	mg/Wipe	2		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0806*	mg/Wipe	*0.100*	*81%*	*50-150*	*B15E430*	*05/29/15*	*05/29/15*	*NWTPH-HCID*	
22_31Wipe : W15E199-08										
Gasoline*	**DET**	mg/Wipe	1		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	F4
Lube oil*	**DET**	mg/Wipe	5		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	F2
Diesel*	**DET**	mg/Wipe	2		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	F0b
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.00*	mg/Wipe	*0.100*	*%*	*50-150*	*B15E430*	*05/29/15*	*05/29/15*	*NWTPH-HCID*	*F6*
22_32W : W15E199-09										
Gasoline	ND	mg/L	0.28		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Diesel	ND	mg/L	0.57		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Lube oil	ND	mg/L	0.57		1	B15F057	06/03/15	06/04/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0917*	mg/L	*0.114*	*81%*	*50-150*	*B15F057*	*06/03/15*	*06/04/15*	*NWTPH-HCID*	
22_6W : W15E199-10										
Gasoline	ND	mg/L	0.27		1	B15F126	06/08/15	06/08/15	NWTPH-HCID	

Reported: 06/17/15 12:54

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Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

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Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E199**	Received:	05/28/15 15:15

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Fuels										
Hydrocarbon Scan by GC-FID										
22_6W : W15E199-10										
Diesel	ND	mg/L	0.53		1	B15F126	06/08/15	06/08/15	NWTPH-HCID	
Lube oil	ND	mg/L	0.53		1	B15F126	06/08/15	06/08/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0708*	mg/L	*0.106*	*67%*	*50-150*	*B15F126*	*06/08/15*	*06/08/15*	*NWTPH-HCID*	
22_33 : W15E199-11										
Gasoline	ND	mg/kg dry	19		1	B15E437	05/29/15	05/29/15	NWTPH-HCID	
Diesel	ND	mg/kg dry	48		1	B15E437	05/29/15	05/29/15	NWTPH-HCID	
Lube oil	**DET**	mg/kg dry	96		1	B15E437	05/29/15	05/29/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*9.31*	mg/kg dry	*9.58*	*97%*	*50-150*	*B15E437*	*05/29/15*	*05/29/15*	*NWTPH-HCID*	
22_34 : W15E199-12										
Gasoline	ND	mg/kg dry	21		1	B15E437	05/29/15	05/29/15	NWTPH-HCID	
Diesel	ND	mg/kg dry	52		1	B15E437	05/29/15	05/29/15	NWTPH-HCID	
Lube oil	**DET**	mg/kg dry	104		1	B15E437	05/29/15	05/29/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*8.38*	mg/kg dry	*10.4*	*81%*	*50-150*	*B15E437*	*05/29/15*	*05/29/15*	*NWTPH-HCID*	
22_35Wipe : W15E199-13										
Gasoline*	ND	mg/Wipe	1		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	
Lube oil*	ND	mg/Wipe	5		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	
Diesel*	ND	mg/Wipe	2		1	B15E430	05/29/15	05/29/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Fluorobiphenyl	*0.0842*	mg/Wipe	*0.100*	*84%*	*50-150*	*B15E430*	*05/29/15*	*05/29/15*	*NWTPH-HCID*	

Reported: 06/17/15 12:54

Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

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City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656
ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E199**	Received:	05/28/15 15:15

Semivolatile Organics - SIM

Polynuclear Aromatics & Phthalates by GCMS-SIM

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
22_24W : W15E199-01										
Acenaphthene	**0.020**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.060	0.060	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Anthracene	**0.10**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)anthracene	**0.037**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)pyrene	**0.058**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(b)fluoranthene	**0.11**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	**0.15**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(k)fluoranthene	**0.037**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Chrysene	**0.071**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	**0.019**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluoranthene	**0.098**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluorene	ND	ug/L	0.030	0.030	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	**0.063**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Phenanthrene	**0.043**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Pyrene	**0.20**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Methylnaphthalene-d10	*0.24*	ug/L	*0.229*	*106%*	*60.4-153*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
Fluoranthene-d10	*0.24*	ug/L	*0.229*	*105%*	*69-149*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
22_27W : W15E199-04										
Acenaphthene	**0.12**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.060	0.060	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Anthracene	**0.075**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(b)fluoranthene	**0.010**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Chrysene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluorene	**0.26**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
1-Methylnaphthalene	**0.051**	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.080	0.080	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Phenanthrene	**0.12**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Pyrene	**0.010**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Methylnaphthalene-d10	*0.23*	ug/L	*0.229*	*99%*	*60.4-153*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
Fluoranthene-d10	*0.22*	ug/L	*0.229*	*97%*	*69-149*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	

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ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E199**	Received:	05/28/15 15:15

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Semivolatile Organics - SIM										
Polynuclear Aromatics & Phthalates by GCMS-SIM										
22_29W : W15E199-06										
Acenaphthene	**0.20**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.060	0.060	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Anthracene	**0.12**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(b)fluoranthene	**0.013**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Chrysene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluorene	**0.47**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
1-Methylnaphthalene	**0.079**	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.20	0.20	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Phenanthrene	**0.11**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Pyrene	**0.016**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Methylnaphthalene-d10	*0.28*	ug/L	*0.229*	*123%*	*60.4-153*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
Fluoranthene-d10	*0.24*	ug/L	*0.229*	*106%*	*69-149*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
22_32W : W15E199-09										
Acenaphthene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Anthracene	**0.047**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Chrysene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Phenanthrene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Methylnaphthalene-d10	*0.25*	ug/L	*0.229*	*108%*	*60.4-153*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
Fluoranthene-d10	*0.24*	ug/L	*0.229*	*106%*	*69-149*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	

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Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E199**	Received:	05/28/15 15:15

Semivolatile Organics - SIM

Polynuclear Aromatics & Phthalates by GCMS-SIM

22_6W : W15E199-10

Analyte	Result	Units	MRL	MDL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Acenaphthene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Acenaphthylene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Anthracene	**0.23**	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(a)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(b)fluoranthene	**0.010**	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Chrysene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluoranthene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Fluorene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
1-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
2-Methylnaphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Naphthalene	ND	ug/L	0.040	0.040	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Phenanthrene	ND	ug/L	0.020	0.020	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Pyrene	ND	ug/L	0.010	0.010	1	B15E414	05/28/15	06/01/15	EPA 8270-SIM	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***					
2-Methylnaphthalene-d10	*0.24*	ug/L	*0.229*	*104%*	*60.4-153*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	
Fluoranthene-d10	*0.24*	ug/L	*0.229*	*103%*	*69-149*	*B15E414*	*05/28/15*	*06/01/15*	*EPA 8270-SIM*	

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Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E199**	Received:	05/28/15 15:15

Quality Control Report

General Chemistry - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec *(Limits)*	RPD *(Limit)*	Prepared: Analyzed	Qualifier
Total Solids - Batch B15E448										
Duplicate (B15E448-DUP1)				**Source: W15E202-02**						
Total solids	**83.2**	% W/W	0.01			83.0		0.2 (5)	05/29/15 :05/30/15	

Fuels - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec *(Limits)*	RPD *(Limit)*	Prepared: Analyzed	Qualifier
Diesel/Oil Hydrocarbons by GC-FID - Batch B15E430										
Blank (B15E430-BLK2)										**F7**
Diesel	ND	mg/Wipe	1.2						05/28/15 :06/03/15	
Lube oil	ND	mg/Wipe	2.5						05/28/15 :06/03/15	
Surrogate										
2-Fluorobiphenyl	*0.0831*	mg/Wipe			*0.100*		83% *(50-150)*		05/28/15 :06/03/15	
Diesel/Oil Hydrocarbons by GC-FID - Batch B15F046										
Blank (B15F046-BLK1)										**F7**
Diesel	ND	mg/kg wet	21						06/03/15 :06/03/15	
Lube oil	ND	mg/kg wet	42						06/03/15 :06/03/15	
Surrogate										
2-Fluorobiphenyl	*14.0*	mg/kg wet			*16.7*		84% *(50-150)*		06/03/15 :06/03/15	
LCS (B15F046-BS1)										**F7**
Diesel	**190**	mg/kg wet	25		200		95% *(50-150)*		06/03/15 :06/03/15	
Lube oil	**111**	mg/kg wet	50		200		55% *(50-150)*		06/03/15 :06/03/15	
Surrogate										
2-Fluorobiphenyl	*22.0*	mg/kg wet			*20.0*		110% *(50-150)*		06/03/15 :06/03/15	
Duplicate (B15F046-DUP1)				**Source: W15E199-05**						**F7**
Diesel	ND	mg/kg dry	32			ND		(50)	06/03/15 :06/03/15	
Lube oil	**310**	mg/kg dry	58			201		43 (50)	06/03/15 :06/03/15	
Surrogate										
2-Fluorobiphenyl	*23.8*	mg/kg dry			*23.4*		102% *(50-150)*		06/03/15 :06/03/15	
Diesel/Oil Hydrocarbons by GC-FID - Batch B15F057										
Blank (B15F057-BLK2)										**F7**
Diesel	ND	mg/L	0.12						06/03/15 :06/09/15	
Lube oil	ND	mg/L	0.062						06/03/15 :06/09/15	
Surrogate										

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Project:	**Portland Harbor**	Client:	Director's Office
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Fuels - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Diesel/Oil Hydrocarbons by GC-FID - Batch B15F057										
Blank (B15F057-BLK2)										F7
Surrogate										
2-Fluorobiphenyl	*0.0334*	mg/L			*0.0500*		67% *(50-150)*		06/03/15 :06/09/15	
LCS (B15F057-BS2)										F7
Diesel	**0.304**	mg/L	0.031		0.500		61% *(50-150)*		06/03/15 :06/09/15	
Lube oil	**0.403**	mg/L	0.062		0.500		81% *(50-150)*		06/03/15 :06/09/15	
Surrogate										
2-Fluorobiphenyl	*0.0324*	mg/L			*0.0500*		65% *(50-150)*		06/03/15 :06/09/15	
LCS Dup (B15F057-BSD2)										F7
Diesel	**0.303**	mg/L	0.031		0.500		61% *(50-150)*	0.2 (200)	06/03/15 :06/09/15	
Lube oil	**0.384**	mg/L	0.062		0.500		77% *(50-150)*	5 (200)	06/03/15 :06/09/15	
Surrogate										
2-Fluorobiphenyl	*0.0346*	mg/L			*0.0500*		69% *(50-150)*		06/03/15 :06/09/15	
Hydrocarbon Scan by GC-FID - Batch B15E430										
Blank (B15E430-BLK1)										
Gasoline	ND	mg/Wipe	1						05/28/15 :05/28/15	
Lube oil	ND	mg/Wipe	2						05/28/15 :05/28/15	
Diesel	ND	mg/Wipe	2						05/28/15 :05/28/15	
Surrogate										
2-Fluorobiphenyl	*0.0867*	mg/Wipe			*0.100*		87% *(50-150)*		05/28/15 :05/28/15	
Hydrocarbon Scan by GC-FID - Batch B15E437										
Blank (B15E437-BLK1)										
Gasoline	ND	mg/kg wet	17						05/29/15 :05/29/15	
Diesel	ND	mg/kg wet	42						05/29/15 :05/29/15	
Lube oil	ND	mg/kg wet	83						05/29/15 :05/29/15	
Surrogate										
2-Fluorobiphenyl	*7.64*	mg/kg wet			*8.33*		92% *(50-150)*		05/29/15 :05/29/15	
Duplicate (B15E437-DUP1)			**Source: W15E199-05**							
Gasoline	ND	mg/kg dry	27			ND			05/29/15 :05/29/15	
Diesel	ND	mg/kg dry	66			ND			05/29/15 :05/29/15	
Lube oil	**DET**	mg/kg dry	133			DET			05/29/15 :05/29/15	
Surrogate										
2-Fluorobiphenyl	*13.0*	mg/kg dry			*13.3*		98% *(50-150)*		05/29/15 :05/29/15	
Hydrocarbon Scan by GC-FID - Batch B15F057										
Blank (B15F057-BLK1)										
Gasoline	ND	mg/L	0.12						06/03/15 :06/04/15	
Diesel	ND	mg/L	0.25						06/03/15 :06/04/15	

Reported: 06/17/15 12:54

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Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656
ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E199**	Received:	05/28/15 15:15

Fuels - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec *(Limits)*	RPD *(Limit)*	Prepared: Analyzed	Qualifier
Hydrocarbon Scan by GC-FID - Batch B15F057										
Blank (B15F057-BLK1)										
Lube oil	ND	mg/L	0.25						06/03/15 :06/04/15	
Surrogate										
2-Fluorobiphenyl	*0.0333*	mg/L			*0.0500*		67% *(50-150)*		06/03/15 :06/04/15	
LCS (B15F057-BS1)										
Gasoline	**DET**	mg/L	0.06		0.200		42% *(50-150)*		06/03/15 :06/04/15	
Diesel	**DET**	mg/L	0.25		0.500		66% *(50-150)*		06/03/15 :06/04/15	
Lube oil	**DET**	mg/L	0.25		0.500		66% *(50-150)*		06/03/15 :06/04/15	
Surrogate										
2-Fluorobiphenyl	*0.0296*	mg/L			*0.0500*		59% *(50-150)*		06/03/15 :06/04/15	
LCS Dup (B15F057-BSD1)										
Gasoline	**DET**	mg/L	0.05		0.200		29% *(50-150)*		06/03/15 :06/04/15	
Diesel	**DET**	mg/L	0.25		0.500		66% *(50-150)*		06/03/15 :06/04/15	
Lube oil	**DET**	mg/L	0.25		0.500		61% *(50-150)*		06/03/15 :06/04/15	
Surrogate										
2-Fluorobiphenyl	*0.0325*	mg/L			*0.0500*		65% *(50-150)*		06/03/15 :06/04/15	
Hydrocarbon Scan by GC-FID - Batch B15F126										
Blank (B15F126-BLK1)										
Gasoline	ND	mg/L	0.12						06/08/15 :06/08/15	
Diesel	ND	mg/L	0.25						06/08/15 :06/08/15	
Lube oil	ND	mg/L	0.25						06/08/15 :06/08/15	F0
Surrogate										
2-Fluorobiphenyl	*0.0290*	mg/L			*0.0500*		58% *(50-150)*		06/08/15 :06/08/15	
LCS (B15F126-BS1)										
Diesel	**DET**	mg/L	0.25		0.500		66% *(50-150)*		06/08/15 :06/08/15	
Surrogate										
2-Fluorobiphenyl	*0.0372*	mg/L			*0.0500*		74% *(50-150)*		06/08/15 :06/08/15	
LCS Dup (B15F126-BSD1)										
Diesel	**DET**	mg/L	0.25		0.500		58% *(50-150)*		06/08/15 :06/08/15	
Surrogate										
2-Fluorobiphenyl	*0.0292*	mg/L			*0.0500*		58% *(50-150)*		06/08/15 :06/08/15	

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ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E199**	Received:	05/28/15 15:15

Semivolatile Organics - SIM - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15E414										
Blank (B15E414-BLK1)										
Acenaphthene	ND	ug/L	0.020	0.020					05/28/15 :06/01/15	
Acenaphthylene	ND	ug/L	0.020	0.020					05/28/15 :06/01/15	
Anthracene	ND	ug/L	0.020	0.020					05/28/15 :06/01/15	
Benzo(a)anthracene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Benzo(a)pyrene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Benzo(b)fluoranthene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Benzo(g,h,i)perylene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Benzo(k)fluoranthene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Chrysene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Dibenzo(a,h)anthracene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Fluoranthene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Fluorene	ND	ug/L	0.020	0.020					05/28/15 :06/01/15	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
1-Methylnaphthalene	ND	ug/L	0.040	0.040					05/28/15 :06/01/15	
2-Methylnaphthalene	ND	ug/L	0.040	0.040					05/28/15 :06/01/15	
Naphthalene	ND	ug/L	0.040	0.040					05/28/15 :06/01/15	
Phenanthrene	ND	ug/L	0.020	0.020					05/28/15 :06/01/15	
Pyrene	ND	ug/L	0.010	0.010					05/28/15 :06/01/15	
Butyl benzyl phthalate	ND	ug/L	1.0	0.50					05/28/15 :06/01/15	
Di-n-butyl phthalate	ND	ug/L	1.0	0.50					05/28/15 :06/01/15	
Diethyl phthalate	ND	ug/L	1.0	0.50					05/28/15 :06/01/15	
Dimethyl phthalate	ND	ug/L	1.0	0.50					05/28/15 :06/01/15	
Di-n-octyl phthalate	ND	ug/L	1.0	0.50					05/28/15 :06/01/15	
Bis(2-ethylhexyl) phthalate	ND	ug/L	1.0	0.50					05/28/15 :06/01/15	
Surrogate										
2-Methylnaphthalene-d10	*0.23*	ug/L			*0.229*		102% *(60.4-153*		05/28/15 :06/01/15	
Fluoranthene-d10	*0.25*	ug/L			*0.229*		108% *(69-149)*		05/28/15 :06/01/15	
LCS (B15E414-BS1)										
Acenaphthene	**0.112**	ug/L	0.020	0.020	0.114		98% *(58.8-155)*		05/28/15 :06/01/15	
Acenaphthylene	**0.115**	ug/L	0.020	0.020	0.114		100% *(64-155)*		05/28/15 :06/01/15	
Anthracene	**0.117**	ug/L	0.020	0.020	0.114		102% *(76.2-129*		05/28/15 :06/01/15	
Benzo(a)anthracene	**0.119**	ug/L	0.010	0.010	0.114		104% *(72.9-138*		05/28/15 :06/01/15	
Benzo(a)pyrene	**0.122**	ug/L	0.010	0.010	0.114		106% *(75.5-137*		05/28/15 :06/01/15	
Benzo(b)fluoranthene	**0.117**	ug/L	0.010	0.010	0.114		102% *(59.9-160*		05/28/15 :06/01/15	
Benzo(g,h,i)perylene	**0.106**	ug/L	0.010	0.010	0.114		93% *(70.1-134)*		05/28/15 :06/01/15	
Benzo(k)fluoranthene	**0.119**	ug/L	0.010	0.010	0.114		104% *(61.1-157*		05/28/15 :06/01/15	
Chrysene	**0.123**	ug/L	0.010	0.010	0.114		108% *(76.7-146*		05/28/15 :06/01/15	
Dibenzo(a,h)anthracene	**0.117**	ug/L	0.010	0.010	0.114		102% *(63.9-140*		05/28/15 :06/01/15	
Fluoranthene	**0.119**	ug/L	0.010	0.010	0.114		104% *(77.5-134*		05/28/15 :06/01/15	
Fluorene	**0.118**	ug/L	0.020	0.020	0.114		103% *(61.2-157*		05/28/15 :06/01/15	

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Water Pollution Control Laboratory
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ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E199**	Received:	05/28/15 15:15

Semivolatile Organics - SIM - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec *(Limits)*	RPD *(Limit)*	Prepared: Analyzed	Qualifier
Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15E414										
LCS (B15E414-BS1)										
Indeno(1,2,3-cd)pyrene	**0.112**	ug/L	0.010	0.010	0.114		98% *(68.4-135)*		05/28/15 :06/01/15	
1-Methylnaphthalene	**0.131**	ug/L	0.040	0.040	0.114		114% *(79.6-158*		05/28/15 :06/01/15	
2-Methylnaphthalene	**0.125**	ug/L	0.040	0.040	0.114		109% *(76-161)*		05/28/15 :06/01/15	
Naphthalene	**0.117**	ug/L	0.040	0.040	0.114		103% *(60.6-164*		05/28/15 :06/01/15	
Phenanthrene	**0.111**	ug/L	0.020	0.020	0.114		97% *(77.4-140)*		05/28/15 :06/01/15	
Pyrene	**0.127**	ug/L	0.010	0.010	0.114		111% *(81.1-141)*		05/28/15 :06/01/15	
Surrogate										
2-Methylnaphthalene-d10	*0.23*	ug/L			*0.229*		102% *(60.4-153*		05/28/15 :06/01/15	
Fluoranthene-d10	*0.24*	ug/L			*0.229*		105% *(69-149)*		05/28/15 :06/01/15	
Matrix Spike (B15E414-MS1)			**Source: W15E194-05**							
Acenaphthene	**0.325**	ug/L	0.020	0.020	0.286	ND	114% *(58.8-155*		05/28/15 :06/01/15	
Acenaphthylene	**0.319**	ug/L	0.020	0.020	0.286	ND	112% *(64-155)*		05/28/15 :06/01/15	
Anthracene	**0.328**	ug/L	0.020	0.020	0.286	ND	115% *(76.2-129*		05/28/15 :06/01/15	
Benzo(a)anthracene	**0.302**	ug/L	0.010	0.010	0.286	ND	106% *(72.9-138*		05/28/15 :06/01/15	
Benzo(a)pyrene	**0.300**	ug/L	0.010	0.010	0.286	ND	105% *(75.5-137*		05/28/15 :06/01/15	
Benzo(b)fluoranthene	**0.288**	ug/L	0.010	0.010	0.286	ND	101% *(59.9-160*		05/28/15 :06/01/15	
Benzo(g,h,i)perylene	**0.259**	ug/L	0.010	0.010	0.286	ND	91% *(70.1-134)*		05/28/15 :06/01/15	
Benzo(k)fluoranthene	**0.291**	ug/L	0.010	0.010	0.286	ND	102% *(61.1-157*		05/28/15 :06/01/15	
Chrysene	**0.315**	ug/L	0.010	0.010	0.286	ND	110% *(76.7-146*		05/28/15 :06/01/15	
Dibenzo(a,h)anthracene	**0.282**	ug/L	0.010	0.010	0.286	ND	99% *(63.9-140)*		05/28/15 :06/01/15	
Fluoranthene	**0.319**	ug/L	0.010	0.010	0.286	ND	112% *(77.5-134*		05/28/15 :06/01/15	
Fluorene	**0.345**	ug/L	0.020	0.020	0.286	0.0251	112% *(61.2-157*		05/28/15 :06/01/15	
Indeno(1,2,3-cd)pyrene	**0.274**	ug/L	0.010	0.010	0.286	ND	96% *(68.4-135)*		05/28/15 :06/01/15	
1-Methylnaphthalene	**0.367**	ug/L	0.040	0.040	0.286	ND	129% *(79.6-159*		05/28/15 :06/01/15	
2-Methylnaphthalene	**0.350**	ug/L	0.040	0.040	0.286	ND	123% *(76-161)*		05/28/15 :06/01/15	
Naphthalene	**0.325**	ug/L	0.040	0.040	0.286	ND	114% *(60.6-164*		05/28/15 :06/01/15	
Phenanthrene	**0.313**	ug/L	0.020	0.020	0.286	ND	109% *(77.4-140*		05/28/15 :06/01/15	
Pyrene	**0.341**	ug/L	0.010	0.010	0.286	ND	119% *(81.1-141*		05/28/15 :06/01/15	
Surrogate										
2-Methylnaphthalene-d10	*0.25*	ug/L			*0.229*		109% *(60.4-153*		05/28/15 :06/01/15	
Fluoranthene-d10	*0.25*	ug/L			*0.229*		110% *(69-149)*		05/28/15 :06/01/15	
Matrix Spike Dup (B15E414-MSD1)			**Source: W15E194-05**							
Acenaphthene	**0.322**	ug/L	0.020	0.020	0.286	ND	113% *(58.8-155* 0.7 (50)		05/28/15 :06/01/15	
Acenaphthylene	**0.320**	ug/L	0.020	0.020	0.286	ND	112% *(64-155)* 0.2 (50)		05/28/15 :06/01/15	
Anthracene	**0.324**	ug/L	0.020	0.020	0.286	ND	113% *(76.2-129* 1 (50)		05/28/15 :06/01/15	
Benzo(a)anthracene	**0.310**	ug/L	0.010	0.010	0.286	ND	108% *(72.9-138* 3 (50)		05/28/15 :06/01/15	
Benzo(a)pyrene	**0.310**	ug/L	0.010	0.010	0.286	ND	108% *(75.5-137* 3 (50)		05/28/15 :06/01/15	
Benzo(b)fluoranthene	**0.293**	ug/L	0.010	0.010	0.286	ND	103% *(59.9-160* 2 (50)		05/28/15 :06/01/15	
Benzo(g,h,i)perylene	**0.271**	ug/L	0.010	0.010	0.286	ND	95% *(70.1-134)* 4 (50)		05/28/15 :06/01/15	
Benzo(k)fluoranthene	**0.303**	ug/L	0.010	0.010	0.286	ND	106% *(61.1-157* 4 (50)		05/28/15 :06/01/15	

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Water Pollution Control Laboratory
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ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15E199**	Received:	05/28/15 15:15

Semivolatile Organics - SIM - QC

Analyte	Result	Units	MRL	MDL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Polynuclear Aromatics & Phthalates by GCMS-SIM - Batch B15E414										
Matrix Spike Dup (B15E414-MSD1)					**Source: W15E194-05**					
Chrysene	**0.324**	ug/L	0.010	0.010	0.286	ND	113% *(76.7-146* 3 (50)		05/28/15 :06/01/15	
Dibenzo(a,h)anthracene	**0.297**	ug/L	0.010	0.010	0.286	ND	104% *(63.9-140* 5 (50)		05/28/15 :06/01/15	
Fluoranthene	**0.317**	ug/L	0.010	0.010	0.286	ND	111% *(77.5-134)* 0.7 (50)		05/28/15 :06/01/15	
Fluorene	**0.351**	ug/L	0.020	0.020	0.286	0.0251	114% *(61.2-157* 2 (50)		05/28/15 :06/01/15	
Indeno(1,2,3-cd)pyrene	**0.287**	ug/L	0.010	0.010	0.286	ND	101% *(68.4-135* 5 (50)		05/28/15 :06/01/15	
1-Methylnaphthalene	**0.364**	ug/L	0.040	0.040	0.286	ND	127% *(79.6-159* 0.9 (50)		05/28/15 :06/01/15	
2-Methylnaphthalene	**0.350**	ug/L	0.040	0.040	0.286	ND	122% *(76-161)* 0.2 (50)		05/28/15 :06/01/15	
Naphthalene	**0.320**	ug/L	0.040	0.040	0.286	ND	112% *(60.6-164* 2 (50)		05/28/15 :06/01/15	
Phenanthrene	**0.315**	ug/L	0.020	0.020	0.286	ND	110% *(77.4-140* 0.9 (50)		05/28/15 :06/01/15	
Pyrene	**0.337**	ug/L	0.010	0.010	0.286	ND	118% *(81.1-141* 1 (50)		05/28/15 :06/01/15	
Surrogate										
2-Methylnaphthalene-d10	*0.25*	ug/L			*0.229*		108% *(60.4-153*		05/28/15 :06/01/15	
Fluoranthene-d10	*0.25*	ug/L			*0.229*		108% *(69-149)*		05/28/15 :06/01/15	

Qualifiers

F0	Analyte was detected in the Method Blank at a concentration greater than one half of the reporting level, but less than the reporting level. Sample result may be a high estimate.
F0a	Fuel pattern most closely resembles transformer oil.
F0b	Results resembles most closely non-PCB transformer oil.
F2	Result for heavy oil is primarily due to overlap from diesel-range hydrocarbons.
F4	Result for gasoline is primarily overlap from diesel-range hydrocarbons.
F6	Surrogate recovery could not be determined due to the high concentration of hydrocarbons in the sample.
F7	This sample underwent silica gel clean-up.
SU5	Surrogate recovery could not be determined due to required dilution of the sample extract.

Definitions

DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

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Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
Sample Custodian: (503) 823-5696
General Lab: (503) 823-5681

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 5/28/15

Work Order #: W15E199

Collected By: MJS, WCR, ELH, PHA

Client Name: **Director's Office**

Project Name: **Portland Harbor**

Requested Analyses

Special Instructions:

Basin 22 Petroleum Sheen Investigation

[1] **Run NWTPH-Dx and NWTPH-Gx if detected**

Turn-Around-Time Request:

- ☐ Standard (10 business days)
- ☐ Rush (5 business days)
- ☐ Other: _____

Lab Number	Location ID	Sample Date	Sample Time	Grab or Comp	Sample Matrix	NWTPH-HCID[1]	PAH (low-Level)	Conductivity (umhos/cm) Meter: Combo 5	# of Containers	Remarks
01	22_24W	5/28/2015	1013	G	Water	●	●	254	2	AQB059 ~~ABQ059~~ Surface Sheen Water
2	22_25Wipe	5/28/2015	1018	G	Wipe	●			1	AQB059 ~~ABQ059~~ Wipe above 16" inlet
3	22_26Wipe	5/28/2015	1021	G	Wipe	●			1	AQB059 ~~ABQ059~~ Wipe below 6" inlet
4	22_27W	5/28/2015	1043	G	Water	●	●	103	2	AAP794 Dry Flow from 12" Lat
5	22_28	5/28/2015	1050	C G	Sed	●			1	AAP794 Inline Sediment DS
6	22_29W	5/28/2015	1056	G	Water	●	●	184	2	AAP794 Dry Flow from US
7	22_30Wipe	5/28/2015	1116	G	Wipe	●			1	ANV453 Wipe under east Lat
8	22_31Wipe	5/28/2015	1119	G	Wipe	●			1	ANV543 Wipe from east shelf
9	22_32W	5/28/2015	1148	G	Water	●	●	173	2	AAP792 N Dry Flow from ~~S~~ Lat
10	22_~~33W~~ 6W	5/28/2015	1209	G	Water	●	●	194	2	AAP791 Dry Flow

Relinquished By:	Date:	Received By:	Date:	Relinquished By:	Date:	Received By:	Date:
Signature:	5/28/14	Signature:	5-28-15	Signature:		Signature:	
Printed Name: Matt Sullivan	Time: 1515	Printed Name: Nicholas Jennings	Time: 15:15	Printed Name:	Time:	Printed Name:	Time:

Portland Harbor - Basin 22 Petroleum Sheen COC #1 (5-28-15)

Page 1 of 2

Page 16 of 18

Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
Sample Custodian: (503) 823-5696
General Lab: (503) 823-5681

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 5/28/15

Work Order #: W15E199

Collected By: MJS, WCR, ECH, PHA

Client Name: **Director's Office**

Project Name: **Portland Harbor**

Requested Analyses

Special Instructions:

Basin 22 Petroleum Sheen Investigation

[1] **Run NWTPH-Dx and NWTPH-Gx if detected**

Turn-Around-Time Request:

- ☐ Standard (10 business days)
- ☐ Rush (5 business days)
- ☐ Other: _____

Lab Number	Location ID	Sample Date	Sample Time	Grab or Comp	Sample Matrix	NWTPH-HCID[1]	PAHs (low-Level)	Conductivity (umhos/cm) Meter: Cond 5	# of Containers	Remarks
11	22_34 33	5/28/2015	1216	C	Sed	●				AAP791 Inline Sediment US
12	22_~~35~~ 34	5/28/2015	1408	C	Sed	●				AAM078 Inline Sediment US
13	22_~~36Wipe~~ 35Wipe	5/28/2015	1412	G	Wipe	●				AAM078 Wipe from MH Collar

Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Matt Sullivan	Signature:	Signature:	Signature:
Printed Name: Matt Sullivan	Printed Name: Nicholas Semness	Printed Name:	Printed Name:
Date: 5/28/14	Date: 5-28-15	Date:	Date:
Time: 1515	Time: 15:15	Time:	Time:

WPCL Cooler Receipt Form

Work Order Number: W15E199 Cooler Receipt Form Filled Out By: MT/KT

Project: Portland Harbor

Sample transport: Samples received on ice____ Courier_____

Directly from field_____

Temperature (°C) 12°C

	Yes	No	NA
Is the COC present and signed?	✓		
Are sample bottles intact?	✓		
Do the COC and sample labels match?	✓		
Are the appropriate containers used?	✓ *		
Are samples appropriately preserved?	✓		
Do VOA vials have Headspace?			✓
Are samples received within holding times?	✓		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	**HNO_3 (1:1) to pH <2**		0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	**H_2SO_4 (18N) to pH <2**		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	**HCl (1:1) to pH <2**	1500678	1.0mL/500mL; 2.0mL/1000mL
4	**HCl (1:1) to pH 2-3**		For TOC: 2-5 drops/250mL
5	**NaOH (pellets) to pH >12**		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments
5/29/15	0955	KT	W15E199-01,04,06,09, 10	A	3	

Comments: * 052915kn: GX followups: there are no extra sediment jars, VOA vials, or wipes for followups.

S:\LAB\Forms\WPCL Cooler Receipt Form Nov 2013.doc

Investigation Day Three
June 3, 2015

GSI Water Solutions, Inc.
55 SW Yamhill Street, Suite 400 Portland, OR 97204
P: 503.239.8799 F: 503.239.8940
info@gsiwatersolutions.com www.gsiwatersolutions.com

Laboratory Data QA/QC Review
Petroleum Sheen Investigation
Outfall Basin 22

To: File

From: Andrew Davidson, GSI

Date: June 28, 2015

This memorandum presents a quality assurance/quality control (QA/QC) review of the laboratory data generated during a source control investigation sampling event conducted by the City of Portland (City). Six composite inline solids samples were collected in Outfall Basin 22 on June 3, 2015 and submitted for analyses.

The laboratory analyses for these source control program samples were completed by the City's Bureau of Environmental Services (BES) Water Pollution Control Laboratory (WPCL) and included the following analyses:

- BES WPCL
    - Total Solids – SM 2540 G (Inline solids samples only)
    - Hydrocarbon Analysis – NWTPH-HCID (NWTPH-Dx, Gx if detected)

The WPCL summary report for all analyses associated with this sampling event is attached for review.

The following QA/QC review of the analytical data is based on the available documentation provided by WPCL. The QA/QC review consisted of reviewing the following elements from the laboratory report, if applicable and available:

- Chain-of-custody for completeness and continuous custody
- Analysis conducted within holding times
- Chemicals of interest detected in method blanks and/or field decontamination blanks
- Internal standard recoveries within laboratory control limits
- Surrogate recoveries within laboratory control limits

- Matrix spike/matrix spike duplicate (MS/MSD) sample results within laboratory control limits
- Laboratory control/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

The samples were extracted and analyzed within the recommended method-specific holding times.

Method Blanks

Method blanks were processed during the hydrocarbon scan analysis (NWTPH-HCID), the analysis of diesel/oil hydrocarbons (NWTPH-Dx), and the analysis of gasoline (NWTPH-Gx). No analytes were detected in any of the method blank samples.

Surrogate Recoveries

Surrogate recoveries were processed during the laboratory analyses of hydrocarbons (NWTPH-HCID, NWTPH-Dx, and NWTPH-Gx). Surrogate recoveries were within control limits for all analyses.

Laboratory Control Samples/Duplicate Laboratory Control Samples

LCS samples were processed during the NWTPH-Dx and NWTPH-Gx analyses. All LCS recoveries were within laboratory control limits.

Duplicate Samples

Duplicate samples were processed during the analyses of total solids, NWTPH-HCID, NWTPH-Dx, and NWTPH-Gx for inline solids samples. All RPDs were within acceptance criteria with one exception:

- The duplicate sample collected from W15F041-02 and analyzed by NWTPH-Gx had an RPD above acceptance criteria. WPCL reports that the results indicate non-homogenous sample matrix and the sample result should be considered an estimate. Accordingly, the

result for gasoline in sample W15F041-02 is flagged as an estimate "J" due to non-homogenous matrix "NM".

Additional Information

WPCL reports the following additional information regarding inline solids samples:

- Diesel results for samples W15F041-01, W15F041-02, W15F041-03, and W15F041-04 during the NWTPH-Dx analysis were positively biased by overlap from large Motor Oil peaks. Accordingly the data are flagged as estimates "J" due to matrix interference "MI".
- All samples analyzed by NWTPH-Dx underwent silica gel clean-up.
- WPCL reports that detections quantified as Diesel and Lube Oil in sample W15F041-04 actually appear to be a single petroleum product that is heavier than Diesel #2 and lighter than the reference lube oil. The values are qualified as estimates "J" due to inadequate matching with the reference compounds "RC".
- WPCL reports that the detected components in sample W15F041-06 does not resemble a fuel pattern but the quantity exceeds the reporting threshold.
- WPCL reports that gasoline detections in samples W15F041-01 and W15F041-02 are primarily due to overlap from diesel-range hydrocarbons. Accordingly, gasoline results for these two samples are qualified as estimates "J" due to matrix interference "MI".
- Sample aliquots for samples W15F041-01 and W15F041-02 were sub-sampled from a jar during the NWTPH-Gx analysis. The sub-sampled aliquot was not preserved with methanol within 48 hours of sampling. Sample results may be biased low. Associated results are flagged as estimates "J" to reflect inadequate preservation times "HT".

City of Portland
Water Pollution Control Laboratory
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June 22, 2015

Linda Scheffler
Director's Office

Work Order	Project	Received
W15F041	**Portland Harbor**	06/03/15 14:57

Enclosed are the results of analysis for the above work order. If you have questions concerning this report, please contact your project coordinator Peter Abrams at 503-823-5533.

Jennifer Shackelford
Laboratory Coordinator QA/QC

City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656
ORELAP Certification ID 4023

LABORATORY ANALYSIS REPORT

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15F041**	Project Mgr:	Linda Scheffler
Received:	6/3/15 14:57		
Submitted By:	Field Operations		

Sample	Laboratory ID	Matrix	Type	Sample Collection Date Start	Sample Collection Date End	Qualifier
22_36	W15F041-01	Sediment	Composite	06/03/15 10:14	06/03/15 10:14	
22_37	W15F041-02	Sediment	Composite	06/03/15 10:20	06/03/15 10:20	
22_38	W15F041-03	Sediment	Composite	06/03/15 10:58	06/03/15 10:58	
22_39	W15F041-04	Sediment	Composite	06/03/15 11:33	06/03/15 11:33	
22_40	W15F041-05	Sediment	Composite	06/03/15 12:30	06/03/15 12:30	
22_41	W15F041-06	Sediment	Composite	06/03/15 12:46	06/03/15 12:46	

Analyte	Result	Units	MRL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
General Chemistry									
Total Solids									
22_36 : W15F041-01									
Total solids	**76.5**	% W/W	0.01		B15F079	06/04/15	06/05/15	SM 2540G	
22_37 : W15F041-02									
Total solids	**72.2**	% W/W	0.01		B15F079	06/04/15	06/05/15	SM 2540G	
22_38 : W15F041-03									
Total solids	**82.4**	% W/W	0.01		B15F079	06/04/15	06/05/15	SM 2540G	
22_39 : W15F041-04									
Total solids	**58.3**	% W/W	0.01		B15F079	06/04/15	06/05/15	SM 2540G	
22_40 : W15F041-05									
Total solids	**62.9**	% W/W	0.01		B15F079	06/04/15	06/05/15	SM 2540G	
22_41 : W15F041-06									
Total solids	**80.1**	% W/W	0.01		B15F079	06/04/15	06/05/15	SM 2540G	

Reported: 06/22/15 08:22

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Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

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Water Pollution Control Laboratory
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Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15F041**	Received:	06/03/15 14:57

Analyte	Result	Units	MRL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Fuels									
Diesel/Oil Hydrocarbons by GC-FID									
22_36 : W15F041-01									F7
Diesel	**2100**	mg/kg dry	140	5	B15F213	06/11/15	06/16/15	NWTPH-Dx	F0
Lube oil	**4800**	mg/kg dry	270	5	B15F213	06/11/15	06/16/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***				
2-Fluorobiphenyl	*20.6*	mg/kg dry	*21.9*	*94%*	*50-150*	*B15F213*	*06/11/15*	*06/16/15*	*NWTPH-Dx*
22_37 : W15F041-02									F7
Diesel	**3100**	mg/kg dry	140	5	B15F213	06/11/15	06/16/15	NWTPH-Dx	F0
Lube oil	**8300**	mg/kg dry	280	5	B15F213	06/11/15	06/16/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***				
2-Fluorobiphenyl	*22.0*	mg/kg dry	*22.5*	*98%*	*50-150*	*B15F213*	*06/11/15*	*06/16/15*	*NWTPH-Dx*
22_38 : W15F041-03									F7
Diesel	**120**	mg/kg dry	51	2	B15F213	06/11/15	06/16/15	NWTPH-Dx	F0
Lube oil	**770**	mg/kg dry	100	2	B15F213	06/11/15	06/16/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***				
2-Fluorobiphenyl	*19.7*	mg/kg dry	*20.2*	*97%*	*50-150*	*B15F213*	*06/11/15*	*06/16/15*	*NWTPH-Dx*
22_39 : W15F041-04									F7
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***				
2-Fluorobiphenyl	*30.4*	mg/kg dry	*31.1*	*98%*	*50-150*	*B15F213*	*06/11/15*	*06/16/15*	*NWTPH-Dx*
22_39 : W15F041-04RE1									F7
Diesel	**37000**	mg/kg dry	780	20	B15F213	06/11/15	06/16/15	NWTPH-Dx	F0, F8
22_39 : W15F041-04RE4									F7
Lube oil	**86000**	mg/kg dry	3100	40	B15F213	06/11/15	06/17/15	NWTPH-Dx	
22_40 : W15F041-05									F7
Diesel	ND	mg/kg dry	33	1	B15F213	06/11/15	06/16/15	NWTPH-Dx	
Lube oil	**360**	mg/kg dry	65	1	B15F213	06/11/15	06/16/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***				
2-Fluorobiphenyl	*23.6*	mg/kg dry	*26.1*	*90%*	*50-150*	*B15F213*	*06/11/15*	*06/16/15*	*NWTPH-Dx*
22_41 : W15F041-06									F7
Diesel	**30**	mg/kg dry	28	1	B15F213	06/11/15	06/16/15	NWTPH-Dx	F5
Lube oil	**330**	mg/kg dry	56	1	B15F213	06/11/15	06/16/15	NWTPH-Dx	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***				
2-Fluorobiphenyl	*20.0*	mg/kg dry	*22.3*	*89%*	*50-150*	*B15F213*	*06/11/15*	*06/16/15*	*NWTPH-Dx*
Hydrocarbon Scan by GC-FID									
22_36 : W15F041-01									
Gasoline	**DET**	mg/kg dry	47	1	B15F078	06/04/15	06/04/15	NWTPH-HCID	F4
Diesel	**DET**	mg/kg dry	117	1	B15F078	06/04/15	06/04/15	NWTPH-HCID	
Lube oil	**DET**	mg/kg dry	235	1	B15F078	06/04/15	06/04/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***				
2-Fluorobiphenyl	*11.0*	mg/kg dry	*11.7*	*94%*	*50-150*	*B15F078*	*06/04/15*	*06/04/15*	*NWTPH-HCID*
22_37 : W15F041-02									

Reported: 06/22/15 08:22

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Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656
ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15F041**	Received:	06/03/15 14:57

Fuels

Hydrocarbon Scan by GC-FID

Analyte	Result	Units	MRL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
22_37 : W15F041-02									
Gasoline	**DET**	mg/kg dry	50	1	B15F078	06/04/15	06/04/15	NWTPH-HCID	F4
Diesel	**DET**	mg/kg dry	124	1	B15F078	06/04/15	06/04/15	NWTPH-HCID	
Lube oil	**DET**	mg/kg dry	248	1	B15F078	06/04/15	06/04/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***				
2-Fluorobiphenyl	*12.0*	*mg/kg dry*	*12.4*	*97%*	*50-150*	*B15F078*	*06/04/15*	*06/04/15*	*NWTPH-HCID*
22_38 : W15F041-03									
Gasoline	ND	mg/kg dry	41	1	B15F078	06/04/15	06/04/15	NWTPH-HCID	
Diesel	**DET**	mg/kg dry	104	1	B15F078	06/04/15	06/04/15	NWTPH-HCID	F1
Lube oil	**DET**	mg/kg dry	207	1	B15F078	06/04/15	06/04/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***				
2-Fluorobiphenyl	*10.2*	*mg/kg dry*	*10.4*	*98%*	*50-150*	*B15F078*	*06/04/15*	*06/04/15*	*NWTPH-HCID*
22_39 : W15F041-04									
Gasoline	ND	mg/kg dry	62	1	B15F078	06/04/15	06/04/15	NWTPH-HCID	
Diesel	**DET**	mg/kg dry	154	1	B15F078	06/04/15	06/04/15	NWTPH-HCID	F1
Lube oil	**DET**	mg/kg dry	308	1	B15F078	06/04/15	06/04/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***				
2-Fluorobiphenyl	*14.5*	*mg/kg dry*	*15.4*	*94%*	*50-150*	*B15F078*	*06/04/15*	*06/04/15*	*NWTPH-HCID*
22_40 : W15F041-05RE1									
Gasoline	ND	mg/kg dry	57	1	B15F078	06/04/15	06/05/15	NWTPH-HCID	
Diesel	**DET**	mg/kg dry	143	1	B15F078	06/04/15	06/05/15	NWTPH-HCID	F1
Lube oil	**DET**	mg/kg dry	285	1	B15F078	06/04/15	06/05/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***				
2-Fluorobiphenyl	*13.3*	*mg/kg dry*	*14.3*	*93%*	*50-150*	*B15F078*	*06/04/15*	*06/05/15*	*NWTPH-HCID*
22_41 : W15F041-06RE1									
Gasoline	ND	mg/kg dry	44	1	B15F078	06/04/15	06/05/15	NWTPH-HCID	
Diesel	ND	mg/kg dry	109	1	B15F078	06/04/15	06/05/15	NWTPH-HCID	
Lube oil	**DET**	mg/kg dry	219	1	B15F078	06/04/15	06/05/15	NWTPH-HCID	
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***				
2-Fluorobiphenyl	*10.4*	*mg/kg dry*	*10.9*	*96%*	*50-150*	*B15F078*	*06/04/15*	*06/05/15*	*NWTPH-HCID*

Reported: 06/22/15 08:22

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Jennifer Shackelford, Laboratory Coordinator QA/QC

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Water Pollution Control Laboratory
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ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15F041**	Received:	06/03/15 14:57

Analyte	Result	Units	MRL	Dil.	Batch	Prepared	Analyzed	Method	Qualifier
Volatile Organics									
NWTPH-Gx by GCMS									
22_36 : W15F041-01									F12
Gasoline	**156**	mg/kg dry	8.01	50	B15F176	06/09/15 16:15	06/10/15	NWTPH-Gx	F4
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***				
Dibromofluoromethane	*0.0273*	mg/L	*0.0250*	*109%*	*50-150*	*B15F176*	*06/09/15 16:15*	*06/10/15*	*NWTPH-Gx*
Toluene-d8	*0.0314*	mg/L	*0.0250*	*125%*	*50-150*	*B15F176*	*06/09/15 16:15*	*06/10/15*	*NWTPH-Gx*
22_37 : W15F041-02									F12
Gasoline	**140**	mg/kg dry	8.43	50	B15F176	06/09/15 16:15	06/10/15	NWTPH-Gx	F4, M1
Surrogate	***Result***		***Expected***	***%Rec***	***Limits(%)***				
Dibromofluoromethane	*0.0275*	mg/L	*0.0250*	*110%*	*50-150*	*B15F176*	*06/09/15 16:15*	*06/10/15*	*NWTPH-Gx*
Toluene-d8	*0.0324*	mg/L	*0.0250*	*130%*	*50-150*	*B15F176*	*06/09/15 16:15*	*06/10/15*	*NWTPH-Gx*

Reported: 06/22/15 08:22

Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

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City of Portland
Water Pollution Control Laboratory
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ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15F041**	Received:	06/03/15 14:57

Quality Control Report

General Chemistry - QC

Analyte	Result	Units	MRL	Spike Level	Source Result	%Rec *(Limits)*	RPD *(Limit)*	Prepared: Analyzed	Qualifier
Total Solids - Batch B15F079									
Duplicate (B15F079-DUP1)			**Source: W15F041-01**						
Total solids	**77.3**	% W/W	0.01		76.5		1 (5)	06/04/15 :06/05/15	

Fuels - QC

Analyte	Result	Units	MRL	Spike Level	Source Result	%Rec *(Limits)*	RPD *(Limit)*	Prepared: Analyzed	Qualifier
Diesel/Oil Hydrocarbons by GC-FID - Batch B15F213									
Blank (B15F213-BLK1)									**F7**
Diesel	ND	mg/kg wet	21					06/11/15 :06/16/15	
Lube oil	ND	mg/kg wet	42					06/11/15 :06/16/15	
Surrogate									
2-Fluorobiphenyl	*13.5*	mg/kg wet		*16.7*		81% *(50-150)*		06/11/15 :06/16/15	
LCS (B15F213-BS1)									**F7**
Diesel	**56.6**	mg/kg wet	25	50.0		113% *(50-150)*		06/11/15 :06/16/15	
Lube oil	**48.3**	mg/kg wet	25	50.0		97% *(50-150)*		06/11/15 :06/16/15	
Surrogate									
2-Fluorobiphenyl	*18.0*	mg/kg wet		*20.0*		90% *(50-150)*		06/11/15 :06/16/15	
Duplicate (B15F213-DUP1)			**Source: W15F041-06**						**F7**
Diesel	ND	mg/kg dry	25		30.1		(50)	06/11/15 :06/16/15	
Lube oil	**265**	mg/kg dry	51		332		23 (50)	06/11/15 :06/16/15	
Surrogate									
2-Fluorobiphenyl	*19.0*	mg/kg dry		*20.2*		94% *(50-150)*		06/11/15 :06/16/15	
Duplicate (B15F213-DUP2)			**Source: W15F108-01**						**F7**
Diesel	**485**	mg/kg dry	30		667		32 (50)	06/11/15 :06/16/15	F3
Lube oil	**193**	mg/kg dry	59		239		21 (50)	06/11/15 :06/16/15	
Surrogate									
2-Fluorobiphenyl	*21.7*	mg/kg dry		*23.6*		92% *(50-150)*		06/11/15 :06/16/15	
Hydrocarbon Scan by GC-FID - Batch B15F078									
Blank (B15F078-BLK1)									
Gasoline	ND	mg/kg wet	33					06/04/15 :06/04/15	
Diesel	ND	mg/kg wet	83					06/04/15 :06/04/15	
Lube oil	ND	mg/kg wet	167					06/04/15 :06/04/15	
Surrogate									
2-Fluorobiphenyl	*6.68*	mg/kg wet		*8.33*		80% *(50-150)*		06/04/15 :06/04/15	

Reported: 06/22/15 08:22

Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

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City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656
ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15F041**	Received:	06/03/15 14:57

Fuels - QC

Analyte	Result	Units	MRL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
Hydrocarbon Scan by GC-FID - Batch B15F078									
Duplicate (B15F078-DUP1)			**Source: W15F041-03**						
Gasoline	ND	mg/kg dry	42		ND			06/04/15 :06/04/15	
Diesel	**DET**	mg/kg dry	106		DET			06/04/15 :06/04/15	F1
Lube oil	**DET**	mg/kg dry	212		DET			06/04/15 :06/04/15	
Surrogate									
2-Fluorobiphenyl	*10.2*	mg/kg dry		*10.6*		96% *(50-150)*		06/04/15 :06/04/15	

Volatile Organics - QC

Analyte	Result	Units	MRL	Spike Level	Source Result	%Rec (Limits)	RPD (Limit)	Prepared: Analyzed	Qualifier
NWTPH-Gx by GCMS - Batch B15F176									
Blank (B15F176-BLK1)									
Gasoline	ND	mg/kg wet	4.17					06/09/15 :06/10/15	
Surrogate									
Dibromofluoromethane	*0.0285*	mg/L		*0.0250*		114% *(50-150)*		06/09/15 :06/10/15	
Toluene-d8	*0.0277*	mg/L		*0.0250*		111% *(50-150)*		06/09/15 :06/10/15	
LCS (B15F176-BS2)									
Gasoline	**29.7**	mg/kg wet	5.00	25.0		119% *(70-130)*		06/09/15 :06/10/15	
Surrogate									
Dibromofluoromethane	*0.0254*	mg/L		*0.0250*		102% *(50-150)*		06/09/15 :06/10/15	
Toluene-d8	*0.0250*	mg/L		*0.0250*		100% *(50-150)*		06/09/15 :06/10/15	
Duplicate (B15F176-DUP1)			**Source: W15F041-02**						
Gasoline	**102**	mg/kg dry	8.33		140		31 (20)	06/09/15 :06/10/15	F4, M1
Surrogate									
Dibromofluoromethane	*0.0281*	mg/L		*0.0250*		112% *(50-150)*		06/09/15 :06/10/15	
Toluene-d8	*0.0302*	mg/L		*0.0250*		121% *(50-150)*		06/09/15 :06/10/15	

Reported: 06/22/15 08:22

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Jennifer Shackelford

Jennifer Shackelford, Laboratory Coordinator QA/QC

City of Portland
Water Pollution Control Laboratory
6543 N. Burlington Ave. / Portland OR 97203 (503) 823-5600 fax (503) 823-5656
ORELAP Certification ID 4023

Project:	**Portland Harbor**	Client:	Director's Office
Work Order:	**W15F041**	Received:	06/03/15 14:57

Qualifiers

F0	Result for Diesel range is positively biased by overlap from large Motor Oil peak(s).
F1	Result for diesel-range hydrocarbons is primarily due to overlap from the heavy oil range.
F12	Sample aliquot was sub-sampled from a soil jar. The sub-sampled aliquot was not preserved with methanol within 48 hours of sampling. Sample results may be biased low.
F3	Result for diesel-range hydrocarbons is primarily due to overlap from gasoline range.
F4	Result for gasoline is primarily overlap from diesel-range hydrocarbons.
F5	Detected components do not resemble a fuel pattern but the quantity exceeds the reporting threshold.
F7	This sample underwent silica gel clean-up.
F8	Hydrocarbons quantified as Diesel and Lube Oil appear to be a single petroleum product that is heavier than Diesel #2 and lighter than the reference Lube Oil.
M1	Matrix duplicate precision measurement indicates non-homogeneous sample matrix. Sample result should be considered an estimate.

Definitions

DET	Analyte Detected	ND	Analyte Not Detected at or above the reporting limit
MRL	Method Reporting Limit	MDL	Method Detection Limit
NR	Not Reportable	dry	Sample results reported on a dry weight basis
% Rec.	Percent Recovery	RPD	Relative Percent Difference
*	This analyte is not certified under NELAP		

Reported: 06/22/15 08:22

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Water Pollution Control Laboratory
6543 N. Burlington Ave.
Portland, Oregon 97203-4552
Sample Custodian: (503) 823-5696
General Lab: (503) 823-5681

City of Portland Chain-of-Custody

Bureau of Environmental Services

Date: 6/3/15

Work Order #: W15F041

Collected By: MJS, PHA, ELH, WCR

Client Name:	**Director's Office**
Project Name:	**Portland Harbor**

Requested Analyses

Special Instructions:

Basin 22 Petroleum Sheen Investigation

[1] **Run NWTPH-Dx and NWTPH-Gx if detected**

Turn-Around-Time Request:

- [x] Standard (10 business days)
- [ ] Rush (5 business days)
- [ ] Other: _____

Lab Number	Location ID	Sample Date	Sample Time	Grab or Comp	Sample Matrix	NWTPH-HCID[1]	# of Containers	Remarks
01	22_37 36	6/3/2015	1014	C G	Sed	●	1	AAP799 Inline Sediment DS
2	22_38 37	6/3/2015	1020	C G	Sed	●	1	AAP799 Inline Sed - 15" W Lat
3	22_39 38	6/3/2015	1058	C G	Sed	●	1	AAP796 Inline Sed - 8" N Lat
4	22_40 39	6/3/2015	1133	C G	Sed	●	1	AAP800 Inline Sediment - US
5	22_41 40	6/3/2015	1230	C G	Sed	●	1	ANF249 Inline Sed - CB Outlet
6	22_42 41	6/3/2015	1246	C G	Sed	●	1	CB to AAP799 AAP800 Inline Sed - CB Outlet

Relinquished By:	Received By:	Relinquished By:	Received By:
Signature: Matt Sullivan	Signature:	Signature:	Signature:
Printed Name: Matt Sullivan	Printed Name: Robert Edgren	Printed Name:	Printed Name:
Date: 6/3/15	Date: 6/3/15	Date:	Date:
Time: 1457	Time: 1457	Time:	Time:

WPCL Cooler Receipt Form

Work Order Number: W15F041 Cooler Receipt Form Filled Out By: (W)

Project: PDX Harbor

Sample transport: Samples received on ice ✓ Courier _____

Directly from field _____

Temperature (°C) 16

	Yes	No	NA
Is the COC present and signed?	✓		
Are sample bottles intact?	✓		
Do the COC and sample labels match?	✓		
Are the appropriate containers used?	✓		
Are samples appropriately preserved?			✓
Do VOA vials have Headspace?			✓
Are samples received within holding times?	✓		

Pres. #	Preservative	LIMS ID	Standard Preservation Amounts
1	**HNO_3 (1:1) to pH <2**		0.5mL/250mL; 1.0mL/500mL; 4-5 drops/50mL centrifuge tube
2	**H_2SO_4 (18N) to pH <2**		0.4mL/250mL; 0.8mL/500mL ; 1.6mL/1000mL
3	**HCl (1:1) to pH <2**		1.0mL/500mL; 2.0mL/1000mL
4	**HCl (1:1) to pH 2-3**		For TOC: 2-5 drops/250mL
5	**NaOH (pellets) to pH >12**		4-10 pellets/500mL; 8-20 pellets/1000mL

Date	Time	Analyst	Sample LIMS ID	Bottle ID	Pres. #	Comments

Comments: _____