FOCUSED INVESTIGATION SAMPLING AND ANALYSIS PLAN

ABERDEEN SAWMILL SITE
FACILITY SITE ID 1126
CLEANUP SITE ID 4987

Prepared for
GRAYS HARBOR
HISTORICAL SEAPORT AUTHORITY
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The material and data in this plan were prepared under the supervision and direction of the undersigned.

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ACRONYMS AND ABBREVIATIONS

°C	degrees centigrade
ARI	Analytical Resources Incorporated
AST	aboveground storage tank
CFR	Code of Federal Regulations
COC	chain of custody
COI	contaminant of interest
DGPS	differential global positioning unit
DNR	Washington State Department of Natural Resources
Ecology	Washington State Department of Ecology
EDD	electronic data deliverable
EIM	Environmental Information Management
FSDS	field sampling data sheet
GHHSA	Grays Harbor Historical Seaport Authority
GPR	ground penetrating radar
HASP	health and safety plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
IDW	investigation-derived waste
LCS	laboratory control sample
the Property	Seaport Landing located at 500 North Custer Street in Aberdeen, Washington
MFA	Maul Foster & Alongi, Inc.
MS/MSD	matrix spike and matrix spike duplicate
MTCA	Model Toxics Control Act
OF	outfall
OSHA	U.S. Occupational Safety and Health Administration
pH	potential hydrogen
PID	photoionization detector
QA	quality assurance
QC	quality control
SAP	sampling and analysis plan
SVOC	semivolatile organic compound
TPH/HCID	total petroleum hydrocarbons—hydrocarbon identification
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
WAC	Washington Administrative Code

1 INTRODUCTION

On behalf of the Grays Harbor Historical Seaport Authority (GHHSA), Maul Foster & Alongi, Inc. (MFA) has prepared this sampling and analysis plan (SAP) for a focused upland investigation of the Seaport Landing site, formerly the Aberdeen Sawmill, located at 500 North Custer Street in Aberdeen, Washington (the Property) (see Figure 1). This focused uplands investigation was developed based on the results of a geophysical survey, stormwater system evaluation, and review of historical records conducted by with input from the Washington Department of Ecology (Ecology). Specifically, this targeted investigation will be conducted to evaluate any impacts associated with suspected underground storage tanks (USTs) encountered during a geophysical survey conducted at the Property in May, 2015 (See Appendix X).

The purpose of this SAP is to describe sampling and analysis procedures and quality assurance and quality control (QA/QC) protocols to maintain consistency in the field aspects of data collection. This SAP has been prepared consistent with the Model Toxics Control Act (MTCA) stipulated in Washington Administrative Code (WAC) 173-340.

1.1 Site Setting

The Property includes uplands areas and leased tideland property (outlined in Figure 1), and is located along the shoreline of the tidally influenced Chehalis River waterfront in Aberdeen, Washington. The Property is located in the alluvial meander plain of the Chehalis River in the northwestern margins of the Willapa Hills physiographic region of southwest Washington. Located at 500 North Custer Street in Aberdeen, the site is approximately 2 miles upriver from Grays Harbor. The City of Aberdeen is situated in southwestern Washington, approximately 15 miles from the Pacific Ocean and approximately 70 air miles west-southwest of Tacoma, Washington. US Highway 101 and US Highway 105 are located less than 0.25 mile south of the site. The site is situated in sections 9 and 10 of township 17 north, range 9 west, Willamette Base Meridian, and occupies approximately 80 acres. The Property is bordered on the west by a former boat dock and marine service center; to the east by a log storage yard; to the north by the Chehalis River; and to the south by residential and commercial development.

1.2 Site Background

A detailed description of historical operations is presented in the Level 1 environmental site assessment (PES 2010) and summarized below. A sawmill has existed on the Property since before 1900. Weyerhaeuser acquired the site in 1955 and operated several sawmills and associated support facilities through January 2009, when the small log sawmill was permanently closed. There are no active wood products manufacturing operations at the site. When the facility was operational, raw logs were brought to the site in log rafts in the Chehalis River and tied up to pilings in the river in front of the Big Mill until the mid-1960s. After the mid-1960s, raw logs were brought to the site by truck and staged on log decks at various locations in and adjacent to the site. The Big Mill was originally configured to manufacture shingles and slats for housing construction. During World War II, the Big Mill was converted to manufacture ship keels for the war effort. The precursor to the small log mill was added in 1972. The last upgrade to the small log mill was in 2003. In 2006, the Big Mill and attached finger pier were closed; the associated structures were removed from the site between 2006 and 2008. This area is now known as the Former Mill Area. The site continued to operate a second mill, known as the small log mill, into early 2009. GHHSA acquired the property on March 29, 2013.

1.3 Previous Environmental Investigations

Several environmental investigations have been conducted at the Property which document contamination in soil, groundwater, and sediment at the Property. Sampling results and conclusions of pertinent previous environmental investigations at the site are summarized in the Study Area Investigation and Alternatives Analysis Work Plan focused on the tidelands adjacent to the upland property (MFA, 2015).

Since the submittal of the tidelands work plan, MFA conducted additional tasks to further evaluate potential environment concerns in the upland portion of the Property. The scope of work proposed in this SAP is based on the results of these efforts, described below.

Prioritization of Environmental Conditions

A Level 1 environmental site assessment (Level 1 ESA) was conducted for the property in August, 2010 in which multiple recognized environmental conditions and data gaps were identified (PES, 2010). MFA reviewed the Level 1 ESA and prioritized investigation of environmental conditions in the uplands that could also impact the tidelands lease portion of the site. The environmental conditions of potential concern identified based on data gaps from previous investigations are as follows (see Figure 2 for locations of features):

1. Uncharacterized soil and groundwater downgradient of former aboveground storage tanks (ASTs) and USTs with confirmed releases, as depicted on Figure 2, including:

    a. An UST located at the southeast corner of the maintenance shop was removed on August 6, 1993. Soil and groundwater were contaminated with petroleum hydrocarbons while benzene, toluene, ethylbenzene, and xylenes were not detected. Soil was excavated and water/free product was pumped. There is insufficient information to determine if soil and groundwater conditions related to this release meet regulatory standards.

    b. A paint waste UST was located at the southeast corner of planer building. This UST was removed in July 1989 and some contaminated soil was excavated. Groundwater contained trichloroethane (TCA) and light non-aqueous phase liquid (hydraulic oil or lube oil). Subsequent groundwater analytical data from nearby monitoring wells did not detect TCA. However, impacted soil from this release remain in place because excavation was discontinued due to concerns of building stability.

c. Sodium hydroxide tanks located in the southwest corner of the main shipping shed were decommissioned in November 1993. A "small" leak in the discharge pipe to the sanitary sewer was discovered during decommissioning, but there is no information regarding sampling or response actions that were conducted after discovery of the leak.

2. Unexcavated and uncharacterized contaminated soil near the Log Stacker at the former planer building (see Figure 2).

   a. Soil contamination occurred following a 50-gallon diesel spill on March 21, 2005 in this area. Excess oil on the surface was absorbed with sawdust and then disposed of, however no soil was excavated (PES, 2010).

3. Pentachlorophenol (PCP) in the area of the planer building. Release of PCP to the planer area (see Figure 2) was investigated in 1989. Remedial actions were conducted and included excavation of soil and debris and removal and disposal of groundwater..

   a. The PCP spill remedial action received a No Further Action Determination from Ecology in 1999 under the Independent Remedial Action Program. An environmental covenant was placed on the Property due to remaining soil that was not excavated due to concerns of building stability.

4. The potential presence of USTs whose locations or continuing presences are uncertain. According to the Phase I ESA (PES, 2010):

   - A 1993 letter from Ecology to Weyerhaeuser indicated the presence of four nested USTs in the northeast corner of the maintenance shop. The USTs were presumably under the building itself. No other information is available concerning these USTs.

   - According to Helen Bond, a former Weyerhaeuser employee, one used oil UST was located under the southwest corner of the maintenance shop. This UST was allegedly removed in 1993. A second UST was allegedly removed from outside of the maintenance shop in 1985. However, the only available documentation is a UST Closure Checklist from August, 1993 documenting the removal of a 1,500-gallon leaded gasoline UST from outside of the southeast corner of the maintenance shop.

   - A UST at the northeast corner of guard shack may have been removed, possibly in the late 1970s, but the fill pipe is still there.

5. Known ASTs with no known releases, for example the AST stored at the chip facility and the AST within the fueling and chemical storage building.

6. Uncharacterized areas such as former wigwam burners and chip piles.

7. Floor drains within buildings, for example the collection drain within the steam cleaning building and drains to blind sumps within the former oil house and compressor building.

8. Stormwater system verification.

Scopes for preliminary evaluations were generated for each of the seven environmental conditions of potential concern identified. Further, the prioritized environmental conditions were also identified by the Ecology, via e-mail, as upland potential areas of needed investigation. MFA staff have had multiple conversations with the Ecology Site Manager, Joyce Mercuri, to develop a focused approach to the upland investigation.

Based on the prioritized environmental conditions, MFA conducted a geophysical survey and stormwater system evaluation to address items (4), (7), and (8) of the environmental conditions of potential concern.

Stormwater System Evaluation and Site Reconnaissance

MFA's review of existing stormwater system plans available for the Property indicated inconsistences between 'as-built' drawings of stormwater features at the Property and the actual location of features. From an environmental perspective, stormwater conveyance is important for understanding potential migration pathways from the upland Property to the aquatic environment.

MFA field-verified the stormwater system features including catch basins and outfalls and recorded locations using a hand-held global positioning system receiver. When possible, stormwater conveyance features were opened to verify diameter of pipe connections present and approximate direction of piping entering and leaving the feature. Locations of stormwater features observed at the Property are included in Figure 3. Floor drains are known to exist in some buildings; these features will be further evaluated during the field investigation.

During Property reconnaissance, two catch basins with associated outfalls (Outfall [OF] 2 and OF 14) were observed adjacent to the west of the Property and appear to discharge on the neighboring Pakonen Boatyard facility (see Figure 3). The ultimate location of the outfall was not visually observed due to dense vegetation and high tide at the time of observation. The outlet from the catch basin attached to OF 14 is comprised of a cement 8-inch diameter pipe while OF 2 piping is comprised of 12-inch diameter corrugated metal pipe. No water was present in these catch basins during observation; however, indications of recent stormwater flow though these catch basins was observed. OF 2 drains an area where lumber was formally stored and loaded onto ships, while OF 14 drains a driveway that accesses the Property on the west side.

Geophysical Survey

A geophysical survey consisting of the use of ground penetrating radar (GPR) at two focused areas at the Property was conducted on May 21, 2015 (See Appendix A). This survey was performed based on the potential presence of USTs around the maintenance shop identified in the 2010 Phase I (PES, 2010). As indicated above, up to six USTs were suspected in the vicinity of the former maintenance shop at the Property while one UST was suspected to be located adjacent to the guard shack. A magnetic survey was proposed as part of this work; however, due to the amount of equipment present in the maintenance area along with the presence of underground utility corridors adjacent to the survey areas it was deemed inadequate to assess the Property for USTs.

The GPR survey identified geophysical anomalies just outside of the north and west walls of the maintenance shop; these anomalies were interpreted as nine potential USTs in the geophysical report. However, the anomalies identified by the GPR report as potential USTs are generally shorter than UST features. Historical information regarding the Seaport Landing site, as described previously, indicates the presence of potential USTs in the vicinity of the northeast and southern portions of the maintenance shop, not the northern and western edges.

An interview conducted with Helen Bond, a former Weyerhaeuser employee, further supports the conclusion that the anomalies identified as potential USTs in the GPR survey report are not USTs. H. Bond recalls that cement vaults housing the electrical and fire systems of the old sawmill were along the northern and western edges of the maintenance shop. These vaults were buried approximately four to six or more feet below ground surface following the decommissioning of the old sawmill. The sizes of the anomalous features identified in the GPR survey report are more consistent with the expected size of rectangular cement vaults.

The GPR survey identified additional anomalies that were not called out as potential UST features in the report. Some of the anomalies around the southeast former of the maintenance shop appear to be more consistent with UST dimensions and placement (approximately ten feet in length and encountered between five and ten feet below ground surface). These UST-like anomalies are also in the areas suspected to have USTs based on historical documentation.

Anomalies likely indicating some ground disturbance were also identified near the guard shack; however, it does not appear that an UST remains in this area.

Based on the information presented above, suspected locations of USTs are depicted on Figure 4.

2 SAMPLING OBJECTIVES AND DESIGN

The scope of this characterization was developed to address the GPR anomalies identified as potential USTs during the geophysical survey in May, 2015, as described in Section 1.3.

2.1 SAMPLING AND ANALYSIS APPROACH

MFA proposes sampling near and in the presumed downgradient direction of the suspected USTs to evaluate any potential UST-related impacts.

MFA will advance 3 borings to 20 feet below ground surface in the proposed locations (see Figure 4), and will collect soil and reconnaissance groundwater to be analyzed for the following contaminants of interest (COIs):

- Petroleum hydrocarbon identification (TPH-HCID) by Northwest Method NWTPH-HCID
- Volatile organic compounds (VOCs) [USEPA 5035A/8260B]

- Semivolatile organic compounds (SVOCs) by USEPA 8270
- Select metals including arsenic, cadmium, chromium, lead and mercury by U.S. Environmental Protection Agency (USEPA) 6020 –total and dissolved metals will be collected for all groundwater samples

Potential follow-up analysis may include Gasoline-range organics (GROs) by Northwest Method NWTPH-Gx and Diesel- and residual-range organics by Northwest Method NWTPH-Dx as appropriate based on TPH-HCID results.

3 FIELD SAMPLING METHODS

The proposed locations of soil and reconnaissance groundwater borings are depicted in Figure 4. Sample methods for each matrix are described below.

3.1 Utility Locations

Buried underground utilities present a unique hazard for subsurface sampling. Private and public utility location services will be used to identify locatable utilities in the subsurface sampling area before field sampling activities begin.

3.1 Upland Borings

The borings will be advanced with the direct-push drill rig and industry standard sampling techniques.

3.2 Soil Sampling

At each boring location, soil samples will be collected and observed to document soil lithology, color, moisture content, and sensory evidence of impairment. Field screening of all soil samples will be conducted by analyzing bagged soil samples of potentially contaminated soil with a photoionization detector (PID). A small amount of soil will be placed in a ziploc bag, and the bag will be shaken to release potential volatile constituents. The tip of the PID will be placed in the bag to take a reading. One selected soil sample and a reconnaissance groundwater sample from each boring will be submitted for laboratory.

Soil samples will be collected for lithologic description, field screening, and chemical analyses, as described below. Samples will be collected at locations where evidence of impacts are observed during field screening, and/or just above the water table (capillary fringe). Samples will be prepared, handled, and documented as follows:

- Soil sampling equipment will be decontaminated before it is used at each sampling location.

- Samples will be obtained using new, uncontaminated gloves or decontaminated, stainless steel spoon, trowel, or knife.
- Soil will be field-screened by measuring soil vapor headspace and documenting visual and olfactory observations. If headspace measurements are collected, a representative amount of soil will be placed in a new, food-grade, zip-lock plastic bag. Samples will then be warmed and agitated before headspace analysis is conducted by carefully piercing the bag with the PID. Field-screen results will be documented in the field book or boring log.
- Soil that will be analyzed for VOCs will be transferred directly from freshly exposed soil into laboratory-supplied containers, using the appropriate USEPA 5035A sampling procedures. The samples will be placed in 40-milliliter vials. Depending on the soil type, 5 milligrams of soil will be added to the prepared vials preserved with sodium bisulfate monohydrate or methanol. A soil sample will also be collected in an unpreserved glass jar to be analyzed for TPH-HCID.
- Large particles (i.e., larger than 0.25 inch) may be removed before the sample is placed in a laboratory-supplied container.
- Soil samples will be transferred directly from the sampling device into laboratory- supplied glass jars, using a new, uncontaminated-gloved hand or decontaminated, stainless steel spoon, trowel, or knife.
- Sample containers will be labeled, packed in iced shipping containers with chain of custody (COC) documentation (see Section 4.3), and hand-delivered or shipped to the laboratory.
- Sampling information will be recorded in a field notebook, on a field sampling data sheet (FSDS), and on the COC form.
- Generally, duplicate soil samples should be collected at the frequency of one duplicate sample for every 20 samples collected.

3.3 Reconnaissance Groundwater Sampling

Reconnaissance groundwater samples will be collected using a stainless steel (e.g., Geoprobe) water sampler. The water sampler will be advanced to the desired depth. The casing around the water sampler will be pulled back, exposing the screen. If moisture is observed and water does not readily flow into the screen, the sampler will be removed and a temporary well will be installed. This will consist of placing 0.010-inch machine slot screen with polyvinyl chloride riser into the boring and allowing the system to rest until the water level stabilizes. If no water is observed in the temporary well after a minimum of four hours, then the well will be abandoned.

If practicable, at least one casing volume of water will be purged before sample collection. Groundwater will be purged using new polyethylene tubing or a stainless steel bailer. If there is enough water, some water will be used to measure water quality field parameters, including potential hydrogen (pH), specific conductance, and temperature.

New, disposable tubing will be used at each location to collect water samples. Nondisposable equipment used for water sample collection will be decontaminated both before its use at the facility and after each sample is collected. Samples to be analyzed for dissolved metals will be field filtered using a disposable filter.

Samples will be labeled, preserved, and couriered to the analytical laboratory under standard COC procedures.

3.4 Sample Location

The horizontal coordinates of all sample locations will be surveyed using a Trimble™ DGPS capable of sub-foot accuracy, depending on satellite coverage. The horizontal datum will be North American Datum 83, Washington State Plane South, reported in feet.

3.5 Nomenclature

Soil and groundwater samples will be labeled with a prefix to describe the location identification number, an "S" or "W" to indicate a soil sample or groundwater matrix, respectively, and the sample depth in feet. The depth interval should be specified as the middle of the sampling interval. For example, a soil sample collected from a boring at location 1 and at 15 feet below ground surface will have the sample nomenclature of B1-S-15.0.

Duplicate soil samples will replace the location number with "DUP," and the sample will have the same sample time as the primary sample. A duplicate sample of the abovementioned sample would appear as BDUP-S-15.0. To avoid confusion, duplicate samples should not be collected from multiple locations at the same depth on the same day and time. Relevant sample information will be documented on the exploratory boring log (see Appendix B) or a field sampling data sheet (FSDS) (see Appendix B).

3.6 Decontamination Procedures

Sample containers, instruments, working surfaces, technician protective gear, and other items that may come into contact with soil sample material must meet high standards of cleanliness. All equipment that comes into direct contact with the soil collected for analysis will be made of stainless steel and will be cleaned prior to use at each sampling location. Decontamination of all items will follow Puget Sound Estuary Program protocols. The decontamination procedure is:

1. Prewash rinse with tap water
2. Wash with solution of tap water and Alconox soap (brush)
3. Rinse with tap water
4. First rinse with distilled water
5. Rinse three more times with distilled water
6. Cover (no contact) all decontaminated items with aluminum foil
7. Store in clean, closed container for next use

Liquid generated by decontamination will be properly handled, according to procedures described in Section 3.10.

3.7 Sample Processing

All samples will be processed according to the holding times and preservation methods outlined in tables 1 and 2. Debris and materials more than 2 inches in diameter will be omitted from sample containers.

3.8 Sample Containers and Labels

Sample containers and preservatives will be provided by the analytical laboratory. The analytical laboratory will maintain documentation certifying the cleanliness of the sample containers and the purity of preservatives provided. Specific container requirements will be determined by the analytical laboratory.

Each sample will have an adhesive plastic or waterproof paper label affixed to the container and will be labeled at the time of collection. The following information will be recorded on the container label at the time of collection:

- Project name
- Sample identification
- Date and time of sample collection
- Preservative type (if applicable)

Samples will be uniquely identified with a sample identification that, at a minimum, specifies sample number and sample location.

3.9 Field Documentation

After sample collection, the following information will be recorded in the project field notebook:

- The date, the time, and the name of person logging sample
- Weather conditions
- Sample location number
- Percentage of woody debris
- Depth of water at the location
- Depth of sample collection

Each sample will be photographed. Soil will be described in the field, using the visual-manual description procedure (Method American Society for Testing and Materials D-2488 modified). This information will also be recorded in the field notebook. Visual-manual characterization includes the following:

- Grain size distribution
- Density/consistency
- Plasticity
- Color and moisture content
- Biological structures (e.g., shells, tubes, macrophytes, bioturbation)
- Presence of debris and quantitative estimate (e.g., wood chips or fibers, paint chips, concrete, sandblast grit, metal debris)
- Presence of oily sheen
- Odor (e.g., hydrogen sulfide)

3.10 Investigation-Derived Waste

Investigation-derived waste (IDW) will consist of decontamination fluids and unused soil collected by the GeoProbe. IDW will be stored in a designated area on the upland property, in 55-gallon drums approved by the Washington State Department of Transportation.

The drums (tops and sides) will be labeled with their contents, the volume of material, the date of collection, and the origin of the material. The waste drums will be sealed, secured, and transferred to a designated, secured area on the uplands property at the end of field sampling activities. The waste will be stored in the designated holding area until it has been characterized. Hazardous-waste and/or risk labels will be placed on the drum after characterization, if necessary.

An aliquot from the fluid drum may be submitted to the analytical laboratory to characterize the waste fluids if this determination cannot be made from the analytical data. After the work is complete and analytical results are received, IDW will be characterized and disposed of appropriately.

3.11 Compliance with U.S. Occupational Safety and Health Administration Regulations

In accordance with Code of Federal Regulations (CFR) 1910.120, the following safety programs will be incorporated during the sampling event:

- As required under WAC 173-204-550(4), a site-specific health and safety plan (HASP) was developed to the standards presented in CFR 1910.120 before field activities begin. The HASP is included as an appendix of the site assessment work plan (Appendix B).
- All field staff participating in sampling activities will be U.S. Occupational Safety and Health Administration (OSHA) 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) trained, with subsequent OSHA eight-hour HAZWOPER refresher courses completed as appropriate.

Further, in order to protect personnel working over water, an overwater workers insurance policy will be in place during the field sampling activities.

4 SAMPLE HANDLING PROCEDURES

In order to maintain sample integrity between the field collection and the laboratory analysis, the storage, handling, and shipping of samples will follow the procedures described in this section.

4.1 Field Quality Control Samples

Field QC samples will be collected to improve the reliability of the data. MFA will collect the following samples:

- **Field Duplicate:** collected to assess the homogeneity of the samples and the precision of the sampling process. One field duplicate for each matrix, (i.e., soil and groundwater) will be collected.
- **Temperature Blank:** used to verify that adequate sample storage temperature was maintained. A temperature blank will be included in each cooler.

4.2 Sample Storage

In order to maintain sample integrity, samples will be placed in coolers filled with ice or equivalent immediately after being collected. Samples will be maintained at approximately 4° centigrade (C).

4.3 Chain-of-Custody Procedures

Samples in the custodian's possession, in a secured location (under lock) with restricted access or in a container that is secured with official seals such that the sample cannot be reached without breaking the seals, are considered to be under custody. COC procedures will be followed for all samples throughout the collection, handling, and analysis process. The principal document used to track possession and transfer of samples is the COC form supplied by the analytical laboratory. Each sample will be represented on the COC form. All data entries will be made with an ink pen.

4.4 Delivery of Samples to Analytical Laboratory

All samples will be shipped or couriered under COC procedures to the analytical laboratory no later than the day after collection. If samples are collected on Friday, they may be held until the following Monday for shipment, provided that this does not adversely impact holding time requirements. Sample containers will be placed in a sealable plastic bag, packed to prevent breakage, and transported in a sealed ice chest containing ice or equivalent.

Upon transfer of sample possession to the analytical laboratory, the persons transferring custody of the sample container will sign the COC form. Upon receipt of samples at the laboratory, the shipping container seal will be broken and the receiver will record the condition of the samples on a sample receipt form. COC forms will be used internally in the lab to track sample handling and final disposition.

5 LABORATORY ANALYTICAL METHODS

5.1 Chemical Analyses

Tables 1 and 2 present summaries of the proposed analytical methods, preservation methods, and holding times for soil and groundwater samples. Soil and reconnaissance groundwater samples will be couriered to a certified laboratory, either OnSite Environmental, Inc. in Redmond, Washington or Analytical Resources, Inc. laboratory in Tukwila, Washington.

5.2 Sample Quantitation Limits

The laboratory will make every effort to meet sample quantitation limits. Unforeseen matrix interference could cause elevated quantitation limits for some compounds. All reasonable means, including additional cleanup steps and method modifications, will be used to bring sample quantitation limits below the screening levels.

5.3 Holding Times

Samples will be maintained at the analytical laboratory and will be analyzed within the holding times shown in tables 1 and 2.

5.4 Sample Preservation

Chemical preservatives are summarized in tables 1 and 2. All samples will be preserved by storage at 4°C.

6 QUALITY ASSURANCE AND QUALITY CONTROL REQUIREMENTS

6.1 Laboratory Quality Assurance and Quality Control Checks

USEPA methods include specific instructions for the analysis of QC samples and the completion of QC procedures during sample analysis. These QC samples and procedures verify that the instrument is calibrated properly and remains in calibration throughout the analytical sequence, and that the sample preparation procedures have been effective and have not introduced contaminants into the samples. Additional QC samples are used to identify and quantify positive or negative interference caused by the sample matrix. The following laboratory QC procedures are required for most analytical procedures:

- **Calibration Verification—**Initial calibration of instruments will be performed at the start of the project or sample run, as required, and when any ongoing calibration does not meet control criteria. The number of points used in the initial calibration is defined in the analytical method. Continuing calibration will be performed as specified in the analytical method to track instrument performance. If a continuing calibration does not meet control limits, analysis of project samples will be suspended until the source of the control failure is either eliminated or reduced to within control specifications. Any project samples analyzed while the instrument was outside control limits will be reanalyzed.
- **Method Blanks—**Method blanks are used to assess possible laboratory contamination of samples associated with all stages of preparation and analysis of samples and extracts. The laboratory will not apply blank corrections to the original data. A minimum of one method blank will be analyzed for every sample extraction group, or one for every 20 samples, whichever is more frequent.
- **Matrix Spike (MS) / Matrix Spike Duplicate (MSD) Samples—**MS samples are analyzed to assess the matrix effects on the accuracy of analytical measurements. A minimum of one MS will be analyzed for each sample delivery group, or one for every 20 samples, whichever is more frequent, when MS/MSD are required by the method. Because the spike is a duplicate sample, it measures the quality of laboratory preparatory techniques and the heterogeneity of the sample.
- **Surrogate Spike Compounds—**Surrogate spikes are used to evaluate the recovery of an analyte from individual samples. All project samples to be analyzed for organic compounds will be spiked with appropriate surrogate compounds as defined in the analysis method. Recoveries determined using these surrogate compounds will be reported by the laboratory; however, the laboratory will not correct sample results using these recoveries.

- **Laboratory Control Samples (LCSs)—**LCS samples are analyzed to evaluate laboratory precision. Analyses of LCSs will be performed by the lab at a frequency that satisfies the analytical methods' requirements.

6.2 Laboratory Calibration and Preventive Maintenance

The laboratory calibration ranges specified in SW-846 (USEPA, 1986) will be followed.

Preventive maintenance of laboratory equipment will be the responsibility of the laboratory personnel and analysts. This maintenance includes routine care and cleaning of instruments and inspection and monitoring of carrier gases, solvents, and glassware used in analyses. The preventive maintenance approach for specific equipment will follow the manufacturers' specifications and good laboratory practices.

Precision and accuracy data will be examined for trends and excursions beyond control limits to determine evidence of instrument malfunction. Maintenance will be performed when an instrument begins to change, as indicated by the degradation of peak resolution, shift in calibration curves, decrease in sensitivity, or failure to meet any of the QC criteria.

7 DATA ANALYSIS AND RECORDKEEPING

7.1 Data Reduction, Validation, and Reporting

The analytical laboratory will submit a four tab delimited electronic data deliverable (EDD), containing all reported results. EDDs will be incorporated into MFA's EQuIS database. Analytical data will also be made available in pdf format. The analytical data package will include laboratory quality assurance and QC results to permit independent and conclusive determination of data quality. Only compounds presented in tables 1 and 2, and associated QA/QC compounds, will be reported by the analytical laboratory. Data quality will be determined by MFA, using the data evaluation procedures described in this section. The results of the MFA evaluation will be used to determine if the project data quality objectives are being met, and will be presented in a data validation memorandum as an appendix to the final report.

7.2 Laboratory Evaluation

Initial data reduction, evaluation, and reporting at the analytical laboratory will be carried out as described in USEPA SW-846 (USEPA, 1986), as appropriate. Additional laboratory data qualifiers may be defined and reported to further explain the laboratory's QC concerns about a particular sample result. All additional data qualifiers will be defined in the laboratory's narrative report associated with each case.

7.3 Data Deliverables

Laboratory data deliverables are listed below. EDDs will contain all data that are presented in the pdf report.

- Transmittal cover letter
- Case narrative
- Analytical results
- COC
- Surrogate and Internal Standard recoveries
- Method blank results
- Laboratory control sample (LCS) results
- MS/MSD results
- Laboratory duplicate results
- EDD

7.4 Data Quality Assurance and Quality Control Review

MFA will evaluate the laboratory data for precision, completeness, accuracy, and compliance with the analytical method. MFA will perform a Tier II validation, consistent with the USEPA's Superfund risk assessment guide (USEPA, 1989), and will assign data qualifiers to sample results, following applicable sections of the USEPA procedures for data review (USEPA, 1986, 2008, 2010, 2011, 2014).

Data qualifiers, as defined by the USEPA, are used to classify sample data according to their conformance to QC requirements. The most common qualifiers are listed below:

- J—Estimate, qualitatively correct but quantitatively suspect
- R—Reject, data not suitable for any purpose
- U—Not detected at a specified reporting limit

Poor surrogate recovery, blank contamination, or calibration problems, among other things, can cause the sample data to be qualified. Whenever sample data are qualified, the reasons for the qualification will be stated in the data evaluation report. Qualified sample data will be assessed for potential cleanup and reanalysis.

QC criteria not defined in the guidelines for evaluating analytical data are adopted, where appropriate, from the analytical method.

The following information will be reviewed during data evaluation, as applicable:

- Sampling locations and blind sample numbers
- Sampling dates
- Requested analysis

- COC documentation
- Sample preservation
- Holding times
- Method blanks
- Surrogate and internal standard recoveries
- MS/MSD results
- Laboratory duplicates
- Field duplicates
- Field blanks
- LCSs
- Method reporting limits above requested levels
- Laboratory qualifiers
- Any additional comments or difficulties reported by the laboratory
- Overall assessment

The results of the data evaluation review will be summarized for the data package. Data qualifiers will be assigned to sample results on the basis of USEPA guidelines, as applicable.

7.5 Data Management and Reduction

MFA uses EQuIS to manage all laboratory data. The laboratory will provide the analytical results in electronic EQuIS-deliverable format. Following data evaluation, data qualifiers will be entered into the EQuIS database.

Data may be reduced to summarize particular data sets and to aid interpretation of the results. Statistical analyses may also be applied to results. Data reduction QC checks will be performed on all hand-entered data, any calculations, and any data graphically displayed. Data may be further reduced and managed using one or more of the following computer software applications:

- Microsoft Excel (spreadsheet)
- EQuIS (database)
- AutoCAD and/or Arc GIS (graphics)
- USEPA ProUCL (statistical software)

Spatial and analytical data will be uploaded to the Washington State Environmental Information Management (EIM) database, including for temporary well locations.

LIMITATIONS

The services undertaken in completing this plan were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This plan is solely for the use and information of our client unless otherwise noted. Any reliance on this plan by a third party is at such party's sole risk.

Opinions and recommendations contained in this plan apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this plan.

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USEPA. 2014. R10 Data validation and review guidelines for polychlorinated dibenzo-p-dioxin and polychlorinated dibenzofuran data (PCDD/PCDF) using method 1613B and SW846 Method 8290A. EPA 90-R-14-003. U.S. Environmental Protection Agency, Region 10 Office of Environmental Assessment. May.

TABLES

Table 1
Soil Analytes and Analytical Methods
Aberdeen Sawmill / Seaport Landing
Aberdeen, Washington

Analyte	Method	Suggested Volume	Container	Number of Containers	Preservative	Storage Temperature	Holding Time from Collection
Total Petroleum Hydrocarbons-Hydrocarbon Identification	NWTPH-HCID	8 oz	Glass Jar	1	none	4°C	14 days
Metals	USEPA 6020	4 ounces	Glass Jar	1	HNO_3 pH < 2	4°C	6 months
Mercury	USEPA 7471	4 ounces	Glass Jar	1	none	4°C	28 days
VOCs	USEPA 8260	5035 Sample Kit	VOA/Glass Jar	1 5035 Sample Kit	Methanol/Sodium Bisulfate	4°C	14 days
SVOCs	USEPA 8270	8 ounces	Glass Jar	1	none	4°C	14 days

NOTES:

5035 Sample Kit = two prepared 40-milliliter VOAs with 5 milliliters of sodium bisulfate, two prepared 40-milliliter VOAs with 5 milliliters of methanol; OR two prepared, capped soil plungers; and one 2-ounce jar for moisture content determination.

Total metals include arsenic, cadmium, chromium, lead, and mercury.

°C = degrees centigrade.

NWTPH = Northwest Total Petroleum Hydrocarbons.

oz = ounces.

SVOC = semivolatile organic compound.

USEPA = U.S. Environmental Protection Agency.

VOA = volatile organic analysis vial.

VOC = volatile organic compounds.

Table 2
Groundwater Analytes and Analytical Methods
Aberdeen Sawmill / Seaport Landing
Aberdeen, Washington

Analyte	Method	Suggested Volume	Container	Number of Containers	Preservative	Storage Temperature	Holding Time from Collection
Total Petroleum Hydrocarbons-Hydrocarbon Identification	NWTPH-HCID	500 mL	Glass Jar	2	none	4°C	14 days
Total and dissolved metals	USEPA 6020	500 milliliter	Polyethylene	2 (1 field filtered)	HNO_3 pH < 2	4°C	6 months
SVOCs	USEPA 8270	500 milliliter	Amber Glass	2	none	4°C	7 days
VOCs	USEPA 8260	40 milliliter	VOA	3	HCL pH < 2	4°C	14 days

NOTES:

Total and dissolved metals include arsenic, cadmium, chromium, lead, and mercury.

°C = degrees centigrade.

HCL = hydrochloric acid.

HNO_3 = nitric acid.

mL = milliliters.

NWTPH = Northwest Total Petroleum Hydrocarbons.

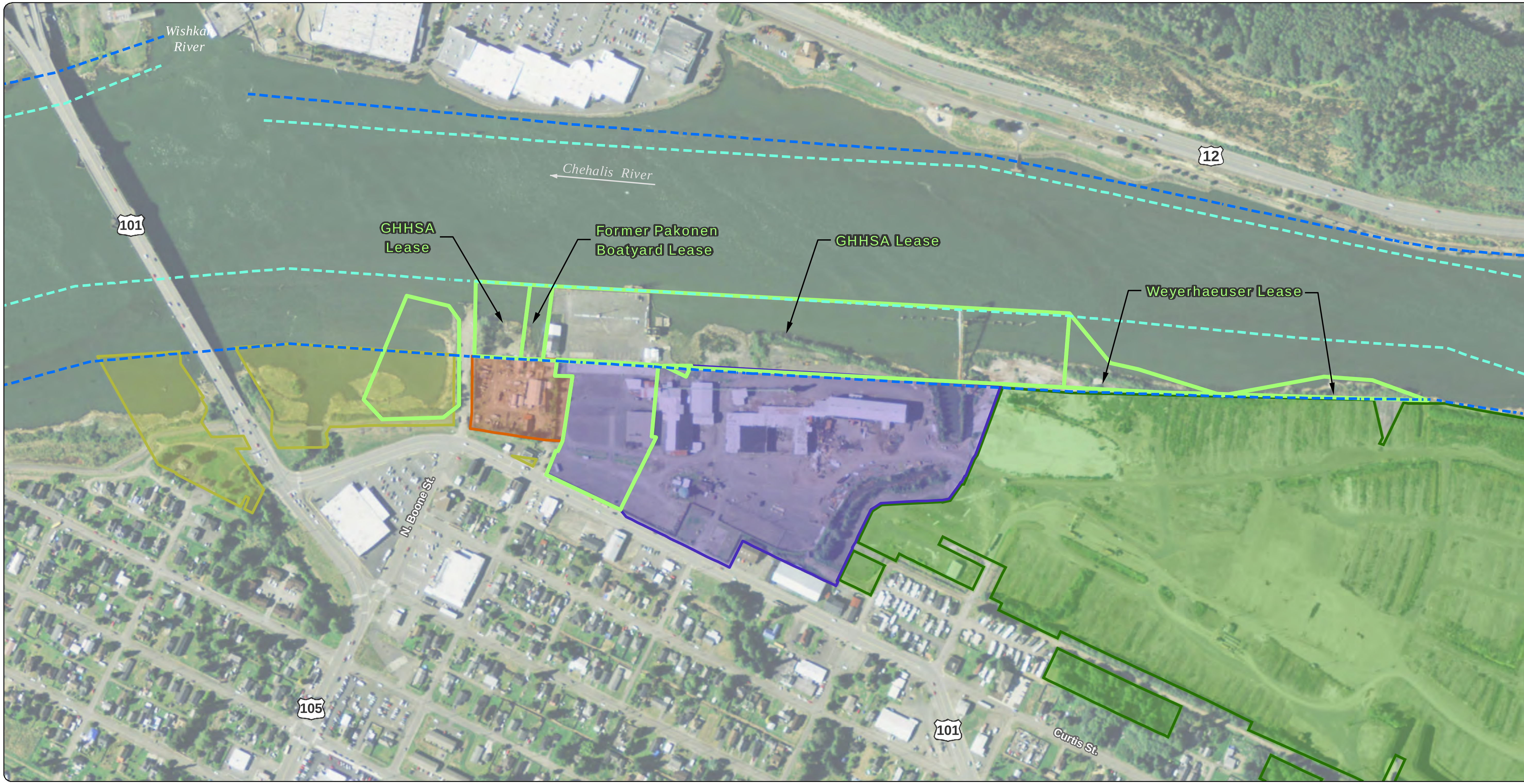
SVOC = semivolatile organic compound.

USEPA = U.S. Environmental Protection Agency.

VOA = volatile organic analysis vial.

VOC = volatile organic compound.

FIGURES



Source: Aerial photograph obtained from Esri ArcGIS Online; parcels and roads obtained from Grays Harbor County; harbor lines obtained from Washington Dept. of Natural Resources.

Legend

Area of Property Ownership
- *City of Aberdeen*
- *Pakonen Boatyard*
- *Seaport Authority*
- *Weyerhaeuser*

- Approximate Aquatic Lease Area
- Inner Harbor Line
- Outer Harbor Line

Figure 1
Property Vicinity
Aberdeen, Washington

Grays Harbor Historical Seaport

0 200 400
Feet

Notes:
1. Areas of property ownership have been generalized based on taxlot information obtained from the County and a purchase sale agreement for the Seaport Authority property, and should be considered approximate.
2. Aquatic lease areas were digitized from a print maps of Aberdeen tidelands dated Mar. 22, 2001 and Jan. 15, 1907 on file with the Office of the Commissioner of Public Lands in Olympia, Washington, and should be considered approximate.

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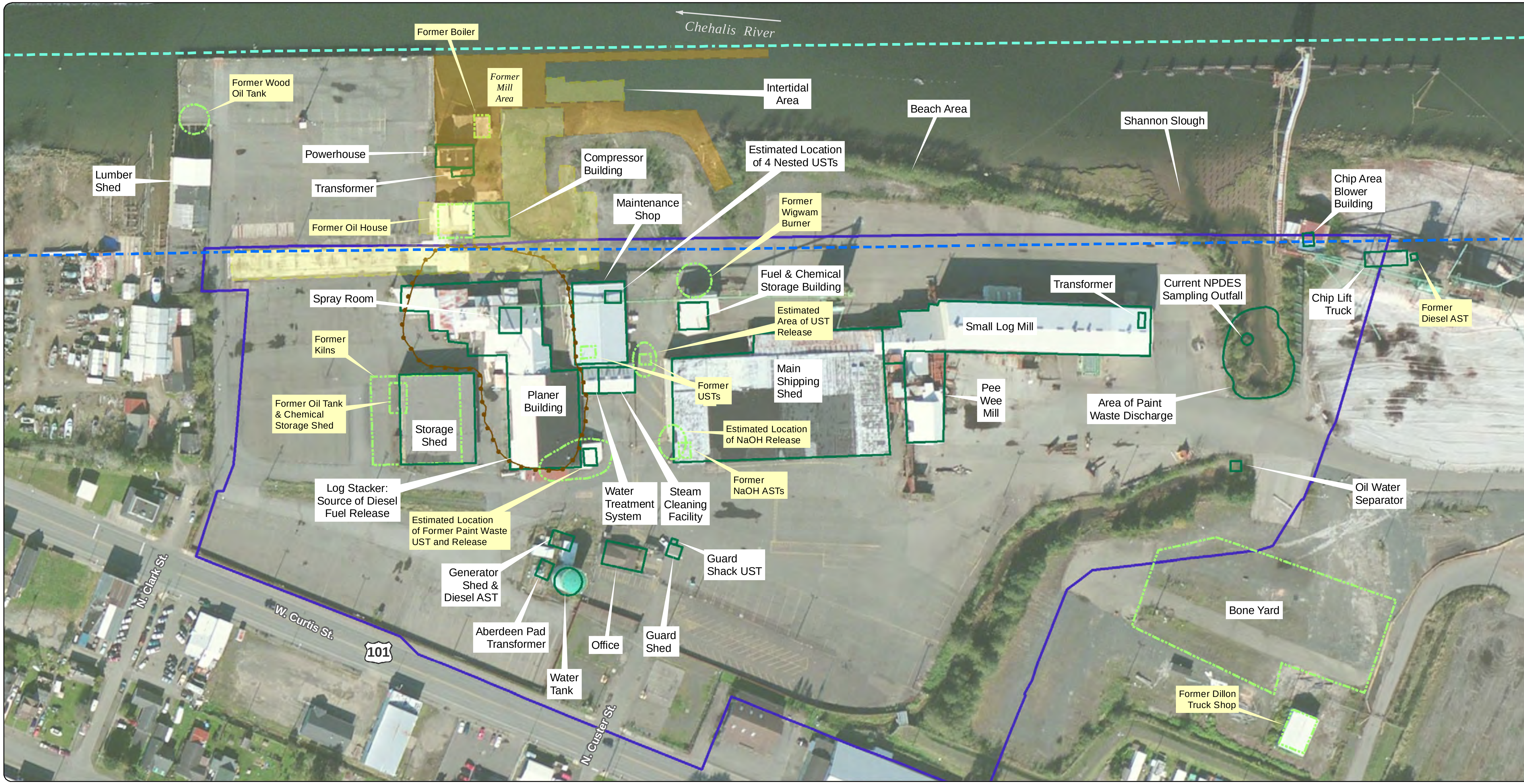
Print Date: 8/6/2015
Approved By: mstringer
Produced By: jmiller
Project: 0863.01.01-02



Source:
Aerial photograph obtained from Esri ArcGIS Online.
Parcels and roads obtained from Grays Harbor County.
Harbor lines obtained from Washington Dept. of Natural Resources.
Former features from Level I Environmental Site Assessment,
PES Environmental; August 13, 2010.

Legend

- Former Mill
- Former Wharf Extension
- Existing Buildings/Features
- Former Buildings/Features
- Former PCP Release
- Inner Harbor Line
- Outer Harbor Line
- Seaport Authority Property

0 100 200
Feet

Figure 2
Seaport Property Features
Aberdeen, Washington

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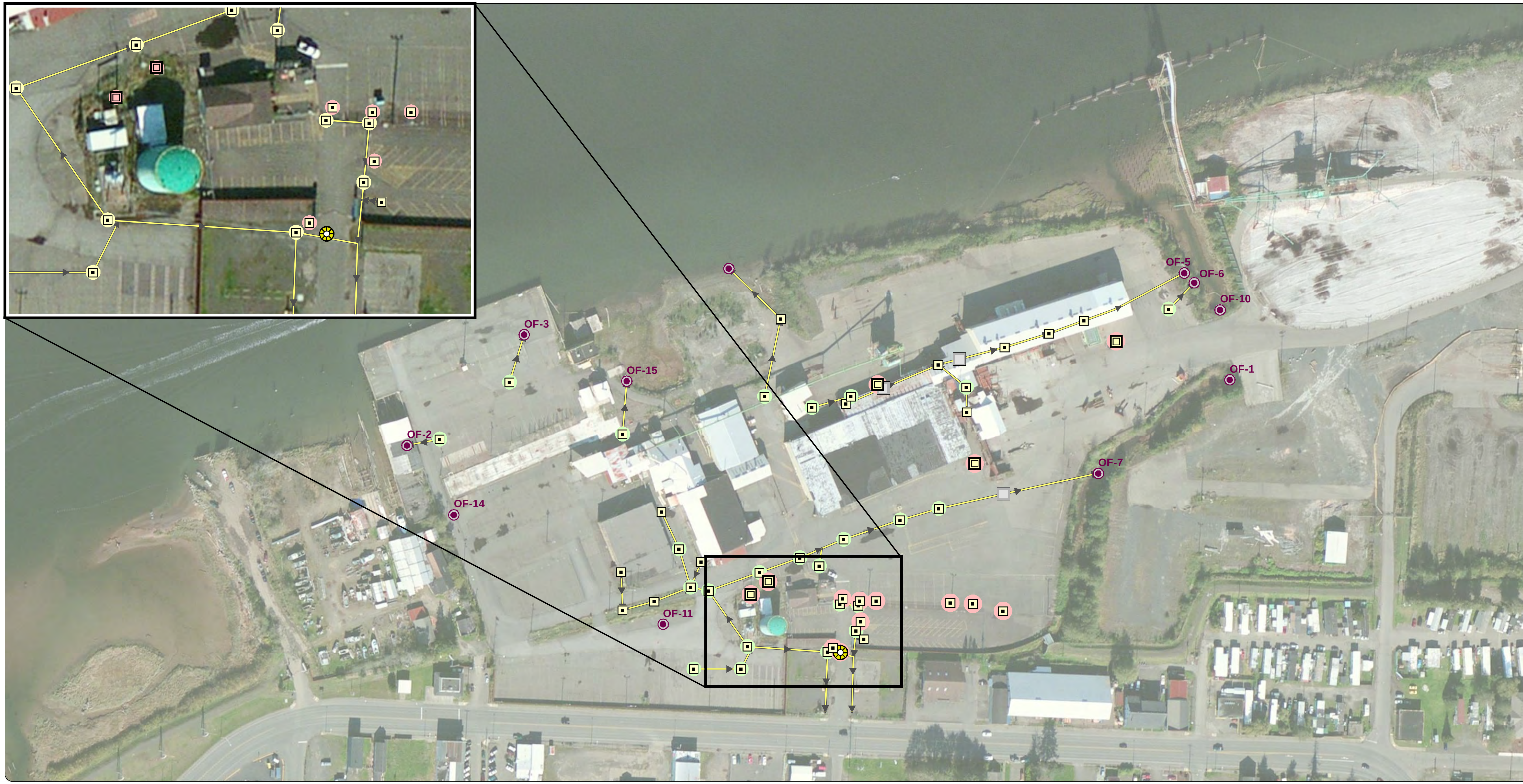

Source: Aerial photograph obtained from Esri ArcGIS Online; 1993 stormwater features digitized from Level I Environmental Site Assessment report, Appendix A-2 (PES Environmental, Inc., 2010); 2000 stormwater features digitized from plan set of existing storm drainage system and grading and drainage plan prepared by Berglund, Schmidt, and Assoc., Inc.

Legend

- Catch Basin
- Electrical Vault
- Sanitary Manhole
- Drain Pipe (with flow direction)
- Oil/Water Separator
- Outfall (field verified)
- Verified
- GPS located

Note: All features are approximate.

0 100 200
Feet

Figure 3
Surface Drainage Features
Aberdeen, Washington

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Figure 4
Upland Boring Locations

Aberdeen, Washington

Legend

- Proposed Boring Location
- Potential UST Approximate Vicinity
- Catch Basin
- Outfall
- Drain Pipe (with flow direction)
- Former Mill
- Aquatic Lease Boundary (approximate)

0 30 60
Feet

1 = The Phase I Environmental Site Assessment (PES, 2010) indicates the potential presence of an UST southeast of the maintenance shop. The GPR survey results show anomolies in this area that are approximately 10 feet in length and are approximately 5-10 feet below ground surface.

2 = The Phase I Environmental Site Assessment (PES, 2010) indicates the potential presence of an UST in the vicintiy of the southwest corner of the maintenance shop. The GPR survey was unable to collect any data from this area due to interference from concrete and surrounding structures.

Note: UST = underground storage tank.
GPR = ground penetrating radar.

Source: Aerial photograph (2013) obtained from Esri ArcGIS Online.

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