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Memorandum

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cc:	Port of Everett – Erik Gerking Weyerhaeuser – Carol Wiseman Washington Department of Natural Resources – Erika Shaffer Floyd|Snider – Lynn Grochala and Jessi Massingale
Date:	October 1, 2019
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Subject:	Work Plan Addendum No. 6 for Additional Upland Area Soil and Groundwater Sample Collection and Analysis at the Weyerhaeuser Mill A Former Site, Everett, Washington

This memorandum is being provided as an addendum (Addendum No. 6) to the Weyerhaeuser Mill A Former Remedial Investigation/Feasibility Study (RI/FS) Work Plan (GeoEngineers 2014a) and Upland Area Sampling and Analysis Plan (SAP; GeoEngineers 2014b) for the Weyerhaeuser Mill A Former Site (Site; Figure 1). This addendum describes additional soil and groundwater sample collection for chemical analysis at the Site. Intertidal sediment samples will also be collected as part of the supplemental investigation of the Open Space Area of the Site. This addendum has been prepared to supplement the RI/FS Work Plan to meet the requirements of Agreed Order No. DE 8979 (Agreed Order).

In accordance with the Washington State Department of Ecology (Ecology)-approved RI/FS Work Plan, soil and groundwater investigation were completed between July 2016 and March 2017 in the upland portion of the Site (Upland Area) to characterize subsurface conditions and evaluate the nature and extent of contamination. Based on the results of the initial groundwater investigation, additional sampling and analysis was completed in accordance with the Ecology-approved RI/FS Work Plan Addendum No. 3 (GeoEngineers 2018a) to further evaluate the nature and extent of metals in groundwater at the Site. The sampling activities and analytical results for the soil and groundwater investigations in the Upland Area were summarized in the Upland Area Remedial Investigation Data Report Technical Memorandum (GeoEngineers 2018b) which was submitted to Ecology on March 19, 2018 for review to determine whether sufficient data existed to define the nature and extent of contamination at the Site.

Based on a review of the data collected for the Upland Area[1], Ecology identified multiple areas where one or more chemicals were detected at a concentration greater than the preliminary screening levels (PSLs) in soil and/or groundwater and determined that additional investigation activities would be required to further evaluate the nature and extent contamination. The areas identified by Ecology to require further investigation include the following:

[1] Ecology's comments on the Upland Area Remedial Investigation Data Report Technical Memorandum were provided in an email dated November 9, 2018 and further discussed in a follow-up meeting held in March 2019. In response to Ecology's comments, GeoEngineers prepared an Upland Area Additional Investigation Proposed Approach Memorandum (GeoEngineers 2019) on behalf of the Port to describe the proposed approach for additional investigation activities in response to the comments.

- In the vicinity of sampling location EDP29;
- In the vicinity of sampling location EDP33;
- In the vicinity of sampling location EDP35;
- In the vicinity of sampling location EDP38 and EDP52;
- In the vicinity of sampling location EST04;
- In the vicinity of sampling location EST12;
- In the Equipment Storage Area located in the southern end of the Site;
- In the Open Space area located in the southern end of the Site; and
- At the Nearshore Confined Disposal (NCD) Facility located in the northern end of the Site.

Identified areas requiring additional investigation are shown on Figure 2. The additional sample collection and analysis described in this addendum for the areas identified above will be performed in accordance with the Ecology-approved Upland Area SAP to supplement the existing environmental data collected for the Site. The results from this and previous Upland Area investigation activities, once combined will provide the basis for the preparation of the RI/FS Report to define the nature and extent of contamination, establish preliminary cleanup levels, present an evaluation of potential cleanup action alternatives for addressing identified contamination and identify a preferred cleanup action alternative for the Upland Area.

The following sections describe the sampling and analysis that will be performed for the each identified area requiring additional investigation in response to Ecology's comments.

ADDITIONAL UPLAND AREA INVESTIGATION FIELD PROCEDURES

Additional investigation activities will be completed in the Upland Area to further characterize the nature and extent of contamination at the Site. The procedures that will be followed for the additional soil and groundwater investigation activities described in this addendum are presented in the Upland Area SAP. General field procedures for soil and groundwater sample collection described in this addendum are summarized below.

Soil Investigation

Explorations to collect soil samples for chemical analyses will utilize hollow-stem auger (HSA), direct push (DP) and/or sonic drilling technologies. Prior to the completion of the soil explorations, an underground utility locate (public and private) will be conducted in the area of the proposed exploration locations to identify subsurface utilities and/or potential underground physical hazards. An air knife (vacuum truck) may be used to clear soil from the surface to approximately 5 feet below ground surface (bgs) at selected exploration locations if utilities are not able to be clearly identified. If an air knife is used to clear drilling locations, a hand auger will be used to attempt to collect samples from the near-surface soils in the upper 5 feet.

Continuous soil samples will be obtained from each exploration. Soil from each sample interval will be visually classified in general accordance with ASTM International (ASTM) D-2488 and screened in the field

for the presence of contamination. If wood debris is present, the type or types of wood debris (i.e., saw dust, bark, chips, chunks, twigs, fibers, etc.), the estimated quantity (i.e., observed percent by volume) of each wood type, and the depth interval where the wood is observed will also be recorded. Field screening will consist of visual observation for the presence of contamination (i.e., staining, discoloration, etc.), water sheen testing (i.e., petroleum hydrocarbons), and organic vapor monitoring (i.e., headspace vapors). Observations of soil and groundwater conditions, and soil field screening results for each exploration will be described in an exploration log prepared for each sampling location.

Field screening will be used to support selection of soil samples for analysis for the specific contaminants that exceeded the PSLs in the areas identified for additional investigation. If field screening results in an investigation area identifies physical evidence of contamination for chemicals other than the target contaminants identified for an investigation area based on a previous PSL exceedance, a representative soil sample will be collected of the material for potential chemical analysis, in addition to the chemical analysis for the targeted contaminants. Additional chemical analysis beyond what is proposed for each investigation area (summarized below) will be performed following Ecology concurrence.

Reusable sampling equipment that comes into contact with soil will be decontaminated before each use. Decontamination procedures for the equipment are described in the Upland Area SAP. Decontamination water generated during groundwater monitoring activities will be placed in labeled 30- or 55-gallon drums. The drums will be sealed and temporarily stored at the Site in a secure location pending permitted off-site disposal. Incidental waste generated during sampling activities such as gloves, plastic sheeting, paper towels and similar expended and discarded field supplies will be disposed of at local trash receptacle or county disposal facility.

Groundwater Investigation

Collection of groundwater samples at monitoring wells located adjacent to the shoreline will be performed within three hours before and one hour after daytime low tides to the extent practicable. Wells nearest the shoreline will be sampled first. Groundwater samples will be obtained using low-flow/low-turbidity sampling techniques to minimize the suspension of sediment in the samples. Prior to sampling, the well will be purged at a rate not to exceed 500 mL/minute. During purging, the water level will be monitored using an electronic water level indicator (e-tape). The purge rate will be reduced if there is a drawdown of the water level by more than five percent. A Horiba U-50 water quality measuring system (or similar) with a flow-through cell will be used to monitor the following water quality parameters during purging: electrical conductivity, dissolved oxygen, pH, salinity, total dissolved solids, oxidation-reduction potential, and temperature. A Hach turbidimeter (or similar) will be used to measure turbidity. Samples will be collected from the wells after the parameters vary by less than 10 percent on three consecutive measurements or after five well volumes have been removed, whichever occurs first. The field measurements will be documented on a field log.

In accordance with the RI/FS Work Plan, samples collected for dissolved metals analyses will be filtered in the field using a disposable inline 0.45-micron filter and preserved in the field with nitric acid. Samples collected for total metals analysis will also be preserved in the field with nitric acid. Additionally, if the turbidity of the groundwater at a monitoring well location is greater than 10 nephelometric turbidity units (NTU), the samples collected for diesel- and heavy oil-range petroleum hydrocarbons, PAHs, PCB, and dioxin

and furan analysis will be centrifuged at the analytical laboratory to remove particulates prior to extraction as these analyses are commonly affected by particulate or colloidal interferences.

Reusable sampling equipment that comes into contact with groundwater will be decontaminated before each use. Decontamination procedures for this equipment are described in the Upland Area SAP (Attachment 1 of the Ecology-approved RI/FS Work Plan). Purge and decontamination water generated during groundwater monitoring activities will be placed in labeled 30-gallon or 55-gallon drums. The drums will be sealed and temporarily stored at the Site in a secure location pending permitted off-site disposal. Incidental waste generated during sampling activities such as gloves, plastic sheeting, paper towels and similar expended and discarded field supplies will be disposed of at local trash receptacle or county disposal facility. The drums will be removed from the facility within 60 days of being generated.

ADDITIONAL UPLAND AREA INVESTIGATION SAMPLING AND ANALYSIS

EDP29 Investigation Area

Background

Sample location EDP29 is shown on Figures 2 and 3. The purpose of the boring at EDP29 was to evaluate potential contamination associated with a gas pump observed in 1950 and 1957 Sanborn Maps and the 1977 Weyerhaeuser Plant diagram.

At this location, diesel- and heavy oil-range petroleum hydrocarbons were detected at a concentration greater that the PSL in soil at a depth of 18-19 feet bgs in a layer comprised of approximately 90 percent wood debris (sawdust and lumber) interbedded with fine sand. In other samples collected from this location, petroleum hydrocarbons either were not detected or were detected at concentrations less than the PSL. In addition, field screening (water sheen and headspace vapor testing) evidence of potential petroleum contamination was not observed in soil from other sample intervals collected from this location.

Investigation Approach

Following review of the existing RI data, Ecology required further groundwater characterization due to the detected concentrations of diesel- and oil-range petroleum hydrocarbons exceeding the PSL in the soil sample collected from EDP29 at 18-19 feet bgs. Ecology's review comments also required additional investigation of the source if groundwater is found to be impacted at this location. In response to Ecology's comments, a tiered investigation approach will be implemented that will include the installation of a new monitoring well (Tier 1) followed by potential additional contingency soil sampling (Tier 2) in the vicinity of the new monitoring well if sample results confirm the presence of diesel- and heavy oil-range petroleum hydrocarbons at concentrations greater than the PSL in groundwater. Tier 1 and contingency Tier 2 investigation activities for the EDP29 investigation area are summarized in Table 1 and described in the following section.

Tier 1 Investigation at EDP29

The following will be completed at investigation area EDP29 to evaluate diesel- and heavy oil-range petroleum hydrocarbons in response to Ecology's comments:

- Install a new shallow monitoring well at the approximate location of EDP29 using HSA drilling techniques as shown on Figure 3.
    - Set the top of the well screen approximately 5 feet above the observed groundwater level, or within 3 feet of the ground surface, whichever is deeper.
    - Set the base of the well screen at the depth at which diesel- and heavy oil-range petroleum hydrocarbons were previously detected at concentrations greater than the PSL (i.e., 18-19 feet bgs).
- Collect continuous core samples from the soil boring to characterize soil conditions and perform field screening to support selection of samples for analysis during advancement of the soil boring to install the monitoring well.
- Submit two soil samples from the well screen interval based on field screening results and consideration of the previous sample results to further evaluate soil concentrations at EDP29 and characterize soil within the screened interval. If field screening does not indicate the presence of petroleum hydrocarbons in soil in the well screen interval, submit one of the soil samples from 18 to 19 feet bgs for analysis.
    - Analyze the soil samples for diesel- and heavy oil-range petroleum hydrocarbons using the NWTPH-Dx method with silica gel/acid wash cleanup.
    - If diesel- and/or heavy oil-range petroleum hydrocarbons are detected at a concentration greater than 2,000 milligrams per kilogram (mg/kg), the sample will also be analyzed for extractable petroleum hydrocarbons (EPH) using EPH method.
- Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.
- After stabilization and development of the new well, collect a groundwater sample during the dry and wet seasons.
- Submit groundwater samples for analysis of diesel- and heavy oil-range petroleum hydrocarbons using the NWTPH-Dx method.
    - If turbidity in the groundwater sample exceeds 10 nephelometric turbidity units (NTUs), the laboratory will centrifuge the sample prior to analysis to reduce the possibility of colloidal interference.
- Compare results from the diesel- and oil-range petroleum hydrocarbon analyses on the groundwater samples to the PSL to determine the need for further investigation at EDP29:
    - If the diesel- and heavy oil-range petroleum hydrocarbon concentrations in groundwater samples are less than the PSL (500 micrograms per liter [µg/L]), no additional investigation will be required at EDP29.
    - If the diesel- and/or heavy oil-range petroleum hydrocarbon concentrations in groundwater samples are greater than the PSL, Tier 2 contingency investigation activities may be performed with Ecology concurrence to further evaluate the possible source and extent of the source of petroleum hydrocarbons in groundwater as described in the following section.

Tier 2 Contingency Investigation at EDP29

The following investigation activities may be performed following Tier I if diesel- or heavy oil-range petroleum hydrocarbons are greater than the PSLs in groundwater samples collected from the monitoring well installed at EDP29:

- Complete additional soil borings using direct push drilling techniques around the new monitoring well installed at EDP29 to investigate the potential source and extent of the source to contamination in groundwater. Specifically:
    - Advance one boring southeast (SE; upgradient) of EDP29, one boring northwest (NW; downgradient) of EDP29, one boring northeast (NE) of EDP29 and one boring southwest (SW) of EDP29.
    - Advance additional soil borings to the depth of 20 feet bgs which encompasses the depth at which diesel- and heavy oil-range petroleum hydrocarbons were previously detected at concentrations greater than the PSL (i.e., 18-19 feet bgs).
    - Initially advance one boring SE (upgradient) of EDP29 at an approximate horizontal distance of 25 feet from the monitoring well location to investigate the potential source.
    - Utilize field screening of soil to support selection of soil samples for analysis and selection of additional boring locations.
    - Advance additional boring(s) SE of EDP29 if diesel- or heavy oil-range petroleum hydrocarbon contamination is readily apparent in field screening of soil in the SE (upgradient) boring indicating a potential source to groundwater.
    - Identify placement of remaining borings based on findings from the initial SE (upgradient) boring location as follows:
        - If diesel- or heavy oil-range petroleum hydrocarbon contamination ***is not*** readily apparent in soil in the initial boring located at approximately 25 feet SE (upgradient) of EDP29, place the remaining borings NW, NE and SW at an approximate distance of 25 feet from the new well location.
        - Utilize field screening of soil to support selection of soil samples for analysis and to identify whether an additional step-out boring(s) is needed in the NW, NE or SW directions to identify and delineate the potential source to groundwater.
- Collect continuous core samples from each soil boring to characterize soil conditions and perform field screening to support selection of samples for analysis during advancement of the soil boring.
- Submit two soil samples from the well screen interval based on field screening results and consideration of the previous sample results to further evaluate soil concentrations at EDP29 and characterize soil within the screened interval.
    - Analyze the soil samples for diesel- and heavy oil-range petroleum hydrocarbons using the NWTPH-Dx method with silica gel/acid wash cleanup.
    - If diesel- or heavy oil-range petroleum hydrocarbons are detected at a concentration greater than 2,000 mg/kg, sample will be analyzed for EPH using EPH method.
- Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.

- Compare the results from the diesel- and heavy oil-range petroleum hydrocarbon analyses on the soil samples to the PSL to determine the need for further investigation at EDP29.
    - If the diesel- and/or heavy oil-range hydrocarbon concentrations in soil samples are less than the PSL (2,000 mg/kg) at locations around EDP29, no additional investigation will be required at EDP29.
    - If the diesel- and/or heavy oil-range hydrocarbon concentrations in soil samples are greater than the PSL, discuss need for archived sample analysis and/or additional investigation with Ecology to further evaluate the source of the petroleum hydrocarbons in groundwater.

EDP33 Investigation Area

Background

Sample location EDP33 is shown on Figures 2 and 4. The purpose of the boring at EDP33 was to evaluate potential contamination associated with dry kiln facilities identified on 1950 and 1957 Sanborn Maps and the 1977 Weyerhaeuser Plant diagram.

At this location, gasoline-range petroleum hydrocarbons and volatile organic compounds (VOCs) including benzene and ethylbenzene were detected at concentrations greater that the PSLs in soil at a depth of 16-17 feet bgs in a layer comprised of wood debris (sawdust). In other samples collected from this location, gasoline-range petroleum hydrocarbons either were not detected or were detected at concentrations less that the PSL. Note that the detection limit for gasoline (59 mg/kg) was greater than the PSL in the sample collected from 14-15 feet bgs and that benzene, ethylbenzene, toluene and xylene (BETX) analyses were not performed on the samples collected from the 8-9 and 14-15 foot sample intervals based on field screening results that did not identify elevated sheens (moderate sheen or greater) or headspace vapors (photoionization detection [PID] readings exceeding 20 parts per million [ppm]) in other sample intervals collected from this location.

Investigation Approach

Following review of the existing RI data, Ecology required further groundwater characterization due to the detected concentrations of gasoline-range petroleum hydrocarbons exceeding the PSL in the soil sample collected from EDP33 at 16-17 feet bgs. In response to Ecology's comments, a tiered investigation approach will be implemented at this location that will include the installation of a new monitoring well (Tier 1) followed by potential additional contingency soil sampling (Tier 2) in the vicinity of the new monitoring well if sample results confirm the presence of gasoline-range petroleum hydrocarbons and/or BETX at concentrations greater than the PSLs in groundwater. Tier 1 and contingency Tier 2 investigation activities for the EDP33 investigation area are summarized in Table 1 and described in the following section.

Tier 1 Investigation at EDP33

The following will be completed at investigation area EDP33 to evaluate gasoline-range petroleum hydrocarbons in response to Ecology's comments:

- Install a new shallow monitoring well at the approximate location of EDP33 using HSA drilling techniques as shown on Figure 4.

  - Set the top of the well screen approximately 5 feet above the observed groundwater level or within 3 feet of the ground surface, whichever is deeper.
  - Set the base of the well screen at the depth at which gasoline-range petroleum hydrocarbons, benzene and ethylbenzene were previously detected at concentrations greater than the PSLs (16-17 feet bgs).

- Collect continuous core samples from the soil boring to characterize soil conditions and perform field screening to support selection of samples for analysis during advancement of the soil boring to install the monitoring well.
- Submit two soil samples from the well screen interval based on field screening results and consideration of the previous sample results to further evaluate soil concentrations at EDP33 and characterize soil within the screened interval. If field screening does not indicate the presence of petroleum hydrocarbons in soil in the well screen interval, submit one of the soil samples from 16-17 feet bgs.
  - Analyze the soil samples for gasoline-range petroleum hydrocarbons and BETX using the NWTPH-G and EPA 8021 methods on an expedited 2-day turn-around time (TAT).
  - If gasoline-range petroleum hydrocarbons are detected at a concentration greater than 200 mg/kg, the sample will also be analyzed for volatile petroleum hydrocarbons (VPH) using VPH method.
- Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.
- After stabilization and development of the new well, collect a groundwater sample during the dry and wet seasons.
- Submit groundwater samples for analysis of gasoline-range petroleum hydrocarbons and BETX using the NWTPH-G and EPA 8021 methods.
- Compare the results from the gasoline-range petroleum hydrocarbon and BTEX analyses on the groundwater samples to the PSLs to determine the need for further investigation at EDP33.
  - If the gasoline-range petroleum hydrocarbon and BTEX concentrations in groundwater samples are less than the PSLs, no additional investigation will be required at EDP33.
  - If the gasoline-range petroleum hydrocarbon and/or BTEX concentrations in groundwater samples are greater than the PSLs, Tier 2 contingency investigation activities may be performed with Ecology concurrence to further evaluate the possible source and extent of the source of petroleum hydrocarbons and/or BETX in groundwater as described in the following section.

Tier 2 Contingency Investigation at EDP33

The following investigation activities may be performed following Tier I if gasoline-range petroleum hydrocarbons and/or BTEX are greater than the PSLs in groundwater samples collected from the monitoring well installed at EDP33:

- Complete additional soil borings using direct push drilling techniques around the new monitoring well installed at EDP33 to investigate the potential source and extent of the source to contamination in groundwater. Specifically:

- Advance one boring SE (upgradient) of EDP33, one boring NW (downgradient) of EDP33, one boring NE of EDP33 and one boring SW of EDP33.
- Advance additional soil borings to the depth of 20 feet bgs which encompasses the depth at which gasoline-range petroleum hydrocarbons, benzene and ethylbenzene were previously detected at concentrations greater than the PSL (i.e., 16-17 feet bgs).
- Initially advance one boring SE (upgradient) of EDP 33 at an approximate horizontal distance of 25 feet from the monitoring well location to investigate the potential source.
- Utilize field screening of soil to support selection of soil samples for analysis and selection of additional boring locations.
- Advance additional boring(s) SE of EDP33 if gasoline-range petroleum hydrocarbon contamination is readily apparent in field screening of soil in the SE (upgradient) boring indicating a potential source to groundwater.
- Identify placement of remaining borings based on findings from the initial SE (upgradient) boring location as follows:
    - If gasoline-range petroleum hydrocarbon contamination ***is not*** readily apparent in soil in the initial boring located 25 feet SE (upgradient), place remaining borings NW, NE and SW at an approximate horizontal distance of 25 feet from the well location.
    - Utilize field screening of soil to support selection of soil samples for analysis and to identify whether an additional step-out boring(s) is needed in the NW, NE or SW directions to identify and delineate the source to groundwater.

- Collect continuous core samples from each soil boring to characterize soil conditions and perform field screening to support selection of samples for analysis during advancement of the soil boring.
- Submit two soil samples from each soil boring for petroleum hydrocarbons and BETX based on field screening results to evaluate and support delineation of the source to groundwater contamination.
    - Analyze the soil samples for gasoline-range petroleum hydrocarbons and BETX using the NWTPH-G and EPA 8021 methods on an expedited 2-day TAT.
    - If gasoline-range petroleum hydrocarbons are detected at a concentration greater than 200 mg/kg, the sample will also be analyzed for VPH using VPH method.
- Compare the results from the gasoline-range petroleum hydrocarbon and BTEX analyses on the soil samples to the PSLs to determine the need for further investigation at EDP33.
    - If the gasoline-range petroleum hydrocarbon and BTEX concentrations in soil samples are less than the PSLs at locations around EDP33, no additional investigation will be required at EDP33.
    - If the gasoline-range petroleum hydrocarbon and/or BTEX concentrations in soil samples are greater than the PSLs, discuss need for archived sample analysis and/or additional investigation with Ecology to further evaluate the source of the petroleum hydrocarbons in groundwater.

EDP35 Investigation Area

Background

Sample location EDP35 is shown on Figures 2 and 5. The purpose of the boring at EDP35 was to evaluate the location of oil house facilities identified on 1950 and 1957 Sanborn Maps and the 1977 Weyerhaeuser Plant diagram.

At this location, polychlorinated biphenyl (PCB) Aroclors were detected at concentrations greater than the PSLs in soil samples collected from depths of 9-10, 14-15 and 18-19 feet bgs. The samples collected from EDP35 were observed to be sand (9-10 feet bgs), predominantly wood debris (approximately 70 percent fibers and chips) with silt and sand (14-15 feet bgs) to approximately 100 percent wood (18-19 feet bgs; lumber, logs, bark and chips). The highest PCB Aroclor concentration detected at the Site (19.4 mg/kg) was collected from the 14-15-foot sample interval at this location. PCB congener analysis was also performed of the sample from 14-15 feet and the total PCB concentration was 2.79 mg/kg.

Investigation Approach

Following review of the existing RI data, Ecology required further groundwater characterization due to the detected concentration of PCBs exceeding the PSL in the soil sample collected from EDP35 at 14-15 feet bgs. In response to Ecology's comments, a tiered investigation approach will be implemented at this location that will include the installation of a new monitoring well (Tier 1) followed by potential additional contingency soil sampling (Tier 2) in the vicinity of the new monitoring well if sample results confirm the presence of PCBs at concentrations greater than the PSL in groundwater. Tier 1 and contingency Tier 2 investigation activities for the EDP35 investigation area are summarized in Table 1 and described in the following section.

Tier 1 Investigation at EDP35

The following will be complete at investigation area EDP35 to evaluate PCBs in response to Ecology's comments:

- Install a shallow monitoring well at the approximate location of EDP35 using HSA drilling techniques as shown on Figure 5.
    - Set the top of the well screen approximately 5 feet above the observed groundwater level, or within 3 feet of the ground surface, whichever is deeper.
    - Set the base of the well screen at the depth at which PCBs were previously detected at the highest concentration (14-15 feet bgs).
- Collect continuous core samples from the soil boring to characterize soil conditions and perform field screening to support selection of samples for analysis during advancement of the soil boring to install the monitoring well.
- Submit two soil samples from the well screen interval based on field screening results and consideration of the previous results to further evaluate soil concentrations at EDP35 and characterize soil within the screened interval. If field screening does not indicate the presence of contamination or debris potentially containing PCBs in soil in the well screen interval, collect one of the soil samples from 14-15 feet bgs which was the depth of the highest PCB concentration at the Site.
    - Analyze the soil samples for PCB Aroclors using EPA Method 8082.
    - Analyze the soil sample with the highest PCB Aroclor concentration at this location for PCB congeners (209 PCB congeners) using EPA Method 1668C.
- Archive remaining samples for potential follow-up analyses based on the results of the initial soil sample analyses.

- After stabilization and development of the new well, collect a groundwater sample during the dry and wet seasons.
- Submit groundwater samples for analysis of PCB Aroclors using EPA Method 8082 and PCB congeners (209 PCB congeners) using EPA Method 1668C.
    - If turbidity in the groundwater sample exceeds 10 NTUs, the laboratory will centrifuge the sample prior to analysis to reduce the possibility of colloidal interference.
- Compare the results from the PCB analyses on the groundwater samples to the PSL to determine the need for further investigation at EDP35.
    - If the total PCB concentrations in groundwater samples are less than the PSL (0.05 µg/L), no additional investigation will be required at EDP35.
    - If the total PCB concentrations in groundwater samples are greater than the PSLs, Tier 2 contingency investigation activities may be performed with Ecology concurrence to further evaluate the possible source and extent of the source of PCBs in groundwater as described in the following section.

Tier 2 Contingency Investigation at EDP35

The following investigation activities may be performed following Tier I if total PCBs are greater than the PSL in groundwater samples collected from the well installed at EDP35:

- Complete additional soil borings using direct push techniques around the new monitoring well installed at EDP35 to investigate the potential source and extent of the source to contamination in groundwater. Specifically:
    - Advance one boring SE (upgradient) of EDP35, one boring NW (downgradient) of EDP35, one boring NE of EDP35 and one boring SW of EDP35.
    - Advance additional soil borings to a depth of 15 feet bgs which encompasses the depth at which the highest PCB concentration was previously detected at the Site (i.e., 14-15 feet bgs).
    - Initially advance one boring SE (upgradient) of EDP35 at an approximate horizontal distance of 25 feet from the monitoring well location to investigate the potential source.
    - Utilize field screening of soil for the presence of contamination or debris potentially containing PCBs to support selection of soil samples for analysis.
    - Advance additional boring(s) SE of EDP35 if the presence of contamination or debris potentially containing PCBs is readily apparent in field screening of soil in the SE (upgradient) boring indicating a potential source to groundwater.
    - Identify placement of remaining borings based on findings from this initial SE (upgradient) boring location as follows:
        - If the presence of contamination or debris potentially containing PCBs ***is not*** readily apparent in soil in the initial boring located 25 feet SE (upgradient), place remaining borings NW, NE and SW at an approximate horizontal distance of 25 feet from the well location.
        - Utilize field screening of soil and the previous results for the sample collected from 14-15 feet bgs which were the highest PCB concentrations at the site to support selection of soil samples for analysis and to identify whether an additional step-out boring(s) is needed in the NW, NE or SW directions to identify and delineate the source to groundwater.

- Collect continuous core samples from each soil boring to characterize soil conditions and perform field screening including observation for the presence of contamination or debris potentially containing PCBs to support selection of samples for analysis during advancement of the soil boring.
- Submit two soil samples from each soil boring for PCBs based on field screening results to evaluate and support delineation of the source to groundwater contamination.
    - Analyze the soil samples for PCB Aroclors using EPA Method 8082.
    - Analyze the soil sample with the highest PCB Aroclor concentration at this location for PCB congeners (209 PCB congeners) using EPA Method 1668C.
- Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.
- Compare the results from the PCB analyses on the soil samples to the PSL to determine the need for further investigation at EDP35.
    - If the PCB concentrations in soil samples are less than the PSLs at locations around EDP35, no additional investigation will be required at EDP35.
    - If the PCB concentrations in soil samples are greater than the PSL, discuss need for follow-up analyses on the samples on hold at the laboratory and/or additional investigation with Ecology to further evaluate the source of the PCBs in groundwater.

EDP38/EDP52 Investigation Area

Background

Sample locations EDP38 and EDP52 are shown on Figures 2 and 5. The purpose of the boring at EDP38 was to evaluate potential contamination associated with the boiler house identified in 1950 and 1957 Sanborn Maps and the 1977 Weyerhaeuser Plant diagram and the purpose of the boring at EDP52 was to evaluate potential contamination associated with the boiler house and hog fuel bin identified on historic maps.

At these locations, the total dioxin/furan toxicity equivalent (TEQ) concentrations were greater than the PSL in samples collected in soil at depths of 8-9 feet bgs at EDP38 and 10-10.5 feet bgs at EDP52 which consisted of black burnt material/ash. Samples from the 13-14-foot and 19-20-foot intervals from EDP38 which consisted of silty sand with gravel and 100 percent wood debris (fibers, chips and sawdust), respectively, were also analyzed for dioxins/furans. Total dioxin/furan TEQ concentrations at these intervals were less than the PSL for protection of human health. Dioxin/furan analyses were not performed on additional samples from EDP52.

Burnt material/ash was also observed in a soil at location EDP39 from 4.5-5 feet bgs. The total dioxins/furan TEQ concentration from this sample interval was less that the PSL. In addition, multiple soil samples collected from locations EST01 and EST15 in which burnt material/ash was not observed were also submitted for dioxin/furan analysis. Total dioxins/furan TEQ concentrations for these samples were also less that the PSL.

Investigation Approach

Following review of the existing RI data, Ecology required that the highest concentration of dioxins and furans in soil be bounded by completing additional soil borings to the east and southwest of EDP38 and EDP52. In response to Ecology's comments, additional soil investigation activities will be completed to bound dioxin/furan concentrations greater than the PSL for protection of human health. Additional investigation activities for the EDP38/EDP52 investigation area are summarized in Table 1 and described in the following section.

Additional Investigation at EDP38/EDP52

The following is will be completed at investigation areas EDP38 and EDP52 to evaluate dioxins/furans in in response to Ecology's comments:

- Advance a direct push soil boring southeast of location EDP38 and a direct push boring southwest of location EDP52 as shown on Figure 5. Specifically:
    - Advance one boring at a horizontal distance of 50 feet southeast of location EDP38. This boring will be located adjacent to the fence at the eastern boundary of the Port of Everett property.
    - Advance the additional soil boring to a depth of 10 feet bgs which encompasses the depth at which dioxins and furans were previously detected at a concentration greater than the PSL (i.e., 8-9 feet bgs).
    - Advance one boring at a horizontal distance of 75 feet southwest of location EDP52.
    - Advance the additional soil boring to a depth of 15 feet bgs which encompasses the depth at which dioxins and furans were previously detected at a concentration greater than the PSL (i.e., 10-10.5 feet bgs).
- Collect continuous core samples from the soil borings to characterize soil conditions and perform field screening including observation for the presence of burnt material/ash which contained the highest dioxin/furan concentrations to support selection of samples during advancement of the boring.
    - If burnt material/ash contamination ***is not*** observed in the soil cores, collect a sample for analysis from a 1-foot interval between 8-10 feet bgs, the depth of the highest dioxin/furan concentrations in EDP38 and EDP52.
    - If burnt material/ash is observed in the soil core(s), collect a sample of the burnt material/ash for analysis and perform additional borings.
    - If burnt material/ash is observed in the initial soil boring located 75 feet southwest of EDP52, advance an additional step-out boring 150 feet southwest of EDP52.
    - If burnt material/ash is observed in the initial soil boring located 50 feet southeast of EDP38, advance an additional step-out boring 75 feet southwest of the initial step out boring. A step-out boring is not proposed in the southeast direction because the initial boring will be located at the Port property boundary.
    - Observe soil cores from the additional step-out locations for the presence of burnt material/ash and collect samples from a one-foot interval between 8-10 feet bgs for analysis if burnt material/ash ***is not*** observed or collect a sample of the burnt material/ash if present.
- Submit one soil sample from each initial boring (and step-out borings if burnt material/ash is observed in the initial soil borings) of the burnt material/ash for analysis.

  - Analyze the soil samples for dioxin and furan analysis using EPA Method 1613, if burnt material/ash material is observed.
  - If burnt material/ash material is not observed, submit one sample from each completed boring for dioxin and furan analysis using EPA Method 1613 from a one-foot interval between 8-10 feet bgs.
- Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.

EST04 Investigation Area

Background

Sample location EST04 is shown on Figures 2 and 6. The purpose of the boring and monitoring well at EST04 was to evaluate potential contamination associated with the following:

- Chemical facilities including a bleach plant and pulp processing facilities identified in the 1950 and 1957 Sanborn Maps and the 1977 Weyerhaeuser Plant diagram.
- Chemical storage including sodium hydroxide, sodium hypochlorite and sulfuric acid tanks identified in an SPCC plan and generally located upgradient from monitoring well EST04.
- Small quantity petroleum storage/handling areas identified in an SPCC plan.
- Auto shop observed in the 1977 Weyerhaeuser Plant diagram and generally located upgradient from monitoring well EST04.
- Historic ship building observed in the 1902 Sanborn map.

At this location, the pH of the soil in the samples is alkaline/basic ranging from 10.86 to 11.23. In addition, contaminants including mercury and thallium, gasoline-range petroleum hydrocarbons, VOCs (benzene and 1,2,4-trichlorobenzene), polycyclic aromatic hydrocarbons (PAHs) and/or PCBs were greater than the PSLs in samples collected from the 13-14-foot and 18-19-foot intervals. Soil within the sample intervals are comprised of sand with silt (13-14 feet bgs) and wood debris (chips, fibers and sawdust; 18-19 feet bgs). At EDP46 located approximately 100 feet northeast of EST04 the pH ranged between 9.56 to 10.90 in soil. At EDP30 located approximately 150 feet northwest of EST04 the pH ranged between 7.32 to 8.94 in soil.

At EST04, the pH of groundwater was 10.92 and 10.38 (similar to soil) during the 2016 dry and 2017 wet season sampling events, respectively. Contaminants including arsenic, copper, lead, mercury and nickel, 1,2,4-trichlorobenzene, carcinogenic PAHs (cPAHs) and PCBs were detected at concentrations greater than the PSLs in groundwater from EST04 during both the dry and wet season sampling events. Diesel- and heavy oil-range petroleum hydrocarbons were detected at concentrations greater than the PSL during the 2016 dry season sampling event. However, during the 2017 wet season sampling event, diesel- and heavy oil-range petroleum hydrocarbons were detected at concentrations less than the PSL. Gasoline-range petroleum hydrocarbons were detected but at concentrations less than the PSL during both the dry and wet season sampling events.

Investigation Approach

Following review of the existing RI data, Ecology identified the following with respect to the contamination previously identified at EST04:

- The RI/FS and cleanup must address the elevated pH in this area[2].
- Groundwater exceeds for metals, petroleum hydrocarbons, 1,2,4-trichlorobenzene, cPAHs and PCBs.
- The main contaminants in soil include petroleum hydrocarbons and PCBs.
- The RI/FS needs to identify and delineate the contaminant source so that it may be addressed and come into compliance as part of the cleanup.

In response to Ecology's comments, a tiered investigation approach will be implemented that will include the completion of additional soil borings surrounding EST04 followed by the installation of new monitoring wells to further evaluate soil and groundwater conditions at this location (Tier 1). Based on the results of the initial soil and groundwater monitoring activities, potential additional contingency soil and groundwater investigation activities may be completed to evaluate pH in soil and groundwater and the effect of pH on the presence of contaminants in groundwater at concentrations greater than the PSLs as well as the source to contaminants in groundwater at concentrations greater than the PSLs (Tier 2). Tier 1 and contingency Tier 2 investigation activities for the EST04 investigation area are summarized in Table 1 and described in the following sections.

Tier 1 Investigation at EST04

The following will be completed to evaluate pH in soil and groundwater and the effect of pH on the presence of contaminants in groundwater at concentrations greater than the PSLs as well as the extent of the source for contaminants in groundwater at concentrations greater than the PSLs at EST04:

- Complete additional soil borings using direct push drilling techniques around the location of monitoring well EST04 to investigate soil pH, metal, petroleum hydrocarbon and PCB concentrations in soil as shown on Figure 6. Specifically:
    - Advance borings to the west, north, east and south of EST04.
    - Advance additional soil borings to the depth of 20 feet bgs which encompasses the depth at which metals, petroleum hydrocarbons and PCBs were previously detected at concentrations greater than the PSL (i.e., 18-19 feet bgs).
    - Initially advance borings east and south (upgradient) from EST04 at approximate increments of 25 feet horizontal to investigate and characterize soil pH.
    - Utilize field screening of soil for pH to initially characterize soil conditions to an approximate horizontal distance of 100 feet upgradient of monitoring well EST04 to identify the potential area with alkaline/basic soil conditions.
    - Utilize field screening of soil for pH and for petroleum hydrocarbons, debris or other indications of contamination to support selection of soil samples for analysis to characterize contaminants in soil and the potential source to groundwater.
    - Advance additional boring(s) beyond 100 feet if pH, petroleum hydrocarbon contamination or other indications of contamination are readily apparent based on field screening of soil in the east and south (upgradient) borings indicating a potential source to groundwater.

[2] Elevated pH is may be contributing to contaminant concentrations in groundwater at EST04.

  - Advance borings west and north (downgradient) from EST04 at approximate increments of 25 feet horizontal to investigate and characterize soil pH utilizing the same procedures applied to upgradient borings.

- Collect continuous core samples from the soil borings to characterize soil conditions and perform field screening including observation for the presence of elevated pH, petroleum hydrocarbons and debris potentially containing metals and/or PCBs to support selection of samples during advancement of the boring.
- Initially, submit two soil samples from up to two borings located in each direction from monitoring well EST04 based on field screening for pH, metals, petroleum hydrocarbons, and PCBs using the following analytical methods:
  - pH by EPA Method 9040.
  - Metals by EPA Method 6010/6020 and 7470/7471.
  - Gasoline-range petroleum hydrocarbons by NWTPH-Gx.
  - Analyze the soil samples on an expedited 2-day TAT.
  - If gasoline-range petroleum hydrocarbons are detected at a concentration greater than 200 mg/kg, the sample will also be analyzed for VPH using VPH method.
  - Diesel- and heavy oil-range petroleum hydrocarbons using the NWTPH-Dx method with silica gel/acid wash cleanup.
  - If diesel- or heavy oil-range petroleum hydrocarbons are detected at a concentration greater than 2,000 mg/kg, the sample will also be analyzed for EPH using EPH method.
  - PCB Aroclors by EPA Method 8082.
  - The three samples with the highest Aroclor concentrations will also be analyzed for PCB congeners (209 PCB congeners) using EPA Method 1668C.
- Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.
- Compare the results from the analyses on the soil samples to the PSLs to determine the location for installation of additional groundwater monitoring well(s) in the vicinity of EST04. Considerations for the selection of new groundwater monitoring well location(s) will include the following:
  - Contaminant concentrations in soil samples relative to the PSLs.
  - Soil pH less than or equal to 9.
  - Other factors resulting from field observations and screening, and results of the soil sample analyses not currently identified.
  - Ecology input.
- Install a minimum of one shallow monitoring well based on the considerations identified above using HSA drilling techniques.
  - Set the top of the well screen approximately 5 feet above the observed groundwater level, or within 3 feet of the ground surface, whichever is deeper.
  - Set the base of the well screen at the depth at which metals, petroleum hydrocarbons and PCBs were previously detected at concentrations greater than the PSL (18-19 feet bgs).

- Collect continuous core samples from the soil borings to characterize soil conditions and perform field screening including observation for the presence of elevated pH, petroleum hydrocarbons and debris potentially containing metals and/or PCBs to support selection of samples during advancement of the boring to install the monitoring well.
- Archive soil samples for potential future analysis.
- After stabilization and development of the new well(s), collect groundwater samples during the dry and wet seasons.
- Additionally, collect groundwater samples from EST04 during the dry and wet seasons.
- Submit groundwater samples for metals, gasoline-, diesel- and heavy oil-range petroleum hydrocarbons.
    - pH by EPA Method 9040.
    - Metals by EPA Method 6010/6020 and 7470/7471.
    - Gasoline-range petroleum hydrocarbons by NWTPH-Gx.
    - Diesel- and heavy oil-range petroleum hydrocarbons by NWTPH-Dx.
    - If turbidity in the groundwater sample exceeds 10 NTUs, the laboratory will centrifuge the sample prior to analysis of to reduce the possibility of colloidal interference.
    - PCB Aroclors by EPA Method 8082 and PCB Congeners (209 PCB congeners) by EPA Method 1668.
    - If turbidity in the groundwater sample exceeds 10 NTUs, the laboratory will centrifuge the sample prior to analysis of to reduce the possibility of colloidal interference.
- Compare the results from the analyses on the groundwater samples to the PSLs to determine the need for further investigation at EST04.
    - If the concentrations in groundwater samples are less than the PSLs, no additional investigation will be required at EST04 to delineate the area of groundwater exceedances and potential source area. The results for soil and groundwater analyses will be used to characterize the source area. The need for additional archive soil sample analysis would be evaluated and discussed with Ecology.
    - If the concentrations in groundwater samples are greater than the PSLs, Tier 2 contingency investigation activities may be performed with Ecology concurrence to further evaluate the possible source and extent of the source of contamination as described in the following section.

Tier 2 Contingency Investigation at EST04

The following investigation activities may be performed following Tier I to further evaluate pH in soil and groundwater and the effect of pH on the presence of contaminants in groundwater at concentrations greater than the PSLs as well as the source to contaminants in groundwater at concentrations greater than the PSLs:

- Advance additional soil borings at distances greater than 100 feet from EST04, perform soil field screening and sampling and laboratory analyses of soil samples to characterize soil using the procedures described above.

- Install additional monitoring wells, perform groundwater sampling and laboratory analyses to characterize groundwater using the procedures described above.

Soil collected as part of the sampling described above may be combined and used for treatability testing including reduction of the soil pH and sequestration of contaminants in soil.

EST12 Investigation Area

Background

Sample location EST12 is shown on Figures 2 and 7. The purpose of the boring and monitoring well at EST12 was to evaluate the potential contamination associated with the following:

- A former 650,000-gallon above ground fuel oil storage tank identified on the 1977 Weyerhaeuser Plant diagram and identified in an SPCC Plan.

At this location, gasoline-range petroleum hydrocarbons were detected at a concentration greater than the PSL in a sample collected in soil at a depth of 22.5-23.5 feet bgs. Diesel- and heavy oil-range petroleum hydrocarbons either were not detected or were detected at concentrations less that the PSL in soil samples submitted for chemical analysis. In groundwater, gasoline- and diesel-range petroleum hydrocarbons were detected at concentrations greater than the PSLs at EST12 during both the 2016 wet and 2017 dry season sampling events. Heavy oil-range petroleum hydrocarbons either were not detected or were detected at concentrations less that the PSL during each of these sampling events.

Investigation Approach

Following review of the existing RI data, Ecology required that the source for petroleum hydrocarbon concentrations in groundwater at EST12 be further delineated. In response to Ecology's comments, a tiered investigation approach will be implemented at this location that will include the completion of additional soil borings in the vicinity of former fuel oil tank (Tier 1) followed by potential additional contingency groundwater sampling (Tier 2) at a new well positioned between EST12 and EST13 if Tier 1 soil sample results do not identify a contaminant source. Tier 1 and contingency Tier 2 investigation activities for the EST12 investigation area are summarized in Table 1 and described in the following section.

Tier 1 Investigation at EST12

The following will be completed to evaluate the source of petroleum hydrocarbons in groundwater:

- Complete additional soil borings upgradient in the area of the former location of the fuel storage tank using sonic drilling techniques to investigate the source and potential extent of the source to contamination in groundwater as shown in Figure 7. Specifically:
    - One boring will be installed west southwest of EST12 at a horizontal distance of 75 feet.
    - One boring will be installed directly SE of EST12 at a horizontal distance of 50 feet.
    - One boring will be installed 50 feet NE of the boring installed 50 feet SE of EST12 (Figure 7).
    - One boring will be installed directly SE of EST12 at a horizontal distance of 100 feet.
    - One boring will be installed 50 feet SW and one boring will be installed 50 feet NE of the boring installed 100 feet SE of EST12.

  - Advance additional soil borings to a depth of 25 feet which encompasses the depth at which gasoline-range petroleum hydrocarbons were previously detected at concentrations greater than the PSL (i.e., 22.5-23.5 feet bgs).
  - Advance additional boring(s) if petroleum hydrocarbon contamination is readily apparent in field screening of soil in the borings indicating a potential source to groundwater.
- Collect continuous core samples from each boring to characterize soil conditions and perform field screening to support selection of samples for analysis during advancement of the soil borings.
- Initially analyze two soil samples from each boring for gasoline-range petroleum hydrocarbons.
  - Analyze the soil samples for gasoline-range petroleum hydrocarbons and BETX using the NWTPH-G and EPA 8021 methods on an expedited 2-day TAT.
  - If gasoline-range petroleum hydrocarbons are detected at a concentration greater than 200 mg/kg, the sample will also be analyzed for volatile petroleum hydrocarbons (VPH) using VPH method.
- Initially analyze two soil samples from each boring for diesel- and heavy oil-range petroleum hydrocarbons.
  - Analyze the soil samples for diesel- and heavy oil-range petroleum hydrocarbons using the NWTPH-Dx method with silica gel/acid wash cleanup.
  - If diesel- and/or heavy oil-range petroleum hydrocarbons are detected at a concentration greater than 2,000 mg/kg, the sample will also be analyzed for EPH using EPH method.
- Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.
- Compare the results from the gasoline-, diesel- and heavy oil-range petroleum hydrocarbon analyses on the soil samples to the PSLs to determine the need for further investigation at EST12.
  - If the gasoline-, diesel- heavy oil-range petroleum hydrocarbon concentrations in soil samples are less than the PSLs (30 and 2,000 mg/kg, respectively), no additional soil investigation will be required at EST12.
  - If the gasoline-, diesel- and/or heavy oil-range petroleum hydrocarbon concentrations in soil samples are greater than the PSLs, Tier 2 contingency investigation activities may be performed with Ecology concurrence to further evaluate the possible source and extent of the source of petroleum hydrocarbons in groundwater as described in the following sections.

Tier 2 Contingency Investigation at EST12

The following investigation steps may be performed following Tier I to evaluate petroleum hydrocarbons at EST12 if petroleum hydrocarbons are detected in soil at concentrations greater than the PSL:

- Install a shallow monitoring well using HSA drilling techniques downgradient of EST12 between EST12 and EST13.
  - Set the top of the well screen approximately 5 feet above the observed groundwater level, or within 3 feet of the ground surface, whichever is deeper.
  - Set the base of the well screen at a depth of 15 feet bgs (similar to monitoring well EST12).

- Collect continuous core samples from the boring to characterize soil conditions and perform field screening of soil to support selection of samples for analysis during advancement of the soil boring to install the monitoring well.
- Submit two soil samples from the well screen interval based on field screening results to characterize soil within the screened interval.
    - Analyze the soil samples for gasoline-range petroleum hydrocarbons and BETX using the NWTPH-G and EPA 8021 methods on an expedited 2-day TAT.
    - If gasoline-range petroleum hydrocarbons are detected at a concentration greater than 200 mg/kg, the sample will also be analyzed for volatile petroleum hydrocarbons (VPH) using VPH method.
    - Analyze the soil samples for diesel- and heavy oil-range petroleum hydrocarbons using the NWTPH-Dx method with silica gel/acid wash cleanup.
    - If diesel- and/or heavy oil-range petroleum hydrocarbons are detected at a concentration greater than 2,000 mg/kg, the sample will also be analyzed for EPH using EPH method.
- Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.
- After stabilization and development of the new well, collect a groundwater sample during the dry and wet seasons.
- Submit groundwater samples for metals, gasoline-, diesel- and heavy oil-range petroleum hydrocarbons.
    - Analyze gasoline-range petroleum hydrocarbons by NWTPH-Gx.
    - Analyze diesel- and heavy oil-range petroleum hydrocarbons by NWTPH-Dx.
    - If turbidity in the groundwater sample exceeds 10 NTUs, the laboratory will centrifuge the sample prior to analysis of to reduce the possibility of colloidal interference.
- Compare the results from the gasoline-, diesel- and heavy oil-range petroleum hydrocarbons analyses on the groundwater samples to the PSLs to determine the need for further investigation at EST12.
    - If the gasoline-, diesel- and heavy oil-range petroleum hydrocarbons concentrations in groundwater samples are less than the PSLs (800 and 500 µg/L, respectively), no additional groundwater investigation will be required at EST12.
    - If the gasoline-, diesel- and/or heavy oil-range petroleum hydrocarbons concentrations in groundwater samples are greater than the PSLs, the approach for any additional investigation will be discussed with Ecology.

Equipment Storage Area Investigation

Background

Sample locations in the Equipment Storage Area are shown on Figures 2 and 8. The purpose of the borings and monitoring well EST16 in the Equipment Storage Area were to characterize soil and groundwater on the southwest portion of the Site that had not previously been characterized.

At this location, metals including antimony, arsenic, beryllium, cadmium, copper, lead, mercury, nickel, silver and/or zinc were detected at concentrations greater that the PSLs in soil samples submitted for

chemical analysis at locations EDP23, EDP43 and EST16. In groundwater, metals either were not detected or detected at concentrations less than the PSLs in dissolved groundwater samples collected during the 2016 dry and 2017 wet season sampling events.

Investigation Approach

Following review of the existing RI data, Ecology required that the metal exceedances in the Equipment Storage Area need to be further delineated to inform cleanup options in the Equipment Storage Area. In response to Ecology's comments, additional soil investigation activities will be completed in this area to delineate the nature and extent of metals contamination detected at concentrations greater than the PSLs. Additional investigation activities for the Equipment Storage Area are summarized in Table 1 and described in the following sections.

Additional Soil Investigation for the Equipment Storage Area

The following will be completed to characterize metals concentrations greater than the PSLs in soil in the Equipment Storage Area:

- Complete additional soil borings in the Equipment Storage Area using direct push techniques at locations shown on Figure 8. Specifically:
    - Advance one row of four borings along the NW portion of the Equipment Storage Area.
    - Advance one row of five borings along the SE portion of the Equipment Storage Area.
    - Advance one row of four borings along the central portion of the Equipment Storage Area.
    - Advance additional soil borings to at least 3 feet into native soil (approximately 25 feet).
- Collect continuous core samples from each boring to characterize soil conditions and perform field screening of soil including observations for the presence of debris potentially containing metals to support selection of samples for analysis during advancement of the soil borings.
- Submit two shallow soil samples from each boring to further evaluate soil metals concentrations.
    - If field screening evidence of contamination or debris potentially containing metals ***is not*** observed in the soil cores, initially analyze a 1-foot interval sample from 2 feet bgs and 6 feet bgs (the depth of the highest observed metals concentrations) using EPA Methods 6010/6020 and 7470/7471.
    - If field screening evidence of contamination or debris potentially containing metals is observed in the soil cores, initially analyze the shallowest sample representative of this material and a sample from 6 feet bgs using EPA Methods 6010/6020 and 7470/7471.
- Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.
- Compare the results from the metals analyses on the soil samples to the PSLs to determine the need for analysis of archived samples.
    - If the metals concentrations in the initial soil sample analyses are less than the PSLs in samples, no additional archive sample analyses or soil investigation will be required in the Equipment Storage Area.
    - If the metals concentrations in the initial soil samples are greater than the PSLs, analyze the archived deeper sample interval for the metals that exceeded the PSL. If the deeper fill zone

sample(s) also contain one or more metals at concentrations greater than the PSLs, then analyze the native soil sample from that location.

- If data gaps remain after additional investigation of the Equipment Storage Area, discuss options for additional investigation activities with Ecology to further characterize soil conditions in the Equipment Storage Area.

Open Space Investigation Area

Background

Sample locations in the Open Space Area and adjacent intertidal marine area are shown on Figures 2 and 8. The purpose of the borings in the Open Space Area was to characterize soil in the public access area.

At this location, metals including copper, lead, mercury, nickel, selenium, thallium and zinc, and/or dioxins/furans were detected at concentrations greater than the PSLs in soil samples submitted for chemical analysis at locations EDP22, EDP 41 and EDP42. Metals and dioxin and furan concentrations greater than the PSLs were detected in samples of fill containing gravel, sand, silt, wood debris, brick and concrete debris and asphalt debris. Metals concentrations were also greater than the PSLs in samples collected from native soil at EDP22 (16-17 feet bgs) and EDP42 (15-16 feet bgs). In addition, heavy oil-range petroleum hydrocarbons were detected at a concentration greater than the PSL for protection of ecological receptors in a sample from a depth of 7-8 feet bgs which is at a depth below the point of compliance for ecological receptors (i.e., 6 feet bgs).

Metals and dioxins and furans were not detected at concentrations greater than the PSLs in sediment samples collected adjacent to the Open Space Area. Sediment samples MAF-SS-16 and MAF-SS-27 were collected at the base of the shoreline slope adjacent to the Open Space Area (Figure 8).

Investigation Approach

Following review of the existing RI data, Ecology required that metals, dioxins and furans be further delineated in the Open Space Area and in the intertidal sediment adjacent to the Open Space Area. In addition, because the results from previous analyses indicate that petroleum hydrocarbons concentrations are less than the PSLs for protection of human health and are less than the PSLs for protection of ecological receptors down to the point of compliance depth for ecological receptors, further soil characterization for these contaminants are not required. In response to Ecology's comments, additional soil investigation activities will be completed in this area to delineate the nature and extent of metals and dioxin/furan contamination detected at concentrations greater than the PSLs. Additional investigation activities for the Open Space Area are summarized in Table 1 and described in the following sections.

Additional Investigation for the Open Space Area

The following investigation activities area proposed to characterize metals and dioxins and furan concentrations greater than the PSLs in the Open Space Area and adjacent intertidal sediment:

- Complete additional nine borings in the Open Space Upland Area and an additional four borings in the intertidal area at the base of the shoreline slope adjacent to the Open Space Area as shown on Figure 8

using direct push drilling techniques to provide additional characterization of Open Space Upland Area soil and adjacent shoreline beach sediment.

  - Advance additional borings to at least 3 feet into native soil/sediment (approximately 10-20 feet).

- Collect continuous core samples from each boring to characterize soil/sediment conditions and perform field screening including observations for the presence of debris potentially containing metals and/or dioxins and furans to support selection of samples for analysis during advancement of the borings.
- Submit two samples from each soil boring from the Open Space Area for metals analysis, and dioxin and furan analysis to evaluate and/or support delineation of the previously identified contamination.
  - Soil samples for potential chemical analysis will target surface soil (0-1-foot bgs), fill soil below the surface and native soil underlying the fill material.
  - If field screening evidence of contamination or debris potentially containing metals and/or dioxins and furans ***is not*** observed in the soil cores, initially analyze a sample at the surface (0-1-foot bgs) sample and a sample from 2-3 feet bgs using EPA Methods 6010/6020 and 7470/7471, and 1613.
  - If field screening evidence of contamination or debris potentially containing metals and/or dioxins and furans is observed in the soil cores, initially analyze a sample at the surface (0-1-foot bgs) sample and a sample representative of the potentially contaminated material using EPA Methods 6010/6020 and 7470/7471, and 1613.
- Submit two sediment samples from each soil boring from the base of the shoreline slope adjacent to the Open Space Area for metals analysis, and dioxin and furan analysis to evaluate and/or support delineation of the previously identified contamination.
  - Sediment samples for potential chemical analysis will target sediment from the surface to a depth of 40 centimeters (cm) (0-40 cm), fill material below a depth of 40 cm and native sediment underlying the fill material.
  - If field screening evidence of contamination or debris potentially containing metals and/or dioxins and furans ***is not*** observed in the sediment cores, initially analyze the 0-40 cm sample and the 2-3-foot sample interval using EPA Methods 6010/6020 and 7470/7471, and 1613.
  - If field screening evidence of contamination or debris potentially containing metals and/or dioxins and furans is observed in the sediment cores, initially analyze the 0-40 cm sample and a sample representative of the potentially contaminated material using EPA Methods 6010/6020 and 7470/7471, and 1613.
- Archive remaining samples for potential follow-up analyses based on the results of initial sample analyses.
- Compare the results from the metals and dioxin and furan analyses on the soil samples from the Open Space Area to the PSLs to determine the need for analysis of archived samples.
  - If the metals and dioxin and furan concentrations from the initial soil sample analyses from the Open Space Area are less than the PSLs, no additional archive soil sample analyses will be required.
  - If the metals and dioxin and furan concentrations in soil samples from the Open Space Area are greater than the PSLs, analyze deeper archived sample(s) for the metals and/or dioxins and furans that exceeded. If the deeper samples also contain one or more metals and/or

dioxins and furans at concentrations greater than the PSLs, then analyze the native soil sample from that location.

- Compare the results from the metals and dioxin and furan analyses on the sediment samples collected at the base of the shoreline slope to the PSLs to determine the need for analysis of archived samples.
    - If the metals and dioxin and furan concentrations in the initial shoreline sediment sample analyses are less than the PSLs, no additional archive sample analyses will be required.
    - If the metals and dioxin and furan concentrations in sediment samples are greater than the PSLs, analyze deeper archived sample(s) for the metals and/or dioxins and furans that exceeded. If the deeper samples also contain one or more metals and/or dioxins and furans at concentrations greater than the PSLs, then analyze the native sediment sample from that location.
- If additional data gaps remain after additional investigation of the Open Space Area, discuss contingency investigation steps with Ecology to further characterize as needed, metals and/or dioxin and furan concentrations in soil in the Open Space Area and/or sediment adjacent to the Open Space Area.

Nearshore Confined Disposal Facility Investigation Area

Background

Sample locations in the NCD containment berm (MW-1 and MW-2) are shown on Figures 2 and 9. The purpose of sampling the monitoring wells installed within the NCD containment berm was to characterize groundwater from the NCD.

Groundwater characterization in the NCD containment berm as part of the RI consisted of collection and analysis of groundwater samples from MW-1 and MW-2 during dry season and wet season sampling events. Initially, the results for groundwater samples collected during the 2016 dry season sampling event had detection limits for several metals that were greater than the PSLs in samples analyzed using NexION 300D and universal cell technology. The samples with elevated detection limits were collected from groundwater monitoring wells installed adjacent to the Marine Area including MW-1 and MW-2. During the 2017 wet season sampling event and an additional 2018 dry season sampling event, metals analyses included the use of the reductive precipitation method (RPM) to reduce the influence of marine water on the analytical detection limits.

The concentrations of copper were less than the PSL in the dissolved groundwater samples collected from MW-2 during the 2017 wet season and 2018 dry season sampling events using RPM. However, the concentrations of copper were greater than the PSL in the dissolved groundwater samples collected from MW-1 during both the 2017 wet season and 2018 dry season sampling events using RPM.

Investigation Approach

Following review of the existing RI data, Ecology required that additional investigation activities be completed utilizing diffusive gradient in thin-film layer (DGT) sampling techniques to further evaluate dissolved copper concentrations at MW-1.

In response to Ecology's comments, additional investigation activities utilizing DGT sampling techniques will be completed in this area to evaluate dissolved copper concentrations in groundwater at MW-1 and in

the shoreline downgradient of MW-1 where groundwater discharges to surface water during both dry and wet season monitoring events. The DGT sampling methodology specifically allows dissolved copper in solution to diffuse through a polyacrylamide hydrogel membrane which inhibits the diffusion of colloidal forms of suspended metals. Dissolved copper that diffuses through this initial membrane reacts with a secondary binding gel layer. This reaction transforms the dissolved copper into a stable form, thereby allowing it to be eluted under controlled conditions by the testing laboratory. Because penetration of the colloidal forms of copper is limited by the polyacrylamide hydrogel, the resulting sample analysis represents the dissolved copper concentration.

Details for DGT sample deployment, analysis and calculation of dissolved copper concentrations are summarized below.

Deploy DGT Samplers to Characterize Copper Concentrations at MW-1

The following will be completed to characterize dissolved copper concentrations in groundwater in proximity to monitoring well MW-1 installed in the northern portion of the NCD containment berm

Shoreline Monitoring Well Sample Collection

At well location MW-1, a DGT sampler will be lowered on a cord and securely attached to the top of the well casing. Within the well, the DGT sampler will be positioned at a depth of approximately 1 to 2 feet above the base of the screened interval so that the sampler remains submerged throughout the sampling duration of approximately 72 to 168 hours. Upon retrieval, the DGT sampler will be removed from the monitoring well and rinsed with deionized water, sealed in a clean plastic bag, and transported to the testing laboratory in a cooler with ice under chain-of-custody for analysis.

Prior to DGT sample deployment, the monitoring well will be purged using a peristaltic pump and polyethylene tubing. Groundwater will be pumped from each well at a rate not to exceed 0.5 liter per minute to minimize drawdown. The base of the tubing (i.e., intake) will be positioned at the approximate deployment depth of the DGT sampler. The following groundwater parameters will be recorded every 5 minutes on a field log until the water quality parameters vary by less than 10 percent on three consecutive measurements:

- Electrical conductivity (EC);
- Dissolved oxygen (DO);
- pH;
- Total dissolved solids (TDS);
- Oxygen reduction potential (ORP);
- Turbidity;
- Salinity; and
- Temperature.

Once the water quality parameters have stabilized, the DGT sampler will be placed in the well. At the time of DGT sampler deployment, a water quality datalogger (AquaTROLL 600 or similar) will be lowered into the well on a cord and securely attached to the top of the well casing so that the datalogger sensor is positioned

at an elevation just above the DGT sampler. The datalogger will be set to collect temperature readings at continuous 15-minute interval. Average temperature readings will be used to determine the diffusion coefficient that will be used to calculate the dissolved copper concentration (further discussed below).

Porewater Sample Collection

A DGT sampler will be deployed at an accessible location on the waterward face of the NCD containment berm downgradient of MW-1 and at target elevation of approximately -2 feet mean lower low water (MLLW). The target elevation may be adjusted based on field conditions including accessibility and tidal elevations during the period of sample deployment. A DGT sampler will be positioned in the intertidal sediment at depth interval between approximately 4 and 6 cm below the mudline to characterize porewater. The DGT sampler will be deployed during a low tide and secured to a stake that will be used to mark its location and hold the sampler in place. The DGT sampler will be deployed for approximately 72 to 168 hours, after which it will be retrieved at a low tide. Upon retrieval, the DGT sampler will be removed from the sediment and rinsed with deionized water, sealed in a clean plastic bag, and transported to the testing laboratory in a cooler with ice under chain-of-custody for analysis.

Measurement of water quality parameters will be performed during DGT sample deployment using an AquaTROLL 600 (or similar) datalogger deployed in a temporary, shallow piezometer located at the sample station. The datalogger sensor will be positioned at the same approximate elevation as the DGT sampler. The datalogger will be set to collected temperature readings continuously at 15-minute intervals. Average temperature readings will be used to determine the diffusion coefficient that will be used to calculate the dissolved copper concentration (further discussed below).

Surface Water Sample Collection

In addition to groundwater and porewater characterization, DGT samplers will be deployed in surface water to characterize dissolved copper just above the mudline adjacent to the porewater DGT deployment location and at surface water sampling location SW02 to characterize background conditions. At the NCD containment berm deployment location, a DGT sampler will be secured to an adjacent piling positioned approximately 2-3 inches above the mudline elevation. At surface water sampling location SW02, a DGT sampler will be lowered on a cord and securely attached to the top of the mooring dolphin. The base of the cord will be weighted to hold the DGT sampler in place at a depth of approximately 1 to 2 feet above the mudline surface to ensure that the sampler is submerged throughout the sampling duration of deployment period. Upon retrieval, the DGT samplers will be removed from the surface water and rinsed with deionized water, sealed in a clean plastic bag, and transported to the testing laboratory in a cooler with ice under chain-of-custody for analysis.

Measurement of water quality parameters will be performed during DGT sample deployment using an AquaTROLL 600 (or similar) datalogger. The datalogger sensor will be positioned at the same approximate elevation as the DGT sampler. The datalogger will be set to collected temperature readings continuously at 15-minute intervals. Average temperature readings will be used to determine the diffusion coefficient that will be used to calculate the dissolved copper concentration (further discussed below).

Laboratory Analysis and Calculation

DGT samples will be submitted to Analytical Resources Inc. (ARI) and analyzed for copper using an acid extraction of copper from the DGT binding gel followed by analysis of the extract using EPA Method 6020. The accumulated copper mass extracted from the binding gel will be used to calculate the dissolved copper

concentration. This calculation is based on diffusive flux relationships and Fick's first law of diffusion as follows:

$$C_{DGT} = (F*\Delta g) / D = (M*\Delta g) / (D*A*t)$$

Where:

C_{DGT} = dissolved concentration (mg/L)
F = Flux (mg/cm^2*s)
M = mass (µmol)
A = area of sample window (cm^2)
T = time of sampler deployment (sec)
D = Copper Diffusion Coefficient (cm^2/sec)
Δg = thickness of the polyacrylamide hydrogel membrane (cm)

The results from copper analyses on the DGT samplers will be compared to the PSL to determine the need for further investigation at MW-1 as follows:

- If the copper concentrations resulting from the analysis of the DGT samplers deployed on the waterward face of the containment berm are less than the PSL (3.1 µg/L), no additional investigation will be required at MW-1.
- If the copper concentrations resulting from the analysis of the DGT samplers deployed on the waterward face of the containment berm are greater than the PSL, additional investigation activities will be discussed with Ecology to further characterize the concentrations in groundwater from the NCD.

Prior to DGT sample deployment and laboratory analysis, a calibration/verification study is to be performed by the testing laboratory under controlled conditions in order to resolve the uncertainties with using DGT sampling techniques for dissolved copper analysis. A copy of the calibration/verification study will be provided to Ecology for review prior to sample collection and analysis.

DATA QUALITY OBJECTIVES

The specific data quality objectives (DQOs) for sediment sampling and analysis are detailed in the Ecology-approved Upland Area SAP. In accordance with the Upland Area SAP, level III laboratory data packages will be obtained for all soil, groundwater, sediment and DGT samples. Level IV data packages will be included for dioxin/furan and PCB congener analyses. Data packages will be checked for completeness immediately upon receipt from the laboratory to ensure that data and QA/QC information requested are present. In addition, an EPA Stage 2B (EPA 2009) data validation will be completed for the environmental data collected under this addendum and will include review of data for the following QC parameters:

- Holding times and sample preservation
- Laboratory Method blanks
- MS/MSD analyses
- LCS/LCSD analyses
- Surrogate spikes

- Field duplicates
- Lab duplicates/replicates
- Calibrations (Initial and Continuing)
- Internal Standards
- Instrument Tunes

In addition to these QC parameters, other documentation such as chain-of-custody records, sample receipt forms and case narratives will be reviewed to evaluate laboratory QA/QC.

REPORTING

The results of the investigation activities and analysis in the investigation areas will be transmitted to Ecology in a memorandum or memorandums that summarize the investigation activities, present the analytical results, and includes tabulated results compared to the PSLs, figures presenting the sample locations, and appendices that provide field logs, laboratory reports and data validation reports. Data collected under this addendum will be combined with the existing data for the Upland Area to complete the RI data set that will be presented in the Upland RI/FS report. Note that the results of sediment samples collected from the base of the shoreline slope adjacent to the Open Space will be incorporated into the Marine Area RI/FS. Chemical analytical data will be submitted to Ecology in electronic format in accordance with Ecology's Environmental Information Management (EIM) Policy 840 following review and validation.

SCHEDULE

The additional sampling and analysis described above will be performed following Ecology approval of this Work Plan addendum. The additional sampling described in this addendum is anticipated to be performed from early winter 2020 to late fall 2020.

LIMITATIONS

This document has been prepared for the exclusive use of the Port of Everett, their authorized agents and regulatory agencies in their evaluation of the Weyerhaeuser Mill A Former Site in Everett, Washington. No other party may rely on the product of our services unless we agree in advance and in writing to such reliance.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

REFERENCES

GeoEngineers Inc. (GeoEngineers) 2019. Upland Area Additional Investigation Proposed Approach, Weyerhaeuser Mill A Former Site, Everett, Washington, Ecology Agreed Order No. DE 8979.

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GeoEngineers Inc. (GeoEngineers) 2014a. Remedial Investigation and Feasibility Study Work Plan. Weyerhaeuser Former Mill A Site, Everett, Washington. Prepared for the Washington Department of Ecology on behalf of the Port of Everett, Weyerhaeuser Company, and Washington State Department of Natural Resources. October 16, 2014.

GeoEngineers Inc. (GeoEngineers) 2014b. Upland Area Remedial Investigation Sampling and Analysis Plan. Weyerhaeuser Former Mill A Site, Everett, Washington. Prepared for the Washington Department of Ecology on behalf of the Port of Everett, Weyerhaeuser Company, and Washington State Department of Natural Resources. October 16, 2014.

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Attachments:

Table 1. Proposed Soil and Groundwater Investigation Locations, Rationale and Approach for Data Gaps

Figure 1. Vicinity Map

Figure 2. Upland Area Additional Investigation Locations

Figure 3. Additional Investigation Locations, EDP29

Figure 4. Additional Investigation Locations, EDP33

Figure 5. Additional Investigation Locations, EDP35, EDP38 and EDP52

Figure 6. Additional Investigation Locations, EST04

Figure 7. Additional Investigation Locations, EST12

Figure 8. Additional Investigation Locations, Equipment Storage Area/Open Space

Figure 9. Additional Investigation Locations, Nearshore Confined Disposal Facility

Table 1

Proposed Soil and Groundwater Investigation Locations, Rationale and Approach for Data Gaps

Weyerhaeuser Mill A Former

Everett, Washington

Investigation Area	Rationale/ Objective		Soil Investigation Sampling and Analysis		Groundwater Investigation Sampling and Analysis	
			Soil Sample Collection[1]	Laboratory Analyses	Groundwater Sample Collection	Laboratory Analyses
EDP29	Additional investigation to further characterize soil and groundwater to: ■ Evaluate contamination associated with gas pump observed in 1950 and 1957 Sanborn Maps and 1977 Weyerhaeuser Plant diagram. ■ Characterize groundwater to determine if petroleum hydrocarbons are present at concentrations exceeding the PSLs (Tier 1 Investigation). ■ Characterize nature and extent of petroleum hydrocarbon contamination in soil if groundwater exceedances are observed (Tier 2 Contingency Investigation).	Tier 1 Investigation	■ Complete soil boring for monitoring well installation using hollow-stem auger drilling methods. ■ Collect continuous core samples from the boring to characterize soil conditions and for field screening to support soil sample selection for potential analysis. ■ Submit two soil samples from the screened interval to further characterize and evaluate soil concentrations. ▪ If field screening does not indicate the presence of petroleum hydrocarbons in soil in the well screen interval, submit one of the soil samples from 18 to 19 feet bgs for analysis. ■ Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.	■ Diesel- and heavy oil-range petroleum hydrocarbons by NWTPH-Dx with silica gel/acid wash cleanup ■ Possible follow-up to NWTPH-Dx: ▪ EPH if diesel- or heavy oil-range petroleum hydrocarbons exceed 2,000 mg/kg	■ Install new shallow monitoring well at EDP29 location using hollow-stem auger drilling methods. ▪ Set the top of the well screen approximately 5 feet above the observed groundwater level, or within 3 feet of the ground surface, whichever is deeper. ▪ Set the bottom of the well screen at the approximate depth at which diesel- and heavy oil-range petroleum hydrocarbons were previously detected above the PSL (18-19 feet bgs). ■ After stabilization and development of the new well, collect a groundwater sample during the dry and wet seasons.	■ Diesel- and heavy oil-range petroleum hydrocarbons by NWTPH-Dx ▪ Centrifuge sample prior to analysis if turbidity is greater than 10 NTUs in the groundwater sample
		Tier 2 Contingency Investigation	■ The following investigation activities may be performed following Tier I if diesel- or heavy oil-range petroleum hydrocarbons are greater than the PSLs in groundwater samples collected from the monitoring well installed at EDP29: ■ Complete additional soil borings 25 feet SE, SW, NE and NW of the new monitoring well location using direct push drilling methods. ▪ Advance additional soil borings to a depth of 20 feet bgs. ▪ Initially advance one boring SE (upgradient) of EDP29 at an approximate horizontal distance of 25 feet from the monitoring well location to investigate the potential source. ▪ Advance additional boring(s) SE of EDP29 if diesel- or heavy oil-range petroleum hydrocarbon contamination is readily apparent in field screening of soil in the SE (upgradient) boring indicating a potential source to groundwater. ▪ Identify placement of remaining borings based on findings from the initial SE (upgradient) boring location as follows: o If diesel- or heavy oil-range petroleum hydrocarbon contamination is not readily apparent in soil in the initial boring located at approximately 25 feet SE (upgradient) of EDP29, place the remaining borings NW, NE and SW at an approximate distance of 25 feet from the new well location. o Utilize field screening of soil to support selection of soil samples for analysis and to identify whether an additional step-out boring(s) is needed in the NW, NE or SW directions to identify and delineate the potential source to groundwater. ■ Collect continuous core samples from each boring to characterize soil conditions and for field screening to support soil sample selection for potential analysis. ■ Submit two soil samples from the well screen interval based on field screening results and consideration of the previous sample results for analysis to identify and delineate the potential source to groundwater. ■ Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.	■ Diesel- and heavy oil-range petroleum hydrocarbons by NWTPH-Dx with silica gel/acid wash cleanup ■ Possible follow-up to NWTPH-Dx: ▪ EPH if diesel- or heavy oil-range petroleum hydrocarbons exceed 2,000 mg/kg	■ Not Applicable	■ Not Applicable

Investigation Area	Rationale/ Objective		Soil Investigation Sampling and Analysis		Groundwater Investigation Sampling and Analysis	
			Soil Sample Collection[1]	Laboratory Analyses	Groundwater Sample Collection	Laboratory Analyses
EDP33	Additional investigation to further characterize soil and groundwater to: ■ Evaluate contamination associated with dry kiln facilities observed in 1950 and 1957 Sanborn Maps and 1977 Weyerhaeuser Plant diagram. ■ Characterize groundwater to determine if petroleum hydrocarbons and/or volatile organics are present at concentrations exceeding the PSLs (Tier 1 Investigation). ■ Characterize nature and extent of petroleum hydrocarbon and volatile organic contamination in soil if groundwater exceedances are observed (Tier 2 Contingency Investigation).	Tier 1 Investigation	■ Complete soil boring for monitoring well installation using hollow-stem auger drilling methods. ■ Collect continuous core samples from the boring to characterize soil conditions and for field screening to support soil sample selection for potential analysis. ■ Submit two soil samples from the screened interval to further characterize and evaluate soil concentrations. ▪ If field screening does not indicate the presence of petroleum hydrocarbons in soil in the well screen interval, submit one of the soil samples from 16-17 feet bgs. ■ Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.	■ Gasoline-range petroleum hydrocarbons by NWTPH-Gx ■ Possible follow-up to NWTPH-G: ▪ VPH if gasoline-range petroleum hydrocarbons exceed 200 mg/kg ■ BTEX by EPA 8021	■ Install new shallow monitoring well at EDP33 location using hollow-stem auger drilling methods. ▪ Set the top of the well screen approximately 5 feet above the observed groundwater level, or within 3 feet of the ground surface, whichever is deeper. ▪ Set the bottom of the well screen at the approximate depth at which gasoline-range petroleum hydrocarbons and VOCs were previously detected above the PSL (16-17 feet bgs). ■ After stabilization and development of the new well, collect a groundwater sample during the dry and wet seasons.	■ Gasoline-Range TPH by NWTPH-Gx ■ BETX by EPA 8021
		Tier 2 Contingency Investigation	■ The following investigation activities may be performed following Tier I if gasoline-range petroleum hydrocarbons and/or BTEX are greater than the PSLs in groundwater samples collected from the monitoring well installed at EDP33: ■ Complete additional soil borings 25 feet SE, SW, NE and NW of the new monitoring well location using direct push drilling methods. ▪ Advance additional soil borings to a depth of 20 feet bgs. ▪ Initially advance one boring SE (upgradient) of EDP 33 at an approximate horizontal distance of 25 feet from the monitoring well location to investigate the potential source. ▪ Advance additional boring(s) SE of EDP33 if gasoline-range petroleum hydrocarbon contamination is readily apparent in field screening of soil in the SE (upgradient) boring indicating a potential source to groundwater. ▪ Identify placement of remaining borings based on findings from the initial SE (upgradient) boring location as follows: o If gasoline-range petroleum hydrocarbon contamination is not readily apparent in soil in the initial boring located 25 feet SE (upgradient), place remaining borings NW, NE and SW at an approximate horizontal distance of 25 feet from the well location. o Utilize field screening of soil to support selection of soil samples for analysis and to identify whether an additional step-out boring(s) is needed in the NW, NE or SW directions to identify and delineate the source to groundwater. ■ Collect continuous core samples from each boring to characterize soil conditions and for field screening to support soil sample selection for potential analysis. ■ Submit two soil samples from each boring for analysis based on field screening results and consideration of the previous sample results for analysis to identify and delineate the potential source to groundwater. ■ Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.	■ Gasoline-range petroleum hydrocarbons by NWTPH-Gx ■ Possible follow-up to NWTPH-G: ▪ VPH if gasoline-range petroleum hydrocarbons exceed 200 mg/kg ■ BTEX by EPA 8021	■ Not Applicable	■ Not Applicable

Investigation Area	Rationale/ Objective		Soil Investigation Sampling and Analysis		Groundwater Investigation Sampling and Analysis	
			Soil Sample Collection[1]	Laboratory Analyses	Groundwater Sample Collection	Laboratory Analyses
EDP35	Follow-up investigation to further characterize soil and groundwater to: ■ Evaluate contamination associated with oil house facilities observed in 1950 and 1957 Sanborn Maps and 1977 Weyerhaeuser Plant diagram. ■ Characterize groundwater to determine if PCBs are present at concentrations exceeding the PSLs (Tier 1 Investigation). ■ Characterize nature and extent of PCBs in soil if groundwater exceedances are observed (Tier 2 Contingency Investigation).	Tier 1 Investigation	■ Complete soil boring for monitoring well installation using hollow-stem auger drilling methods. ■ Collect continuous core samples from each soil boring to characterize soil conditions and perform field screening including observation for the presence of contamination or debris potentially containing PCBs to support selection of samples for analysis ▪ If field screening does not indicate the presence of contamination or debris potentially containing PCBs in soil in the well screen interval, collect one of the soil samples from 14-15 feet bgs which was the depth of the highest PCB concentration at the Site. ■ Submit two soil samples from the screened interval to further characterize and evaluate soil concentrations. ■ Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.	■ PCB Aroclors by EPA 8082 ■ Follow-up to EPA 8082: ▪ PCB Congeners (209 PCB Congeners) by EPA 1668C for sample with the highest PCB Aroclors concentration	■ Install new shallow monitoring well at EDP35 location by hollow-stem auger drilling methods. ▪ Set the top of the well screen approximately 5 feet above the observed groundwater level, or within 3 feet of the ground surface, whichever is deeper. ▪ Set the base of the well screen at the approximate depth at which PCBs were previously detected at the highest PCB concentration (14-15 feet bgs). ■ After stabilization and development of the new well, collect a groundwater sample during the dry and wet seasons.	■ PCB Aroclors by EPA 8082 ▪ Centrifuge sample prior to analysis if turbidity is greater than 10 NTUs in the groundwater sample ■ PCB Congeners (209 PCB Congeners) by EPA 1668C ▪ Centrifuge sample prior to analysis if turbidity is greater than 10 NTUs in the groundwater sample
		Tier 2 Contingency Investigation	■ The following investigation activities may be performed following Tier I if total PCBs are greater than the PSL in groundwater samples collected from the well installed at EDP35: ■ Complete additional soil borings 25 feet SE, SW, NE and NW of the new monitoring well location using direct push drilling methods. ▪ Advance additional soil borings to a depth of 15 feet bgs. ▪ Initially advance one boring SE (upgradient) of EDP35 at an approximate horizontal distance of 25 feet from the monitoring well location to investigate the potential source. ▪ Utilize field screening of soil for the presence of contamination or debris potentially containing PCBs to support selection of soil samples for analysis. ▪ Advance additional boring(s) SE of EDP35 if the presence of contamination or debris potentially containing PCBs is readily apparent in field screening of soil in the SE (upgradient) boring indicating a potential source to groundwater. ▪ Identify placement of remaining borings based on findings from this initial SE (upgradient) boring location as follows: o If the presence of contamination or debris potentially containing PCBs is not readily apparent in soil in the initial boring located 25 feet SE (upgradient), place remaining borings NW, NE and SW at an approximate horizontal distance of 25 feet from the well location. o Utilize field screening of soil and the previous results for the sample collected from 14-15 feet bgs which were the highest PCB concentrations at the site to support selection of soil samples for analysis and to identify whether an additional step-out boring(s) is needed in the NW, NE or SW directions to identify and delineate the source to groundwater. ■ Collect continuous core samples from each soil boring to characterize soil conditions and perform field screening including observation for the presence of contamination or debris potentially containing PCBs to support selection of samples for analysis. ■ Submit two soil samples from each boring for analysis based on field screening results and consideration of the previous sample results for analysis to identify and delineate the potential source to groundwater. ▪ Initially submit samples where field screening evidence of contamination is greatest. In the absence of field screening evidence, initially submit one of the samples from 14-15 feet bgs in which the highest PCB concentrations were detected. ■ Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.	■ PCB Aroclors by EPA 8082 ■ Follow-up to EPA 8082: ▪ PCB Congeners (209 PCB Congeners) by EPA 1668C for sample with the highest PCB Aroclors concentration	■ Not Applicable	■ Not Applicable

Investigation Area	Rationale/ Objective		Soil Investigation Sampling and Analysis		Groundwater Investigation Sampling and Analysis	
			Soil Sample Collection[1]	Laboratory Analyses	Groundwater Sample Collection	Laboratory Analyses
EDP38/EDP52	Additional investigation to further characterize soil to: ■ Evaluate contamination associated with boiler houses and hog fuel bin observed in 1950 and 1957 Sanborn Maps and 1977 Weyerhaeuser Plant diagram. ■ Characterize nature and extent of dioxin and furan contamination identified in soil at sampling locations EDP38 and EDP52.	Additional Investigation	■ Complete additional soil borings 50 feet SE of EDP38 and 75 feet SW of EDP52 using direct push drilling methods. ▪ Advance additional soil borings to a depth of 10 feet bgs at EDP38 and 15 feet bgs at EDP52. ▪ Collect continuous core samples from each boring to characterize soil conditions and for field screening to support soil sample selection for potential analysis. o If burnt material/ash contamination is not observed in the soil cores, collect a sample for analysis from a 1-foot interval between 8-10 feet bgs, the depth of the highest dioxin/furan concentrations in EDP38 and EDP52. o If burnt material/ash is observed in the soil core(s), collect a sample of the burnt material/ash for analysis and perform additional borings. o If burnt material/ash is observed in the initial soil boring located 75 feet SW of EDP52, advance an additional step-out boring 150 feet SW of EDP52. o If burnt material/ash is observed in the initial soil boring located 50 feet SE of EDP38, advance an additional step-out boring 75 feet SW of the initial step out boring. A step-out boring is not proposed in the SE direction because the initial boring will be located at the Port property boundary. o Observe soil cores from the additional step-out locations for the presence of burnt material/ash and collect samples from a one-foot interval between 8-10 feet bgs for analysis if burnt material/ash is not observed or collect a sample of the burnt material/ash if present. ■ Submit one soil sample from each initial boring (and step-out borings if burnt material/ash is observed in the initial soil borings) of the burnt material/ash for analysis. ▪ Submit one soil sample for analysis from each initial boring (and step-out borings if burnt material/ash is observed in the initial soil borings) of the burnt material/ash, if observed. ▪ Submit one sample for analysis from each completed boring from a 1-foot interval between 8-10 feet bgs if burnt material/ash is not observed. ■ Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.	■ Dioxins and Furans by EPA 1613	■ Not Applicable	■ Not Applicable

Investigation Area	Rationale/ Objective		Soil Investigation Sampling and Analysis		Groundwater Investigation Sampling and Analysis	
			Soil Sample Collection[1]	Laboratory Analyses	Groundwater Sample Collection	Laboratory Analyses
EST04	Additional investigation to further characterize soil and groundwater to: ■ Evaluate contamination associated with historical chemical storage and processing facilities, petroleum storage, and auto shop (1950 and 1957 Sanborn Maps and 1977 Weyerhaeuser Plan diagram) and historic ship building (1902 Sanborn Map). ■ Characterize nature and extent of pH, metal, petroleum hydrocarbon and PCB contamination identified in soil at sampling location EST04 (Tier 1 Investigation). ■ Characterize nature and extent of pH, metal, petroleum hydrocarbon and PCB contamination in groundwater in the vicinity of EST04 (Tier 1 Investigation). ■ Complete additional soil and/or groundwater investigation activities based on the results of the Tier 1 Investigations (Tier 2 Contingency Investigation).	Tier 1 Investigation	■ Initially, complete additional borings north, east, south and west of EST04 using direct push drilling methods. ▪ Advance additional soil borings to a depth of 20 feet bgs. ▪ Initially advance soil borings to the east and south (upgradient) at approximate 25-foot increments from EST04 to investigate and characterize soil pH to a distance of up to 100 feet upgradient of EST04. o Advance addition borings beyond 100 feet if field screening evidence of contamination is observed indicating a potential upgradient source to groundwater. ▪ Advance borings west and north (downgradient) from EST04 at approximate increments of 25 feet horizontal to investigate and characterize soil pH utilizing the same procedures applied to upgradient borings. ■ Collect continuous core samples from each boring to characterize soil conditions and for field screening to support soil sample selection for potential analysis. ■ Initially, submit two soil samples from up to two borings located in each direction from monitoring well EST04 based on field screening for analysis. ■ Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.	■ pH by EPA 9040 ■ Metals by EPA 6000/7000 ■ Gasoline-range petroleum hydrocarbons by NWTPH-Gx ■ Possible follow-up to NWTPH-G: ▪ VPH if gasoline-range petroleum hydrocarbons exceed 200 mg/kg ■ Diesel- and heavy oil-range petroleum hydrocarbons by NWTPH-Dx with silica gel/acid wash cleanup ■ Possible follow-up to NWTPH-Dx: ▪ EPH if diesel- or heavy oil-range petroleum hydrocarbons exceed 2,000 mg/kg ■ PCB Aroclors by EPA 8082 ■ Follow-up to EPA 8082: ▪ PCB Congeners (209 PCB Congeners) by EPA 1668C for sample with the highest PCB Aroclors concentration	■ Complete soil borings for monitoring well installation using hollow-stem auger drilling methods after initial soil sample collection and analysis. ▪ Collect continuous core samples from the borings completed for monitoring well installation to characterize soil conditions and for field screening to support soil sample selection for potential future analysis. ▪ Archive soil samples for potential analyses. ■ Install a minimum of one shallow monitoring well based on soil investigation results. ▪ Set the top of the well screen approximately 5 feet above the observed groundwater level, or within 3 feet of the ground surface, whichever is deeper. ▪ Set the base of the well screen at the approximate depth at which contaminants exceeded the PSLs (18-19 feet bgs). ■ After stabilization and development of the new well, collect a groundwater sample during the dry and wet seasons. ■ Additionally, collect groundwater samples from EST04 during the dry and wet seasons.	■ pH by EPA 9040 ■ Metals by EPA 6000/7000 ■ Gasoline-range petroleum hydrocarbons by NWTPH-Gx ■ Diesel- and heavy oil-range petroleum hydrocarbons by NWTPH-Dx ▪ Centrifuge sample prior to analysis if turbidity is greater than 10 NTUs in the groundwater sample ■ PCB Aroclors by EPA 8082 ▪ Centrifuge sample prior to analysis if turbidity is greater than 10 NTUs in the groundwater sample ■ PCB Congeners (209 PCB Congeners) by EPA 1668C ▪ Centrifuge sample prior to analysis if turbidity is greater than 10 NTUs in the groundwater sample
		Tier 2 Contingency Investigation	■ The following investigation activities may be performed following Tier I to further evaluate pH in soil and groundwater and the effect of pH on the presence of contaminants in groundwater at concentrations greater than the PSLs as well as the source to contaminants in groundwater at concentrations greater than the PSLs: ■ Advance additional soil borings at distances greater than 100 feet from EST04, perform soil field screening and sampling and laboratory analyses of soil samples to characterize soil using the procedures described for the Tier 1 Investigation.		■ The following investigation activities may be performed following Tier I to further evaluate pH in soil and groundwater and the effect of pH on the presence of contaminants in groundwater at concentrations greater than the PSLs as well as the source to contaminants in groundwater at concentrations greater than the PSLs: ■ Install additional monitoring wells, perform groundwater sampling and laboratory analyses to characterize groundwater using the procedures described for the Tier 1 Investigation.	

Investigation Area	Rationale/ Objective		Soil Investigation Sampling and Analysis		Groundwater Investigation Sampling and Analysis	
			Soil Sample Collection[1]	Laboratory Analyses	Groundwater Sample Collection	Laboratory Analyses
EST12	Additional investigation to further characterize soil to: ■ Evaluate contamination associated with 650,000-gallon above ground fuel oil storage tank identified on the 1977 Weyerhaeuser Plant diagram. ■ Characterize nature and extent of petroleum hydrocarbon contamination in soil in the vicinity of EST12 (Tier 1 Investigation). ■ Characterize groundwater if soil investigation activities do not identify a potential contaminant source (Tier 2 Contingency Investigation).	Tier 1 Investigation	■ Complete additional soil borings upgradient of EST12 (former fuel tank area) using sonic drilling methods. ▪ Advance soil borings at locations upgradient of EST12 including: o One boring will be installed west southwest of EST12 at a horizontal distance of 75 feet. o One boring will be installed directly SE of EST12 at a horizontal distance of 50 feet. o One boring will be installed 50 feet NE of the boring installed 50 feet SE of EST12. o One boring will be installed directly SE of EST12 at a horizontal distance of 100 feet. o One boring will be installed 50 feet SW and one boring will be installed 50 feet NE of the boring installed 100 feet SE of EST12. ▪ Advance each additional soil boring to a depth of 25 feet bgs. ■ Collect continuous core samples from each boring to characterize soil conditions and for field screening to support soil sample selection for potential analysis. ■ Submit two soil samples from each boring for analysis to evaluate and support delineation of the source to groundwater contamination. ■ Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.	■ Gasoline-range petroleum hydrocarbons by NWTPH-Gx ■ Possible follow-up to NWTPH-G: ▪ VPH if gasoline-range petroleum hydrocarbons exceed 200 mg/kg ■ Diesel- and heavy oil-range petroleum hydrocarbons by NWTPH-Dx with silica gel/acid wash cleanup ■ Possible follow-up to NWTPH-Dx: ▪ EPH if diesel- or heavy oil-range petroleum hydrocarbons exceed 2,000 mg/kg	■ Not Applicable	■ Not Applicable
		Tier 2 Contingency Investigation	■ The following investigation steps may be performed following Tier I to evaluate petroleum hydrocarbons at EST12 if petroleum hydrocarbons are detected in soil at concentrations greater than the PSL: ■ Complete soil boring for monitoring well installation using hollow-stem auger drilling methods. ■ Collect continuous core samples from the boring to characterize soil conditions and for field screening. ■ Submit two samples from the screened interval to further characterize and evaluate soil concentrations. ■ Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.	■ Gasoline-range petroleum hydrocarbons by NWTPH-Gx ■ Possible follow-up to NWTPH-G: ▪ VPH if gasoline-range petroleum hydrocarbons exceed 200 mg/kg ■ Diesel- and heavy oil-range petroleum hydrocarbons by NWTPH-Dx with silica gel/acid wash cleanup ■ Possible follow-up to NWTPH-Dx: ▪ EPH if diesel- or heavy oil-range petroleum hydrocarbons exceed 2,000 mg/kg	■ The following investigation steps may be performed following Tier I to evaluate petroleum hydrocarbons at EST12 if petroleum hydrocarbons are detected in soil at concentrations greater than the PSL: ■ Install a shallow monitoring well at a location between EST12 and EST13 based on the soil investigation results using hollow-stem auger drilling methods. ▪ Set the top of the well screen approximately 5 feet above the observed groundwater level, or within 3 feet of the ground surface, whichever is deeper. ▪ Set the base of the well screen at a depth of 15 feet bgs (similar to EST12). ■ After stabilization and development of the new well, collect a groundwater sample during the dry and wet seasons.	■ Gasoline-range petroleum hydrocarbons by NWTPH-Gx ■ Diesel- and heavy oil-range petroleum hydrocarbons by NWTPH-Dx ▪ Centrifuge sample prior to analysis if turbidity is greater than 10 NTUs in the groundwater sample

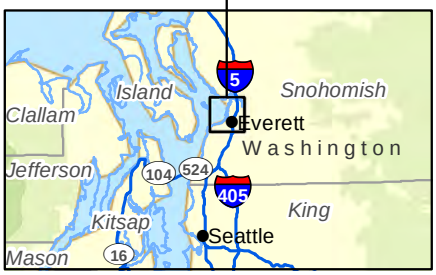
Investigation Area	Rationale/ Objective		Soil Investigation Sampling and Analysis		Groundwater Investigation Sampling and Analysis	
			Soil Sample Collection[1]	Laboratory Analyses	Groundwater Sample Collection	Laboratory Analyses
Equipment Storage Area	Additional investigation to further characterize soil to: ■ Characterize nature and extent of metals contamination in soil identified in Equipment Storage Area.	Additional Equipment Storage Area Investigation	■ Complete soil borings using direct push drilling methods including the following: ▪ One row of four (4) borings along the NW portion of the Equipment Storage Area. ▪ One row of five (5) borings along the SE portion of the Equipment Storage Area. ▪ One row of four (4) borings along the central portion of the Equipment Storage Area. ▪ Advance additional soil borings to at least three feet into native soil (approximately 25 feet). ■ Collect continuous core samples from each boring to characterize soil conditions and for field screening to support soil sample selection for potential analysis. ■ Submit two shallow soil samples from each boring to further evaluate soil metals concentrations. ▪ If field screening evidence of contamination or debris potentially containing metals is not observed in the soil cores, initially analyze a 1-foot interval sample from 2 feet bgs and 6 feet bgs (the depth of the highest observed metals concentrations). ▪ If field screening evidence of contamination or debris potentially containing metals is observed in the soil cores, initially analyze the shallowest sample representative of this material and a sample from 6 feet bgs. ■ Archive remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.	■ Metals by EPA 6000/7000 series	■ Not Applicable	■ Not Applicable
Open Space Area	Follow-up investigation to further characterize soil/sediment to: ■ Characterize the nature and extent of metals and dioxin and furan contamination in soil identified in the Open Space Area. ■ Characterize metals and dioxin and furan contamination in sediment at the base of the shoreline slope.	Additional Upland Area Investigation	■ Complete up to nine (9) soil borings using direct push drilling methods. ▪ Advance additional soil borings to at least three feet into native soil (approximately 20 feet). ■ Collect continuous core samples from each boring to characterize soil conditions and for field screening including observations for the presence of debris potentially containing metals and/or dioxins and furans to support selection of samples for analysis. ■ Submit two soil samples from each boring to further characterize soil conditions. ▪ Soil samples for potential chemical analysis will target surface soil (0-1-foot bgs), fill soil below the surface and native soil underlying the fill material. o If field screening evidence of contamination or debris potentially containing metals and/or dioxins and furans is not observed in the soil cores, initially analyze a sample at the surface (0 1-foot bgs) sample and a sample from 2-3 feet bgs. o If field screening evidence of contamination or debris potentially containing metals and/or dioxins and furans is observed in the soil cores, initially analyze a sample at the surface (0-1-foot bgs) sample and a sample representative of the potentially contaminated material. ■ Archive/hold remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.	■ Metals by EPA 6000/7000 ■ Dioxins/Furans by EPA 1613	■ Not Applicable	■ Not Applicable
Open Space Area	Follow-up investigation to further characterize soil/sediment to: ■ Characterize the nature and extent of metals and dioxin and furan contamination in soil identified in the Open Space Area. ■ Characterize metals and dioxin and furan contamination in sediment at the base of the shoreline slope.	Additional Marine Area Investigation	■ Complete four (4) borings using direct push drilling methods. ▪ Advance additional sediment borings to at least three feet into native sediment (approximately 10 feet). ■ Collect continuous core samples from each boring to characterize sediment conditions and for field screening to support sample selection for potential analysis. ■ Submit two sediment samples from each boring to further characterize sediment conditions. ▪ Sediment samples for potential chemical analysis will target sediment from the surface to a depth of 40 centimeters (cm) (0-40 cm), fill material below a depth of 40 cm and native sediment underlying the fill material. o If field screening evidence of contamination or debris potentially containing metals and/or dioxins and furans is not observed in the sediment cores, initially analyze the 0-40 cm sample and the 2-3-foot sample interval using EPA Methods 6010/6020 and 7470/7471, and 1613. o If field screening evidence of contamination or debris potentially containing metals and/or dioxins and furans is observed in the sediment cores, initially analyze the 0-40 cm sample and a sample representative of the potentially contaminated material using EPA Methods 6010/6020 and 7470/7471, and 1613. ■ Archive/hold remaining samples for potential follow-up analyses based on the results of initial soil sample analyses.	■ Metals by EPA 6000/7000 ■ Dioxins/Furans by EPA 1613	■ Not Applicable	■ Not Applicable

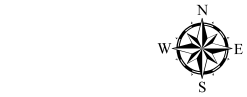
Investigation Area	Rationale/ Objective		Soil Investigation Sampling and Analysis		Groundwater Investigation Sampling and Analysis	
			Soil Sample Collection[1]	Laboratory Analyses	Groundwater Sample Collection	Laboratory Analyses
Nearshore Confined Disposal (NCD) Facility	Additional investigation to further characterize groundwater: ■ Downgradient of the NCD and MW-1 for potential copper contamination discharging to marine water utilizing diffusive gradient in thin-film layer (DGT) samplers.	Additional NCD Investigation	■ Not Applicable	■ Not Applicable	■ Deploy DGT samplers (and dataloggers to measure temperature) simultaneously in the following four (4) locations: ▪ In surface sediment (approximately 4-6 cm bgs) immediately waterward of MW-1. ▪ Just above the waterward face of the NCD containment berm in surface water. ▪ In monitoring well MW-1. ▪ At the surface water sampling location SW02 on South Terminal Wharf (background location). ■ Deploy the DGT samplers at each sample location during both dry and wet seasons.	■ Copper by EPA Method 6020 using acid extraction of copper from the DGT resin gel

Notes:

[1] Field screening of soil samples will include water sheet testing, and headspace vapor, pH and salinity measurements in accordance with the Ecology-approved Upland Area Sampling and Analysis Plan (GeoEngineers 2014b).

bgs = below ground surface
NWTPH = Northwest Total Petroleum Hydrocarbons
PCBs = Polychlorinated Biphenyls
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
EPA = Environmental Protection Agency
PSL = preliminary screening level
EPH = Extractable Petroleum Hydrocarbons
VPH = Volatile Petroleum Hydrocarbons
cm = centimeter
DGT = diffusive gradient in thin-film layer
NCD = Nearshore Confined Disposal Facility
NTU = Nephelometric Turbidity Unit
SW = southwest
SE = southeast
NW = northwest
NE = northeast





Notes:
1. The locations of all features shown are approximate.
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3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps

Projection: NAD 1983 UTM Zone 10N

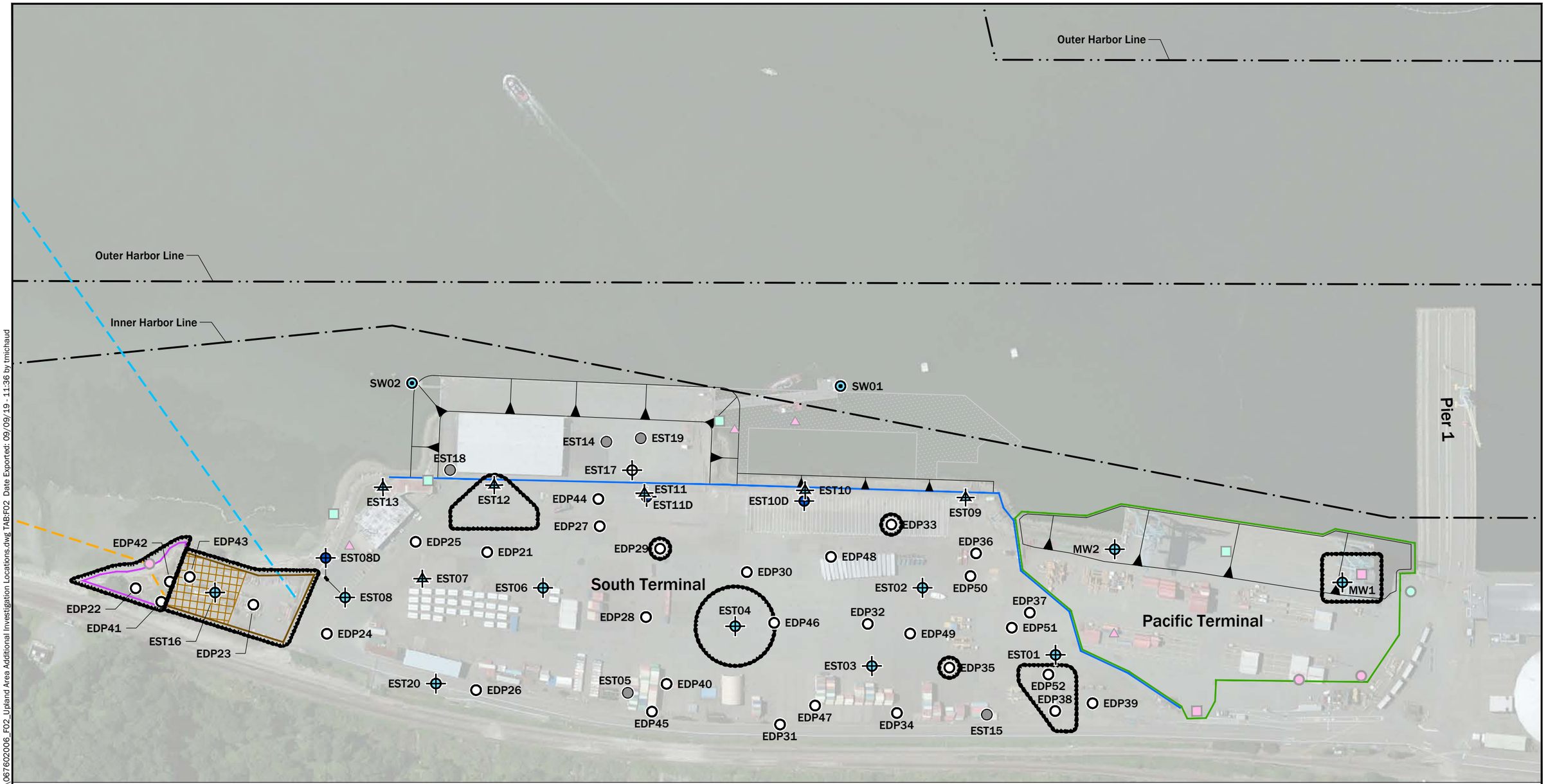
Vicinity Map

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure 1

Path: \\sea\projects\0\0676020\GIS\DNR_Comment_Figures\067602001_DNR_VicinityMap.mxd Map Revised: 13 December 2012 amanza



250 0 250
Feet

Notes:
1. Petroleum Hydrocarbons Include Gasoline-, Diesel-, and Heavy Oil-Range Petroleum Hydrocarbons.
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Data Source: Base aerial from Bing Maps, 2011.
Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Legend

Remedial Investigation (RI) Location
- Shallow Soil Boring/Monitoring Well
- Deep Soil Boring/Monitoring Well
- Piezometer
- Surface Water Sample Location
- Soil Boring
- Decommissioned Monitoring Well

Previous Soil/Groundwater Investigation Location
- Shallow Soil Boring/Monitoring Well

- Investigation Area
- Construction Berm Fill
- Historical Pier
- Nearshore Confined Disposal (NCD) Facility
- Bulkhead
- Open Space
- Equipment Storage Area (Bone Yard)
- Gravel Paved Working Surface

- Historical Industrial Outfall
- Former Combined Sewer Outfall (CSO)
- Former Stormwater Outfall
- Current CSO
- Current Stormwater Outfall
- Current Kimberly-Clark/City of Everett/City of Marysville Outfall 100 (Approximate)
- Current Kimberly-Clark/Weyerhaeuser Outfall SW001 (Approximate)

Upland Area Additional Investigation Locations

Weyerhaeuser Mill A Former
Everett, Washington

GeoEngineers

Figure 2

P:\0\0676020\CAD\06\Additional Investigation Area\0676020006_F02_Upland Area Additional Investigation Locations.dwg TAB:F02 Date Exported: 09/09/19 - 11:36 by tmichaud

P:\0\0676020\CAD\06\Additional Investigation Area\067602006_F03_EDP29.dwg TAB:F03 Date Exported: 06/19/19 - 8:50 by mwoods

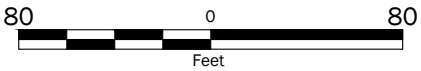
Legend

- Proposed Additional Monitoring Well Investigation Location
- Shallow Soil Boring/Monitoring Well
- Deep Soil Boring/Monitoring Well
- Piezometer
- Surface Water Sample Location
- Soil Boring
- Shallow Soil Boring/Monitoring Well
- Bulkhead

Notes:

1. Petroleum Hydrocarbons Include Gasoline-, Diesel-, and Heavy Oil-Range Petroleum Hydrocarbons.
2. The locations of all features shown are approximate.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base aerial from Bing Maps, 2011.
Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet



Additional Investigation Location
EDP29

Weyerhaeuser Mill A Former
Everett, Washington

GeoEngineers

Figure 3

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Legend

- Proposed Additional Monitoring Well Investigation Location
- Shallow Soil Boring/Monitoring Well
- Deep Soil Boring/Monitoring Well
- Piezometer
- Surface Water Sample Location
- Soil Boring
- Shallow Soil Boring/Monitoring Well
- Bulkhead

Notes:
1. Petroleum Hydrocarbons Include Gasoline-, Diesel-, and Heavy Oil-Range Petroleum Hydrocarbons.
2. The locations of all features shown are approximate.
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Data Source: Base aerial from Bing Maps, 2011.
Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

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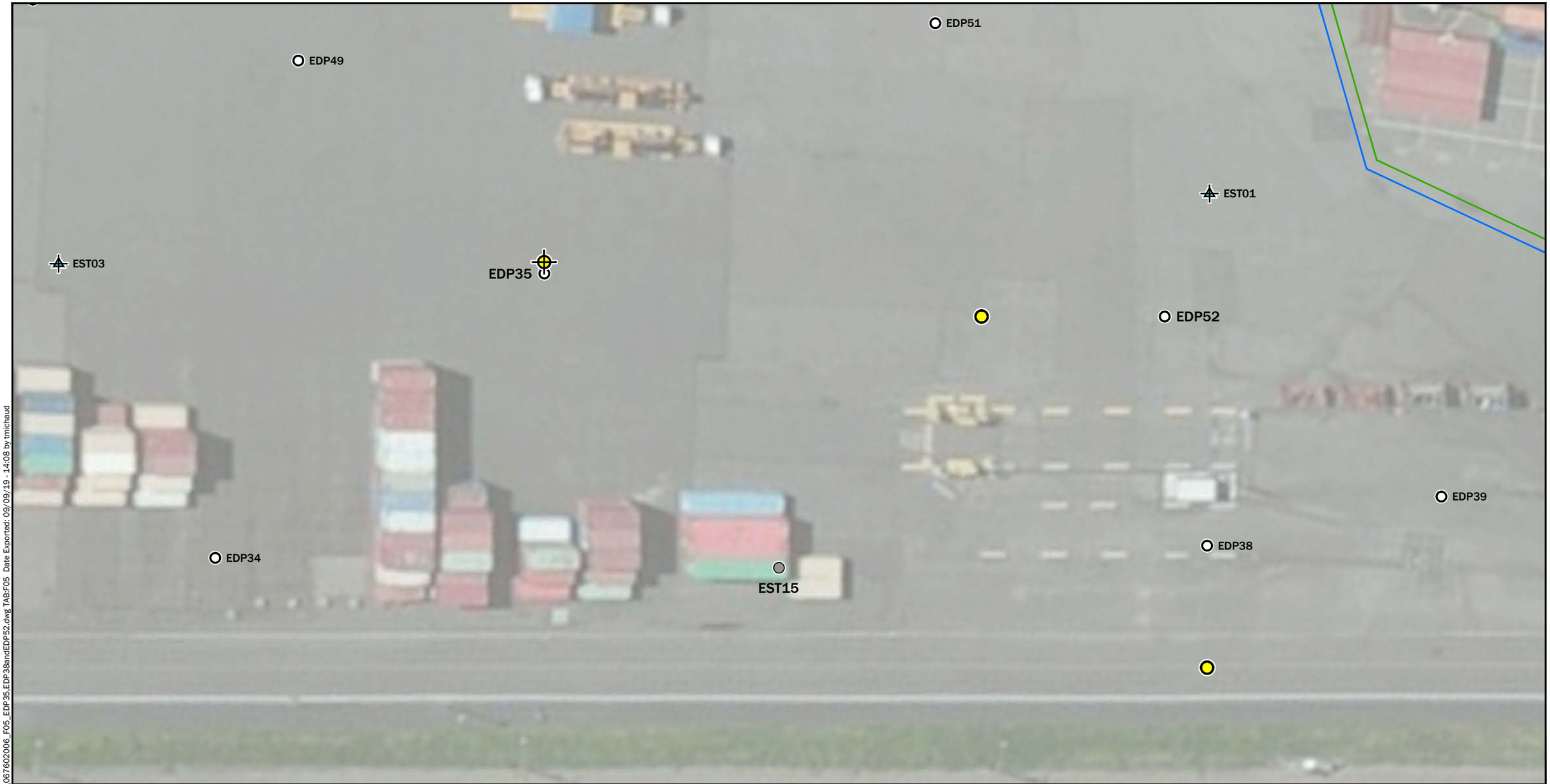
Feet

Additional Investigation Location
EDP33

Weyerhaeuser Mill A Former
Everett, Washington

GeoEngineers

Figure 4



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Legend

- Proposed Additional Monitoring Well Investigation Location
- Proposed Additional Soil Boring Investigation Location
- Shallow Soil Boring/Monitoring Well
- Soil Boring
- Decommissioned Monitoring Well
- Nearshore Confined Disposal (NCD) Facility
- Bulkhead

Notes:

1. Petroleum Hydrocarbons Include Gasoline-, Diesel-, and Heavy Oil-Range Petroleum Hydrocarbons.
2. The locations of all features shown are approximate.
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Data Source: Base aerial from Bing Maps, 2011.

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

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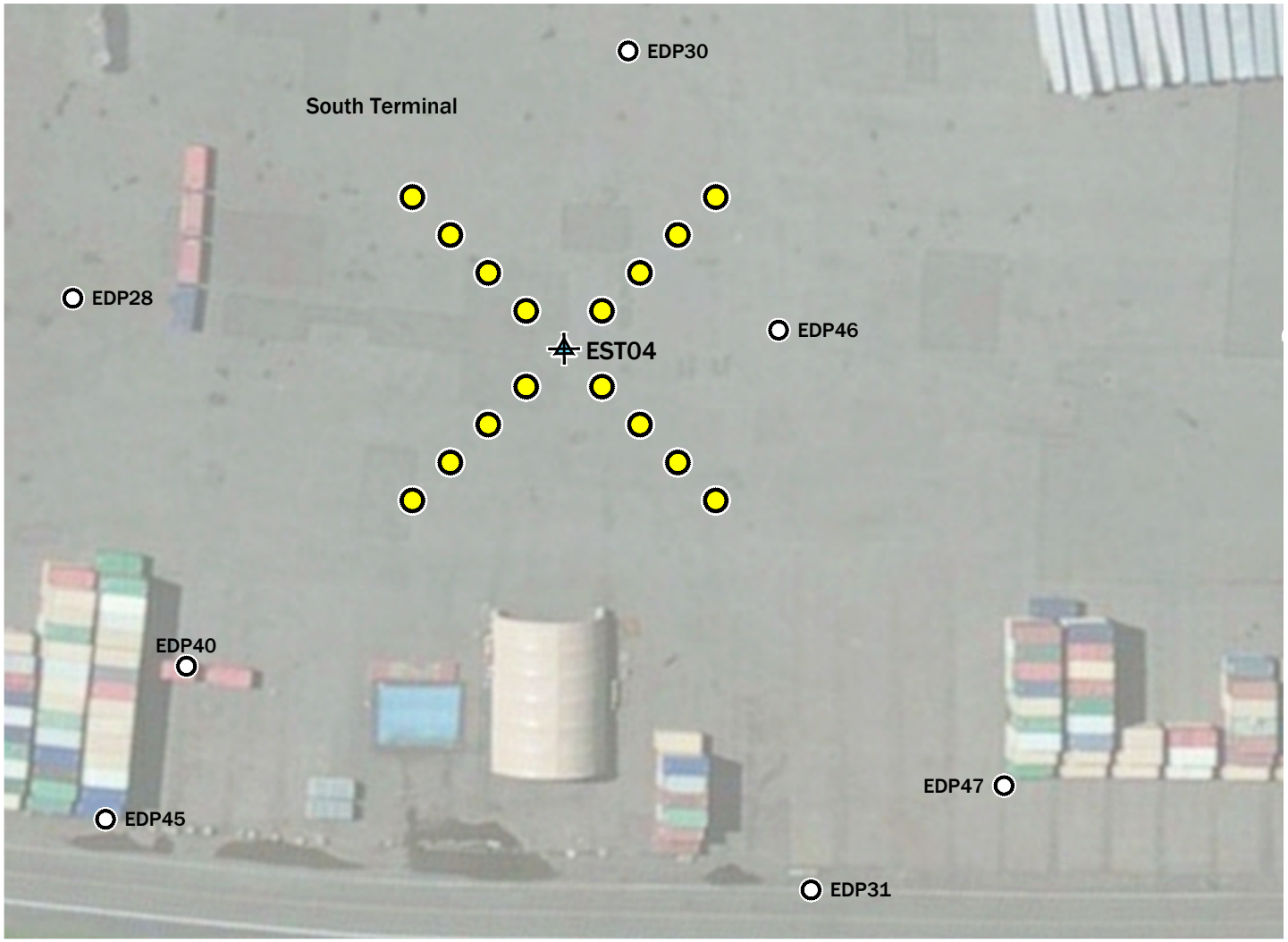
Feet

Additional Investigation Locations EDP35, EDP38 and EDP52

Weyerhaeuser Mill A Former
Everett, Washington

GeoEngineers

Figure 5



Legend

- Proposed Additional Soil Boring Investigation Location
- Shallow Soil Boring/Monitoring Well
- Soil Boring

Notes:

1. Petroleum Hydrocarbons Include Gasoline-, Diesel-, and Heavy Oil-Range Petroleum Hydrocarbons.
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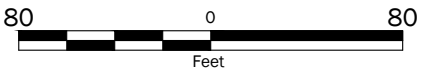
Data Source: Base aerial from Bing Maps, 2011.
Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet



Additional Investigation Location
EST04

Weyerhaeuser Mill A Former
Everett, Washington

GeoEngineers

Figure 6

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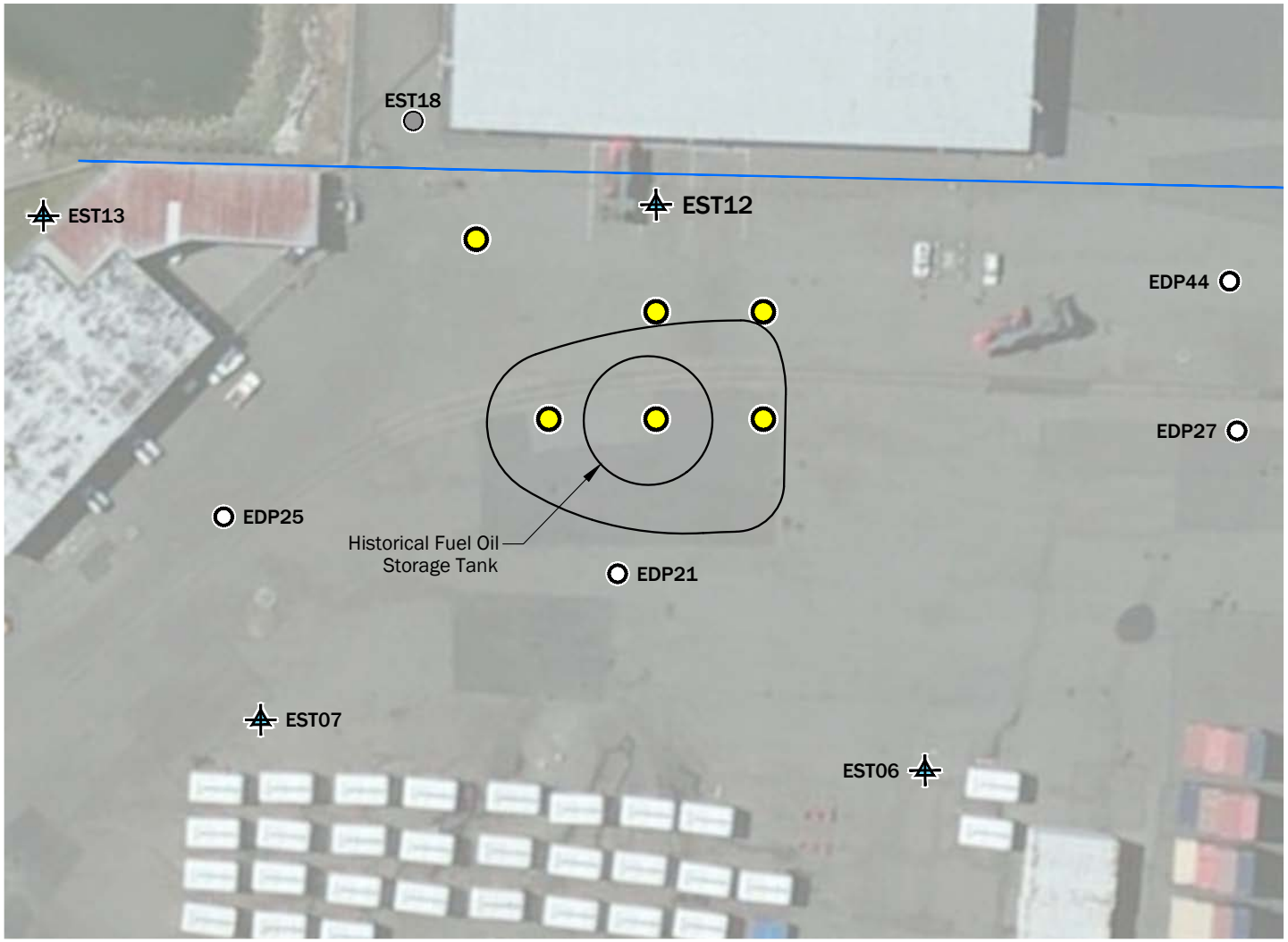

Legend

- Proposed Additional Soil Boring Investigation Location
- Shallow Soil Boring/Monitoring Well
- Soil Boring
- Decommissioned Monitoring Well
- Bulkhead

Notes:

1. Petroleum Hydrocarbons Include Gasoline-, Diesel-, and Heavy Oil-Range Petroleum Hydrocarbons.
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Data Source: Base aerial from Bing Maps, 2011.
Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

80 0 80
Feet

Additional Investigation Location
EST12

Weyerhaeuser Mill A Former
Everett, Washington

GeoEngineers

Figure 7

MAF-SS-24
MAF-SS-25
MAF-SS-15
MAF-SS-16
MAF-SS-27
MHHW (Approximate)
A1-31B
EDP42
EDP43
EDP22
EDP41
EST16
EDP23
EDP24
EDP25
EST13
EST08D
EST08
EST07

Legend

- Proposed Additional Soil/Sediment Boring Investigation Location
- Shallow Soil Boring/Monitoring Well
- Deep Soil Boring/Monitoring Well
- Soil Boring
- Sediment Investigation Location
- Open Space
- Equipment Storage Area (Bone Yard)
- Gravel Paved Working Surface
- Current Kimberly-Clark/City of Everett/City of Marysville Outfall 100 (Approximate)
- Current Kimberly-Clark/Weyerhaeuser Outfall SW001 (Approximate)
- Mean Higher High Water (MHHW)

Notes:

1. Petroleum Hydrocarbons Include Gasoline-, Diesel-, and Heavy Oil-Range Petroleum Hydrocarbons.
2. The locations of all features shown are approximate.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base aerial from Bing Maps, 2011.

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

60 0 60
Feet

Additional Investigation Locations
Equipment Storage Area/Open Space

Weyerhaeuser Mill A Former
Everett, Washington

GeoEngineers

Figure 8

P:\0\0676020\CAD\06\Additional Investigation Area\067602006_F08_ESA.dwg TAB:F08 Date Exported: 09/09/19 - 11:51 by tmichaud

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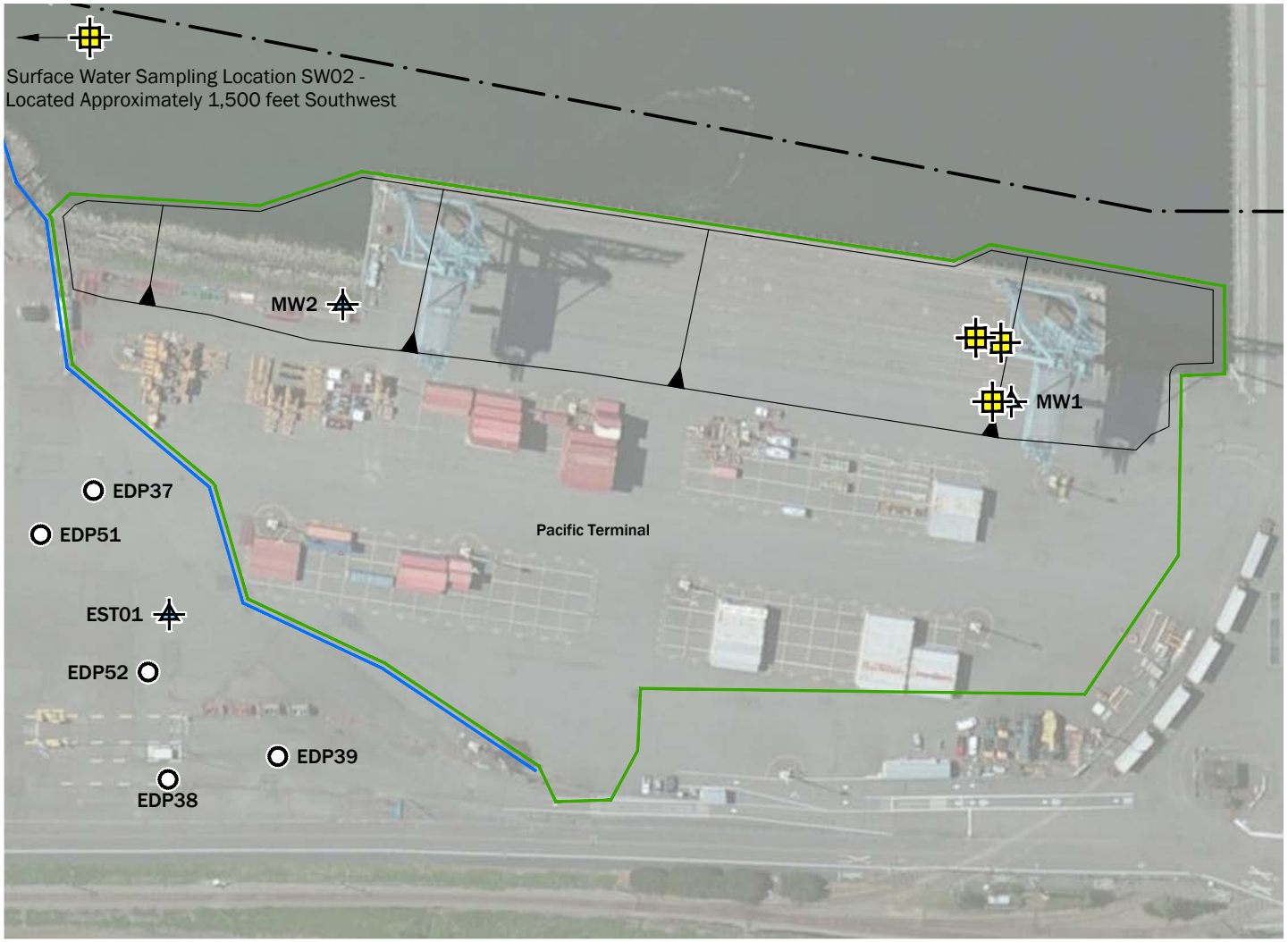

Legend

- Proposed Additional DGT Sampling Location
- Shallow Soil Boring/Monitoring Well
- Deep Soil Boring/Monitoring Well
- Soil Boring
- Bulkhead
- Construction Berm Fill
- Nearshore Confined Disposal (NCD) Facility

Notes:

1. Petroleum Hydrocarbons Include Gasoline-, Diesel-, and Heavy Oil-Range Petroleum Hydrocarbons.
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Data Source: Base aerial from Bing Maps, 2011.
Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

150 0 150
Feet

Additional Investigation Location
Nearshore Confined Disposal Facility

Weyerhaeuser Mill A Former
Everett, Washington

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Figure 9