

Final Pre-Remedial
Design Work Plan
Under-Dock and
Nearshore Areas
Port Angeles Rayonier
Mill Site
Port Angeles,
Washington

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Acronyms

AO	Agreed Order
cm	centimeter
DF	<i>Port Angeles Rayonier Mill Site: Under-dock and Nearshore Areas Pre-Remedial Design Analysis and Decision Framework</i>
DJS	Dock, Jetty, and Shoreline
DNR	Department of Natural Resources
Ecology	Washington State Department of Ecology
EMNR	enhance monitored natural recovery
ESA	Endangered Species Act
FCS	Field Conditions Survey
ft	feet/foot
HASP	Health and Safety Plan
IAP	Interim Action Plan
IDP	Inadvertent Discovery Plan
in	inch
QAPP	Quality Assurance Project Plan
RCW	Revised Code of Washington
SAP	Sampling and Analysis Plan
SEPA	State Environmental Policy Act
SMA	Sediment Management Area
USACE	United States Army Corps of Engineers



1 Introduction

On behalf of Rayonier A.M. Properties, LLC (“RAMP”), Dalton, Olmsted & Fuglevand (“DOF”) and EHS Support LLC (“EHS Support”) have collaboratively prepared this Pre-Remedial Design Work Plan (“Work Plan”) to meet requirements set forth in the Agreed Order (AO) No. DE 6815 (Washington State Department of Ecology [Ecology], 2010) and its subsequent two amendments (Ecology, 2012 and 2024a) issued by Ecology for the former Port Angeles Rayonier Mill Site (“Site”) located in Port Angeles, Washington, at 700 North Ennis Street (**Figure 1**). The Second Amendment to Agreed Order No. DE 6815 (“AO amendment”; Ecology, 2024a) was finalized on June 3, 2024, and includes a requirement to prepare a Work Plan that will detail the hydrodynamic modeling and sampling approach to meet the sediment data needs identified in the *Draft Interim Action Plan* (IAP; Ecology, 2023) and the *Port Angeles Rayonier Mill Site: Under-dock and Nearshore Areas Pre-Remedial Design Analysis and Decision Framework* (DF; Ecology, 2024b) attached to the AO amendment. The DF defines how sampling and remedial decision-making will be conducted for the under-dock (Sediment Management Area [SMA]-3) and nearshore (SMA-4) regions of the marine study area. Per the DF, potential remedial actions include dredging, enhanced monitored natural recovery (EMNR), or thin-layer capping. Selection will be based on the results of analytical sediment chemistry data and hydrodynamic modeling to be done to identify erosive areas within the under-dock and nearshore areas.

This Work Plan describes environmental field sampling and laboratory analytical activities to satisfy Task 1 of the AO amendment.

Performing the under-dock sediment sampling required by the DF will require considerable effort, the mobilization of a large floating derrick in addition to typical surface and subsurface sampling equipment, and removal of timber deck stringers to allow access to the sediment surface by the sampling equipment. To allow collection of additional data to support remedial design including dock removal, RAMP may, with mutual agreement from Ecology, decide to implement a Pilot Study to evaluate removal of dock pilings. This Pilot Study would be included in project permitting for potential performance in 2025 concurrent with the DF-required sediment sampling.

1.1 Background

Corporate predecessors of RAMP operated a dissolving sulfite pulp mill at the Site until the mill was dismantled in 1997. A portion of the mill was located on land leased from the Washington State Department of Natural Resources (DNR). The Site is located on the eastern side of Port Angeles Harbor (“Harbor”) in Clallam County, Washington. The Harbor and nearby City of Port Angeles are located on the north side of the Olympic Peninsula on the shoreline of the Strait of Juan de Fuca (**Figure 1**). The only highway to Port Angeles is Highway 101; there is no active rail service and resources, such as landfills, that can accept contaminated soil other than those located at some distance from the Site (e.g., in Arlington, Oregon, or Klickitat County, Washington, approximately 350 miles away). The Site is located within the Port Angeles city limits, in an area of mixed industrial, commercial, recreational, and residential land uses. Most of the Site is zoned heavy industrial. The area associated with the steep bluffs and ravine along the southern margin of the Site is zoned for public buildings and parks (Windward, 2021).



Previous studies and interim actions have been performed at the Site since implementation of the AO in 2010 (Ecology, 2010). Results of prior investigations were included in previous AO-required documents approved by Ecology (GeoEngineers, 2021; Tetra Tech, 2021; Windward, 2021).

More recently, RAMP conducted a Field Conditions Survey (FCS) during fall and winter 2019 to support design evaluation of a Dock, Jetty, & Shoreline (DJS) Project that was under consideration at that time. Portions of the FCS are relevant to the work proposed in this Work Plan. Consequently, the pertinent field activities and data collected during that field event are described in **Section 2**.

In 2020 and 2021, a portion of the dock superstructure was removed, including most of the concrete deck panels, some timber stringers and pile caps, and a warehouse that was located on the northern portion of the dock. The partial dock removal is described in **Section 2**.

Shoreline and nearshore structures that are being evaluated for potential removal as part of the remediation are shown on **Figure 2** and include the following:

- **Jetty:** Timber crib rock jetty. Approximately 700 feet (ft) long and approximately 30 ft wide, approximately 375 creosote timber pilings.
- **Dock:** Creosote piling supported creosote timber dock, approximately 1,050 ft long and 250 ft wide (approximately 5.7 acres of overwater coverage), over 4,300 creosote timber pilings, approximately 3,000 square ft of concrete foundation.

The areas noted above, and adjacent areas that may be impacted from their removal, form the Work Plan Study Area for purposes of this Work Plan.

1.2 Objectives of the Pre-Design Sediment Sampling

Multiple surface and subsurface sediment samples will be collected for sediment chemistry and grain size data, consistent with the requirements of the DF. The following are the objectives of the pre-remedial design sediment sampling:

- Assess potential risk to benthic community receptors and human health
- Refine the extent of contamination in surface and subsurface sediments
- Characterize physical properties to support scour assessment
- Determine depth of native sediments
- Support the remedial design and detailed design-level evaluation for the under-dock and nearshore areas and inform remedy selection
- Obtain data necessary for numerical modeling per the *Coastal Conceptual Site Model and Hydrodynamic Modeling Action Plan* (“Modeling Memo”; EHS Support, 2024)

1.3 Permitting and Other Approvals

In-water sampling will require a United States Army Corps of Engineers (USACE) permit. The Nationwide Permit 6 “Survey Activities” covers sediment sampling activities, and USACE will likely use this permit to authorize this sampling event. Endangered Species Act (ESA) consultation will be conducted concurrent with the USACE permitting process. It is anticipated that the USACE permit will require an Inadvertent Discovery Plan (IDP). The Site has an IDP developed for the 2019 FCS that will be used for this work and is included in **Appendix E**. Whether ESA consultation is necessary, and what level of consultation (formal or informal) is necessary, would be determined by USACE.



State and local permits generally are not required under a state-led cleanup project. Revised Code of Washington (RCW) 70A.305.090 exempts state-led cleanup projects from the procedural requirements of obtaining permits under programs including the hydraulic code (RCW 77.55) and the Shoreline Management Act (RCW 90.58). However, RCW 70A.305.090 requires that Ecology ensure the project complies with the substantive provisions of these programs.

In-water sampling is exempt from review under the State Environmental Policy Act (SEPA), per Washington Administrative Code 197-11-800 (17), which exempts data collection. The SEPA lead agency (likely the City of Port Angeles for this work) would be responsible for determining whether the project meets this exemption.

1.4 Site Background

Before Europeans arrived in the late 1850s, the Port Angeles area was home to the Lower Elwha Klallam Tribe (Wegmann et al., 2010). The arrival of the Puget Sound Co-Operative Colony in 1887 initiated one of the earliest periods of population growth in Port Angeles. The colony was established on the western bank of Ennis Creek, next to the l'e'nis village, and was home to nearly 400 people at its peak.

In 1917, the United States Spruce Production Corporation constructed a spruce sawmill. A large portion of the sawmill was constructed on pilings. The sawmill was never operated and sat idle until Olympic Forest Products purchased it in 1929. From 1929 to 1930, the spruce mill was renovated, and a pulp mill was constructed. The pulp mill was operated by Olympic Forest Products from 1930 to 1937. In 1937, Olympic Forest Products merged with two other independent Olympic Peninsula companies to form Rayonier Inc.

Mill ownership shifted to ITT Rayonier Inc. between 1968 and 1994, after which it returned to Rayonier Inc. Rayonier Inc. permanently ceased pulp production at the mill in 1997 and dismantled the mill facilities between 1997 and 1999. The mill decommissioning was completed by October 1999.

RAMP has certain obligations under their lease with Washington State DNR for the dock, jetty, and other fill that is located on the Washington State DNR leasehold. On March 5, 2019, there was a fire in the northern portion of the Large Foundation. This event led to the 2020–2021 dock deconstruction tasks. Present-day conditions within the Work Plan Study Area are shown in **Figure 2**.

The upland area contains remnant building foundations and support pilings. Soil from the excavation of a trench to accommodate City of Port Angeles sewer pipes is stockpiled in the West Mill Area. Much of the West Mill Area is covered with several feet of crushed concrete (concrete pad) that was left on-site after demolition of the aboveground mill structures. The mill property is bounded to the south by high tree-covered bluffs that rise to a plateau above the property. The mill property is mostly flat between the bluffs and the Harbor to the north (**Figure 1**). Residential and commercial properties, including Olympic Memorial Hospital, are located on the plateau to the south of the mill property. Ennis Creek flows from the Olympic Mountains through the property and discharges into the Harbor.

Most of the Site is vacant. The Olympic Discovery Trail, a pedestrian pathway constructed along the former Seattle and North Coast Railroad right-of-way, is located at the foot of the bluff in the southern portion of the Site. The trail is located on an access easement granted to the City of Port Angeles by RAMP. The pedestrian pathway is separated from the majority of the Work Plan Study Area by a fence; it



includes a bridge that crosses Ennis Creek near the northeastern corner of the former mill parking lot. A municipal wastewater treatment plant owned by the City of Port Angeles is located east of, and adjacent to, the southern portion of the Work Plan Study Area.

1.5 Work Plan Organization

This Work Plan is organized into the following remaining sections:

- **Section 2** summarizes the field investigations and dock deconstruction conducted in 2019–2021.
- **Section 3** describes the proposed field investigations and data collection methodologies.
- **Section 4** discusses data use and management.
- **Section 5** outlines reporting requirements.
- **Section 6** provides a schedule of activities.
- **Section 7** lists the references cited in the Work Plan.
- **Tables:** Includes the tables referenced in the Work Plan.
- **Figures:** Includes the figures referenced in the Work Plan.
- **Appendices¹:** Includes the Sampling and Analysis Plan (SAP; **Appendix B**), Quality Assurance Project Plan (QAPP; **Appendix C**), and Health and Safety Plan (HASP; **Appendix D**).

¹ Per Ecology direction and acknowledgement in a letter dated August 26, 2025 (Ecology, 2025), Appendix A, the Coastal Conceptual Site Model and Hydrodynamic Modeling Action Plan, and Appendix E, the Inadvertent Discovery Plan, will be provided as separate, standalone documents.



2 Previous Field Investigations and Partial Dock Removal

This section describes investigation and construction work that occurred in the Work Plan Study Area prior to implementation of the AO amendment. Information related to existing sediment data within the Work Plan Study Area, inclusive of surface sediment data collected in 2019–2020, is shown on **Table 1** through **Table 4** as referenced below.

2.1 Sediment Data Collection and Sampling

RAMP conducted an FCS during the fall and winter 2019 under USACE permit NWS-2019-616. The FCS was conducted to generate necessary data to support the refinement of the engineering design for the proposed DJS Project at the Site and to close out the Washington State DNR lease. In 2022, a technical memorandum was submitted to Ecology summarizing analytical chemistry data from sediment samples collected as part of the FCS to provide additional surficial sediment chemistry data for sampling points under and adjacent to the dock structure within SMA-1 (EHS Support, 2022). This memorandum discussed FCS objectives and sampling design, sediment sampling procedures, laboratory analysis and data validation procedures, and sediment sampling results.

Sampling and data collection locations from the FCS are visualized on **Figure 3**, with diver assisted sampling information on **Figure 4**. The following tables are also provided:

- Sample location coordinates and mudline elevations (**Table 1**)
- Sampling methods and analyses for each station (**Table 2**)
- Sediment geotechnical sample results (**Table 3**)
- Sediment chemistry analytical results (**Table 4**)

The data collected as part of the 2019 FCS will be included and evaluated in the Draft Data Summary Report.

2.2 Partial Dock Removal

The scope of work for the partial dock removal work completed in 2020 and 2021 was removal of most decking, beams, and pile caps from the above-water portions of the Main Dock (“Dock”) and the warehouse structure on the northern portion of the Dock. RAMP removed the existing concrete decking and related timber support structures (beams and pile caps) to reduce accessibility. Removal of the Dock decking was encouraged by the City of Port Angeles.

The marine contractor Quigg Brothers conducted the work between fall 2020 and fall 2021. Work included removal of decking, beams, and pile caps from the above-water portions of the Dock and removal of the remaining frame and roof of a former steel-framed building on the Dock. No soil, groundwater, or sediment was removed or disturbed during the work.

Some of the concrete decking was left in place to provide a safe work area for future work as shown on **Figure 1** and **Figure 3**. With exception of the nearshore part of the dock, the stringers and pile caps were left in place to provide structural stability. Work was performed under USACE permit NWS-2019-466.



3 Proposed Field Investigations

The DF requires that “surface and subsurface sediments in the under-dock and nearshore areas must be adequately characterized to inform best management practices to remove the in-water structures, to minimize redistribution of contaminated sediment, and to inform the selection of appropriate remedies” (Ecology, 2024b). Therefore, prior to implementing full-scale removal of the remaining in-water structures, surface sediment samples (0–10 centimeters [cm]; 0–45 cm in intertidal areas) and subsurface sediment cores (0 to 8 ft or more) will be collected from representative and spatially distributed locations from the under-dock area, including intertidal and subtidal locations, and nearshore areas. Notwithstanding the foregoing, RAMP and Ecology may agree to a pilot-scale removal of certain in-water structures to assist with determining the best means and methods to accomplish demolition and removal and to determine how sediment control during these activities may be best achieved.

The following data needs have been identified and will be addressed as follows:

- Existing sediment physical properties (grain size distribution) data are limited in geographical coverage near the jetty, near shore east of the dock, and under the dock. Sediment grain size distribution samples will be collected using a vibracore to meet requirements in the DF.
- Existing surface sediment data are limited in geographical coverage near the jetty, near shore east of the dock, and under the dock. Surface sediment samples will be collected using a grab sampler (power grab or similar) or by using hand tools in intertidal areas during low tide in areas where boat access is limited.
- Existing subsurface sediment data are limited in geographical coverage near the jetty, nearshore east of the dock, and under the dock. Samples of subsurface sediment will be collected using a vibracore.

Sediment samples will be sent to an Ecology-accredited laboratory for chemical analysis as detailed in **Section 3.1**, **Section 3.2**, and **Section 3.3** of this Work Plan. Detailed procedures for sample collection, identification, handling, and laboratory analysis are presented in the attached SAP (**Appendix B**) and QAPP (**Appendix C**). The rationale for different sampling approaches is discussed further below.

In addition, potential changes in coastal dynamics and sediment transport that could occur as a result of in-water structure removal must be assessed through hydrodynamic numerical modeling. Sediment sampling will support modeling efforts and address modeling requirements presented in the DF. Modeling methods and anticipated data usage are described in the Modeling Memo (EHS Support, 2024), included as **Appendix A**, which was submitted to Ecology on August 2, 2024. Ecology has provided preliminary comments on the Modeling Memo.

A Dock and Piling Removal Pilot Study may be performed concurrent with the DF-required sediment sampling. This is anticipated to include removal of a limited portion of the timber dock stringers (horizontal timber structural members that supported the previously removed concrete deck panels), piling caps (horizontal members that support the stringers that are attached to the supporting piling), and a limited number of timber piling. It is anticipated this Pilot Study work would be performed in an area coincident with several of the planned under-dock sediment sample locations.



3.1 Physical Properties Sediment Sampling

Material physical property samples will be collected at 24 coring locations shown on **Figure 5**, **Table 5**, and **Table 6** using a vibracore. **Section 3.3** describes subsurface sample collection using a vibracore; physical property samples will be collected from the same core used to collect sediment chemistry samples if volume allows. If volume does not allow, a separate core will be collected for physical properties by advancing the corer at least 3 ft below mudline. Sediment samples will be collected at intervals 3–9 inches (in; 6-in horizon), 9–15 in (12-in horizon), and 15–21 in (18-in horizon). Each interval will be analyzed for grain size distribution to support a scour assessment. Sample intervals are shown in **Table 6**.

3.2 Surface Sediment Sampling

Surface sediment samples (0–10 cm below mudline in subtidal areas and 0–45 cm below mudline in intertidal areas) will be collected at 24 locations (8 locations west of the dock near the jetty, 13 locations under the dock, and 3 east of the dock) as shown on **Figure 5**. Subtidal surface samples (0–10 cm below mudline) will be collected using a power grab or similar surface sediment sampling device. Intertidal surface samples (0–45 cm) are located at or above elevation -4' Mean Lower Low Water (MLLW) based on typical lowest tide annually and will be collected using a vibracore.

3.3 Subsurface Sediment Sampling

Subsurface sediment samples will be collected at 24 locations (8 locations west of the dock near the jetty, 13 locations under the dock, and 3 east of the dock) as shown on **Figure 5**. Subsurface samples will be collected using a vibracore.

Cores will be advanced at least 8 ft below the mudline to determine the depth and nature of sediment deposition. Subsurface sediment core intervals will be 1–2 ft for subtidal subsurface samples and 1.5–2.5 ft for intertidal subsurface samples, and any subsurface intervals within the depositional horizon, as well as any intervals with visual indications that potential contaminants may be present (e.g., sheen), will be submitted for chemical analysis. The depth of depositional material (surface to native material) will be visually determined based on grain size and color for each core collected. The deeper intervals below the depositional horizon will be archived for potential chemical analysis as needed to determine extent of vertical contamination. Sampling intervals based on location are shown in **Table 6**.

The cores in subtidal areas will be sampled based on a 1 ft in situ sample interval for the first 4 ft and then 2-ft intervals (samples from the core to represent 1-ft to 2-ft in situ intervals). The cores in intertidal areas will be sampled based on a 1-ft in situ sample intervals from 1.5 ft to 4.5 ft and then 2-ft intervals from 4.5 ft and beyond (samples from the core to represent 1-ft to 2-ft in situ intervals).

3.4 Potential Dock and Piling Removal Pilot Study

RAMP may elect to perform, if mutually agreed to with Ecology, a limited pilot study to evaluate dock and piling removal methods, impacts efficiencies, and other factors to support remedial design and project planning. This Pilot Study is anticipated to include the following:

- Removal of limited number of timber deck stringers and piling caps
- Removal of limited number of pilings



This work would be performed in the same general area of several of the under-dock sediment sampling locations, providing data on piling lengths at different areas along the length of the dock.

3.5 Field Data Collection Preparation

Prior to implementing the field sediment sampling program, the following supporting activities will be completed:

- Permitting as described in **Section 1.3**
- Coordination and Right of Entry from the Washington State DNR for sampling on DNR property
- Field utility locate to identify any underground utilities within the Work Plan Study Area
- Identification of project support areas, including the following:
 - Sampling vessel moorage
 - Core sample processing area
 - Property access, as needed
- Contracting and coordination with sampling vessel
- Contracting and coordination with analytical laboratory



4 Data Use

Sediment samples will be collected to support multiple project objectives, as presented in **Section 1.2**, including refining the extent of contamination in surface and subsurface sediments and providing data to inform remedial design requirements, as practicable, for development of remedial alternatives within areas of insufficient existing data. Data will also be used to:

- Define the nature and extent of chemical contamination based on comparisons of sediment concentrations to appropriate sediment cleanup standards.
- Determine surface sediment chemistry for recalculation of surface and intertidal spatially weighted average concentrations as appropriate.
- Determine depth of depositional sediment overlying native substrate beneath the dock to assess sediments with potential for erosion, and subsequent redistribution of potentially contaminated sediment, and inform appropriate remedies.
- Determine grain size distribution of sediments (surface and subsurface) to assess sediment with potential for erosion, and subsequent redistribution of potentially contaminated sediment, and inform appropriate remedies.
- Map chemical concentrations in sediment, both horizontally and vertically, to support design, confirm potential chemicals of concern in the Z-layer (the surface exposed by dredging, if dredging is performed), and evaluate potential capping of contaminated sediments within areas where capping is a selected remedy and below the Z-layer if necessary, based on a proposed dredging remedy within that SMA.
- Determine sediment chemistry for the development and evaluation of potential dredged material management options.
- Determine sediment physical parameters, such as grain size and density, to evaluate the ability to dredge, dredged material management, and sediment management approaches other than dredging, including capping or EMNR.
- Determine sediment chemistry to support the structure and piling removal plan.
- Determine typical piling lengths, piling condition, and appropriate dock and piling removal methods.

Specific analytical suites and related methods and detection/reporting limit information are provided in the SAP (**Appendix B**) and QAPP (**Appendix C**). Existing sediment data have been used as guidance in developing the planned analytical suite and analysis program. Archived core samples will be sequentially analyzed, as needed, to delineate the depth of contamination at each coring location. All sampled core intervals may not be analyzed.

4.1 Data Management and Analysis

Field investigation personnel will maintain a daily record of significant events, observations, and measurements during field investigations. Field records will be transcribed directly into a dedicated waterproof field logbook or onto standardized paper or electronic field data sheets. The laboratory shall record the results of each analysis in a Laboratory Information Management System in accordance with the contracted laboratory's quality assurance plan. Data will be provided as electronic data deliverables. Data may be reduced to summarize particular datasets and to aid interpretation of the results.

Additional details regarding data review, recording, and reporting are provided in Section 8.1 in the QAPP. Data validation methods are also provided in Section 9 in the QAPP.



5 Reporting Requirements

As required by AO amendment, Task 5, RAMP will prepare a Draft Pre-Remedial Design Sediment Results Report (“Draft Sediment Report”) for Ecology review and comment (Ecology, 2024a). The Draft Sediment Report will summarize the results of all pre-remedial design sediment data collection. A separate Hydrodynamic Modeling Results Report, summarizing the results of hydrodynamic modeling activities will be provided under separate cover, per Ecology approval. The sediment sampling results and modeling will be used with the decision matrix in the Decision Framework (Exhibit F) to select appropriate remedies for SMA-3 (Under-dock) and SMA-4 (Nearshore area). The Draft Sediment Report will document the selected remedies for SMA-3 and SMA-4. The Final Sediment Report (AO amendment Task 6) will include the following:

- Summary of field procedures and any deviations from the Work Plan, SAP, and QAPP
- Summary of all pre-remedial design data
- Figures showing sample locations and results
- Tabulated data
- Statistical methods used to evaluate the data
- Validated data and a data validation memo
- Data submittal to the Environmental Information Management (EIM) System

Following completion of field data collection, data will be validated as described within the QAPP, and a sediment chemistry data report, including a data validation memorandum, will be prepared and submitted to Ecology. Data validation will be performed as detailed in the QAPP.



6 Schedule

Field sampling in SMA-3 is anticipated to require approximately 3–4 weeks. Field sampling in SMA-4 is anticipated to require an additional 2–3 weeks. Attaining this schedule is dependent on several factors, including the following:

- Ecology approval of the Work Plan, SAP (**Appendix B**), QAPP (**Appendix C**), and HASP (**Appendix D**)
- Weather conditions
- Subcontractor availability
- Timing with the in-water work window
- Permitting timeline

RAMP will work to address factors within its control, specifically ensuring subcontractor availability, as practicable. A schedule of activities is provided in **Table 6-1** per the AO amendment.

Table 6-1 Schedule of Activities

Deliverable/Task	Date
Submit the Final PRDWP	Within 30 calendar days of Ecology and RAMP meeting to discuss Ecology's comments on the Draft PRDWP, but not more than 60 calendar days from receipt of Ecology's comments
Prepare and submit a Joint Aquatic Resources Permit Application (JARPA)	Within 30 calendar days of Ecology approval of the Final PRDWP
Begin Sediment Data Collection	Within 60 calendar days of permit issuance
Completion of Fieldwork	Within 60 calendar days of when fieldwork began
Submit Validated Data to Environmental Information Management (EIM) System	Within 60 calendar days of receipt of final data package
Submit the Draft Sediment Report	Within 60 calendar days of receipt of final validated data package
Submit the Final Sediment Report	Within 30 calendar days of Ecology and RAMP meeting to discuss Ecology's comments on the Draft Sediment Report, but not more than 60 calendar days from receipt of Ecology's comments

Note:

PRDWP = Pre-Remedial Design Work Plan



7 References

- EHS Support. 2022. Port Angeles Rayonier Mill Marine Study Area Field Conditions Survey – Sediment Chemistry Data Summary Submittal. March 8.
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- GeoEngineers. 2021. Interim Action Report Volume I: Upland Data Summary Report for the Study Area, Port Angeles Rayonier Mill Site, Port Angeles, Washington. Final. September 1.
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- Washington State Department of Ecology. 2010. Agreed Order No. DE 6815. March.
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- Washington State Department of Ecology. 2023. Draft Interim Action Plan, Port Angeles Rayonier Mill Study Area, Port Angeles Washington. November.
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- Washington State Department of Ecology. 2025. Port Angeles Rayonier Mill Site – Response to Ecology Comments: Draft Pre-Remedial Design Work Plan (August 15, 2025).
- Wegmann, K. W., Homburg, J. A., Bohnenstiehl, D. R., Bowman, J. D., Windingstad, J. D., and Huber, E. K. 2010. Geomorphology of the City of Port Angeles waterfront. Statistical Research, Inc.
- Windward. 2021. Former Rayonier Mill in Port Angeles Interim Action Report Volume II: Marine Data Summary Report. Final. September 1.



Tables

Table 1
2019 Sediment Sampling Location Coordinates
Final Pre-Remedial Design Work Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, Washington

Location ID	Video Probe Locations			Vibracore Locations ¹			Surface Grab Locations			Drill Locations		
	Easting (ft)	Northing (ft)	Elevations (MSL) ²	Easting (ft)	Northing (ft)	Water Depth (ft) ³	Easting (ft)	Northing (ft)	Water Depth (ft) ³	Easting (ft)	Northing (ft)	Elevations (MSL) ²
BA01	1011524.786	418909.066	5.454	1011518.941	418909.601	4.083	N/A	N/A	N/A	N/A	N/A	N/A
BA03	1011989.714	419255.975	5.519	1011978.01	419255.306	6.165	N/A	N/A	N/A	N/A	N/A	N/A
BA04	1011830.48	419348.819	5.492	1011819.61	419343.382	5.511	N/A	N/A	N/A	N/A	N/A	N/A
BA05	1011948.531	419009.336	5.295	1011968.714	418998.436	3.265	N/A	N/A	N/A	N/A	N/A	N/A
LP01	1010606.306	418672.474	4.739	1010610.024	418669.193	4.913	N/A	N/A	N/A	1010611.238	418658.144	21.267
LP02	1010687.777	418696.285	4.476	1010681.791	418690.977	5.061	N/A	N/A	N/A	N/A	N/A	N/A
LP03	1010429.648	418402.508	4.873	1010438.451	418402.781	4.772	N/A	N/A	N/A	N/A	N/A	N/A
LP04	1010640.034	418434.189	4.778	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LP05	1010801.301	418475.78	4.766	N/A	N/A	N/A	N/A	N/A	N/A	1010805.061	418477.076	8.002
LP06	1010968.769	418427.552	4.602	N/A	N/A	N/A	N/A	N/A	N/A	1010959.893	418433.949	6.699
LP07	1010479.06	418179.005	4.968	1010487.3	418174.199	2.109	N/A	N/A	N/A	N/A	N/A	N/A
LP08-SS16	1010978.789	418279.427	4.791	N/A	N/A	N/A	326713.549	1209577.041	16.6	1010983.349	418280.995	12.786
LP09	1010832.436	418131.562	4.685	N/A	N/A	N/A	N/A	N/A	N/A	1010833.2	418133.679	9.08
LP10	1011029.543	418122.712	4.172	N/A	N/A	N/A	N/A	N/A	N/A	1011031.924	418123.937	20.086
LP11	1011152.275	418224.576	4.229	N/A	N/A	N/A	N/A	N/A	N/A	1011162.083	418222.32	13.112
LP12	1010708.598	417940.279	4.647	N/A	N/A	N/A	N/A	N/A	N/A	1010697.661	417947.146	9.657
LP13	1010868.968	417945.795	4.793	N/A	N/A	N/A	N/A	N/A	N/A	1010867.173	417947.093	14.09
NJ01	1010661.737	418879.297	4.751	1010656.066	418878.339	5.629	326120.455	1209905.09	23.9	N/A	N/A	N/A
NJ02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1010833.277	418751.991	9.668
NJ03	1011081.385	418850.404	4.761	1011072.63	418842.16	4.778	N/A	N/A	N/A	N/A	N/A	N/A
NJ04	1011067.648	418733.807	4.599	1011066.211	418730.746	6.837	N/A	N/A	N/A	1011074.753	418730.461	9.112
NJ05	1010937.727	418570.435	5.432	1010933.644	418572.363	4.189	N/A	N/A	N/A	1010942.021	418571.666	10.25
NJ06	1011062.614	418497.992	5.453	1011057.275	418492.414	6.819	N/A	N/A	N/A	1011065.419	418501.079	9.883
SS01	N/A	N/A	N/A	N/A	N/A	N/A	326821.309	1210078.154	13.3	N/A	N/A	N/A
SS02	N/A	N/A	N/A	N/A	N/A	N/A	326328.538	1209953.606	20.5	N/A	N/A	N/A
SS03	N/A	N/A	N/A	N/A	N/A	N/A	326522.693	1209759.633	15.8	N/A	N/A	N/A
SS04	N/A	N/A	N/A	N/A	N/A	N/A	326865.739	1209729.824	14.2	N/A	N/A	N/A
SS05	N/A	N/A	N/A	N/A	N/A	N/A	326215.299	1209372.993	21.4	N/A	N/A	N/A
SS06	N/A	N/A	N/A	N/A	N/A	N/A	326081.893	1209036.953	29.8	N/A	N/A	N/A
SS07	N/A	N/A	N/A	N/A	N/A	N/A	325427.893	1209235.559	20.6	N/A	N/A	N/A
SS09	N/A	N/A	N/A	N/A	N/A	N/A	324952.75	1208446.582	40.9	N/A	N/A	N/A
SS10	N/A	N/A	N/A	N/A	N/A	N/A	325979.097	1208612.427	33.1	N/A	N/A	N/A
SS11	N/A	N/A	N/A	N/A	N/A	N/A	325859.813	1207978.882	34.2	N/A	N/A	N/A
SS12	1011572.259	419242.767	5.422	1011579.725	419243.728	4.374	325742.369	1208992.377	34.5	N/A	N/A	N/A
SS13	N/A	N/A	N/A	N/A	N/A	N/A	325444.464	1208510.606	38.3	N/A	N/A	N/A

Table 1
2019 Sediment Sampling Location Coordinates
Final Pre-Remedial Design Work Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, Washington

Location ID	Video Probe Locations			Vibracore Locations ¹			Surface Grab Locations			Drill Locations		
	Easting (ft)	Northing (ft)	Elevations (MSL) ²	Easting (ft)	Northing (ft)	Water Depth (ft) ³	Easting (ft)	Northing (ft)	Water Depth (ft) ³	Easting (ft)	Northing (ft)	Elevations (MSL) ²
SS14	N/A	N/A	N/A	N/A	N/A	N/A	325427.092	1208951.217	36.6	N/A	N/A	N/A
SS15	N/A	N/A	N/A	N/A	N/A	N/A	325638.116	1208737.993	34.7	N/A	N/A	N/A

Notes:

¹Vibracore locations are draft and are being verified.

²MSL elevation recorded at the water's surface.

³Water depth as measured with leadline in the field, MSL elevation not recorded.

ft = feet

MSL = Mean Sea Level

Table 2
2019 Sediment Sampling Summary
Final Pre-Remedial Design Work Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, Washington

Sample Location	Sample Date	Collection Method	Sample Interval	Sample Analysis
LP1/SS2	11/18/2019	Videoprobe	0-4.5'	Visual only
	11/22/2019	Vibracore	0.2-1.0'	Visual only
		Vibracore	0-0.2'	Atterberg Limits
	11/23/2019	Power grab	0-10 cm	Visual only
LP2	11/18/2019	Videoprobe	0-4.7'	Visual only
	11/22/2019	Vibracore	0-0.8'	Visual only
LP3	11/18/2019	Videoprobe	0-4.9'	Visual only
	11/22/2019	Vibracore	0-1.0'	Grain Size
LP4	11/18/2019	Videoprobe	0-1.8'	Visual only
LP5/SS3	11/18/2019	Videoprobe	0-4.9'	Visual only
	11/23/2019	Power grab	0-10 cm	Visual only
LP6	11/18/2019	Videoprobe	0-5'	Visual only
LP7/SS1	11/18/2019	Videoprobe	0-4.1'	Visual only
	11/22/2019	Vibracore	0-1.0'	Visual only
	11/23/2019	Power grab	0-10 cm	Visual only
LP8/SS16	12/5/2019	Hollow-Stem Auger	3-4.0'	Visual only
		Hollow-Stem Auger	4-5.0'	Visual only
		Hollow-Stem Auger	5-6.0'	Visual only
LP9/SS4	11/18/2019	Videoprobe	0-4.9'	Visual only
	12/4/2019	Hollow-Stem Auger	3.5-4.5'	Visual only
		Hollow-Stem Auger	4.5-5'	Visual only
		Hollow-Stem Auger	5.5-6.5'	Visual only
	11/23/2019	Power grab	0-10 cm	Visual only
LP10	11/18/2019	Videoprobe	0-5'	Visual only
	12/4/2019	Hollow-Stem Auger	5-6.0'	Visual only
		Hollow-Stem Auger	6-7.0'	Visual only
		Hollow-Stem Auger	7-8.0'	Visual only
LP11	11/18/2019	Videoprobe	0-5'	Visual only
LP12	11/18/2019	Videoprobe	0-4.8'	Visual only
	12/5/2019	Hollow-Stem Auger	3.2-4.3'	Visual only
		Hollow-Stem Auger	6.5-7.5'	Visual only
		Hollow-Stem Auger	4.8-5.8'	Visual only
LP13	11/18/2019	Videoprobe	0-1.3'	Visual only
	12/4/2019	Hollow-Stem Auger	8-9.5'	Visual only
		Hollow-Stem Auger	9.5-10.5'	Visual only
		Hollow-Stem Auger	10.5-11.5'	Visual only
SS5	11/23/2019	Power grab	0-10 cm	Visual only
SS14	11/23/2019	Power grab	0-10 cm	Visual only
SS16	11/18/2019	Videoprobe	0-3.1'	Visual only
	11/23/2019	Power grab	0-10 cm	Visual only
SS11	11/23/2019	Power grab	0-10 cm	Visual only
SS13	11/23/2019	Power grab	0-10 cm	Visual only
SS7	11/23/2019	Power grab	0-10 cm	Visual only

Table 2
2019 Sediment Sampling Summary
Final Pre-Remedial Design Work Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, Washington

Sample Location	Sample Date	Collection Method	Sample Interval	Sample Analysis
SS9	11/23/2019	Power grab	0-10 cm	Visual only
NJ1	11/18/2019	Videoprobe	0-2.5'	Visual only
	11/21/2019	Vibracore	0-1.0'	Visual only
	11/23/2019	Power grab	0-10 cm	Visual only
	11/23/2019	Power grab	0-10 cm	Visual only
NJ2	11/18/2019	Videoprobe	0-1.5'	Visual only
NJ3	11/21/2019	Vibracore	0-0.5'	Visual only
NJ4	11/18/2019	Videoprobe	0-5'	Visual only
	11/21/2019	Vibracore	0-0.5'	Visual only
NJ5	11/18/2019	Videoprobe	0-4.1'	Visual only
	11/21/2019	Vibracore	0-1.0'	Visual only
NJ6	11/18/2019	Videoprobe	0-3.9'	Visual only
	11/21/2019	Vibracore	0-1.0'	Visual only
BA1/SS6	11/18/2019	Videoprobe	0-5'	Visual only
	11/22/2019	Vibracore	0-0.8'	Atterberg Limits/Grain Size
		Vibracore	0.8-1.3'	Atterberg Limits/Grain Size
		Vibracore	1.3-2.0'	Atterberg Limits/Grain Size
	11/23/2019	Power grab	0-10 cm	Visual only
BA2/SS12	11/22/2019	Vibracore	0-1.0'	Atterberg Limits
	11/23/2019	Power grab	0-10 cm	Visual only
BA3	11/18/2019	Videoprobe	0-2.4'	Visual only
	11/21/2019	Vibracore	0-0.4'	Atterberg Limits
BA4/SS15	11/18/2019	Videoprobe	0-2.2'	Visual only
	11/21/2019	Vibracore	0-0.8'	Visual only
	11/23/2019	Power grab	0-10 cm	Visual only
BA5/SS10	11/18/2019	Videoprobe	0-5'	Visual only
	11/22/2019	Vibracore	0-1.1'	Atterberg Limits
	11/23/2019	Power grab	0-10 cm	Visual only
D1	12/3/2019	Diver core sample	0-0.8'	Visual only
	12/2/2019	Diver grab sample	0-10 cm	Grain Size, TS, SVOCs, HCB, PCBs, D&F, metals, TOC
D2	12/3/2019	Diver core sample	0-0.8'	Visual only
		Diver core sample	0.8-1.2'	Visual only
	12/2/2019	Diver grab sample	0-10 cm	Grain Size, TS, SVOCs, HCB, PCBs, D&F, metals, TOC
D3	12/3/2019	Diver core sample	0-0.7'	Visual only
	12/2/2019	Diver grab sample	0-10 cm	Grain Size, TS, SVOCs, HCB, PCBs, D&F, metals, TOC
D4	12/3/2019	Diver core sample	0-1.0'	Visual only
		Diver core sample	1-1.8'	Visual only
	12/2/2019	Diver grab sample	0-10 cm	Grain Size, TS, SVOCs, HCB, PCBs, D&F, metals, TOC
D5	12/3/2019	Diver core sample	0-1.0'	Visual only
		Diver core sample	1-1.7'	Visual only
	12/2/2019	Diver grab sample	0-10 cm	Grain Size, TS, SVOCs, HCB, PCBs, D&F, metals, TOC
D6	12/3/2019	Diver core sample	0-1.0'	Visual only
		Diver core sample	1-2.0'	Visual only
	12/2/2019	Diver grab sample	0-10 cm	Grain Size, TS, SVOCs, HCB, PCBs, D&F, metals, TOC

Table 2
2019 Sediment Sampling Summary
Final Pre-Remedial Design Work Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, Washington

Notes:

BA = Berth Area

D = Under-Dock Area

LP = Log Pond

NJ = Near Jetty Area

SS = Surface Sediment

Table 3
Summary of 2019 Sediment Geotechnical Sample Results
Final Pre-Remedial Design Work Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, Washington

Apparent Grain Size Distribution Summary Percent Finer Than Indicated Size														
Sample No.	Gravel			Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt				Clay	
Phi Size	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
Sieve Size (microns)	3/8"	#4 (4750)	#10 (2000)	#18 (1000)	#35 (500)	#60 (250)	#120 (125)	#230 (63)	31	15.6	7.8	3.9	2	1
BA1-SED-0-0.8	100.0	94.9	89.2	85.3	80.1	75.1	70.5	62	32.5	15.5	11.3	9.2	7.7	6.4
BA1-SED-0.8-1.3	100	99.7	99.2	96.2	94.2	92.5	90	81	62.6	44.3	30	20.2	13.9	9.7
BA1-SED-1.3-2.0	100	100	98.9	93.3	85.6	78.7	73.5	67.4	45.5	30.8	22.2	16.6	12.9	10.2
LP3-SED-0-1.0	100	99.3	96.8	77	35.3	10.5	7.7	6.9	4.1	2.9	1.9	1.4	0.9	0.6
D3-GRAB-SED-0-10cm	100	100	98.3	94.8	89.3	78.1	53.4	19.7	11.1	8.4	6.5	5.4	4.4	3.7
	100	97.8	96.2	93.1	87.8	76.5	52.5	19.2	11	8.2	6.2	5.2	4.1	3.5
	100	99.4	97.7	94.4	88.8	77.1	52.9	17.6	10.9	8.3	6.7	5.2	4.2	3.6
D6-GRAB-SED-0-10cm	100	93.4	85.5	76.2	54	9	2	1.6						
D4-GRAB-SED-0-10cm	100	65.2	48.8	38.7	33.4	28.4	19.6	12.3	6.6	5.2	3.8	3	2.3	1.9
D2-GRAB-SED-0-10cm	100	72.6	59.2	50.8	46.2	40.6	32.6	23.3	16.5	13.6	9.4	7.3	5.5	3.9
D1-GRAB-SED-0-10cm	100	80.6	71.8	60.4	44	16.7	3.2	0.8						
D5-GRAB-SED-0-10cm	100	99.5	92	82.2	67	21.2	3.9	2.3						

Apparent Grain Size Distribution Summary Percent Retained in Each Size Fraction														
Sample No.	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Medium Silt	Fine Silt	Very Fine Silt	Clay			Total Fines
Phi Size	< -1	-1 to 0	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	> 10	> 4
Sieve Size (microns)	> #10 (2000)	10-18 (2000-1000)	18-35 (1000-500)	35-60 (500-250)	60-120 (250-125)	120-230 (125-62)	62.5-31.0	31.0-15.6	15.6-7.8	7.8-3.9	3.9-2.0	2.0-1.0	<1.0	<230 (<62)
BA1-SED-0-0.8	10.8	3.9	5.2	5	4.5	8.5	29.6	17	4.2	2.1	1.5	1.2	6.4	62
BA1-SED-0.8-1.3	0.8	3	2	1.7	2.6	8.9	18.4	18.3	14.2	9.8	6.3	4.2	9.7	81
BA1-SED-1.3-2.0	1.1	5.6	7.7	6.9	5.3	6	21.9	14.7	8.6	5.6	3.6	2.7	10.2	67.4
LP3-SED-0-1.0	3.2	19.8	41.7	24.9	2.8	0.8	2.8	1.2	0.9	0.6	0.4	0.3	0.6	6.9
D3-GRAB-SED-0-10cm	1.7	3.5	5.5	11.2	24.8	33.6	8.7	2.7	1.9	1.1	1	0.7	3.7	19.7
	3.8	3.1	5.3	11.2	24	33.3	8.2	2.8	2	1	1.1	0.6	3.5	19.2
	2.3	3.3	5.6	11.7	24.2	35.3	6.7	2.6	1.6	1.4	1	0.6	3.6	17.6
D6-GRAB-SED-0-10cm	14.5	9.3	22.2	45	7	0.4	1.6							1.6
D4-GRAB-SED-0-10cm	51.2	10.1	5.3	5	8.9	7.3	5.7	1.4	1.4	0.8	0.7	0.4	1.9	12.3
D2-GRAB-SED-0-10cm	40.8	8.4	4.6	5.6	8	9.3	6.8	2.9	4.2	2.1	1.8	1.7	3.9	23.3
D1-GRAB-SED-0-10cm	28.2	11.4	16.4	27.3	13.5	2.4	0.8							0.8
D5-GRAB-SED-0-10cm	8	9.8	15.2	45.8	17.3	1.6	2.3							2.3

Table 4
Summary of 2019 Sediment Chemistry Sample Results
Final Pre-Remedial Design Work Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, Washington

Analyte	Volume III Sediment Cleanup Objectives (Table 3-11)	Volume III Sediment Cleanup Screening Levels (Table 3-12)	Volume III Sediment Cleanup Screening Levels (Table 3-6)	D1 12/2/2019 0-10 cm		D2 12/2/2019 0-10 cm		D3 12/2/2019 0-10 cm		D4 12/2/2019 0-10 cm		D5 12/2/2019 0-10 cm		D6 12/2/2019 0-10 cm	
SVOCs (EPA 8270D)	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg OC	µg/kg	µg/kg OC	µg/kg	µg/kg OC	µg/kg	µg/kg OC	µg/kg	µg/kg OC	µg/kg	µg/kg OC
Phenol	-	-	1,200	9.1 J	-	22.4	-	71.2	-	13.6 J	-	19.9 U	-	19.8 U	-
1,4 Dichlorobenzene	-	-	-	5.0 U	-	5.0 U	-	5.0 U	-	5.0 U	-	5.0 U	-	5.0 U	-
1,2 Dichlorobenzene	-	-	-	5.0 U	-	5.0 U	-	1.2 J	-	5.0 U	-	5.0 U	-	5.0 U	-
Benzyl Alcohol	-	-	-	20.0 U	-	19.9 U	-	19.9 U	-	19.9 U	-	19.9 U	-	20.0 U	-
4 Methylphenol	-	-	670	20.0 U	-	250.0 J	-	1250.0 J	-	110.0 J	-	19.9 U	-	20.0 U	-
2,4 Dimethylphenol	-	-	29	20.0 U	-	4.3 J	-	7.2 J	-	3.9 J	-	19.9 U	-	20.0 U, J	-
1,2,4 Trichlorobenzene	-	-	-	5.0 U	-	5.0 U	-	5.0 U	-	5.0 U	-	5.0 U	-	5.0 U	-
Naphthalene	-	-	-	19.7 J	-	123.0	-	524.0	-	37.9	-	7.6 J	-	20.0 U	-
Benzoic acid	-	-	-	20.8 U	-	65.0 U	-	49.6 U	-	28.8 J	-	15.1 U	-	100.0 U	-
2 Methylnaphthalene	-	-	-	10.8 J	-	46.3	-	133.0	-	13.9 J	-	19.9 U	-	20.0 U	-
Acenaphthylene	-	-	-	18.0 J	-	49.4	-	64.0	-	45.6	-	19.9 U	-	20.0 U	-
Dimethylphthalate	-	-	-	20.0 U	-	19.9 U	-	19.9 U	-	20.0 U	-	19.9 U	-	20.0 U	-
Acenaphthene	-	-	57,000 µg/kg OC	16.5 J	5,156	73.3	2,956	168.0	5,437	17.2 J	2,293	6.1 J	3,813	20.0 U	0
Dibenzofuran	-	-	58,000 µg/kg OC	26.7	8,344	79.2	3,194	169.0	5,469	19.6 J	2,613	7.9 J	4,938	20.0 U	0
N Nitrosodiphenylamine	-	-	-	5.0 U	-	6.5	-	5.0 U	-	2.2 J	-	5.0 U	-	5.0 U	-
Pentachlorophenol	-	-	-	20.0 U	-	3.4 J	-	7.0 J	-	24.3	-	19.9 U	-	20.0 U	-
Phenanthrene	-	-	480,000 µg/kg OC	522.0	163,125	472.0	19,032	1360.0	44,013	307.0	40,933	21.0	13,125	27.5	34,375
Anthracene	-	-	-	53.6	-	291.0	-	295.0	-	423.0	-	9.8 J	-	20.0 U	-
Fluoranthene	-	-	1,200,000 µg/kg OC	868.0	271,250	804.0	32,419	1520.0	49,191	1500.0 J	200,000	49.2	30,750	17.1 J	21,375
Pyrene	-	-	-	569.0	-	977.0	-	1660.0	-	1380.0 J	-	51.3	-	12.8 J	-
Benzo(a)anthracene	-	-	-	101.0	-	358.0	-	327.0	-	748.0 J	-	25.0	-	20.0 U	-
Chrysene	-	-	460,000 µg/kg OC	265.0	82,813	996.0	40,161	786.0	25,437	2560.0	341,333	30.1	18,813	20.0 U	0
bis(2 Ethylhexyl)phthalate	-	-	78,000 µg/kg OC	50.0 U	0	49.7 U	0	55.7	1,803	50.0 U	0	49.8 U	0	50.0 U	0
Benzo(a)pyrene	-	-	-	269.0	-	895.0	-	776.0	-	1300.0 J	-	63.7	-	40.0 U	-
Benzo(a)pyrene	-	-	-	105.0	-	383.0	-	290.0	-	480.0 J	-	31.5	-	20.0 U	-
Indeno(1,2,3 cd)pyrene	-	-	88,000 µg/kg OC	61.6	19,250	213.0	8,589	163.0	5,275	215.0	28,667	27.2	17,000	20.0 U	0
Dibenzo(a,h)anthracene	-	-	-	28.7	-	95.7	-	58.1	-	113.0	-	8.9 J	-	20.0 U	-
Benzo(g,h,i)perylene	-	-	78,000 µg/kg OC	72.8	22,750	216.0	8,710	169.0	5,469	204.0	27,200	29.7	18,563	20.0 U	0
Hexachlorobenzene	-	-	-	0.5 U	-	2.8 U	-	0.5 U	-	0.5 U	-	0.5 U	-	0.5 U	-
Total LPAH (calculated) ¹	-	-	780,000 µg/kg OC	629.8	196,813	1008.7	40,673	2411.0	78,026	830.7	110,760	44.5	27,813	27.5	34,375
Total HPAH (calculated) ²	-	-	5,300,000 µg/kg OC	2340.1	731,281	4937.7	199,101	5749.1	186,055	8500.0	1,133,333	316.6	197,875	189.9	237,375
cPAHs TEQ (calculated) ³	16	64	-	127	-	460	-	353	-	613	-	38	-	0	-
PCBs				µg/kg	µg/kg OC	µg/kg	µg/kg OC	µg/kg	µg/kg OC	µg/kg	µg/kg OC	µg/kg	µg/kg OC	µg/kg	µg/kg OC
Aroclor 1016	-	-	-	4.0 U		4.0 U		4.0 U		4.0 U		4.0 U		4.0 U	
Aroclor 1221	-	-	-	4.0 U		4.0 U		4.0 U		4.0 U		4.0 U		4.0 U	
Aroclor 1232	-	-	-	4.0 U		4.0 U		4.0 U		4.0 U		4.0 U		4.0 U	
Aroclor 1242	-	-	-	4.0 U		4.0 U		4.0 U		4.0 U		4.0 U		4.0 U	
Aroclor 1248	-	-	-	4.0 U		4.0 U		4.0 U		4.0 U		4.0 U		4.0 U	
Aroclor 1254	-	-	-	10.0		14.0		48.4		4.4		2.4 J		4.0 U	
Aroclor 1260	-	-	-	60.1		42.6		175.0		16.3 J		4.3		4.0 U	
Total Aroclor PCBs, ND=0	-	-	65,000 µg/kg OC		21,906		2,282		7,230		2,760		4,188		0
Dioxins/Furans	ng/kg	ng/kg	ng/kg	ng/kg		ng/kg		ng/kg		ng/kg		ng/kg		ng/kg	
2,3,7,8 TCDF	-	-	-	1.27		0.78 J		5.18		0.19 U		0.07 U		1.00 U	
2,3,7,8 TCDD	-	-	-	0.23 U		0.30 U		1.06 J		0.18 U		1.00 U		0.12 U	
1,2,3,7,8 PeCDF	-	-	-	0.27 U		0.38 U		2.07		0.12 U		0.07 U		0.06 U	
2,3,4,7,8 PeCDF	-	-	-	0.30 J		0.40 J		2.67		0.10 U		1.00 U		0.04 U	
1,2,3,7,8 PeCDD	-	-	-	1.00 U		0.75 J		3.85		0.18 J		0.06 U		1.00 U	
1,2,3,4,7,8 HxCDF	-	-	-	0.61 U		0.56 U		2.87		0.12 U		0.11 U		0.05 U	
1,2,3,6,7,8 HxCDF	-	-	-	0.29 U		0.32 U		2.19		0.07 U		1.00 U		1.00 U	
2,3,4,6,7,8 HxCDF	-	-	-	0.20 U		0.28 U		1.38		1.00 U		0.04 U		1.00 U	

Table 4
Summary of 2019 Sediment Chemistry Sample Results
Final Pre-Remedial Design Work Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, Washington

Analyte	Volume III Sediment Cleanup Objectives (Table 3-11)	Volume III Sediment Cleanup Screening Levels (Table 3-12)	Volume III Sediment Cleanup Screening Levels (Table 3-6)	D1 12/2/2019 0-10 cm	D2 12/2/2019 0-10 cm	D3 12/2/2019 0-10 cm	D4 12/2/2019 0-10 cm	D5 12/2/2019 0-10 cm	D6 12/2/2019 0-10 cm
1,2,3,7,8,9 HxCDF	-	-	-	0.21 J	0.16 J	0.82 U, J	1.00 U	1.00 U	1.00 U
1,2,3,4,7,8 HxCDD	-	-	-	0.30 U	0.59 U	2.98	0.16 U	1.00 U	1.00 U
1,2,3,6,7,8 HxCDD	-	-	-	0.53 U	2.09	7.68	0.55 U	0.50 U	0.13 U
1,2,3,7,8,9 HxCDD	-	-	-	0.38 J	1.15	4.48	0.31 U	0.10 U	0.07 J
1,2,3,4,6,7,8 HpCDF	-	-	-	2.10	6.63	36.70	1.30 J	0.85 U	0.27 J
1,2,3,4,7,8,9 HpCDF	-	-	-	0.25 J	0.36 U	1.00 U	0.09 U	1.00 U	1.00 U
1,2,3,4,6,7,8 HpCDD	-	-	-	11.90	98.50	433.00	16.20	8.63	1.41 J
OCDF	-	-	-	4.29	23.30	136.00	3.08	1.96 U	0.37 U
OCDD	-	-	-	109.00	1,050.00	5,630.00 J	154.00 J	94.20	9.84 J
Total TCDF	-	-	-	10.10	9.11	83.20	0.64 J	0.06 J	1.00 U
Total TCDD	-	-	-	9.08	17.90	231.00	11.00 J	0.37 J	0.10 J
Total PeCDF	-	-	-	2.86	3.12	23.60	0.58 J	0.34 J	0.04 J
Total PeCDD	-	-	-	3.15	9.70	118.00	4.29 J	1.00 U	1.00 U
Total HxCDF	-	-	-	3.72	8.91	39.40	1.63	1.82	0.48 J
Total HxCDD	-	-	-	4.97	40.00	209.00	9.09	1.09	0.56 J
Total HpCDF	-	-	-	5.32	22.60	225.00	3.87	2.93	0.74 J
Total HpCDD	-	-	-	37.50	407.00	3,180.00	60.10	22.80	3.42
Total 2,3,7,8 TCDD Equivalence (WHO2005, ND=112 EDL, Including EMPC)	2.3	ND	-	0.97	3.15	14.96	0.75	0.30	0.22
Total 2,3,7,8 TCDD Equivalence (WHO2005, ND=0, Including EMPC):			-	0.89	3.15	14.96	0.75	0.26	0.18
Metals	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Antimony	-	-	-	0.3 U	0.4 U	0.4 U	0.3 U	0.3 U	0.3 U, J
Chromium	-	-	-	9.4 J	19.6 J	17.0 J	8.7 J	19.4 J	27.4 J
Copper	35	35	-	17.6 J	16.0 J	17.9 J	7.3 J	18.4 J	24.6 J
Lead	-	-	-	3.5 J	12.1 J	9.3 J	2.2 J	2.3 J	3.0 J
Silver	-	-	-	0.0 J	0.1 J	0.1 J	0.0 J	0.0 J	0.1 J
Arsenic	12	14	-	4.6	3.8	5.3	1.9	2.0	3.0
Cadmium	0.82	2.4	-	0.2	0.7	0.6	0.3	0.1 J	0.1 J
Selenium	0.6	0.6	-	0.73	0.85 J	1.29	0.76 U	0.79	1.03
Zinc	77	77	-	20.6 J	44.2 J	36.5 J	16.5 J	30.9 J	42.7 J
Mercury	0.11	0.13	0.59	0.0248 J	0.0545	0.114	0.039	0.00814 J	0.0259 U
Wet Chemistry				%	%	%	%	%	%
TOC	-	-	-	0.32	2.48	3.09	0.75	0.16	0.08
Volatile solids	-	-	-	1.53	4.93	8.76	2.7	1.68	1.79
Total Solids	-	-	-	71.28	52.68	53.09	63.81	73.78	75.23

Notes:

Cells with "-" have no SCOs or CSLs listed in the Volume III reference tables

¹Total HPAHs were calculated as the sum of benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, total benzofluoranthenes, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene.

²Total LPAHs were calculated as the sum of acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene.

³Calculated based on Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAHs) using Toxicity Equivalency Factors (TEFs), Department of Ecology, April 2015. ND=0

% = percent

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

mg/kg = milligram per kilogram

ng/kg = nanogram per kilogram

OC = organic carbon

U = The analyte was analyzed for, but was not detected

µg/kg = microgram per kilogram

Table 5
Proposed Sample Locations
Final Pre-Remedial Design Work Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, Washington

Location ID	Northing (ft)	Easting (ft)	Latitude	Longitude
P1	419207.77	1011764.14	48.12041	-123.40763
P2	419191.50	1011868.20	48.12037	-123.40720
P3	419100.53	1011798.16	48.12012	-123.40748
P4	418949.77	1011693.09	48.11970	-123.40789
P5	418886.92	1011760.61	48.11953	-123.40760
P6	418918.70	1011833.44	48.11962	-123.40731
P7	418727.47	1011728.25	48.11909	-123.40771
P8	418698.43	1011646.92	48.11900	-123.40804
P9	418659.85	1011780.46	48.11891	-123.40749
P10	418348.40	1011580.86	48.11804	-123.40826
P11	418364.50	1011651.51	48.11809	-123.40798
P12	418394.59	1011742.68	48.11818	-123.40761
P13	418558.64	1011684.19	48.11862	-123.40787
P14	418530.15	1011983.80	48.11857	-123.40664
P15	418411.88	1011996.31	48.11825	-123.40657
P16	418435.97	1011912.62	48.11831	-123.40692
P17	418350.50	1011451.32	48.11803	-123.40879
P18	418415.20	1011418.04	48.11821	-123.40894
P19	418424.30	1011232.77	48.11821	-123.40970
P20	418438.40	1011104.52	48.11824	-123.41023
P21	418578.00	1011060.55	48.11862	-123.41042
P22	418652.56	1010889.21	48.11881	-123.41114
P23	418790.70	1010952.52	48.11919	-123.41090
P24	418822.89	1010762.76	48.11926	-123.41168

Notes:

Datum = NAD83(96) WA State Plane N, US-FT

ft = feet

Table 6
Core Interval Sampling Layout
Final Pre-Remedial Design Work Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, Washington

Surface Sample Locations				
Sediment Chemistry Intervals (Depth Below ML)	Sediment Chemistry Suite	Archive	Grain Size Distribution	Physical Property Intervals (Depth Below ML)
0-45 cm (intertidal)	1		1	
0-10 cm (subtidal)	1		1	

Intertidal Core Locations				
Sediment Chemistry Intervals (Depth Below ML)	Sediment Chemistry Suite	Archive	Grain Size Distribution	Physical Property Intervals (Depth Below ML)
0-1'	1		1	0.3'-0.8'
			1	0.8'-1.3'
1'-2'	1		1	1.3'-1.8'
2'-3'		1		
3'-4'		1		
4'-6'		1		
6'-8'		1		

Subtidal Core Locations				
Sediment Chemistry Intervals (Depth Below ML)	Sediment Chemistry Suite	Archive	Grain Size Distribution	Physical Property Intervals (Depth Below ML)
0-1'	1		1	0.3'-0.8'
			1	0.8'-1.3'
1'-2'	1		1	1.3'-1.8'
2'-3'		1		
3'-4'		1		
4'-6'		1		
6'-8'		1		

Notes:

ML = Mudline



Figures

PLOT TIME: 8/28/2024 8:17 AM MOD TIME: 8/23/2024 3:27 PM USER: Dan Pickering DWG: P:\Rayonier Pt Angeles CAD\2024 Work Plan\Figures\2024-08-23 RYAM_1_WP_VIN-LOC.dwg



VICINITY MAP



Plan View

0 300

Scale in Feet

Note

1. Background image date July 2023 - Google Earth Map.

Rayonier Advanced Materials
Port Angeles, WA - Rayonier Mill Site
Pre-Remedial Design Work Plan

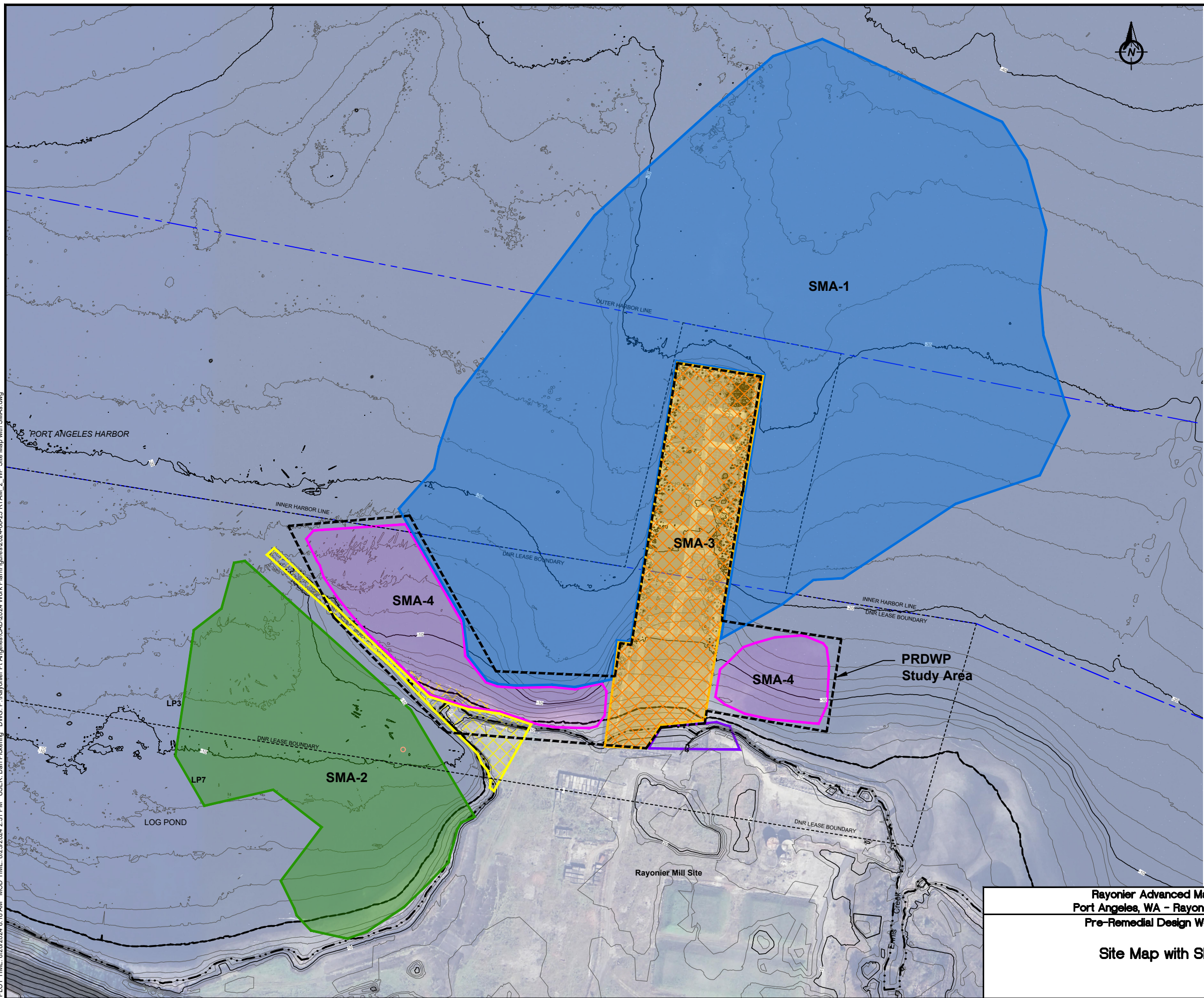
Project Location and Vicinity Map

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FIGURE
1

August 28, 2024

PLOT TIME: 8/28/2024 8:18 AM MOD TIME: 8/23/2024 2:31 PM USER: Dan Pickering DWG: P:\Rayonier PT Angeles\CAD\2024 Work Plan\Figures\2024-08-23 RYAM_2_WP Site Map with SMAs.dwg

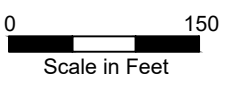


SEDIMENT MANAGEMENT AREA (SMA)

- SMA-1
- SMA-2
- SMA-3
- SMA-4

LEGEND

- Dock Structure
- Jetty Structure
- PRDWP Study Area
- DNR Lease Boundary
- Harbor Line
- Parcel Boundary
- Existing Contour MNR (2')
- Existing Contour MJR (10')



NOTES

- 1. The locations of all features shown are approximate.
- 2. Bathymetric survey conducted with multi-beam hydrographic survey completed by Sea Engineering in 2014.
- 3. Upland base survey drawing provided by Northwestern Territories, Inc., dated 10/03/2000.
- 4. Background image date March 2024 - Google Earth Map.

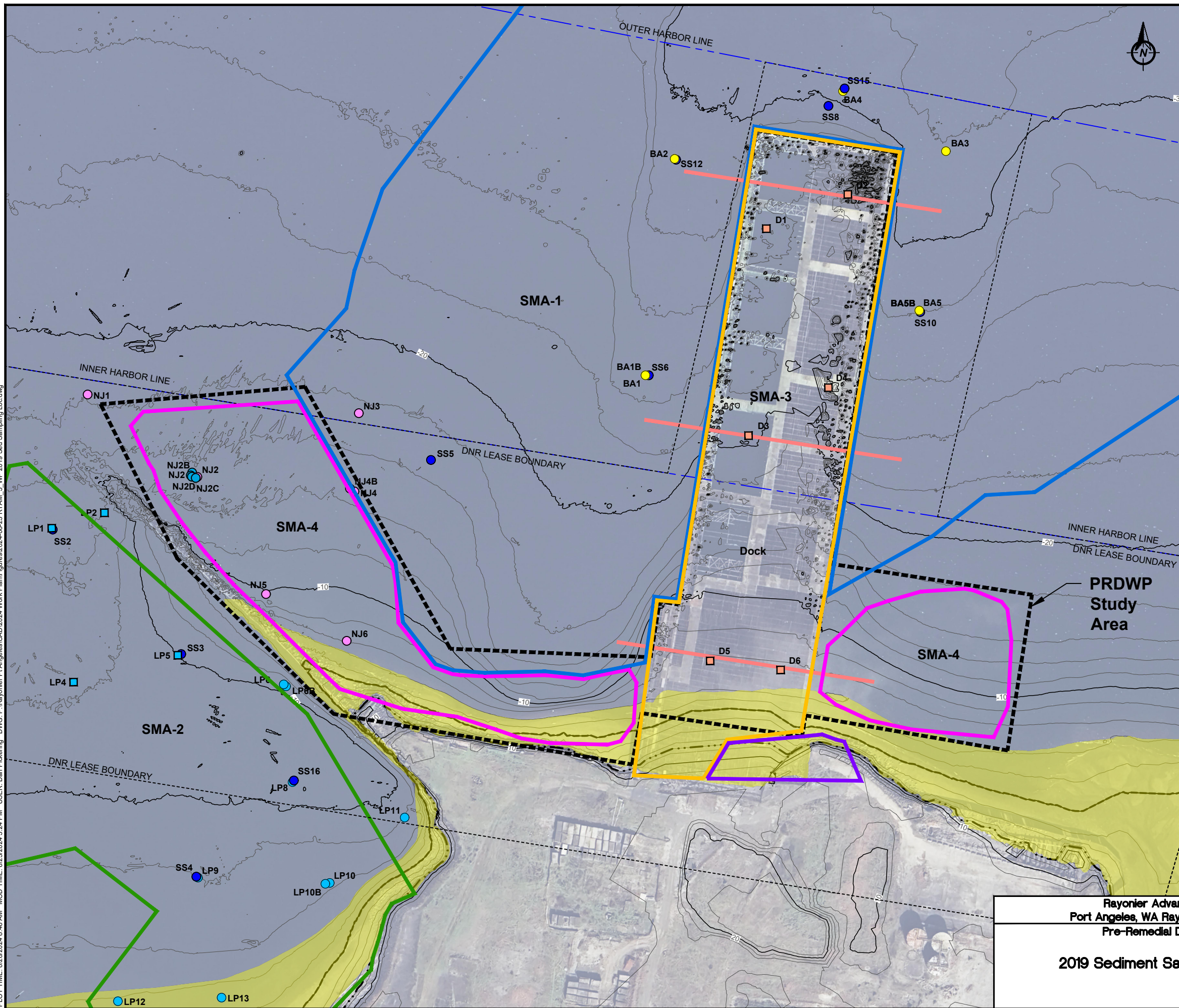
Rayonier Advanced Materials
Port Angeles, WA - Rayonier Mill Site
Pre-Remedial Design Work Plan

Site Map with SMAs

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FIGURE
2
August 28, 2024

PLOT TIME: 8/28/2024 8:48 AM MOD TIME: 8/23/2024 3:24 PM USER: Dan Pickering DWG: P:\Rayonier PI Angeles CAD\2024 Work Plan\Figures\2024-08-23 RYAM_3_WP 2019 Sed Sampling Loc.dwg



SAMPLING LEGEND

- 2019 Sampling Event**
- Underdock dive transects
 - LP5 Core - visual logging - Drill Rig (Log Pond)
 - LP11 Core - visual core logging - vibracore (Log Pond)
 - BA1 Core - visual logging - vibracore (North Jetty)
 - NJ2 Core - visual logging - vibracore (Berth Area)
 - D6 Underdock/thru dock sediment sample location
 - SS3 Additional sample location

SEDIMENT MANAGEMENT AREA (SMA)

- SMA-1
- SMA-2
- SMA-3
- SMA-4

LEGEND

- Intertidal Zone (approx. -4 to +8 MLLW)
- PRDWP Study Area
- DNR Lease Boundary
- Harbor Line
- Parcel Boundary
- 30 Existing Contour MNR (2')
- 10 Existing Contour MJR (10')

0 150
Scale in Feet

NOTES

- The locations of all features shown are approximate.
- Bathymetric survey conducted with multi-beam hydrographic survey completed by Sea Engineering in 2014.
- Upland base survey drawing provided by Northwestern Territories, Inc., dated 10/03/2000.
- Background image date March 2024 - Google Earth Map.

Rayonier Advanced Materials
Port Angeles, WA Rayonier Mill Study Area
Pre-Remedial Design Work Plan

2019 Sediment Sampling Locations

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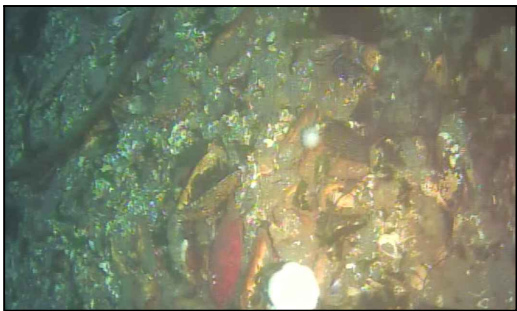
FIGURE
3

August 28, 2024

PLOT TIME: 8/28/2024 8:37 AM MOD TIME: 8/23/2024 3:22 PM USER: Dan Pickering DWG: P:\Rayonier PI Angeles CAD\2024 Work Plan\Figures\2024-08-23 RYAM_4 Diver-Assisted Sampling.dwg

Analyte	Volume III Sediment Cleanup		
	SCO (Table 3-11)	SCL (Table 3-12)	SCL (Table 3-6)
SVOCs (ug/kg)			
Total LPAH	-	-	780,000
Total HPAH	-	-	5,300,000
cPAH TEQ	16	64	-
Total PCBs (ug/kg)	-	-	65,000
Dioxins/Furans (ng/kg)			
2,3,7,8 TCDD TEQ	2.3	ND	-
Metals (mg/kg)			
Copper	35	35	-
Arsenic	12	14	-
Cadmium	0.82	2.4	-
Selenium	0.6	0.6	-
Zinc	77	77	-
Mercury	0.11	0.13	0.59

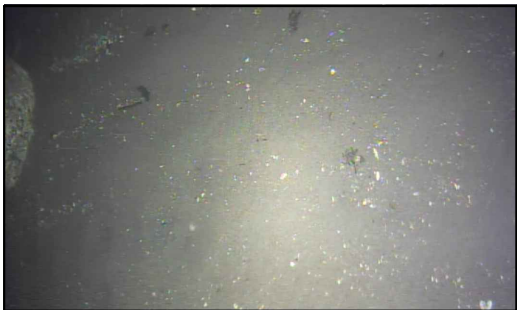
Analyte	D1 0-10 cm
SVOCs (ug/kg)	
Total LPAH	196,813
Total HPAH	731,281
cPAH TEQ	127
Total PCBs (ug/kg)	21,906
Dioxins/Furans (ng/kg)	
2,3,7,8 TCDD TEQ	0.97
Metals (mg/kg)	
Copper	17.6 J
Arsenic	4.62
Cadmium	0.21
Selenium	0.73
Zinc	20.6 J
Mercury	0.0248 J



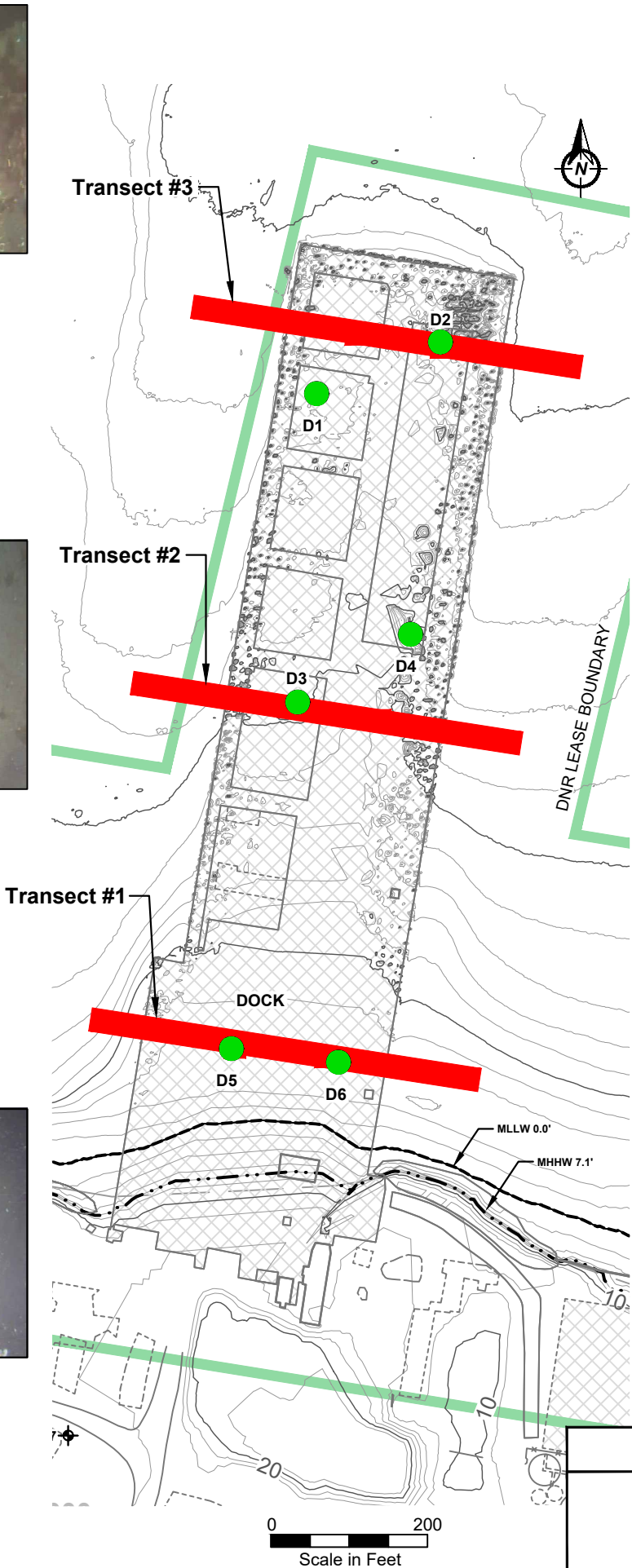
Sample Location D1
Soft, silty sand with prevalent shell fragments.



Sample Location D3
Soft, silty sand.



Sample Location D5
Sand with interspersed rock.

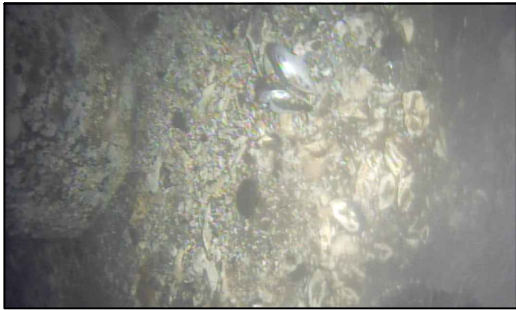


Analyte	D2 0-10 cm
SVOCs (ug/kg)	
Total LPAH	40,673
Total HPAH	199,101
cPAH TEQ	460
Total PCBs (ug/kg)	2,282
Dioxins/Furans (ng/kg)	
2,3,7,8 TCDD TEQ	3.15
Metals (mg/kg)	
Copper	16 J
Arsenic	3.82
Cadmium	0.72
Selenium	0.85 J
Zinc	44.2 J
Mercury	0.0545



Sample Location D2
Soft, silty sand with prevalent shell fragments.

Analyte	D4 0-10 cm
SVOCs (ug/kg)	
Total LPAH	110,760
Total HPAH	1,133,333
cPAH TEQ	613
Total PCBs (ug/kg)	2,760
Dioxins/Furans (ng/kg)	
2,3,7,8 TCDD TEQ	0.75
Metals (mg/kg)	
Copper	7.33 J
Arsenic	1.89
Cadmium	0.29
Selenium	<0.76
Zinc	16.5 J
Mercury	0.039



Sample Location D4
Soft, silty sand with prevalent shell fragments.

Analyte	D6 0-10 cm
SVOCs (ug/kg)	
Total LPAH	34,375
Total HPAH	237,375
cPAH TEQ	0
Total PCBs (ug/kg)	ND
Dioxins/Furans (ng/kg)	
2,3,7,8 TCDD TEQ	0.22
Metals (mg/kg)	
Copper	24.6 J
Arsenic	3.04
Cadmium	0.05 J
Selenium	1.03
Zinc	42.7 J
Mercury	<0.0259



Sample Location D6
Sand with interspersed rock.

- LEGEND**
- Existing MLLW (0.00')
 - . - . - Existing MHHW (7.06')
 - DNR Lease Boundary
 - Existing Contour MNR (2')
 - 30- Existing Contour MJR (10')

- SAMPLING LEGEND**
- Underdock dive transects
 - D1 Underdock sediment sample location

SURVEY NOTE

- The locations of all features shown are approximate.

DATUM

Horizontal - Washington Coordinate System, North Zone, NAD 83(91).

Vertical - N.O.S. MLLW.

CAD file provided by Northwestern Territories, Inc., DNR Aquatic Lands Lease, Lease No. 22-002356 for: Rayonier, Inc., 3-26-2001, RAY00102_DNR_LEASE.DWG

Analyte	D5 0-10 cm
SVOCs (ug/kg)	
Total LPAH	27,813
Total HPAH	197,875
cPAH TEQ	38
Total PCBs (ug/kg)	4,188
Dioxins/Furans (ng/kg)	
2,3,7,8 TCDD TEQ	0.3
Metals (mg/kg)	
Copper	18.4 J
Arsenic	2
Cadmium	0.06 J
Selenium	0.79
Zinc	30.9 J
Mercury	0.00814 J

Rayonier Advanced Materials
Port Angeles, WA - Rayonier Mill Study Site
Pre-Remedial Design Work Plan

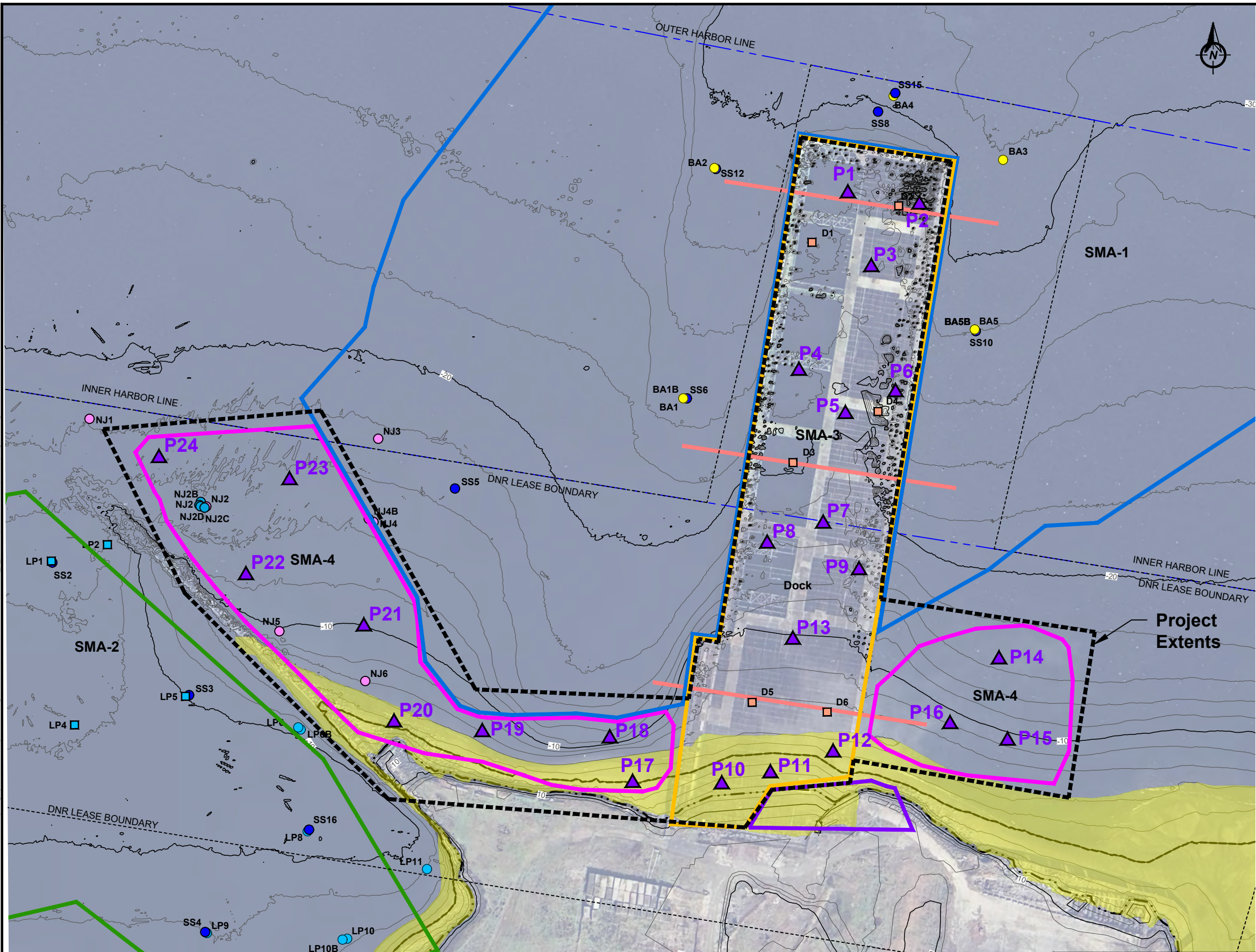
2019 Diver Assisted Sampling

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FIGURE
4

August 28, 2024

PLOT TIME: 8/12/2025 2:39 PM MOD TIME: 8/12/2025 2:39 PM USER: Kelley Bagley DWG: P:\Rayonier PI Angeles\CAD\2025 SAP\2025-08-12 RYAM_3_SAP Proposed Data Gaps Sampling Loc.dwg



SAMPLING LEGEND

- P5** Proposed Locations
- 2019 Sampling Event**
- Underdock dive transects
 - LP5 Core - visual logging - Drill Rig (Log Pond)
 - LP11 Core - visual core logging - vibracore (Log Pond)
 - BA1 Core - visual logging - vibracore (North Jetty)
 - NJ2 Core - visual logging - vibracore (Berth Area)
 - D6 Underdock/thru dock sediment sample location
 - SS3 Additional sample location

SEDIMENT MANAGEMENT AREA (SMA)

- SMA-1
- SMA-2
- SMA-3
- SMA-4

LEGEND

- Intertidal Zone (approx. -4 to +8 MLLW)
- Project Extents
- DNR Lease Boundary
- Harbor Line
- Parcel Boundary
- 30 Existing Contour MNR (2')
- 10 Existing Contour MJR (10')

NOTES

- The locations of all features shown are approximate.
- Bathymetric survey conducted with multi-beam hydrographic survey completed by Sea Engineering in 2014.
- Upland base survey drawing provided by Northwestern Territories, Inc., dated 10/03/2000.
- Background image date March 2024 - Google Earth Map.

Rayonier Advanced Materials
Port Angeles, WA Rayonier Mill Study Area
Pre-Remedial Design Work Plan

Proposed Data Gaps Sampling Locations

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FIGURE

5

August 12, 2025



Appendix A Coastal Conceptual Site Model and Hydrodynamic Modeling Action Plan

To be provided as a separate, standalone document, as acknowledged by Ecology in a letter dated August 26, 2025 (Ecology, 2025).



Appendix B Sampling and Analysis Plan

Final Sampling and Analysis Plan Under- Dock and Nearshore Areas

Port Angeles Rayonier
Mill Site

Port Angeles,
Washington

Prepared for:

Rayonier A.M.
Properties

Prepared by:

DOF DALTON
OLMSTED
FUGLEVAND

EHS  **Support**TM

September 2025



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1	Introduction	1
2	Project and Site Description	2
2.1	Project Background.....	2
2.2	Site Description	2
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Acronyms

°C	degree Celsius
AO	Agreed Order
cm	centimeters
COC	chain of custody
DGPS	differential global positioning system
Ecology	Washington State Department of Ecology
ft	feet/foot
HASP	Health and Safety Plan
IAP	Interim Action Plan
ID	identification
I _A	incremental length of sediment acquired in the core tube
I _p	incremental penetration of the core tube below mudline
m	meter
m/s	meter per second
MLLW	Mean Lower Low Water elevation
PSEP	Puget Sound Estuary Program
QAPP	Quality Assurance Project Plan
QA	quality assurance
QC	quality control
SAP	Sampling and Analysis Plan
SCUM	Sediment Cleanup User's Manual
SMS	Sediment Management Standards
V-SAM	vibracore sediment acquisition monitoring
WAC	Washington Administrative Code



1 Introduction

This Sampling and Analysis Plan (SAP) has been prepared to support the associated Pre-Remedial Design Work Plan (“Work Plan”) that was prepared to meet requirements set forth in the Second Amendment to Agreed Order No. DE 6815 (“AO amendment”; Washington State Department of Ecology [Ecology], 2024) between Ecology and Rayonier A.M. Properties, LLC (“RAMP”). The requirements in the AO amendment were established in support of remedial interim action planning at the former Port Angeles Rayonier Mill Site (“Site”) located in Port Angeles, Washington, at 700 North Ennis Street (**Figure 1**).

This SAP details procedures to be implemented during field sampling activities in support of sediment data gathering efforts as part of pre-design for remediation. This SAP was developed in accordance with Ecology’s *Sediment Cleanup User’s Manual* (SCUM; Ecology, 2021) and meets the requirements of Washington Administrative Code (WAC) 173-340-820 in the Model Toxics Control Act and WAC 173-204-600 in the Sediment Management Standards (SMS). Updates to this SAP will be communicated to Ecology and addressed as addenda if needed.

A Quality Assurance Project Plan (QAPP) has also been developed as a separate document within the Work Plan (see Appendix C in the Work Plan). The QAPP presents the data quality objectives, laboratory activities, and field quality assurance/quality control (QA/QC) procedures to be implemented during field sampling activities and laboratory analyses in support of sediment chemistry data gathering efforts. QAPP addenda will also be developed, if appropriate, depending on future field investigation requirements.

A Health and Safety Plan (HASP) for support of field sampling activities is included with the Work Plan, as well. HASP addenda will also be developed, if appropriate, depending on future field investigation requirements.

Other additional addenda, such as sampling protocols and standard operation procedures, will be provided with future work plan documentation as needed.



2 Project and Site Description

The following sections include a description of the project as defined by the AO originally prepared in 2010 (Ecology, 2010) for the Site.

2.1 Project Background

Ecology and RAMP entered into AO No. DE 6815 in 2010 to develop an Interim Action Plan (IAP) to address groundwater, freshwater, marine sediments, and the upland soils at the Site. In 2012, the AO was amended (Ecology, 2012) to facilitate a Combined Sewer Overflow project on a portion of the former Rayonier Mill property that RAMP conveyed to the City of Port Angeles. The AO was amended a second time (effective June 3, 2024) to address requirements for RAMP to perform additional field investigations to fill sediment chemistry data gaps identified in the Draft IAP (Ecology, 2023).

2.2 Site Description

The Site is located on the eastern side of Port Angeles Harbor (“Harbor”) in Clallam County, Washington. The Harbor and nearby City of Port Angeles are located on the north side of the Olympic Peninsula on the shoreline of the Strait of Juan de Fuca (**Figure 1**).

Shoreline and nearshore structures within the Site related to the scope of work described in this SAP are shown on **Figure 2** and include:

- **Jetty:** Timber crib rock jetty. Approximately 700 feet (ft) long and approximately 30 ft wide, approximately 375 creosote timber pilings.
- **Dock:** Creosote piling supported creosote timber dock approximately 1,050 ft long and 250 ft wide (approximately 5.7 acres of overwater coverage), over 4,300 creosote timber pilings, approximately 3,000 square ft of concrete foundation.

Sections 1.1 and 1.4 of the Work Plan include additional background and Site description information.



3 Project Organization and Responsibilities

The specific roles, activities, and responsibilities of project participants are described in Section 2 of the QAPP.



4 Sediment Sample Collection, Processing, and Handling Procedures

This section describes the activities, methods, and procedures that will be used to complete the sediment sampling investigation. Sample collection and management discussed herein include procedures relating to sediment sampling (e.g., surface grabs, cores, etc.).

The rationale for the sampling design and the design assumptions for locating and selecting environmental samples are detailed in Section 3 in the Work Plan. Sediment sampling procedures will comply with Ecology protocols (Ecology, 2021).

4.1 Sediment (Surface Grab and Subsurface Core Sampling)

Sampling methods for surface sediment (grabs) and subsurface sediment (cores) are outlined in the following subsections.

4.1.1 Station and Sample Identification and Nomenclature

Each sample location will be assigned a unique numerical identifier, and each sample will be assigned a unique alphanumeric identifier according to the following method:

- Each sample identification (ID) will be identified by **Project_Sample Method-Sample Location Number_Start Depth-End Depth**.
- The project name will be identified by four letters: RAMP for Rayonier Advanced Materials Port Angeles.
- Sample method will be identified as **SG** for surface grab sediment, **SVC** for subtidal sediment vibracore, and **IVC** for intertidal sediment vibracore.
- Sample location number will be in order by sample method beginning with -001 (e.g., SG-001).
- Sample depth will be identified by the upper and lower sample collection depths. Surface grab depths are measured in centimeters (cm), and sediment core intervals are measured in ft.
 - For example, a sample ID for the first surface sediment grab location will be RAMP_SG-001_0-10 and from the 0- to 2-ft interval of a subtidal sediment vibracore will be RAMP_SVC-001_0-2.
- QA/QC samples will be identified by **Project_Sample Type-Sample Number**
 - For example, a sample ID for the first surface sediment grab blind duplicate will be RAMP_DUP-001.

4.1.2 Station Positioning

Horizontal positioning will be determined by the sampling vessel's onboard differential global positioning system (DGPS) based on target coordinates for each sample location, as identified in **Table 1** and visualized on **Figure 3**. Measured station positions will be converted to latitudinal and longitudinal coordinates to the nearest 0.01 second. The accuracy of measured and recorded horizontal coordinates is typically less than 1 meter (m) and will be within 2 m according to Puget Sound Estuary Program (PSEP) guidance. Northing and easting coordinates of the vessel will be updated every second and displayed directly on a computer onboard the vessel. The coordinates will then be processed in real time and stored at the time of sampling using the navigation system. Washington State Plane South



Coordinates, North American Datum of 1983 (NAD83) High Accuracy Reference Network (HARN), will be used for the horizontal datum.

Tidal elevation during sampling will be determined using a tide gauge and tide board to be installed on-site for the duration of the sampling event. Waterline elevation and distance to the mudline will be used to calculate the elevation of the mudline relative to Mean Lower Low Water elevation (MLLW).

A checkpoint will be used to ensure the horizontal accuracy of the sampling vessel's navigation system. This checkpoint will be located at a known fixed point accessible by the sampling vessel (such as a pier face, dock, piling, or similar structure). At the beginning and end of each day, the vessel will be stationed at the checkpoint, a DGPS reading will be taken, and the two readings will be compared. The two position readings should agree within 1 to 2 m, per PSEP guidance.

4.1.3 Sampling Platforms

Surface and subsurface sediment will be collected from a platform appropriate for the sample collection method and sampling location. Appropriate sampling platforms may include sampling on foot (shallow locations at low tide), a small vessel operated by a qualified operator, or a larger vessel, including barges with cranes, specifically designed to support environmental sampling activities and operated by a qualified operator.

4.1.4 Surface Sediment Sample Collection Method

Surface sediment samples for laboratory analyses from the 0- to 10-cm biologically active zone will be collected for physical and chemical testing. Surface samples may be collected using a power grab sampler or by hand in nearshore areas inaccessible by sampling vessel in accordance with PSEP (1997) and Ecology's SCUM (Ecology, 2021) protocols. Samples collected by hand will be collected using a stainless-steel spoon and homogenized in a stainless-steel bowl. Samples will be collected at intertidal locations during low tide when the sediment surface is exposed.

The grab sampler is used to collect large volume surface sediment samples. The sampler uses a hinged jaw assembly for sample collection. Upon contact with sediments, the jaws are closed to collect the sample. Outside of the dock footprint, the power grab sampler will be used to collect samples in the following manner:

- Maneuver the vessel to the sampling location using a DGPS to within 1 to 2 m of the target sampling location.
- Using a lead line, measure and record water depth at the target sampling location.
- Open the decontaminated grab sampler jaws to the deployment position.
- Draw the winch cable to the grab sampler taut and vertical.
- Lower the sampler through the water column to the bottom at a speed of approximately 0.3 m per second (m/s).
- Close the jaws of the sampler when the sampler reaches the bottom, and record the time and DGPS coordinates.
- Retrieve the sampler, raising it at approximately 0.3 m/s.
- Evaluate the retrieved sediment sample aboard the vessel against the following PSEP acceptability criteria:
 - Grab sampler is not overfilled (i.e., sediment surface is not touching the top of sampler).



- Sediment surface is relatively flat, indicating minimal disturbance or winnowing (for samples collected to characterize wood debris [if required], acceptable grab samples will allow for minor surface disturbance).
- Overlying water is present, indicating minimal leakage.
- Overlying water has low turbidity, indicating minimal sample disturbance.
- Desired penetration depth is achieved (i.e., at least 15 cm).
- Siphon off overlying water and use a stainless-steel spoon to collect a 0- to 10-cm sediment layer from inside the sampler, taking care not to collect sediment in contact with the sides of the sampler.
- Take a photograph of the undisturbed intact sample in the grab sampler prior to collecting the sample.
- Place the collected sediment in a stainless-steel mixing bowl, and when sufficient sample volume has been collected, collect samples for volatile analysis.
- Homogenize the remaining sediment in the stainless-steel bowl for approximately 10 minutes, or until substrate uniformity is achieved, using a stainless-steel spoon.
- Place homogenized sediment immediately into appropriate pre-labeled sample containers (**Table 2**), and place immediately on ice and cool to less than or equal to 6 degrees Celsius (°C) until delivered to the appropriate analytical laboratory.

Within the dock footprint, the power grab sampler will be used to collect samples in the following manner:

- Maneuver the crane barge alongside the dock to where the sampling location is within the crane's radius using a DGPS to within 1 to 2 m of the target sampling location.
- Use a small support vessel capable of navigating under the dock to mark sampling locations with an anchor and buoy.
- Measure and record water depth at the target sampling location immediately prior to sample collection using a lead line from the support vessel.
- Crane will be utilized to remove dock stringers as necessary to access sample location under dock.
- Open the decontaminated grab sampler jaws to the deployment position.
- Draw the crane cable to the grab sampler taut and vertical.
- Position the grab sampler over the sample location.
- Lower the sampler through the water column to the bottom at a speed of approximately 0.3 m/s.
- Close the jaws of the sampler when the sampler reaches the bottom, and record the time and DGPS coordinates.
- Retrieve the sampler, raising it at approximately 0.3 m/s.
- Evaluate the retrieved sediment sample aboard the vessel against the following PSEP acceptability criteria:
 - Grab sampler is not overfilled (i.e., sediment surface is not touching the top of the sampler).
 - Sediment surface is relatively flat, indicating minimal disturbance or winnowing (for samples collected to characterize wood debris [if required], acceptable grab samples will allow for minor surface disturbance).
 - Overlying water is present, indicating minimal leakage.
 - Overlying water has low turbidity, indicating minimal sample disturbance.
 - Desired penetration depth is achieved (i.e., at least 15 cm).



- Siphon off overlying water and use a stainless-steel spoon to collect a 0- to 10-cm sediment layer from inside the sampler, taking care not to collect sediment in contact with the sides of the sampler.
- Take a photograph of the undisturbed, intact sample in the grab sampler prior to collecting the sample.
- Place the collected sediment in a stainless-steel mixing bowl, and when sufficient sample volume has been collected, collect samples for volatile analysis.
- Homogenize the remaining sediment in the stainless-steel bowl for approximately 10 minutes, or until substrate uniformity is achieved, using a stainless-steel spoon.
- Place homogenized sediment immediately into appropriate pre-labeled sample containers (**Table 2**), and place immediately on ice and cool to less than or equal to 6°C until delivered to the appropriate analytical laboratory.

Sample Collection Forms and Daily Log notes (**Appendix A**) of grab samples will be maintained as samples are collected. At a minimum, the following information will be included on the Sample Collection Form or Daily Log:

- Water depth to mudline surface
- Horizontal and vertical location information of each grab sample as described in **Section 4.1.2**
- Date and time of collection of each sediment grab sample
- Names of field supervisor and person(s) collecting and logging the sample
- Observations made during sample collection, including weather conditions, complications, ship traffic, and other details associated with the sampling effort
- Station location ID and sample ID
- Physical description in accordance with ASTM International (“ASTM”) procedures (ASTM D2488 and ASTM D2487—Unified Soil Classification System [ASTM, 2017]), including type, density, consistency, and color
- Odor (e.g., hydrogen sulfide, petroleum)
- Presence of vegetation and debris (e.g., wood chips or fibers, paint chips, concrete, sandblast grit, and metal debris)
- Biological activity (e.g., detritus, shells, tubes, bioturbation, and live or dead organisms)
- Presence of oil sheen
- Any other distinguishing characteristics or features
- Any deviation from the approved sampling plan

Sediment surface samples will also be visually inspected for the presence of wood waste.

4.1.5 Subsurface Sediment Sample Collection Method (Cores)

Subsurface sediment will be collected by obtaining sediment cores at each location using a vibracore. If the vibracore is unable to achieve target depth below mudline due to obstruction (e.g., debris, wood waste, compact sand lens) and data at that location are critical to evaluation and design needs, an auger rig or other drilling technology may be used as appropriate based on conditions.

4.1.5.1 Vibracore Sampling

A vibracore collects a continuous profile of subsurface sediment by using a high-frequency vibrating coring device that penetrates the underlying sediments with minimal distortion. When the core tube has



been advanced to full penetration, or has met refusal and will not advance further, the tube is withdrawn from the sediment.

4.1.5.2 Vibracore Sediment Acquisition Monitoring

The vibracore sediment acquisition monitoring (V-SAM) coring methodology employs aluminum core tubes driven into the substrate by a high-frequency vibrating drivehead attached to the top of the core tube, the same as conventional vibracoring (**Figure 4-1** and **Figure 4-2**). The V-SAM system directly measures the length of sediment acquired in the core tube as well as the corresponding incremental distance that the core tube is advanced into the sediment. The difference between the driven distance and the core acquisition length informs the sampler of the percentage of sediment recovered (within the driven interval). For example, if driven 1 ft and 1 ft of sediment is measured inside the tube, that is a 100 percent recovery. If driven 1 ft into sediment and only 0.5 ft is measured in the core, that is a 50 percent recovery. V-SAM is typically implemented using shorter drive intervals (1- to 3-ft intervals until full core drive is achieved or refusal occurs), unlike traditional sediment coring methods that may drive the full length of the core or until refusal in one interval for subsampling sediment.

The equipment consists of a bottom-sitting vibracore A-frame configured with two specialized fathometers.

- The Penetration Fathometer, mounted on the A-frame drivehead, measures the incremental penetration of the core tube below mudline (I_p) by recording the changing distance as the drivehead advances the core and moves closer to the sediment bed. This is the distance the core has been driven below the mudline.
- The Acquisition Fathometer, located at the top of and inside the core tube, measures the incremental length of sediment acquired in the core tube (I_A) by recording the distance to the top of the sediment as the core is advanced into the sediment bed during driving. This is the length of sediment core inside the tube.

Recording and comparing the measures of I_p and I_A during vibracoring is referred to as V-SAM.

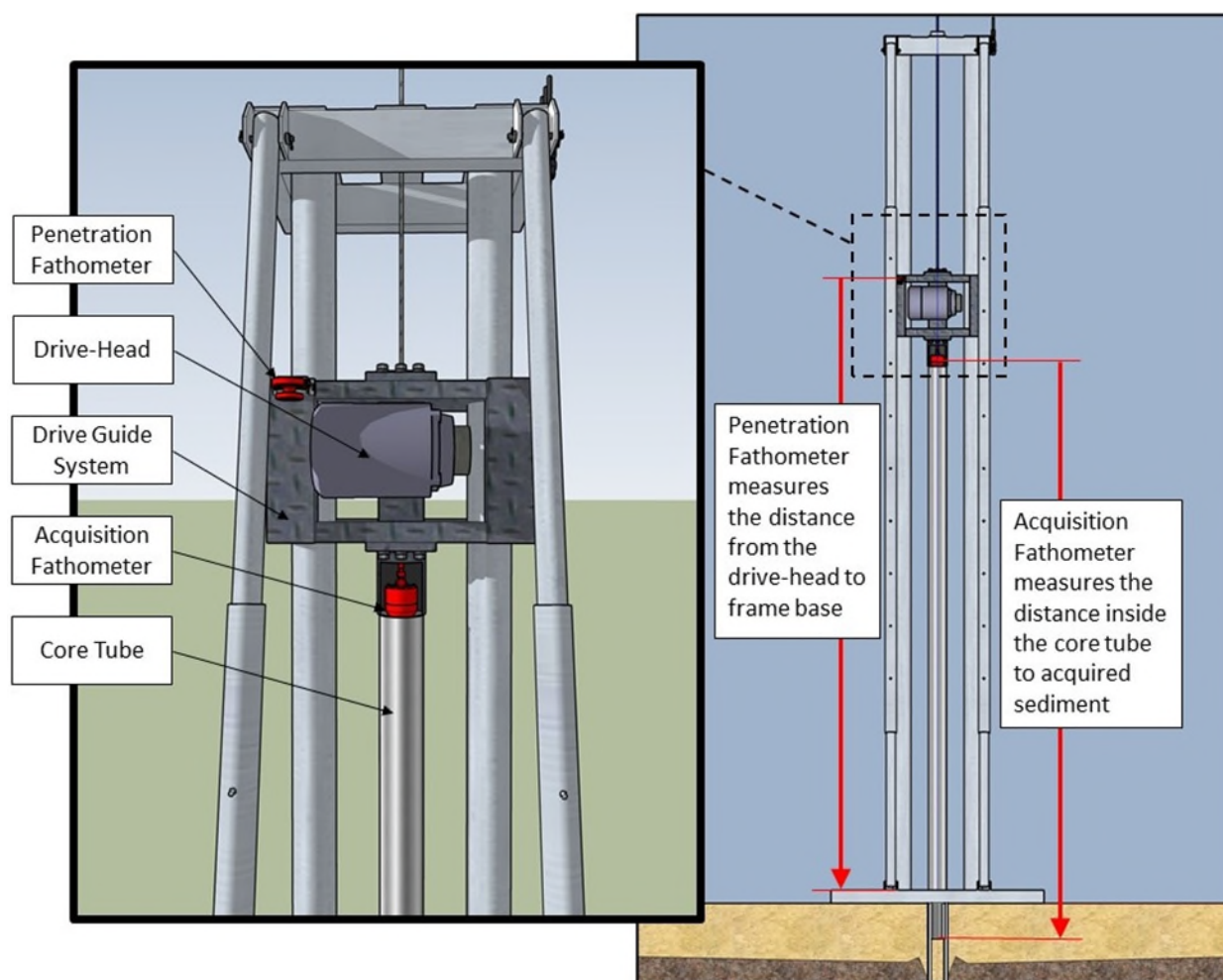
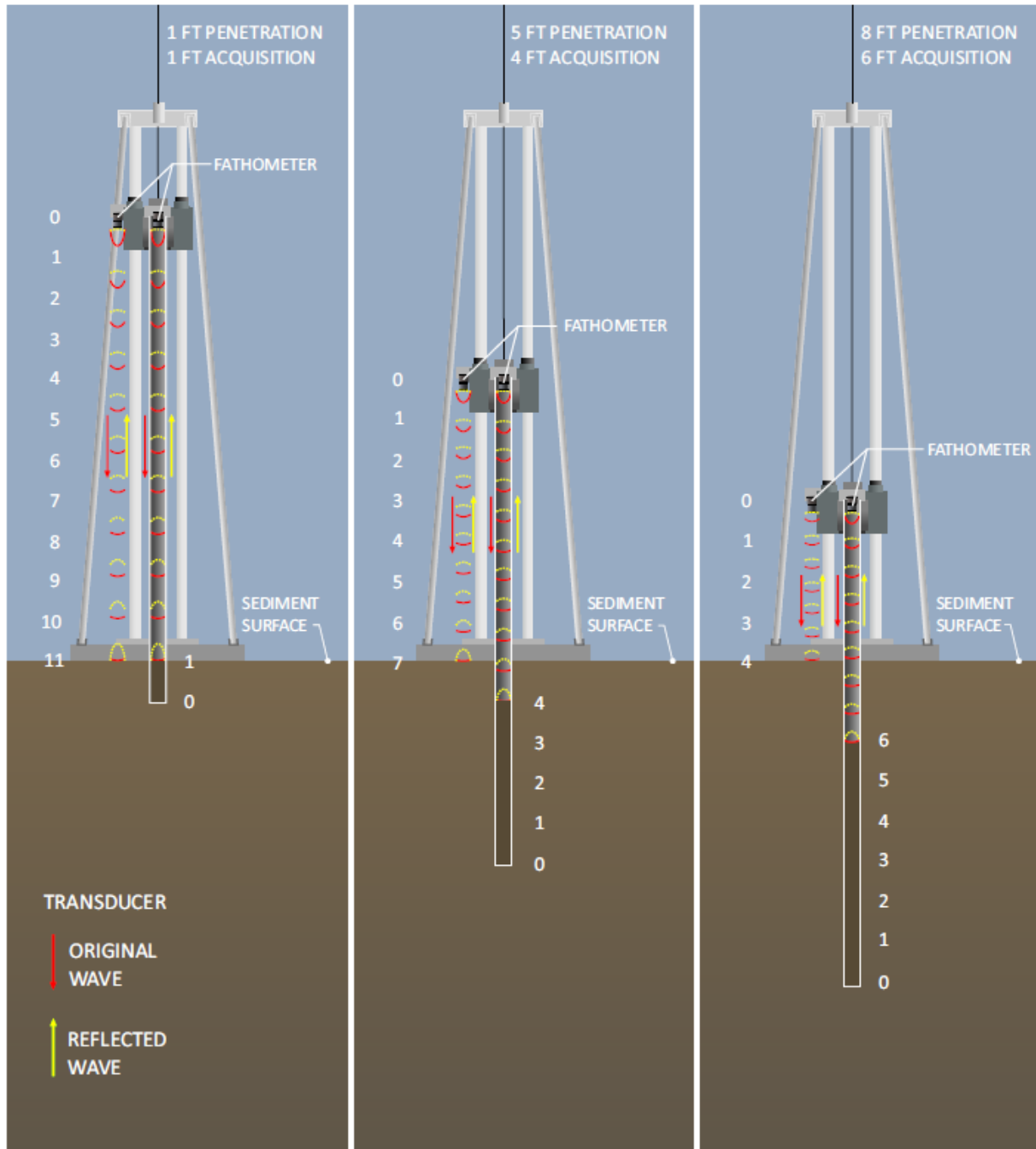


Figure 4-1 Marine Sampling System's V-SAM Vibracoring System
(Reproduced from Fuglevand et al., 2021)



After extraction from the bed of the waterway, the core tube will be kept in an upward-oriented position, measured for penetration depth and headspace (the distance from the top of the core to contact with retrieved sediment), and sectioned into manageable lengths for transport to the core processing location. Samples will be submitted to the laboratory for chemical analysis.



**Figure 4-2 Marine Sampling System's V-SAM Fathometer System
(Reproduced from Fuglevand et al., 2021)**



4.1.5.3 Sample Collection Procedures

Sediment cores will be collected at set intervals (**Table 3**) using the V-SAM system and decontaminated aluminum core tube barrels. The core tube caps will be removed from the decontaminated core tubes just prior to placement into the vibracore frame. Care will be taken during sampling to avoid contact of the sample tube with potentially contaminated surfaces. Extra sample tubes will be available during sampling operations in the event of core tube breakage or contamination.

Outside of the dock footprint, vibracore sediment samples will be collected in the following manner:

- Maneuver the vessel to the proposed sample location.
- Secure a decontaminated core tube the length of the desired penetration depth to the vibracore assembly, and deploy it from the vessel.
- Deploy the corer by winch to the mudline, where the vibracore will then be energized and advanced to the target coring depth.
- Continuously monitor and record the incremental penetration and acquisition measurements from the transducers attached to the fathometer equipment during the coring operation.
- Collect a continuous core sample to the designated coring depth or until refusal, whichever is reached first. Cores are typically advanced in 1- to 3-ft intervals.
- Measure and record the location of the core and measure the depth to sediment using a lead line or a survey tape attached to the vibracore head assembly.
- Measure and record the mechanical depth of core penetration.
- Extract the core from the sediment using the winch.
- Spray off the assembly and core barrel, while they are suspended from the A-frame, and then place them on the vessel deck.
- Remove the core tube from the vibracore assembly once on board the vessel, and measure the headspace (distance from the sediment surface to the top of the core tube) to verify acquisition readings.

Within the dock footprint, vibracore sediment samples will be collected in the following manner:

- Maneuver the crane barge alongside the dock to where the sampling location is within the crane's radius using a DGPS to within 1 to 2 m of the target sampling location.
- Mark sampling locations with an anchor and buoy using a small support vessel capable of navigating under the dock.
- Crane will be utilized to remove dock stringers as necessary to access sample location under dock.
- Secure a decontaminated core tube the length of the desired penetration depth to the vibracore assembly.
- Lift and position the corer over the sample location, and slowly lower through the water column until the corer contacts the mudline.
- Using a lead line from the support vessel, measure and record water depth at target sampling location.
- Energize the vibracoring unit, and advance to the target coring depth.
- Continuously monitor and record the incremental penetration and acquisition measurements from the transducers attached to the fathometer equipment during the coring operation.
- Collect a continuous core sample to the designated coring depth or until refusal, whichever is reached first. Cores are typically advanced in 1- to 3-ft intervals.



- Measure and record the location of the core, and measure the depth to sediment using a lead line or a survey tape attached to the vibracore head assembly.
- Measure and record the mechanical depth of core penetration.
- Extract the core from the sediment.
- Spray off the assembly and core barrel, while they are suspended, and then place them on the barge deck.
- Remove the core tube from the vibracore assembly once on board the vessel, and measure the headspace (distance from the sediment surface to the top of the core tube) to verify acquisition readings.

Conformance with the performance standard for subsurface cores collected by V-SAM will be based on the acquisition data (measures of I_p and I_A during vibracoring). Acceptance criteria for sediment core samples are as follows:

- The incremental recovery percentage is 50 percent or greater within an increment.
- Overlying water is present, and the surface is intact.
- The core tube appears intact without obstruction or blocking.
- Target penetration depth is achieved unless refusal occurs after three attempts, in which case the deepest penetrating core will be sampled.

If sample acceptance criteria are not achieved, the core will be rejected, the sample location will be shifted no more than 30 ft from the target location, and another attempt will be made to collect an acceptable core. At least three attempts to collect an acceptable core will be made for each sample location. If a core is not collected that meets acceptance criteria after three attempts, the field lead will determine if additional attempts are likely to result in a core that will meet acceptance criteria or if a core already collected will contain enough sediment for the analysis suite appropriate for the sample location. Rationale for accepting a core that does not meet acceptance criteria will be documented in the field notes.

Acceptable cores will have the extra tube cut off near the sediment surface and will be capped and stored upright on the vessel. Cores longer than 6 ft in length will be cut into smaller sections (up to 4 ft long) so that they can be transported to the processing facility in a vertical position, if possible, and so they will fit in the insulated storage box on the vessel and at the processing facility.

The core tube will be labeled with the location ID and an arrow pointing to the top of core in permanent black marker. At the end of each day, or incrementally during the day, the cores will be taken to the processing facility, where they will be processed the following day.

Logs and field notes of core samples will be maintained as samples are collected. The following information will be included in this log:

- Mudline elevation of each core station sampled relative to MLLW
- Location of each core station as determined by DGPS
- Date and time of collection of each sediment core sample
- Names of field supervisor and person(s) collecting and logging the sample
- Observations made during sample collection, including weather conditions, complications, ship traffic, and other details associated with the sampling effort
- The sample station ID
- Core tube penetration depth



- Sediment core length
- Acquisition data and acquisition curve including the drive interval measurements versus interval acquisition measurements.
- Any deviation from the approved Work Plan, SAP, or QAPP

4.1.6 Core Processing

Core processing will be conducted one core at a time at the processing facility. The cores will be stored cool or on ice until they can be processed in the order in which they were collected. Cores may be held for a maximum of 72 hours before processing. Core processing will be conducted by an appropriately trained environmental professional.

Cores will be cut for logging and sampling by removing the core caps and cutting the core tube longitudinally with a circular saw. The core will be split into two vertical halves with decontaminated stainless-steel spatulas. If the core was divided into sections for easier transport, this step will be repeated for each section until the entire core is extracted. The entire length of each core will be logged, even if deeper than the target sample depth. Prior to sampling, color photographs will be taken, and a sediment description of each core will be recorded on the core log. At a minimum, the following parameters will be noted:

- In situ sample intervals/elevations based on V-SAM measurements from the core log
- Physical description in accordance with ASTM (2017), including type, density, consistency, and color
- Odor (e.g., hydrogen sulfide, petroleum)
- Visual stratification, structure, and texture
- Vegetation and debris (e.g., wood chips or fibers, paint chips, concrete, sandblast grit, and metal debris)
- Biological activity (e.g., detritus, shells, tubes, bioturbation, and live or dead organisms)
- Visual presence of oil sheen on water surface or staining of the sediment
- Any other distinguishing characteristics or features

Starting at the mudline, the core will be sectioned into sample intervals based on the requirements of the sample design for each location. The sample design intervals may vary slightly based on sediment lithology and observations. In situ sample intervals will be established based on the details provided in the V-SAM core log. This method will provide the best estimate of elevations related to the vertical extent of contamination for remedial alternative evaluation and related to the post-dredge surface in the proposed maintenance dredge areas (e.g., z-samples collected for Dredged Material Management Program evaluation, if required). Field observations collected during core penetration and core logging may be used to supplement V-SAM core log data (or replace if V-SAM core log data are not available or due to malfunction) to identify in situ sample intervals.

The sampled intervals from each core will be placed in a clean stainless-steel bowl. Samples for volatile analyses will be collected directly from the sample interval before the interval is homogenized. The remaining sediment will be homogenized by thoroughly mixing with stainless-steel utensils until the sediment appears uniform in color and texture. The homogenized sediment sample will be placed in the appropriate sample jars using a stainless-steel spoon and stored on ice until submitted to the identified analytical laboratory. Each jar will be firmly sealed and clearly labeled.



4.2 Field Quality Control Samples

Field QC samples will be collected along with the sediment samples to evaluate reproducibility of field and laboratory procedures and matrix effects as described in Section 7.1 in the QAPP.

4.3 Equipment Decontamination Procedures

The decontamination procedures described below are to be used by field personnel to clean drilling, sampling, and related field equipment. Deviation from these procedures must be documented in the field records.

4.3.1 Sediment Sampling Equipment

All non-dedicated sampling equipment used (e.g., stainless-steel bowls, stainless-steel spoons, hand augers, core samplers, etc.) will be cleaned using a three-step procedure, as follows:

1. Scrub surfaces of equipment that would be in contact with the sample with brushes using an Alconox solution.
2. Rinse and scrub equipment with clean tap water.
3. Rinse equipment a final time with deionized water to remove tap-water impurities.

Decontamination of the reusable sampling devices will occur between the collection of each sample.

4.3.2 Sediment Processing

Sample containers, instruments, working surfaces, technician protective gear, and other items that may come into contact with suspected contaminated sediment must meet high standards of cleanliness. All equipment and instruments used that are in direct contact with the sediment collected for analysis will be made of glass, stainless steel, or high-density polyethylene and will be decontaminated at the beginning of each day as well as between sampling locations. Decontamination of all items will follow PSEP protocols.

The decontamination procedure is as follows:

1. Perform pre-wash rinse with site water.
2. Wash with solution of laboratory-grade, non-phosphate-based soap (e.g., Alconox).
3. Rinse with site water.
4. Rinse three times with laboratory-grade distilled water.
5. Cover all decontaminated items with aluminum foil.
6. Store in a clean area or closed container for next use.

4.4 Containers, Preservation, and Holding Times

Containers, preservation, and hold times are detailed in Section 6 in the QAPP.



4.5 Sample Identification and Labels

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

- Project name
- Sample identification (as described in **Section 4.1.1**)
- Date and time of sample collection
- Preservative type (if required)
- Initials of the person preparing the sample

4.6 Waste Management

Sediment remaining after grab sampling and minimal spilled sediment (that does not have visible oil sheen or oil droplets) on the deck of the sampling vessel will be washed overboard at the collection site prior to moving to the next sampling station. Excess sediment remaining after processing of the core tubes will be disposed of in an appropriate manner using the procedures outlined in the specific laboratory's waste-handling plan. Remaining sediment after core processing and decontamination water generated from decontamination of non-dedicated tools will be segregated and stored in 55-gallon drums at the processing facility. Filled drums will be disposed of by RAMP using a waste-management contractor. Investigation-derived waste will be disposed of at a facility permitted to accept the waste. Sediment waste will be managed in accordance with WAC 173-303-070.

Disposable sampling materials and personal protective equipment used in sample processing—such as disposable coveralls, gloves, and paper towels—that are not visibly contaminated will be placed in heavy-duty garbage bags for disposal as municipal waste.



5 Sample Transport and Chain-of-Custody Procedures

This section addresses the sampling program requirements for maintaining custody of the samples throughout the sample collection and delivery process.

5.1 Sample Custody Procedures

Samples are considered to be in one's custody if they are in the custodian's possession or view, in a secured location (under lock) with restricted access, or in a container that is secured with an official seal, such that the sample cannot be accessed without breaking the seal.

Chain-of-custody (COC) procedures will be followed for all samples throughout the collection, handling, and analysis process. The principal document used to track possession and transfer of samples is the COC form; an example COC is provided in **Appendix B**. Each sample will be represented on a COC form the day it is collected. All data entries will be made using an indelible ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, and then dating and initialing the change. Blank lines or spaces on the COC form will be lined-out and dated and initialed by the individual maintaining custody.

A COC form will accompany each cooler of samples to the analytical laboratory. Each person who has or relinquishes custody of the samples will sign and date the COC form and ensure that the samples are not left unattended unless properly secured. Copies of all COC forms will be retained in the project files.

5.2 Sample Delivery and Receipt Requirements

Samples submitted to the laboratory will be collected in the appropriate sample containers and preserved as specified in Section 6 in the QAPP. The persons transferring custody of the sample container will sign the COC form upon transfer of sample possession to the laboratory, unless the samples are shipped via commercial carriers, in which case the custody signature will be that of the individual taking possession of the samples from the carrier at its final destination. All samples for chemical analysis will be kept on ice following collection and will be transported to the analytical lab on ice.

When the samples are delivered to the laboratory, the receiver will record the condition of the samples on a sample receipt form. COC forms will be used internally in the laboratory to track sample handling and final disposition. If containers arrive with broken custody seals, the laboratory will note this on the COC record and will immediately notify the Project Manager or Field Lead as identified in Section 2 of the QAPP. Samples scheduled for archive will be preserved by the laboratory according to the QAPP and method requirements for potential analyses.



6 Analytical Testing

Information on target analytes, appropriate analytical testing methods, and laboratory-testing information, as the information relates to the media being evaluated, is included in the QAPP.

The analyses to be requested at each sampling location are described in Section 3 in the Work Plan.



7 References

ASTM International. 2017. Annual Book of ASTM Standards. In *Soil and Rock (I)*.

Fuglevand, P., Lamb, C., Browning, D., and Jaworski, B. 2021. Vibracore sediment acquisition monitoring (V-SAM) for remediation dredging design at the Portland Harbor Superfund Site. *Proceedings of the Dredging Summit and Expo 2021: June 15–17, 2021*. https://www.westerndredging.org/phocadownload/2021_Virtual/Proceedings/1B-3.pdf

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Washington State Department of Ecology. 2021. Sediment Cleanup User's Manual, Guidance for Implementing the Cleanup Provisions of the Sediment Management Standards, Chapter 173-204 WAC. Publication No. 12-09-057. Revised December.

Washington State Department of Ecology. 2023. Draft Interim Action Plan, Port Angeles Rayonier Mill Study Area, Port Angeles Washington. November.

Washington State Department of Ecology. 2024. Second Amendment to Agreed Order No. DE 6815. June 3.



Tables

Table 1
Proposed Sample Locations
Final Sampling and Analysis Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, Washington

Location ID	Northing (ft)	Easting (ft)	Latitude	Longitude
P1	419207.77	1011764.14	48.12041	-123.40763
P2	419191.50	1011868.20	48.12037	-123.40720
P3	419100.53	1011798.16	48.12012	-123.40748
P4	418949.77	1011693.09	48.11970	-123.40789
P5	418886.92	1011760.61	48.11953	-123.40760
P6	418918.70	1011833.44	48.11962	-123.40731
P7	418727.47	1011728.25	48.11909	-123.40771
P8	418698.43	1011646.92	48.11900	-123.40804
P9	418659.85	1011780.46	48.11891	-123.40749
P10	418348.40	1011580.86	48.11804	-123.40826
P11	418364.50	1011651.51	48.11809	-123.40798
P12	418394.59	1011742.68	48.11818	-123.40761
P13	418558.64	1011684.19	48.11862	-123.40787
P14	418530.15	1011983.80	48.11857	-123.40664
P15	418411.88	1011996.31	48.11825	-123.40657
P16	418435.97	1011912.62	48.11831	-123.40692
P17	418350.50	1011451.32	48.11803	-123.40879
P18	418415.20	1011418.04	48.11821	-123.40894
P19	418424.30	1011232.77	48.11821	-123.40970
P20	418438.40	1011104.52	48.11824	-123.41023
P21	418578.00	1011060.55	48.11862	-123.41042
P22	418652.56	1010889.21	48.11881	-123.41114
P23	418790.70	1010952.52	48.11919	-123.41090
P24	418822.89	1010762.76	48.11926	-123.41168

Notes:

Datum = NAD83(96) WA State Plane N, US-FT

ft = feet

Table 2
Analytical List and Bottleware
Final Sampling and Analysis Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, Washington

Parameter and Analytical Method	Container Size and Type	Preservative
SVOCs/SVOC - cPAHs by EPA 8270E SIM	8-oz glass jar	
PCBs - Congeners by EPA 1668C	8-oz glass jar	
Dioxins and Furans by EPA 1613	8-oz amber glass jar	
Metals by EPA 6020B/EPA 6020 UCT-KED (may include TCLP)	4-oz glass jar	
Total Organic Carbon by EPA 9060A	8-oz glass jar	
Grain Size by PSEP-PS	4-oz glass jar	
Total Solids by SM 2540 G-97	8-oz glass jar	
Total Sulfides by SM 4500-S2	4-oz glass jar	Zinc Acetate Solution (0.2 mL 2M zinc acetate solution per 100 mL sample)
Archive	8 or 16-oz glass jar	Location specific

Notes:

- All sample containers will have lids with Teflon® inserts.
- Based on analytical suite and minimum sample size, methods may be combined into one sample container.
- Thermal preservation based on Sediment Cleanup User's Manual Table 4-7 (Ecology, 2021).
- Samples will be analyzed for mercury before freezing.

°C = degrees Celsius

mL = milliliter

oz = ounce

PSEP = Puget Sound Estuary Protocols

Table 3
Core Interval Sampling Layout
Final Sampling and Analysis Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, Washington

Surface Sample Locations				
Sediment Chemistry Intervals (Depth Below ML)	Sediment Chemistry Suite	Archive	Grain Size Distribution	Physical Property Intervals (Depth Below ML)
0-45 cm (intertidal)	1		1	
0-10 cm (subtidal)	1		1	

Intertidal Core Locations				
Sediment Chemistry Intervals (Depth Below ML)	Sediment Chemistry Suite	Archive	Grain Size Distribution	Physical Property Intervals (Depth Below ML)
0-1'	1		1	0.3'-0.8'
			1	0.8'-1.3'
1'-2'	1		1	1.3'-1.8'
2'-3'		1		
3'-4'		1		
4'-6'		1		
6'-8'		1		

Subtidal Core Locations				
Sediment Chemistry Intervals (Depth Below ML)	Sediment Chemistry Suite	Archive	Grain Size Distribution	Physical Property Intervals (Depth Below ML)
0-1'	1		1	0.3'-0.8'
			1	0.8'-1.3'
1'-2'	1		1	1.3'-1.8'
2'-3'		1		
3'-4'		1		
4'-6'		1		
6'-8'		1		

Notes:

ML = Mudline



Figures

PLOT TIME: 8/28/2024 8:17 AM MOD TIME: 8/23/2024 3:27 PM USER: Dan Pickering DWG: P:\Rayonier Pt Angeles CAD\2024 Work Plan\Figures\2024-08-23 RYAM_1_WP_VIN-LOC.dwg



VICINITY MAP



Plan View

0 300

Scale in Feet

Note

1. Background image date July 2023 - Google Earth Map.

Rayonier Advanced Materials
Port Angeles, WA - Rayonier Mill Site
Pre-Remedial Design Work Plan

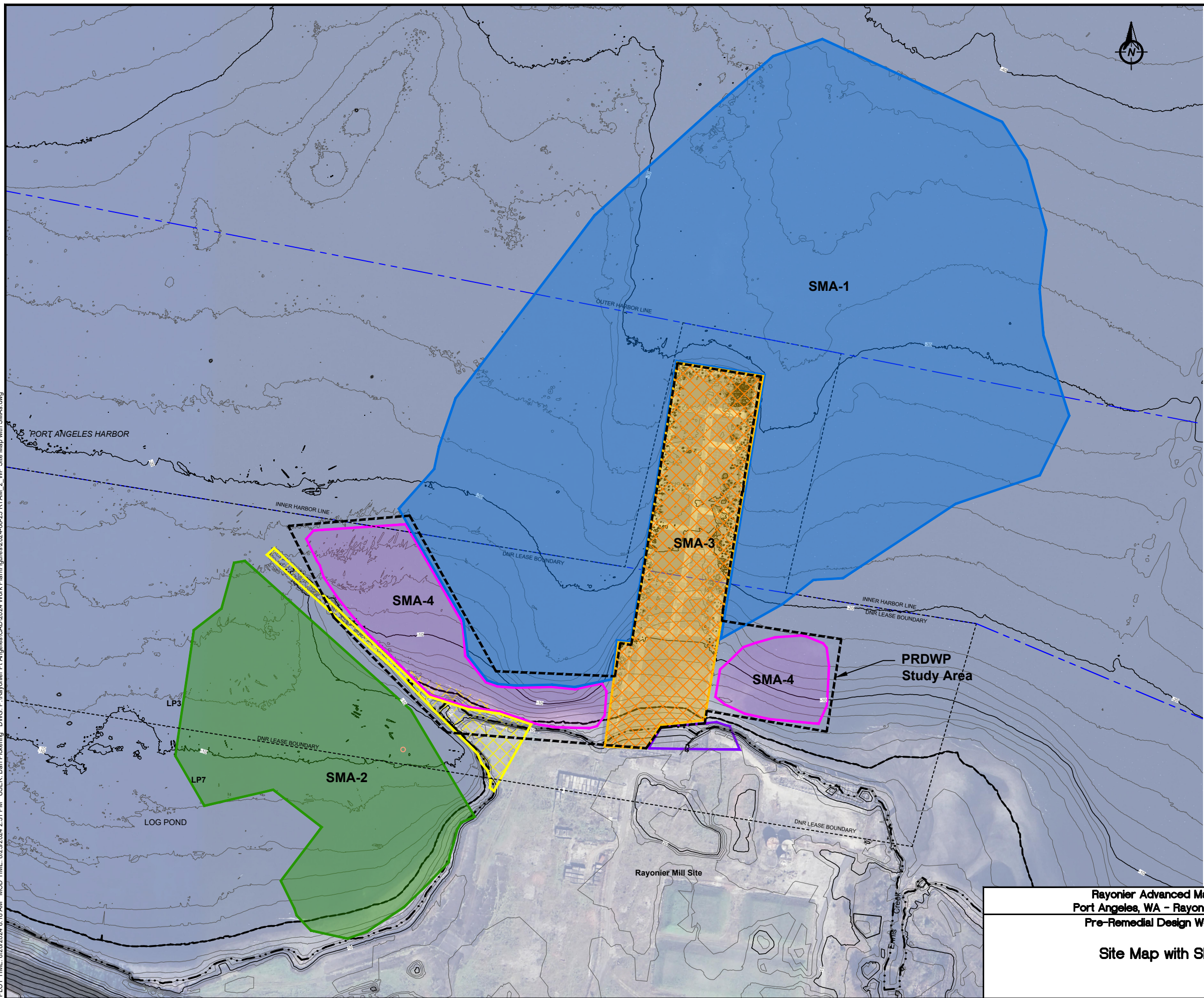
Project Location and Vicinity Map

DOF DALTON
OLMSTED
FUGLEVAND

FIGURE
1

August 28, 2024

PLOT TIME: 8/28/2024 8:18 AM MOD TIME: 8/23/2024 2:31 PM USER: Dan Pickering DWG: P:\Rayonier PT Angeles\CAD\2024 Work Plan\Figures\2024-08-23 RYAM_2_WP Site Map with SMAs.dwg

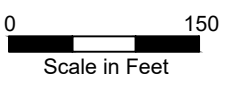


SEDIMENT MANAGEMENT AREA (SMA)

- SMA-1
- SMA-2
- SMA-3
- SMA-4

LEGEND

- Dock Structure
- Jetty Structure
- PRDWP Study Area
- DNR Lease Boundary
- Harbor Line
- Parcel Boundary
- 30 Existing Contour MNR (2')
- Existing Contour MJR (10')

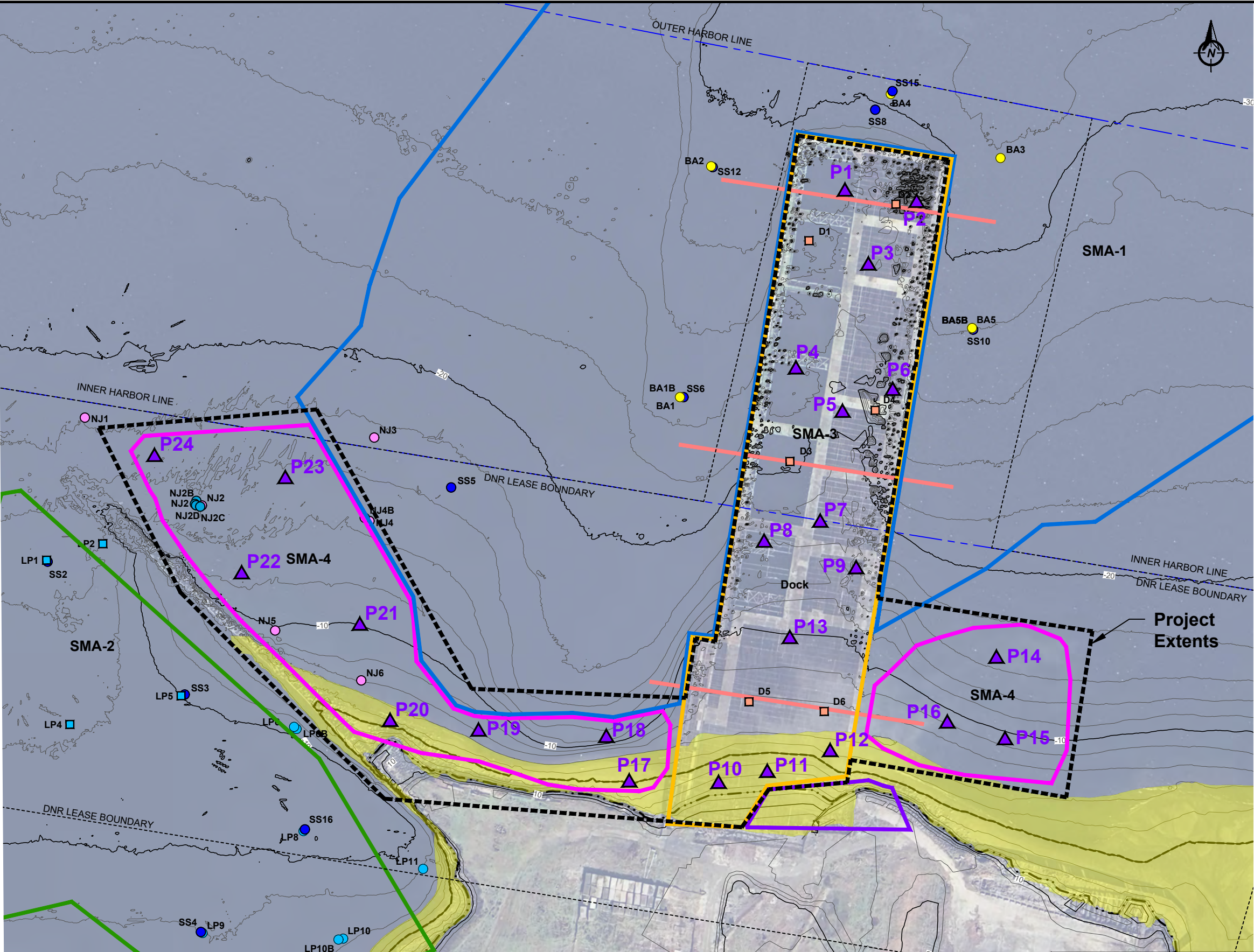


NOTES

- 1. The locations of all features shown are approximate.
- 2. Bathymetric survey conducted with multi-beam hydrographic survey completed by Sea Engineering in 2014.
- 3. Upland base survey drawing provided by Northwestern Territories, Inc., dated 10/03/2000.
- 4. Background image date March 2024 - Google Earth Map.

Rayonier Advanced Materials Port Angeles, WA - Rayonier Mill Site Pre-Remedial Design Work Plan	 FIGURE 2 August 28, 2024
Site Map with SMAs	

PLOT TIME: 8/12/2025 2:39 PM MOD TIME: 8/12/2025 2:39 PM USER: Kelley Bagley DWG: P:\Rayonier PI\Anges\CAD\2025 SAP\2025-08-12 RYAM_3_SAP Proposed Data Gaps Sampling Loc.dwg



SAMPLING LEGEND

- P5** Proposed Locations
- 2019 Sampling Event**
- Underdock dive transects
- LP5** Core - visual logging - Drill Rig (Log Pond)
- LP11** Core - visual core logging - vibracore (Log Pond)
- BA1** Core - visual logging - vibracore (North Jetty)
- NJ2** Core - visual logging - vibracore (Berth Area)
- D6** Underdock/thru dock sediment sample location
- SS3** Additional sample location

SEDIMENT MANAGEMENT AREA (SMA)

- SMA-1
- SMA-2
- SMA-3
- SMA-4

LEGEND

- Intertidal Zone (approx. -4 to +8 MLLW)
- Project Extents
- DNR Lease Boundary
- Harbor Line
- Parcel Boundary
- 30 Existing Contour MNR (2')
- Existing Contour MJR (10')

NOTES

- The locations of all features shown are approximate.
- Bathymetric survey conducted with multi-beam hydrographic survey completed by Sea Engineering in 2014.
- Upland base survey drawing provided by Northwestern Territories, Inc., dated 10/03/2000.
- Background image date March 2024 - Google Earth Map.

Rayonier Advanced Materials
Port Angeles, WA Rayonier Mill Study Area
Pre-Remedial Design Work Plan

Proposed Data Gaps Sampling Locations

DOF DALTON
OLMSTED
FUGLEVAND

FIGURE
3

August 12, 2025



Appendix A Field Forms and Logs



Sediment Grab Location ID: _____

Date: _____ Time: _____

PROJECT NAME: _____

WEATHER CONDITIONS: _____

SAMPLING METHOD: _____

VESSEL/CREW: _____

TIDE DATA SOURCE: _____

SAMPLERS: _____

SURFACE SEDIMENT GRAB SAMPLE DATA

LATITUDE/NORTHING:				LONGITUDE/EASTING:			
GRAB ATTEMPT TIME	WATER DEPTH (ft)	PENETRATION DEPTH (cm)	ACCEPTABLE GRAB* (Y/N)	TIDE LEVEL (ft MLLW)	MUDLINE ELEVATION (ft MLLW)	WOOD WASTE (%)	COMMENTS

*Acceptance criteria: Sampler not overfilled, uniform sample thickness, and desired penetration.

SAMPLE DATA	SAMPLE ID:
-------------	------------

SEDIMENT COLOR	SEDIMENT TYPE		MODIFIER: with	MODIFIER: trace	SEDIMENT ODOR	COMMENTS
☐ BROWN	☐ SILTY	☐ COBBLES	☐ GRAVEL	☐ GRAVEL	☐ NONE	
☐ BROWN/GRAY	☐ SANDY	☐ GRAVEL	☐ SAND	☐ SAND	☐ SLIGHT	
☐ GRAY	☐ GRAVELLY	☐ SAND	☐ SILT	☐ SILT	☐ STRONG	
☐ GRAY/BROWN		☐ SILT	☐ SHELLS	☐ SHELLS		
☐ DARK GRAY		☐ CLAY	☐ WOOD	☐ WOOD		
☐ BLACK			☐ ORGANICS	☐ ORGANICS		
☐ OLIVE			☐ OTHER:	☐ OTHER:		
☐ RED						

PROJECT:		COORDINATES:	
LOCATION:		SURFACE ELEVATION:	TOC Elev.:
DRILLING CONTRACTOR:		DATE:	
DRILLING EQUIPMENT:		TOTAL DEPTH OF BORING:	Ecology ID #:
DRILLING METHOD:		LOGGED BY:	
SAMPLING METHOD:		RESPONSIBLE PROF.:	REG. NO.:

NOTES:					
DEPTH (cm)	SAMPLES				VISUAL SOIL DESCRIPTION
	Lab Sample	Sample Recovery	PID (ppm)	Sheen Test Result	
					Soil Group Name (USCS): color, moisture, density/consistency, grain size, other descriptors
2					
4					
6					
8					
10					
12					
14					
16					
18					
20					
22					
24					
26					
28					
30					
32					
34					
36					
38					
40					

Note: The summary log is an interpretation based on samples, drill action, and interpolation. Variations between what is shown and actual conditions should be anticipated.

CORE ACQUISITION LOG

CORE ID:

ACCEPTED

Attempt: 1

PROJECT:

PROJECT LOCATION:

PROJ. NO.:

DOF Staff: Dan Pickering

Other Staff:

#N/A

First Sample
Interval:

#N/A

Deepest Target
Sample Depth:

#N/A

Time:

13:07

CORING EQUIPMENT

CORING INFORMATION

FATHOMETERS (ft.)	
21.4	Zero Drive
19.8	Zero Acquisition
0.0	Reflector
0	Core Transducer

CONTRACTOR:

EQUIPMENT: Vibracore

VESSEL: Nancy Anne

CAPTAIN:

MSS Crew:

DATE 1/16/2024

START TIME 13:07

END TIME 14:08

Weather: Clear

Temp: 31

FIELD LOG BY : DJP

Head Space 2.1 90%

MECH DRIVE LENGTH, ft. 18.9

ACQUISITION AFTER DRIVE, ft. 17.8 94%

ACQUISITION AFTER RETRIEVAL, ft. (2) 17.9 95%

LOSS ON RETRIEVAL, ft. (3) -0.1

Material Type end of core:

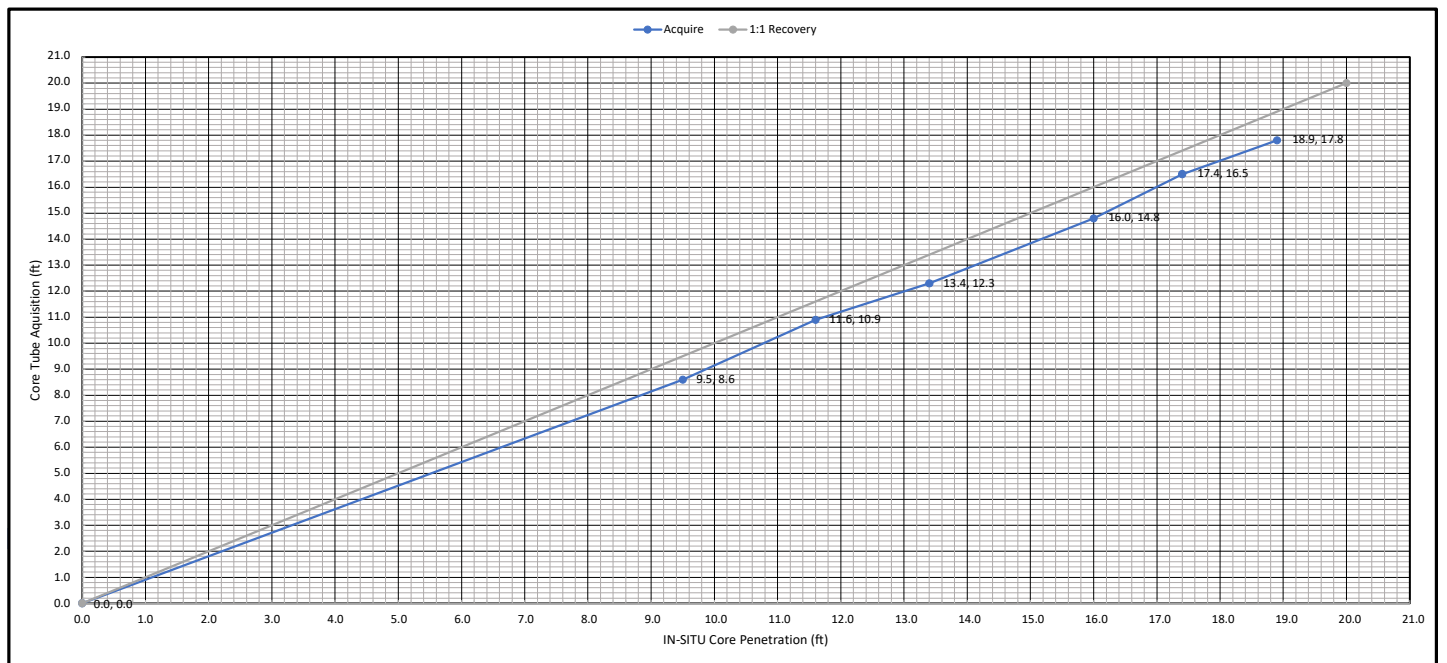
Fathometer Readings		TUBE (ft.)		Increment	Comment	Core Cut Plan (ft.)	
Drive	Acquire	Drive	Acquire	% Recover		In-Situ	Core
21.4	19.8	0.0	0.0			HS	0.5
11.9	11.2	9.5	8.6	91%	Free fall ~9.5'	0.0	0.0
9.8	8.9	11.6	10.9	110%		1.0	0.9
8	7.5	13.4	12.3	78%	Easy driving	2.0	1.8
5.4	5	16.0	14.8	96%		3.0	2.7
4	3.3	17.4	16.5	121%		4.0	3.6
2.5	2	18.9	17.8	87%		5.0	4.5
						6.0	5.4
						7.0	6.3
						8.0	7.2
						9.0	8.1
						10.0	9.1
						11.0	10.2
						12.0	11.2
						13.0	12.0
						14.0	12.9
						15.0	13.8
						16.0	14.8
						17.0	16.0
						18.0	17.0
						19.0	0.0
Process core? (y/n/b/x)*		Y					

Interpolated value

* "Accepted"/"Rejected"/"Bulk Sample Only"/"No Core Recovered"

Core Cut Plan (ft.)	
In-Situ	Core
HS	0.5
0.0	0.0
1.0	0.9
2.0	1.8
3.0	2.7
4.0	3.6
5.0	4.5
6.0	5.4
7.0	6.3
8.0	7.2
9.0	8.1
10.0	9.1
11.0	10.2
12.0	11.2
13.0	12.0
14.0	12.9
15.0	13.8
16.0	14.8
17.0	16.0
18.0	17.0
19.0	0.0

MUDLINE ELEVATION (Datum: NAVD88)					
Water Surface Elev., ft.		13:05	BB Gage		
Water Surface Elev., ft.		MLLW	MLLW		
Water Depth, ft.		lead line	12.4	fathometer	
Mudline Elevation, ft.		-12.4		0	
Mudline Elevation, ft.		Solinst:	0		
CORE GPS LOCATION:					
East	1043444.15				
North	635600.53				
Equip. :	Trimble 855 & 555 heading				
Tube Segments - In-Situ Depth and Core Tube Length (ft.)					
ID#	In-Situ Depth		Core Tube Length (ft)		
	Top	Bottom	Top	Bottom	
A	-0.3	3.3	-0.5	3	3.5
B	3.3	7.7	3	7	4
C	7.7	11.7	7	11	4
D	0.0		11		-11
					0
					0.5





Appendix B Chain-of-Custody Forms

Chain of Custody Record

[illegible]



Appendix C Quality Assurance Project Plan

Final Quality Assurance Project Plan Under- Dock and Nearshore Areas

Port Angeles Rayonier
Mill Site

Port Angeles,
Washington

Prepared for:

Rayonier A.M.
Properties, LLC

Prepared by:

DOF DALTON
OLMSTED
FUGLEVAND

EHS  **Support**TM

September 2025



Final Quality Assurance Project Plan – Approvals

Agreed Order Number DE 6815

Port Angeles Rayonier Mill Site

September 2025

Approved by:

Signature: Amy Coats Date: 9/25/25
Amy Coats, Analytical Quality Control Manager, EHS Support LLC

Signature: Warren Snyder Date: 9/25/25
Warren Snyder, Project Coordinator, Rayonier A.M. Properties, LLC

Signature: Tasya Gray Date: 9/25/25
Tasya Gray, Project Manager, Dalton, Olmsted & Fuglevand, Inc.

Signature: _____ Date: _____
TBD, Laboratory Project Manager, Lab TBD



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Embedded Table

Table 2-1 Roles and Responsibilities

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Table 4	Sediment Management Standards Criteria
Table 5	Summary of Data Quality Indicators
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Table 7	Quality Control Procedures and Frequency

Attached Figure

Figure 1 Project Location and Vicinity Map



Acronyms

AO	Agreed Order
COC	chain of custody
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CRM	certified reference material
DF	<i>Port Angeles Rayonier Mill Site: Under-dock and Nearshore Areas Pre-Remedial Design Analysis and Decision Framework</i>
DQO	data quality objective
Ecology	Washington State Department of Ecology
EDD	electronic data deliverables
EIM	Environmental Information Management
EQulS	Environmental Quality Information System
IAP	Interim Action Plan
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MS	matrix spike
MSD	matrix spike duplicate
MQO	measurement quality objective
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PSEP	Puget Sound Estuary Program
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SCUM	Sediment Cleanup User's Manual
SMA	Sediment Management Area
SMS	Sediment Management Standards
SWAC	spatially weighted average concentration
SOP	standard operating procedure
TOC	total organic carbon
USEPA	United States Environmental Protection Agency



1 Introduction

This Quality Assurance Project Plan (QAPP) has been prepared to support the associated Pre-Remedial Design Work Plan (“Work Plan”) that was prepared to meet requirements set forth in the Second Amendment to Agreed Order No. DE 6815 (“AO amendment”; Washington State Department of Ecology [Ecology], 2024a) between Ecology and Rayonier A.M. Properties, LLC (“RAMP”). The requirements in the AO amendment were established in support of remedial interim action planning at the former Port Angeles Rayonier Mill Site (“Site”) in Port Angeles, Washington, at 700 North Ennis Street (**Figure 1**).

This QAPP ensures that scientific data are acquired according to established methods and procedures designed to obtain results that are objective, true, reproducible, and of known accuracy. This QAPP provides guidance in the planning process and specifications to ensure that environmental sampling associated with pre-remedial design investigation activities are planned and executed in a manner consistent with the quality assurance/quality control (QA/QC) objectives stated below:

- Field determinations and analytical results are valid through adherence to Ecology field procedures, Ecology-approved analytical protocols, and calibration and preventive maintenance of equipment.
- Samples are identified and controlled through chain-of-custody (COC) procedures.
- Records are retained as documentary evidence of field activities and observations.
- Evaluations of the data are accurate, appropriate, and consistent throughout the project.

The content of this QAPP is based on Ecology requirements for a QAPP as stated in the *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies* (Ecology, 2016) and the *Sediment Cleanup User’s Manual* (SCUM; Ecology, 2021). This QAPP includes discussion of the following:

- Data quality objectives (DQOs)
- Measurement quality objectives (MQOs)
- Laboratory QC
- Data management
- Data validation and verification

QAPP addenda will be developed, if appropriate, depending on future field investigation requirements.

1.1 Project Background and Description

The Site is located on the northern end of the Olympic Peninsula and on the eastern side of Port Angeles Harbor in Clallam County, Washington. Ecology and RAMP entered into AO No. DE 6815 in 2010 to develop an Interim Action Plan (IAP) to assess groundwater, freshwater, marine sediments, and upland soils. The AO was recently amended for a second time, effective June 3, 2024 (Ecology, 2024a), to include requirements for RAMP to fill additional sediment chemistry data gaps identified in the Draft IAP (Ecology, 2023).

Sections 1.1 and 1.4 of the Work Plan include additional background and Site description information.



2 Project Organization and Schedule

The roles and responsibilities of project team members are described in **Table 2-1**. Prior to fieldwork commencing, each team member will receive a copy of the final approved Work Plan and all supporting materials (e.g., this QAPP). Ecology will be notified in writing if changes to roles and/or responsibilities change.

Table 2-1 Roles and Responsibilities

Title/Role	Name	Organization	Responsibilities
Ecology Project Manager	Marian Abbett	Ecology	Oversees the project on behalf of the Washington State Department of Ecology
Project Coordinator	Warren Snyder	RAMP	Oversees strategic path of the project and organizes and communicates project information and tasks between Ecology and the project team
Technical Leads	Rob Webb; Gary Long	Dalton, Olmsted & Fuglevand (“DOF”); EHS Support LLC (“EHS Support”)	Oversees project strategy and provides technical advisement
Consultant Project Managers	Natasya Gray; Catharine Parker	DOF; EHS Support	Supervises, coordinates, and manages all work for the project, including planning, scheduling, and project financials
Analytical Quality Control Manager	Amy Coats	EHS Support	Performs or coordinates data validation, consults on project chemistry issues (e.g., lab and method selection)
Data Validator	Amy Coats or designee	EHS Support	Performs data review/data validation sufficient to meet goals of the study
Field Lead/Site Safety Lead	Dan Pickering	DOF	Leads and coordinates field activities
Health and Safety Manager	Anthony Cerruti	DOF	Responsible for review and implementation of the project Health and Safety Plan
Field Equipment Manager	TBD	DOF	Ensures equipment is properly maintained and ready for use
Environmental Laboratory Project Manager(s)	TBD	TBD	Manages laboratory analysis and reporting

Note:

TBD = to be determined



3 Data Quality Objectives

The overall DQO is to develop and implement procedures for field data collection, field sampling, and chain of custody, as well as laboratory analysis and reporting, that will provide results that are scientifically valid and the levels of which are sufficient to meet MQOs and thereby support the goals of the study. DQOs will be specified at two levels to make decisions based on the results (Ecology, 2016). Quality objectives at the decision level are required when data will be used to select between two clear alternative conditions or to determine compliance with a standard. The DQO Process to establish these quality objectives is outlined in the following sections, as recognized by Ecology and established by the United States Environmental Protection Agency's (USEPA's) *Guidance on Systematic Planning Using the Data Quality Objectives Process, EPA QA/G-4* (USEPA, 2006) and *Data Quality Objectives Process for Hazardous Waste Site Investigations, EPA QA/G-4HW Final* (USEPA, 2000). Analytical QA/QC procedures were also developed based on the protocols and QA guidance of the Puget Sound Estuary Program (PSEP, 1986, 1997a, 1997b, and 1997c).

3.1 State the Problem

Per the *Port Angeles Rayonier Mill Site: Under-dock and Nearshore Areas Pre-Remedial Design Analysis and Decision Framework* (DF; Ecology, 2024b), pre-remedial design data are needed to inform the selection of a remedy that is protective of under-dock (Sediment Management Area [SMA]-3) and nearshore (SMA-4) areas after structure removal. Additionally, data are needed to inform best management practices for removing in-water structures (i.e., dock, jetty, and treated timbers and pilings).

3.2 Identify the Decision

Surface and subsurface sediment samples will be collected and analyzed for physical and chemical parameters to

- Assess potential risk for benthic community receptors and human health,
- Refine the extent of contamination in surface and subsurface sediments,
- Characterize physical properties to support scour assessment, and
- Determine depth of native sediments.

Ultimately, data will inform the selection and design of a sediment remedy that meets the requirements of the Model Toxics Control Act (Washington State Legislature, 2023). The data will also identify the potential for sediment erosion and subsequent redistribution of contaminated sediment as outlined in the DF.

3.3 Identify the Inputs to the Decision

Surface and subsurface sediment samples will be collected from the under-dock and nearshore areas. Sediment samples will be analyzed for the Sediment Management Standards (SMS) benthic suite, total organic carbon (TOC), total solids, total sulfides, grain size, metals, polychlorinated biphenyl (PCB) congeners and congener pairs, polycyclic aromatic hydrocarbons (PAHs), carcinogenic PAHs (cPAHs), and dioxins/furans congeners. The full list of analytes is provided in **Table 1**.



3.4 Define the Boundaries of the Study

The boundaries of the study for surface and subsurface sediment collection are defined as follows:

- Geographically:
 - o The study boundaries are SMA-3, the under-dock area; and SMA-4, the nearshore area.
- Temporally:
 - o A Joint Aquatic Resources Permit Application for pre-remedial design investigation activities will be submitted within 30 days of Ecology approval of the Final Work Plan.
 - o Sediment data collection will commence within 60 days upon issuance of the permit.
 - o Work must be completed within the allowed in-water work window, typically July 15 to February 15.
 - o Fieldwork must be completed within 60 days of commencement.

3.5 Develop a Decision Rule

The decision framework for a remedy protective of benthic organisms and human health is outlined in the DF (Ecology, 2024b) and reproduced in **Table 2** and **Table 3**, respectively, and is based on the pre-remedial design sampling results.

3.6 Specify Tolerable Limits on Decision Errors

Laboratory QC samples will be collected and analyzed by an Ecology-accredited laboratory. Performance and acceptance criteria are described in **Section 5**.

Preliminary screening criteria used to determine appropriate analytical methods and reporting limits with the laboratory are provided in Tetra Tech (2021) and **Table 4**. SMS sediment cleanup objectives and cleanup screening levels are presented for benthic community and human health protection. To assess human health protection, the spatially weighted average concentrations (SWACs) of SMA-3 and SMA-4 are compared with the SWACs of the sediment cleanup unit.

3.7 Optimize the Design for Obtaining Data

Section 3 of the Work Plan describes the design for obtaining data.



4 Sampling Process Design and Field Procedures

Section 4 of the Sampling and Analysis Plan (SAP) describes the sampling design and field procedures.



5 Measurement Quality Objectives

Decision-level quality objectives only describe how a decision will be made; MQOs are needed to set the criteria for the quality of the data itself. MQOs, also referred to as measurement performance criteria, are the performance or acceptance thresholds or goals for the project's data, based on precision, accuracy/bias, representativeness, comparability, completeness, and sensitivity (referred to herein as data quality indicators). These data quality indicators have been established for each matrix and parameter and are discussed in the following sections and summarized in **Table 5**.

5.1 Precision

Precision is the agreement among a set of replicate measurements without consideration of the “true” or accurate value (i.e., variability between measurements of the same material for the same analyte). Precision is measured in a variety of ways including statistically, such as calculating variance or standard deviation. Random errors present because of normal variability include the following:

- Field sampling procedures
- Handling, transporting, and preparing samples for shipment to the laboratory
- Obtaining a subsample from the field sample for analysis
- Preparing the sample for analysis at the laboratory
- Analysis of the sample (including data handling errors)

Precision in the laboratory is assessed through the calculation of relative percent difference (RPD) between laboratory duplicate sample measurements within a batch and between batches. Laboratory precision measures both sample preparation and analysis reproducibility. Laboratory precision can be assessed through the analysis of matrix spike/matrix spike duplicate (MS/MSD) samples, laboratory control sample/laboratory control sample duplicate (LCS/LCSD) pairs, laboratory duplicates, and/or field duplicates. Acceptance criteria for laboratory precision will be specified in the laboratory method or laboratory standard operating procedures (SOPs).

RPD is calculated as follows:

$$RPD = \left(\frac{|R1 - R2|}{\frac{R1 + R2}{2}} \right) \times 100$$

Where R1 is MS, LCS, or parent sample and R2 is MSD, LCSD, laboratory duplicate, or field duplicate.

5.2 Accuracy and Bias

Accuracy is the degree of agreement between a measured value and the true value. It should be noted that precise data may not be accurate data. Accuracy can be expressed as a percent recovery or percent deviation of the measurement with respect to its known or true value. Improper sample collection can impact accuracy, as can sample matrix issues. In the laboratory, poorly calibrated analytical or sampling equipment, or limitations or errors in analytical methods and techniques, can cause inaccuracy. Laboratory practices are designed to monitor for such issues to improve accuracy. Accuracy and bias in



the data can be evaluated by assessing pertinent QC elements, including LCS, MS, surrogate, and internal standard recoveries.

Laboratories assess the overall accuracy of their instruments and analytical methods (independent of sample or matrix effects) through the measurement of “standards,” materials of accepted reference value. Accuracy will vary from analysis to analysis because of individual sample and matrix effects. In an individual analysis, accuracy will be measured in terms of the percent recovery of surrogate or internal standard compounds in organic analyses, or the percent recovery of spiked compounds in MSs and/or MSDs, and/or LCSs. This gives an indication of expected recovery for analytes tending to behave chemically like the spiked or surrogate compounds and provides an indication of bias for the parameter of interest. The laboratory method blanks and field-generated blanks will indicate contamination introduced during various portions of the process from sample collection to preparation and analysis. Laboratory accuracy will be improved by following the USEPA methods referenced in this QAPP; following laboratory SOPs, which include detailed requirements for each analysis; utilizing experienced/trained laboratory personnel; and ensuring the purity of laboratory reagents and chemicals.

Percent recovery is calculated using the following formula:

$$\text{Percent Recovery} = \left(\frac{\text{Spiked Sample Result} - \text{Sample Result}}{\text{Spike Added}} \right) \times 100$$

5.3 Completeness

Completeness is a measure of the amount of usable data collected compared with the amount of data expected to be obtained. Three measures of completeness are defined as the following:

- Sampling completeness: the number of valid samples collected relative to the number of samples planned for collection
- Analytical completeness: the number of valid sample measurements or results relative to the number of total sample results
- Overall completeness: the number of valid sample measurements relative to the number of samples planned for collection

Laboratory completeness is a measure of the number of valid measurements obtained from all valid samples submitted to the laboratory. The laboratory completeness objective is greater than 95 percent. This allows for the potential loss of samples that are impossible to analyze due to unforeseen interferences and rejected data following data validation.

5.4 Sensitivity

Sensitivity refers to the ability of an analytical procedure to quantify an analyte at a given concentration. An analyte must be quantified lower than the regulated criteria values to be in compliance with this QAPP. To ensure reporting limits are lower than criteria, Error! Reference source not found. laboratories will attempt to adjust quantitation limits based on dilutions, sample sizes, extract/digestate volumes, percent solids, and cleanup procedures. Sensitivity will be maximized by following the USEPA methods, laboratory SOPs, and experienced/trained laboratory personnel. Anticipated method detection limits, reporting limits, and practical quantitation limits will be provided by the laboratory. These limits are



subject to change and be updated by the laboratory; updates will be submitted to Ecology, if needed, prior to sampling.

5.5 Representativeness

Representativeness is a qualitative parameter that expresses the degree to which the data and sampling design accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. Representativeness is a qualitative parameter that is dependent upon the proper design of the sampling program and the laboratory QC program. Representativeness in the laboratory is ensured by using the proper analytical procedures and appropriate methods and by meeting sample holding times. Following the detailed requirements outlined in the USEPA methods and the laboratory SOPs will maximize the representativeness of the laboratory data.

5.6 Comparability

Comparability is defined as the extent to which data from one data set can be compared directly with similar or related data sets and/or decision-making standards. Comparability is dependent on the use of USEPA methods and approved laboratory SOPs and the reporting of data in standardized units.

5.7 Historical Data

If historical data are used to support the remedial decision, an evaluation of the appropriateness of the data will be completed. The following should be considered when using such data:

- Similarities between the purpose of the original data collection and the purpose for which the data are currently being used
- Acceptable level of uncertainty associated with the current decision-making process to which historical data will be applied

A description of such assessment shall be provided in the overall report in which the data are presented.



6 Sediment Analytical Testing

Sediment analytical testing will be conducted by an Ecology-approved laboratory. The rationale for sampling and target analyte lists at each sampling location are described in Section 3 of the Work Plan. Sediment samples will be analyzed for the following parameters, utilizing the associated methods, as specified in the Work Plan:

- Grain size distribution (PSEP-PS)
- Total solids (SM 2540 G-97)
- Total sulfides (SM 4500-S2)
- TOC (EPA 9060A)
- Metals (EPA 6020B/EPA 6020 UCT-KED)
- cPAHs (EPA 8270E SIM)
- PAHs (EPA 8270E SIM)
- Dioxins/furans congeners (EPA 1613)
- PCB congeners and congener pairs (EPA 1668C)

Details regarding container size and type, minimum sample size, holding time, and preservation are provided in **Table 6**.



7 Analytical Quality Control

Sample QC consists of those activities specifically conducted to ensure the QA program is being implemented according to the specified requirements, to assess the effectiveness of the sample QA program, to identify non-conformances, and to verify that any identified deficiencies are corrected. If any significant deviations from the QA program are documented, corrective action measure(s) will be immediately implemented and documented.

7.1 Field Quality Control

Several field QC samples will be collected concurrently with sediment sampling to evaluate the efficiency of field sampling and laboratory procedures. **Table 7** lists the types and frequency of field QC samples, as well as appropriate corrective actions. The types of QC samples are described below:

- Field duplicates are collected from the same sample material as the parent sample, after the parent sample has been homogenized. The field duplicate will be collected blind (i.e., no sample location nor time will be associated with the sample on the COC) and will be analyzed for the same constituent list as the parent sample.
- MS/MSD samples will be collected to provide the laboratory with sufficient sample volume to run the MS/MSD analysis.
- Equipment blanks will be collected when non-dedicated sampling equipment is used. At a minimum, equipment blanks will be collected once per sample collection method.
- Temperature blanks will be included with each sample cooler shipment to allow the laboratory to measure sample temperatures upon receipt. Samples should be cooled to less than or equal to 6 degrees Celsius.

7.2 Laboratory Quality Control

QC samples are analyzed within a batch of investigation samples and processed following the same sample preparation and measurement procedures identified in **Table 1**. Results from laboratory QC samples inform whether the overall analytical system is functioning properly and whether the MQOs have been met. Specific QC requirements must be met by the laboratory and are designed in a way to ensure that project MQOs will be achieved. If analytical results do not meet MQOs or performance expectations, then samples may be reanalyzed to confirm the results; if inconsistencies continue to be observed, then new samples may be collected as described in the SAP. **Table 7** lists the types and frequency of laboratory QC samples for this investigation, as well as appropriate corrective actions, based on the SCUM (Ecology, 2021). The different types of QC samples are discussed further below.

7.2.1 Laboratory Instrument Calibration

Calibration is an essential component of the analytical system and is performed prior to sample analysis. Initial and continuing calibration are performed based on requirements specified in analytical methods and/or laboratory SOPs. Calibration standards are analyzed following the same methods and procedures as investigation samples. The frequency of calibration, and the use of external or internal standards, depends on the analytical procedure and the measurement system. Providing the laboratory with expected levels of constituents in the samples can help ensure that sample responses fall within the range of the calibration curve.



7.2.2 *Laboratory Duplicates*

Laboratory duplicates of one or more samples within each batch provide an estimation of laboratory preparation and analytical precision. Specifying which samples are to be analyzed in duplicate may be appropriate if it is expected that some samples may not contain measurable amounts of an analyte of interest; duplicates should be collected from areas suspected to be contaminated. Laboratory duplicates are not analyzed in batches that include MS/MSD pairs. In these cases, the precision information is provided by results of the MS/MSD analysis.

7.2.3 *Matrix Spikes/Matrix Spike Duplicates*

MS samples are used to assess the precision and accuracy of analytical data for specific compounds in specific matrices (i.e., sample-specific QC). MS analysis is typically performed at a frequency of 1 per 20 investigative samples per method per matrix. An MSD allows evaluation of precision. The MS and the MSD are both spiked with the same known quantities of analytes. In an MS/MSD pair, the percent recoveries are calculated and used to assess accuracy, and the RPD between MS and MSD results is calculated and used to assess precision.

7.2.4 *Method Blanks*

Method blanks will be analyzed as part of each analytical batch for each methodology performed. Method blanks are used to evaluate contamination introduced during sample preparation and/or analysis, as the blank should effectively have no concentration present of the analyte of interest. A positive blank response indicates contamination; potential impacts to reported field sample results can be evaluated.

7.2.5 *Laboratory Control Samples*

A LCS is prepared when known concentrations of target analytes are spiked into an aliquot of analyte-free material (deionized water or 'clean' sand). The LCS undergoes the same preparation and analytical procedure as the field samples. It is analyzed to determine, without sample matrix, whether the overall procedure is working within control limits. The recoveries of the spiked analytes are evaluated to determine accuracy.

7.2.6 *Surrogate Spikes*

Surrogate spikes are used to monitor performance of the preparation and analysis process, particularly extraction efficiency and possible matrix interference on a sample-by-sample basis for organic parameters. Surrogate spikes are added to all samples for many organic parameters. Surrogate spikes are a sample-specific QC. Since surrogate compounds are not expected to be present in samples, their recoveries have been shown to predict experimental recoveries of target analytes.

7.2.7 *Reference Materials*

Standard reference materials or certified reference materials (CRMs) that more closely match the matrix of environmental samples may be used as check standards to assess accuracy and bias for an analytical



method at all stages or sample preparation and analysis. Concerns with meeting MQOs may be resolved through analyses of representative samples and reference materials.



8 Data Management

8.1 Data Review, Recording, and Reporting

Sample collection information will be transcribed directly into a dedicated waterproof field logbook or onto standardized forms. If errors are made, results will be legibly crossed out, initialed, and dated by the person recording the data, and corrected in a space adjacent to the original (erroneous) entry. Field data will be internally verified in the field for accuracy by the Project Manager or his/her designee. Copies of field documents will be uploaded to the designated project SharePoint site for safekeeping. Documents will include the following:

- Field notes
- Core logs
- Pictures
- Videos
- COCs

Laboratory results will be submitted electronically. The first of these submissions will be the sample acknowledgements received from the laboratory. These acknowledgements will be reviewed by the Project Manager or his/her designee to ensure that the laboratory's identification of methods and analyses matches the COCs and approved analytical matrix. A portable document format (PDF) of the laboratory report and the Electronic Data Deliverables (EDDs) in the specified formats will also be reviewed by the laboratory Project Manager prior to reporting. Once received, the reports and EDDs will be uploaded to the designated project SharePoint site for safekeeping prior to submission to Ecology's Environmental Information Management (EIM) system and upload to the Environmental Quality Information Systems (EQulS). Data will be reduced to summarize particular datasets and inform the interpretation of the results.

Records will be retained for at least 10 years from the date of a) issuance of a permit, administrative order, consent decree, or other administrative document; or b) site delisting. Records include the following:

- Final and Ecology-approved SAP
- Field records that document any departures from the SAP and/or QAPP
- Analytical results, including laboratory reports, summary tables, and data reports

8.2 Laboratory Data Deliverables

The analytical laboratories will provide a Level II data package. Laboratories will also provide sample and QC data in EDDs, which can be used for upload to EIM and EQulS. Level II data package components include the following:

- Sample analytical results
- Case narrative
- Surrogate recoveries, where appropriate
- COC
- Method blank
- LCS summary
- LCSD, where applicable



- MS summary
- MSD summary, where applicable
- Laboratory duplicate, where appropriate

Laboratory data, including QC data, will be uploaded to Ecology's EIM within 60 calendar days of receipt of final data package.



9 Data Validation and Verification

Data generated through field activities or laboratory operations will be reviewed prior to reporting.

9.1 Field Sampling Data

Field sampling data will be verified daily by each person performing the tasks. These data will be verified for completeness and correctness. Field sampling data will also be independently reviewed daily by the Project Manager or designee to ensure that records are complete, accurate, and legible and verify that the sampling procedures are in accordance with the protocols specified in the QAPP. External verification of the field records by the Project Manager or designee will ensure the following:

- Logbooks and standardized forms have been filled out completely, and the information recorded accurately reflects the activities that were performed.
- Records are legible and in accordance with good recordkeeping procedures (i.e., entries are signed and dated, data are not obliterated, and changes are initialed, dated, and explained).
- Sample collection, handling, preservation, and storage procedures were conducted in accordance with the protocols described in the QAPP. Any deviations were documented and approved by the appropriate personnel.
- Verification of the COC will be performed to ensure that appropriate samples were collected and submitted to the laboratory for the correct analyses.

Pertinent field data that are entered manually into an electronic data table (e.g., water quality parameters) will undergo at least a 20 percent QC check against the hard copy field data by someone other than the person who performed the manual entry. If inaccuracies are identified, then a 100 percent QC check will be performed. Inaccuracies will be confirmed with the person who performed the manual entry and will be resolved prior to upload to SharePoint and reporting.

9.2 Laboratory Sample Data

It is expected that the laboratory conducted a sufficient quality review of the data before reporting. The laboratory is responsible for monitoring the analysis, identifying analytical problems, and taking corrective actions prior to the expiration of sampling hold times. Per the SCUM (Ecology, 2021), the laboratory should communicate any problems to the Project Manager during the analysis. If reasonable corrective actions do not result in bringing QC sample results within control limits, then data may need to be qualified.

To ensure accurate transfer of laboratory data, the accuracy of electronic data tables (e.g., exceedance screening tables) will be verified by manually checking a minimum of 20 percent of the electronic data against the laboratory data package(s). If inaccuracies are detected, additional data will be checked and appropriate corrective actions taken. Inaccuracies will be communicated to the laboratory with specific resolutions identified.

Data generated from future sampling at the Site will support the goals of the IAP (Ecology, 2024a) and the DF (Ecology, 2024b). The plan for achieving these goals is to follow an iterative process made up of discrete stages associated with varying contaminant concentrations and investigation/remediation options. In accordance with USEPA guidance, a graded approach (rather than a one-size-fits-all approach) will be used: the level of review for each subset of data will be designated based on the goals



of that stage of the project and an evaluation of whether formal validation would potentially change interpretation or use of reported analytical results.

When validation is appropriate, chemical laboratory data will be reviewed in accordance with the most recent USEPA Contract Laboratory Program National Functional Guidelines (USEPA, 2020a, 2020b, and 2020c), the SCUM (Ecology, 2021), this QAPP, laboratory analytical methods, and professional judgment. The following elements are to be reviewed during data validation:

- Verification that the COC is complete and signed
- Review of sample receipt condition
- Holding times and preservation
- QC results meet MQOs for laboratory method blanks, field blanks, CRMs, LCSs, MS/MSDs, field duplicates, laboratory duplicates, and surrogate spikes

The elements reviewed during validation include most of those specified for a SCUM QA1 review. However, field records are not generally provided to validators and will be reviewed by the project team, and comparisons of laboratory quantitation limits with applicable screening criteria are generated separately.



10 References

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Washington State Legislature. 2023. Washington Administrative Code Title 173. Chapter 173-340 Model Toxics Control Act Cleanup Regulations. Last updated August 23.



Tables

Table 1
Sediment Chemistry Analytes
Final Quality Assurance Project Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, WA

Analytes (Methods)			
Conventional Parameters (See Methods Below)			
Grain Size Distribution (PSEP-PS)	Total Solids (%) (SM 2540 G-97)	Total Sulfides (SM 4500-S2)	Total organic carbon (%) (EPA 9060A)
Metals (mg/kg DW) (EPA 6020B/EPA 6020 UCT-KED)			
Arsenic	Cadmium	Chromium	Copper
Lead	Mercury	Selenium	Silver
Zinc			
cPAHs (µg/kg DW) (EPA 8270E SIM)			
Benzo(a)pyrene	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene
Chrysene	Dibenzo(a,h)anthracene	Indeno(1,2,3-cd)pyrene	
PAHs (µg/kg DW) (EPA 8270E SIM)			
Total LPAH	Napthalene	Acenaphthylene	Acenaphthene
Fluorene	Phenanthrene	Anthracene	2-Methylnaphthalene
Total HPAH	Fluoranthene	Pyrene	Benzo(a)anthracene
Chrysene	Total Benzofluoranthenes	Benzo(b)fluoranthene	Benzo(k)fluoranthene
Benzo(a)pyrene	Benzo(g,h,i)perylene	Indeno(1,2,3-cd)pyrene	Dibenzo(a,h)anthracene
Dioxins/Furans Congeners (ng/kg DW) (EPA 1613)			
2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD
1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	
2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF
1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF
1,2,3,4,7,8,9-HpCDF	OCDF		
PCB Congeners and Congener Pairs (ng/kg DW) (EPA 1668C)			
PCB-1	PCB-48	PCB-110/115	PCB-164
PCB-2	PCB-50/53	PCB-111	PCB-165
PCB-3	PCB-52	PCB-112	PCB-167
PCB-4	PCB-54	PCB-113/90/101	PCB-169
PCB-5	PCB-55	PCB-114	PCB-170
PCB-6	PCB-56	PCB-117/116/85	PCB-171/173
PCB-7	PCB-57	PCB-118	PCB-172
PCB-8	PCB-58	PCB-120	PCB-174
PCB-9	PCB-59/62/75	PCB-121	PCB-175
PCB-10	PCB-60	PCB-122	PCB-176
PCB-11	PCB-61/70/74/76	PCB-123	PCB-177
PCB-12/13	PCB-63	PCB-126	PCB-178
PCB-14	PCB-64	PCB-127	PCB-179
PCB-15	PCB-66	PCB-128/166	PCB-180/193
PCB-16	PCB-67	PCB-130	PCB-181
PCB-17	PCB-68	PCB-131	PCB-182
PCB-19	PCB-69/49	PCB-132	PCB-183/185
PCB-21/33	PCB-72	PCB-133	PCB-184
PCB-22	PCB-73	PCB-134/143	PCB-186
PCB-23	PCB-77	PCB-136	PCB-187

Table 1
Sediment Chemistry Analytes
Final Quality Assurance Project Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, WA

Analytes (Methods)			
PCB Congeners and Congener Pairs (ng/kg DW) (EPA 1668C)			
PCB-24	PCB-78	PCB-137	PCB-188
PCB-25	PCB-79	PCB-138/163/129/160	PCB-189
PCB-26/29	PCB-80	PCB-139/140	PCB-190
PCB-27	PCB-81	PCB-141	PCB-191
PCB-28/20	PCB-82	PCB-142	PCB-192
PCB-30/18	PCB-83/99	PCB-144	PCB-194
PCB-31	PCB-84	PCB-145	PCB-195
PCB-32	PCB-88/91	PCB-146	PCB-196
PCB-34	PCB-89	PCB-147/149	PCB-197/200
PCB-35	PCB-92	PCB-148	PCB-198/199
PCB-36	PCB-94	PCB-150	PCB-201
PCB-37	PCB-95/100/93/102/98	PCB-151/135/154	PCB-202
PCB-38	PCB-96	PCB-152	PCB-203
PCB-39	PCB-103	PCB-153/168	PCB-204
PCB-41/40/71	PCB-104	PCB-155	PCB-205
PCB-42	PCB-105	PCB-156/157	PCB-206
PCB-43	PCB-106	PCB-158	PCB-207
PCB-44/47/65	PCB-107/124	PCB-159	PCB-208
PCB-45/51	PCB-108/119/86/97/125/87	PCB-161	PCB-209
PCB-46	PCB-109	PCB-162	--

Table 2
Decision Framework Outline for Benthic Protection
Final Quality Assurance Project Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, WA

Benthic Protection			
Erosion Modeling Results ^{1,2}	Surface Sediment Chemistry ³	Subsurface Chemistry Results	Potential Remedial Consideration ⁴
Erosive	Surface Sediment Chemistry $\geq$ SCO	NA	Dredging ⁵
	Surface Sediment Chemistry < SCO	Subsurface ⁵ > SCO	Dredging or thin layer cap ⁶
		Subsurface < SCO	No action
Non-Erosive	Surface Sediment Chemistry $\geq$ 3X SCO (subtidal) or 1.5X SCO (intertidal) ⁷	NA	Dredging
	3X SCO (subtidal) or 1.5X SCO (intertidal) > Surface Sediment Chemistry $\geq$ SCO	Subsurface > surface	EMNR or Dredging ⁸
		Subsurface < surface	EMNR
	Surface Sediment Chemistry < SCO	Subsurface > surface	No action or EMNR ⁹
		Subsurface < surface	No action

Notes:

¹Erosive is defined as a net annual loss of sediment following removal of structures.

²Non-erosive is defined as a static equilibrium or net annual deposition of sediment following removal of structures.

³The surface sediment point of compliance for benthic protection is 10 cm.

⁴Remedy preference order based on permanence 1. dredging, 2. thin-layer capping, 3. EMNR

⁵Potential new surface after erosion.

⁶Erosive. EMNR not appropriate in erosive areas; a thin layer cap may be considered an appropriate remedy if the cap material creates a non-erosive surface overlying the in-situ subsurface sediments.

⁷This is a site-specific remediation level. The 3X SCO applies only to subtidal sediment areas. For intertidal areas use 1.5X SCO. EPA 2014.

⁸If higher contamination at depth will remain buried below the biologically active zone, then EMNR. If higher contamination at depth may be exposed or carried upwards through bioturbation or other disturbance, then dredging.

⁹If higher contamination at depth may be exposed or carried upwards through bioturbation or other disturbance, then EMNR.

SCO = Sediment Cleanup Objective for benthic protection

EMNR = Enhanced Monitored Natural Recovery

NA = Not Applicable

Table 3
Decision Framework Outline for Human Health Protection
Final Quality Assurance Project Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, WA

Human Health Protection ³			
Erosion Modeling Results ^{1,2}	SMA SWAC ⁴ compared to SCU SWAC ⁵	Subsurface Chemistry Results	Potential Remedial Consideration ⁶
Erosive	Surface Sediment Chemistry $\geq$ SCO	NA	Dredging ⁵
	Surface Sediment Chemistry < SCO	Subsurface ⁵ > SCO	Dredging or thin layer cap ⁶
		Subsurface < SCO	No action
Non-Erosive	Surface Sediment Chemistry $\geq$ 3X SCO (subtidal) or 1.5X SCO (intertidal) ⁷	NA	Dredging
	3X SCO (subtidal) or 1.5X SCO (intertidal) > Surface Sediment Chemistry $\geq$ SCO	Subsurface > surface	EMNR or Dredging ⁸
		Subsurface < surface	EMNR
	Surface Sediment Chemistry < SCO	Subsurface > surface	No action or EMNR ⁹
		Subsurface < surface	No action

Notes:

¹Erosive is defined as a net annual loss of sediment following remedial activities.

²Non-erosive is defined as a static equilibrium or net annual deposition of sediment following remedial activities.

³The surface sediment point of compliance for intertidal areas is 45 cm and 10 cm for subtidal areas.

⁴SMA SWAC is SWAC of sediment management areas (e.g., under-dock footprint or nearshore areas)

⁵SCU SWAC is SWAC of sediment cleanup unit

⁶Remedy preference order based on permanence: 1. dredging, 2. thin-layer capping, 3. EMNR

⁷SMA SWAC is statistically significantly higher than SCU SWAC; statistical difference is to be determined by comparison between the two populations of data used to develop the SWAC.

⁸Erosive. EMNR not appropriate in erosive areas.

⁹Thin layer cap may be appropriate given the SMA SWAC is less than the SCU SWAC, and deeper sediments are less contaminated than the surface sediments. Thin layer cap material must be proven to be non-erosive, effective over the long-term, and appropriate habitat.

¹⁰Dredging may be more appropriate to reduce SCU SWAC below Cleanup Levels in reasonable restoration timeframe.

SWAC = Spatially Weighted Average Concentration

EMNR = Enhanced Monitored Natural Recovery

NA = Not Applicable

Table 4
Sediment Management Standards Criteria
Final Quality Assurance Project Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, WA

IHS	Unit	SCO	CSL
Benthic Community			
Mercury	mg/kg dw	0.41	0.59
Acenaphthene	mg/kg OC	16	57
Benzo(g,h,i)perylene	mg/kg OC	31	78
Chrysene	mg/kg OC	110	460
Dibenzofuran	mg/kg OC	15	58
Fluoranthene	mg/kg OC	160	1,200
Fluorene	mg/kg OC	23	79
Indeno(1,2,3-cd)pyrene	mg/kg OC	34	88
Phenanthrene	mg/kg OC	100	480
Pyrene	mg/kg OC	1000	1,400
Total HPAH	mg/kg OC	960	5,300
Total LPAH	mg/kg OC	370	780
bis(2-ethylhexyl)phthalate	mg/kg OC	47	78
2,4-dimethylphenol	µg/kg dw	29	29
2-methylphenol	µg/kg dw	63	63
4-methylphenol	µg/kg dw	670	670
phenol	µg/kg dw	420	1,200
Total PCBs	mg/kg OC	12	65
Human Health			
Arsenic	mg/kg	12	14
Cadmium	mg/kg	0.82	2.4
Copper	mg/kg	35	35
Selenium	mg/kg	0.6	0.6
Zinc	mg/kg	77	77
Total mercury	mg/kg	0.11	0.13
alpha-BHC	µg/kg	1.3	1.3
cPAH TEQ	µg/kg	16	64
PCB congener TEQ	ng/kg	0.1	ND
Dioxin/furan TEQ	ng/kg	2.3	ND
Total TEQ	ng/kg	ND	5

Notes:

alpha-BHC = α-Hexachlorocyclohexane

cPAH = carcinogenic polycyclic aromatic hydrocarbon

CSL = cleanup screening level

dw = dry weight

HPAH = high-molecular-weight polycyclic aromatic hydrocarbon

IHS = indicator hazardous substance

LPAH = low-molecular-weight polycyclic aromatic hydrocarbon

mg/kg = milligram per kilogram

ng/kg = nanogram per kilogram

OC = organic carbon

PCB = polychlorinated biphenyl

SCO = Sediment Cleanup Objective

TEQ = toxicity equivalence

µg/kg = microgram per kilogram

Table 5
Summary of Data Quality Indicators
Final Quality Assurance Project Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, WA

Parameter	Precision	Accuracy	Surrogate Spikes	Completeness	CRM/SRM
	RPD	%R	%R	% Valid Samples	
Grain Size	± ≤20%	NA	NA	95%	NA
Total Solids	± ≤20%	NA	NA	95%	NA
Total Sulfides	± ≤20%	75%-125%	NA	95%	NA
Total Organic Carbon	± ≤20%	75%-125%	NA	95%	Certified limits
Metals	± ≤20%	NA	NA	95%	Certified limits
cPAHs	± ≤35%	50%-150%	Lab Limits	95%	Certified limits
PAHs	± ≤35%	50%-150%	Lab Limits	95%	Certified limits
Dioxins/Furans Congeners	± ≤30%	EPA 1613 Limits	Lab Limits	95%	PS-SRM Advisory limits
PCB Congeners and Congener Pairs	± ≤35%	50%-150%	Lab Limits	95%	PS-SRM Advisory limits

Notes:

%R = percent recovery

c = carcinogenic

CRM = certified reference material

NA = not applicable

PAH = polycyclic aromatic hydrocarbon

PCB = polychlorinated biphenyl

PS-SRM = Puget Sound Reference Material

RPD = relative percent difference

SRM = standard reference material

Table 6
Sample Collection
Final Quality Assurance Project Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, Washington

Parameter and Analytical Method	Container Size and Type ¹	Minimum Sample Size ²	Holding Time	Preservative ³
SVOCs/SVOC - cPAHs by EPA 8270E	8-oz glass jar	50-100g	14 days until extraction	Cool to 4°C ± 2°C
			1 year until extraction	Freeze/-18°C
			40 days after extraction	Cool to 4°C ± 2°C
SVOCs/SVOC - cPAHs by EPA 8270E SIM	8-oz glass jar	100g	14 days until extraction	Cool to 4°C ± 2°C
			1 year until extraction	Freeze/-18°C
			40 days after extraction	Cool to 4°C ± 2°C
PCBs - Congeners by EPA 1668C	8-oz glass jar	50-100g	14 days until extraction	Cool to 4°C ± 2°C
			1 year until extraction	Freeze/-18°C
			40 days after extraction	Cool to 4°C ± 2°C
Dioxins and Furans by EPA 1613	8-oz amber glass jar	30g	14 days until extraction	Cool to 4°C ± 2°C
			1 year until extraction	Freeze -18°C
			40 days after extraction	Cool to 4°C ± 2°C
Metals by EPA 6020B/EPA 6020 UCT-KED (may include TCLP)	4-oz glass jar	50g	6 months	Cool to 4°C ± 2°C
			2 years	Freeze -18°C
Mercury by EPA 7471B	4-oz glass jar	1g	28 days for Hg	Cool to 4°C ± 2°C
			1 year	Freeze -18°C ⁴
Total Organic Carbon by EPA 9060A	8-oz glass jar	25g	28 days	Cool to 4°C ± 2°C
			6 months	Freeze -18°C
Total Volatile Solids by PSEP 1986	8-oz glass jar	50g	28 days	Cool to 4°C ± 2°C
			6 months	Freeze -18°C
Grain Size by PSEP-PS	4-oz glass jar	50g	6 months	Cool to 4°C ± 2°C
Total Solids by SM 2540 G-97	8-oz glass jar	50g	14 days	Cool to 4°C ± 2°C
			6 months	Freeze -18°C
Total Sulfides by SM 4500-S2	4-oz glass jar	50g	7 days	Cool to 4°C ± 2°C, Zinc Acetate, no headspace
Archive	8 or 16-oz glass jar ³	location specific	14 days until extraction	Cool to 4°C ± 2°C
			1 year until extraction	Freeze -18°C

Notes:

¹All sample containers will have lids with Teflon® inserts

²Based on analytical suite and minimum sample size, methods may be combined into one sample container.

³Thermal preservation based on Sediment Cleanup User's Manual Table 4-7.

⁴Samples will be analyzed for mercury before freezing

°C = degrees Celsius

oz = ounce

g = gram

PSEP = Puget Sound Estuary Protocols

Table 7
Quality Control Procedures and Frequency
Final Quality Assurance Project Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, WA

Quality Control Procedure	Frequency	Corrective Action
Organic Analyses (cPAHs, PAHs, PCB Congeners and Congener Pairs)		
Field Duplicates	One per every 20 samples, from areas known or suspected to be contaminated.	Modify field sample homogenization procedures.
Equipment Blanks	When non-dedicated sampling equipment is used, collect a minimum of one blank per sample collection method.	Compare to method blank results to rule out laboratory contamination. Modify sample collection and equipment decontamination procedures. Qualify associated data.
Field Matrix Spike/Matrix Spike Duplicate	One per sampling event per method or 1 in every 20 samples, whichever is more frequent.	Modify field sample procedures to ensure sufficient sample volume can be collected.
Temperature Blanks	One per cooler shipment to be measured upon laboratory receipt of the samples to ensure sample temperature is less than or equal to 4° C.	Modify sample preservation methods to ensure samples are placed on sufficient ice prior to and during shipment.
Instrument Calibration	Before sample analysis and when continuing calibration does not meet method requirements. Continuing calibration is method-specific.	Recalibrate and reanalyze affect samples.
Holding Times	All samples should be checked.	Laboratory to qualify results if holding times are exceeded. Use professional judgment to qualify results as estimated or reject data.
Method Blanks	One per sample batch or every 20 samples, whichever is more frequent, or when there is a change in reagents.	Laboratory to eliminate or greatly reduce laboratory contamination. Re-extract and reanalyze affected samples.
Analytical Laboratory Duplicates and Matrix Spike Duplicates	One duplicate analysis with every sample batch or every 20 samples, whichever is more frequent. Use analytical replicates when samples are expected to contain target analytes, otherwise use matrix spike duplicates.	Laboratory to re-extract and reanalyze samples to qualify the data if sample homogeneity problems are suspected.
Matrix Spikes	One per sample batch or every 20 samples, whichever is more frequent. Spiked with the same analytes at the same concentration as the laboratory control sample.	If results are outside the limits, re-evaluate data to find source(s) of difference. If an analytical error cannot be corrected, samples should be re-extracted.
Surrogate Spikes	Added to every organics sample as specified in analytical protocol.	Follow corrective actions specified in the analytical method.
Laboratory Control Samples	One per analytical batch or every 20 samples, whichever is more frequent.	Laboratory to correct problem to verify the analysis can be performed in a clean matrix with acceptable precision and recovery. Then, re-extract and reanalyze affected samples.
Certified or Standard Reference Material	Project specific requirement or at project manager's discretion.	Laboratory to re-extract and reanalyze samples if analytical problems suspected, or to qualify the data after consultation.

Table 7
Quality Control Procedures and Frequency
Final Quality Assurance Project Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, WA

Quality Control Procedure	Frequency	Corrective Action
Inorganic Analyses (Metals)		
Field Duplicates	One per every 20 samples, from areas known or suspected to be contaminated.	Modify field sample homogenization procedures.
Equipment Blanks	When non-dedicated sampling equipment is used, collect a minimum of one blank per sample collection method.	Compare to method blank results to rule out laboratory contamination. Modify sample collection and equipment decontamination procedures. Qualify associated data.
Field Matrix Spike/Matrix Spike Duplicate	One per sampling event per method or 1 in every 20 samples, whichever is more frequent.	Modify field sample procedures to ensure sufficient sample volume can be collected.
Temperature Blanks	One per cooler shipment to be measured upon laboratory receipt of the samples to ensure sample temperature is less than or equal to 4° C.	Modify sample preservation methods to ensure samples are placed on sufficient ice prior to and during shipment.
Instrument Calibration	Daily and initial calibration verification immediately after initial calibration. Continuing Calibration Verification after every 10 samples or every 2 hours, whichever is more frequent, and after the last sample. Initial and continuing calibration blanks immediately after initial calibration, then 10% of samples or every 2 hours, whichever is more frequent, and after the last sample.	Optimize and recalibrate the instrument and reanalyze any affected samples; resolve discrepancy prior to sample analysis.
Holding Times	All samples should be checked.	Laboratory to qualify results if holding times are exceeded. Use professional judgment to qualify results as estimated or reject data.
Method Blanks	With every sample batch or every 20 samples, whichever is more frequent.	Laboratory to re-digest and reanalyze samples.
Analytical Laboratory Duplicates and Matrix Spike Duplicates	One duplicate analysis with every sample batch or every 20 samples, whichever is more frequent. Use analytical replicates when samples are expected to contain target analytes, otherwise use matrix spike duplicates.	Laboratory to re-digest and reanalyze samples if analytical problems are suspected.
Matrix Spikes	With every sample batch or every 20 samples, whichever is more frequent.	Laboratory may be able to correct or minimize problem, or qualify and accept data.
Laboratory Control Samples	With every sample batch or every 20 samples, whichever is more frequent.	Laboratory to correct problem to verify the analysis can be performed in a clean matrix with acceptable precision and recovery. Then, reanalyze affected samples.
Certified or Standard Reference Material	Project specific requirement or at project manager's discretion.	Laboratory to re-digest and reanalyze samples if analytical problems are suspected.

Table 7
Quality Control Procedures and Frequency
Final Quality Assurance Project Plan Under-Dock and Nearshore Areas
Port Angeles Rayonier Mill Site
Port Angeles, WA

Quality Control Procedure	Frequency	Corrective Action
PCDD/PCDF Analyses (Dioxins/Furans)		
Field Duplicates	One per every 20 samples, from areas known or suspected to be contaminated.	Modify field sample homogenization procedures.
Equipment Blanks	When non-dedicated sampling equipment is used, collect a minimum of one blank per sample collection method.	Compare to method blank results to rule out laboratory contamination. Modify sample collection and equipment decontamination procedures. Qualify associated data.
Field Matrix Spike/Matrix Spike Duplicate	One per sampling event per method or 1 in every 20 samples, whichever is more frequent.	Modify field sample procedures to ensure sufficient sample volume can be collected.
Temperature Blanks	One per cooler shipment to be measured upon laboratory receipt of the samples to ensure sample temperature is less than or equal to 4° C.	Modify sample preservation methods to ensure samples are placed on sufficient ice prior to and during shipment.
Ongoing Precision and Recovery	One per analytical batch (<20 samples).	Check calculation. Re-extract and reanalyze batch.
Stable-Isotope-Labeled Compounds	Spiked into each sample for every target analyte.	Check calculations. Qualify all associated results as estimated. Reanalyze specific samples and reject all affected results outside the criteria.
Sample Target Analyte Ion Abundance Ratios	All detected analytes for all samples.	Laboratory to qualify results "K" or "EMPC".
Method Blanks	One per analytical batch (<20 samples).	If the method blank results are greater than the reporting limit, halt analysis, find the source of contamination, and reanalyze batch. Report project samples as non-detected for results less than or equal to the reported method blank values.
GC/MS Tune	At the beginning of each 12 hour shift; must start and end each analytical sequence.	Re-analyze affected samples. Reject all data not meeting method 1613B requirements.
Instrument Calibration	Initial calibration and when continuing calibration fails; continuing calibration must start and end each analytical sequence.	
Window Defining/Column Performance Mix	Before every initial and continuing calibration.	
Confirmation of 2,3,7,8-TCDF	For all primary column detections of 2,3,7,8-TCDF.	Failure to verify presence of 2,3,7,8-TCDF by second column confirmation or use of an alternative primary column that meets resolution criteria requires qualification of associated 2,3,7,8-TCDF results as non-detected at the associated values.
Sediment Reference Material	One per analytical batch.	Extraction and analysis should be evaluated by the lab and re-analysis performed of the entire sample batch once performance criteria can be met.

Notes:

2,3,7,8-TCDF = 2,3,7,8-Tetrachlorodibenzofuran

c = carcinogenic

EMPC = estimated maximum concentration

PAH = polycyclic aromatic hydrocarbons

PCB = polychlorinated biphenyls

PCDD = polychlorinated dibenzo-p-dioxins

PCDF = polychlorinated dibenzofurans



Figure

PLOT TIME: 8/28/2024 8:17 AM MOD TIME: 8/23/2024 3:27 PM USER: Dan Pickering DWG: P:\Rayonier Pt Angeles CAD\2024 Work Plan\Figures\2024-08-23 RYAM_1_WP_VIN-LOC.dwg



VICINITY MAP



Plan View

0 300

Scale in Feet

Note

1. Background image date July 2023 - Google Earth Map.

Rayonier Advanced Materials
Port Angeles, WA - Rayonier Mill Site
Pre-Remedial Design Work Plan

Project Location and Vicinity Map

DOF DALTON
OLMSTED
FUGLEVAND

FIGURE
1

August 28, 2024



Appendix D Health and Safety Plan

Final Health and Safety Plan Under-Dock and Nearshore Areas

Port Angeles Rayonier
Mill Site

Port Angeles,
Washington

Prepared for:
Rayonier A.M.
Properties

Prepared by:



September 2025



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Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists
AO	Agreed Order
COPC	constituents of potential concern
DOF	Dalton Olmsted & Fuglevand
DOSH	Washington State Division of Occupational Safety and Health
HASP	Health and Safety Plan
IDLH	immediately dangerous to life and health
mg/m ³	milligrams per cubic meter
PEL	Permissible Exposure Limit
PPE	Personal Protective Equipment
ppm	parts per million
RAMP	Rayonier A.M. Properties, LLC
TWA	time-weighted average
USCG	United States Coast Guard
WAC	Washington Administrative Code



1 Introduction

This Health and Safety Plan (HASP) has been prepared to support the associated Pre-Remedial Design Work Plan (Work Plan) that was prepared to meet requirements set forth in the Second Amendment to Agreed Order No. DE 6815 (AO amendment) (Ecology, 2024) between the Washington State Department of Ecology (Ecology) and Rayonier A.M. Properties, LLC (RAMP). The requirements in the AO amendment were established in support of remedial interim action planning at the former Port Angeles Rayonier Mill Site (Site) in Port Angeles, Washington at 700 North Ennis Street (**Figure 1**).

The intent of this plan is to also meet the requirements of the Washington State Division of Occupational Safety and Health (DOSH) Hazardous Waste Site Operations regulation (Washington Administrative Code [WAC] 296-843). It is not intended to address normal safety practices on construction sites, such as those covered in the DOSH Safety Standards for Construction Work (WAC 296-155). Normal safety practices for construction sites cover a wide range of possible hazards which are covered in the Dalton, Olmsted & Fuglevand (DOF) Corporate Health and Safety Program (DOF, 2020). This HASP describes the safety and health guidelines developed to protect on-site personnel consisting of DOF personnel and designated subcontractors and must be available on site when work is being performed. The HASP is specifically limited to field activities associated with the Work Plan. The scope of the HASP includes the collection of sediment surface grab samples and subsurface core samples, as well as the procedures for processing sediment core samples at another location for laboratory analysis.

The procedures and guidance contained in this HASP are based upon the best available information regarding the physical and chemical hazards known, or suspected to be, present at the Site. This HASP may not be appropriate if the work is not performed by or using the methods presently anticipated, as described in the Sampling and Analysis Plan (SAP) (see Appendix B in the Work Plan). This HASP must be revised if new information becomes available or investigation activities are modified. Updates to this HASP will be addressed as addenda or line-edits, where appropriate, and Ecology will be notified.

A hard copy of this HASP, and future addenda, will be present at all sediment surface, sediment subsurface core, and sediment processing locations. Prior to undertaking any field activities, all individuals performing field work and visitors for the sample collection or processing areas must read, understand, and comply with this plan. If any part is unclear, the individual should seek clarification from the onsite safety officer prior to commencing field work. Once the HASP has been read and understood, any individual entering a controlled area of the site (exclusion or contaminant reduction zone) must sign the Acknowledgement Form (**Appendix A**), which will then be placed in the project files. Failure to comply with the requirements of the HASP is grounds for immediate removal from the Site.



2 Project and Site Description

2.1 Project Description

DOF will conduct environmental sampling within the shoreline and upland portions of the Site. The purpose of data collection is to inform the remedial design and numerical modeling of sediment and shoreline stability. Planned field activities are outlined in the Work Plan. Scope of work includes:

- Surface sediment collection, processing, and materials logging
- Subsurface sediment collection, core processing, and materials logging
- Collecting sediment chemistry data
- Investigation-derived waste management

2.2 Site Description

The Site is located on the northern end of the Olympic Peninsula and on the eastern side of Port Angeles Harbor in Clallam County, Washington. The Site is bounded on the south by a high bluff with residential and commercial properties south of the property. To the north, the Site gently slopes toward Port Angeles Harbor. Ennis Creek flows from the Olympic Mountains through the property and discharges into Port Angeles Harbor.

Sections 1.1 and 1.4 of the Work Plan include additional background and Site description information.



3 Project Organization and Responsibilities

The specific roles, activities, and responsibilities of Project participants are described in **Table 3-1**. Contact information is located in the Project Information Sheet, which is provided in **Appendix B**. The Project Information Sheet is encouraged to be posted and readily accessible in work areas of the project site.

Table 3-1 Project Team Roles and Responsibilities

Title/Role	Name	Organization	Responsibilities
Ecology Project Manager	Marian Abbett	Ecology	Oversees the project on behalf of the Washington State Department of Ecology.
Project Coordinator	Warren Snyder	RAMP	Oversees strategic path of the project and organizes and communicates project information and tasks between Ecology and the project team.
Technical Leads	Rob Webb; Gary Long	DOF ; EHS Support LLC (EHS Support)	Oversees project strategy and provides technical advisement.
Consultant Project Managers	Natasya Gray; Catharine Parker	DOF; EHS Support	Supervises, coordinates, and manages all work for the project, including planning, scheduling, and project financials.
Analytical Quality Control Manager	Amy Coats	EHS Support	Performs or coordinates data validation, consults on project chemistry issues (e.g., lab and method selection).
Field Lead/Site Safety Lead	Dan Pickering	DOF	Leads and coordinates field activities.
Health and Safety Manager	Anthony Cerruti	DOF	Responsible for review and implementation of the project Health and Safety Plan.



4 Emergency Procedures

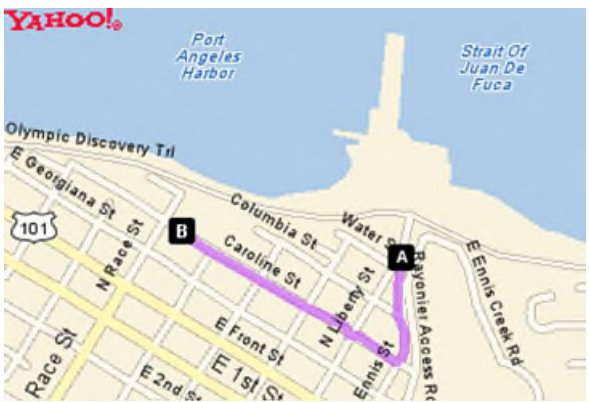
In case of an emergency, the Site Safety Lead must be notified immediately (**Table 3-1**). However, if the situation is life-threatening and notification of the Site Safety Lead would delay emergency response, field personnel may notify the appropriate emergency contacts prior to notifying the Site Safety Lead. Emergency decontamination of an injured person shall be accomplished if not injurious to the person. The Site Safety Lead will initiate contacts as follows:

1. Call appropriate emergency services numbers (ambulance, fire, etc.) (**Table 4-1**) and provide the following information:
 - a. Name and location of person reporting
 - b. Location of incident
 - c. Name and affiliation of injured party
 - d. Description of injuries
 - e. Status of medical aid effort
 - f. Details on any chemical involved and description of any personnel or contaminated gear to be sent with the injured party
 - g. Temporary control measures to minimize further risk to others
2. Call Project Manager and Health and Safety Manager and provide incident data

4.1 Emergency Information

Emergency information is provided in **Table 4-1** below. All project team members should be prepared to locate this information quickly.

Table 4-1 Emergency Information

Hospital Name and Address:	Olympic Medical Center 939 Caroline Street Port Angeles, WA 98362
Hospital Phone Number:	(360) 417-7000
Route to Hospital:	1. Start at 700 N Ennis St, Port Angeles going toward Columbia St – go 0.2 mi 2. Turn Right on Caroline St – go 0.5 mi 3. Arrive at 939 Caroline St, Port Angeles, on the Right 



Ambulance:	9-1-1
Poison Control:	(800) 732-6985
Police:	9-1-1
Fire:	9-1-1
Location of Nearest Telephone:	Cell phones are carried by all field personnel
Nearest Fire Extinguisher:	Working platform (barge or vessel) or field vehicle (upland)
Nearest First Aid Kit:	Working platform (barge or vessel) or field vehicle (upland)

4.2 Man-Overboard Emergency Procedure

There is a potential for a man-overboard scenario while the team is working over water, either from the sampling vessel, barge, or support vessel. The potential is increased when heavy equipment is being used, during stormy weather, or if there is debris in the water. If a person falls overboard from a motorized vessel, all vessel engines will be stopped immediately. **At least one person is to maintain visual contact with the subject** while floatation devices (i.e., life rings) attached to security lines are thrown to the victim from the vessel to allow the person to be brought back on board. Steps to replace wet and cold clothes with dry, warm replacements will be made immediately after a quick first-aid review for potential injuries. No other parties shall enter the water except if the victim is unconscious or seriously injured. Rescuers must wear life preservers and will be tethered to the vessel. Persons entering the water may need to be treated for cold stress.

Cold stress can also occur for workers exposed to low air temperatures, rains, and winds. In these conditions, field teams must be prepared to wear proper protective clothing and to recognize symptoms of cold stress (shivering, numbness, drowsiness, muscular weakness, and if severe enough, death). Treatment for cold stress should consist of moving the person to a dry, warm location (indoors), providing rapid but gentle rewarming, replacing wet clothing with dry, and providing warm liquids. Call medical care at once.

All work over water will comply with WAC 296-800-16070 and WAC 296-155-235.



5 Planned Field Activities

Tasks under this HASP include the collection of sediment surface grab samples and subsurface core samples. In addition to the sediment collection efforts, the subsurface core samples will be processed on-site to identify analytical testing intervals and placement of sediment in supplied jars prior to delivery to the selected analytical testing laboratory. Activity Hazard Analysis (AHA) for each of the main field tasks are provided in **Appendix C** of this plan. The rationale for the sampling design and the design assumptions for locating and selecting environmental samples is detailed in Section 3 in the Work Plan.



6 Hazard Analysis

This section presents the AHA (both chemical and physical), and the steps to minimize worker exposure.

6.1 Chemical Hazards

Confirmed and unconfirmed constituents of potential concern (COPCs) in sediment from the Work Plan.

Table 6-1 below summarizes chemical hazards for selected COPCs listed in Table 8 of the Work Plan.

Table 6-1 Summary of Chemical Hazards Potentially Present at the Site

Compound/ Description	Exposure Limits/IDLH	Exposure Routes	Toxic Characteristics
Petroleum Hydrocarbons			
Gasoline	DOSH PEL 8hr TWA= 300 ppm	Inhalation, skin, absorption, ingestion, direct dermal contact	Irritation to eyes, skin, mucus membranes, dermatitis, headache, exhaustion, blurred vision, dizziness, slurred speech, confusion, convulsions, liver or kidney damage.
Diesel	None established by DOSH. ACGIH has adopted 100 mg/m ³ for a TWA (as total hydrocarbons - inhalable fraction and vapor)	Ingestion, inhalation, skin absorption, skin and eye contact	Irritated eyes, skin, and mucous membrane; fatigue; blurred vision; dizziness; slurred speech; confusion; convulsions; and headache, and dermatitis.
Waste oil – may contain metals, gas, antifreeze and PAHs	No DOSH PEL	Ingestion, inhalation, skin absorption, skin and eye contact	Depends on the ancillary contaminants.
Lube Oil/Mineral Oil – as a mist	No DOSH PEL	If the oil is not a mist, then route of exposure is skin and eye contact	Exposure to oil mists can cause eye, skin and upper respiratory tract irritation.
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)			
Carcinogenic polycyclic aromatic hydrocarbons (as coal tar pitch volatiles)	DOSH PEL 8hr TWA= 2 mg/m ³	Inhalation, ingestion, dermal and eye contact	Nausea, vomiting, low blood pressure, abdominal pain, convulsions, and coma.
Chlordane	DOSH PEL 8hr TWA= 0.5 mg/m ³	Inhalation, skin absorption, ingestion, skin and/or eye contact.	Acute effects of chlordane in humans consist of gastrointestinal distress and neurological symptoms, such as tremors and convulsions. Chronic (long-term) inhalation exposure of humans to chlordane results in effects on the nervous system. Poisoning victims may appear agitated or excited, but later they



Compound/ Description	Exposure Limits/IDLH	Exposure Routes	Toxic Characteristics
			may become depressed, uncoordinated, tired or confused. Other symptoms reported in cases of chlordane poisoning include headaches, dizziness, vision problems, irritability, and weakness or muscle twitching. In severe cases, respiratory failure and death may occur.
Metals			
Arsenic (inorganic)	DOSH PEL 8hr TWA= 0.01 mg/m ³ IDLH 5.0 mg/m ³	Inhalation, skin absorption, skin and eye contact, ingestion	Ulceration of nasal septum; dermatitis; GI disturbances; peripheral neuropathy; respiratory irritation; hyperpigmentation of skin.
Copper	DOSH PEL 8hr TWA= 1 mg/m ³ IDLH 100 mg/m ³	Inhalation, ingestion, skin and eye contact	Irritated eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis.
Chromium Metal	DOSH PEL 8hr TWA= 0.5 mg/m ³ IDLH 250 mg/m ³	Inhalation, ingestion, skin and eye contact	Irritated eyes, skin respiratory system.
Lead	DOSH PEL 8hr TWA= 0.05 mg/m ³ IDLH 100 mg/m ³	Inhalation, ingestion, skin and eye contact	Lassitude; insomnia; facial pallor; abnormalities; weight loss, malnutrition, constipation, abdominal pain; colic; anemia; gingival lead line; tremors; paralysis of the wrist and ankles; encephalopathy; kidney disease; irritated eyes; hypertension.
Mercury (vapor)	DOSH PEL 8hr TWA= 0.05 mg/m ³ IDLH 10 mg/m ³	Inhalation, skin absorption, skin and eye contact, ingestion	Irritated eyes, skin; cough, chest pain, dyspnea, bronchitis, pneumonia; tremors, insomnia, irritability, indecision, headache, lassitude; stomatitis, salivation; GI disturbances, abnormalities, low weight; proteinuria.



Compound/ Description	Exposure Limits/IDLH	Exposure Routes	Toxic Characteristics
Nickel (metal and insoluble compounds)	DOSH PEL 8hr TWA= 1.0 mg/m ³ IDLH 10 mg/m ³	Inhalation, skin and eye contact	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen].
Zinc (as zinc oxide)	DOSH PEL 8hr TWA= 10 mg/m ³ (total); 5 mg/m ³ respirable	Inhalation	Toxic only as particulate, unless present as a fume.
PCBs, Dioxins/Furans			
PCBs (54% chlorine)	DOSH PEL 8hr TWA= 0.5 mg/m ³ IDLH 5.0 mg/m ³	Inhalation (dusts or mists), skin absorption, ingestion, skin and/or eye contact	Irritated eyes, chloracne, liver damage, reproductive effects, potential carcinogen.
Dioxins/furans	See below		

Notes:

ACGIH = American Conference of Governmental Industrial Hygienists

DOSH = Division of Occupational Safety and Health

IDLH = immediately dangerous to life or health

mg/m³ = milligrams per cubic meter

PEL = permissible exposure limit

ppm = parts per million

STEL = short-term exposure limit

TLV = threshold limit value

TWA = time-weighted average

6.1.1 Dioxins/Furans

Very little human toxicity data from exposure to tetrachlorodibenzodioxins and/or polychlorinated dibenzodioxins are available. Health-effect data obtained from occupational settings in humans are based on exposure to chemicals contaminated with dioxins. It produces a variety of toxic effects in animals and is considered one of the most toxic chemicals known. Most of the available toxicity data are from high-dose oral exposures to animals (including tumor production, immunological dysfunction, and teratogenesis). Very little dermal and inhalation exposure data are available in the literature. It is important for field personnel to remember that although dioxins are toxic and carcinogenic, most of the information is based on exposure to high doses of liquid product. These products are not very volatile, so the major concern is on skin protection and inhalation/ingestion of soil particles. The ACGIH recommends a 20 ppm threshold limit value for 1,4-dioxane (an example of numerous dioxin compounds), lists it as being absorbed through the skin, and lists it as potentially carcinogenic as well as toxic to liver and kidneys. This is typical of health effects for dioxin/furan compounds. Care should be taken especially in sampling product from drums and wells known to contain detectable levels of



dioxins. Emphasis will be on working outside in well-ventilated areas using proper personal protective equipment (PPE) (**Section 8.2**). There is significant variability in dioxin lethality in animals. The signs and symptoms of dioxin poisoning in humans, however, are analogous to those observed in animals.

6.2 Physical Hazards

General construction and project physical hazards are addressed in the DOF Corporate Health and Safety Policy (DOF, 2020). Physical hazards associated with the project specific collection and processing of sediment samples at the Site are discussed below.

Sediment samples will be collected from a vessel operated by qualified marine sampling company personnel. The onboard deployment and retrieval of large pieces of sampling equipment can result in pinch-point physical hazards. Only personnel whose presence is required will be allowed on the vessel during deployment and retrieval of the samplers. The subsurface coring equipment and surface grab samplers will be handled by a sufficient number of knowledgeable persons. A safety line may be attached to the equipment during deployment and retrieval, as necessary. If high winds or rough waters are recorded, the pilot and the Site Safety Lead will use best professional judgement to ensure safe field operations. Environmental contractor's operator/pilot is the person responsible for evaluating weather and water conditions and maintaining compliance with all United States Coast Guard (USCG) rules and regulations. All personnel on the vessel will wear proper PPE, along with Type II or Type V USCG-approved personal floatation devices.

Exposure to inclement weather, fatigue, and seasickness can lead to injuries or incidents during performance of sediment sampling and processing. To prevent fatigue and overexposure to inclement weather conditions, field personnel will take regular work breaks, wear weather-appropriate clothing, and keep hydrated. Extra clothing for layering will be brought onsite to accommodate changes in weather. Fatigue can be prevented by personnel conducting self-monitoring evaluations and taking appropriate action. The sampling team collective is responsible for encouraging open communication between personnel to ensure fatigue levels and conditions are monitored.

Slips, trips, and falls may be a hazard to field crew working on either the vessel or the sampling processing area. Personnel should keep areas clear of debris, use tools and equipment to assist with moving equipment, and wear required PPE.



7 Site Control Zones

Three Site control zones will be established for sediment sampling and processing field procedures: an exclusion zone, a contamination reduction zone, and a support zone. The zones will be established to help ensure that personnel are properly protected against the hazards present where they are working and that work activities and contamination are properly confined.

7.1 Exclusion Zones

The exclusion zone is the area where contamination is known or suspected to be present and where Site activities are being conducted. Only authorized field personnel with proper training are allowed in the exclusion zone. During sediment sampling activities, the exclusion zone includes the area of the vessel in which collected sediments are handled and stored. When no sediment is on board, the entire vessel is considered the support zone.

During onsite sediment processing, the exclusion zone will be the area in which the core is extruded and selected intervals are sampled. The onsite processing area will be established in a well-ventilated area away from the public. The sediment processing exclusion zone will be isolated, with only one entry/exit location, using barrier tape and demarcation cones/candlesticks.

No eating and/or drinking will occur in the exclusion zone. No visitors are allowed in the exclusion zone. Personnel conducting work in the exclusion zone will wear appropriate PPE (**Section 7.2**).

7.2 Contaminant Reduction Zone

The contamination reduction zone is the transition area between the exclusion zone and the support zone, and it is where the PPE decontamination process and the transfer of samples are conducted. During sediment sampling activities, the vessel deck, except areas noted in the section above, is considered the contamination reduction zone. During sediment processing activities, the contamination reduction zone will be located at the exclusion zone exit/entry location, where containers for PPE disposal and/or decontamination will be established.

7.3 Support Zone

The support zone is where all personnel will store equipment and supplies, conduct daily tailgate meetings, and prepare for the daily activities. Visitors are allowed in the support zone. On the sampling vessel, the support zone will be located in the cabin of the vessel, or on the vessel deck when contaminated sediment is not on deck. The support zone at the sediment processing area will be established outside the contamination reduction zone.



8 Training and Personal Protective Equipment Requirements

8.1 Training Requirements

All personnel conducting field work associated with the sediment sampling and processing activities will provide documentation of training in accordance with WAC 296-843. Site personnel will provide documentation of acquired training prior to the start of the sampling program.

Hazardous waste Site workers are required to have 40 hours of Hazardous Waste Operations training along with annual 8-hour refresher training. Auditors, or other employees whose work onsite will be for a specific task or of limited duration and whose work will not result in exposure over published exposure limits, are required to have 24 hours of health and safety training. At least one person of the onsite crew must have received the 8-hour Hazardous Waste Operations Site Supervisor training.

In addition, at least two DOF employees on site will be certified in first aid and cardiopulmonary resuscitation (CPR).

Personnel handling sediment sampling equipment will be part of a medical surveillance program to verify that they are physically capable of conducting the assigned work task, are approved for the use of protective equipment, will wear respiratory protection, and are not predisposed to occupationally induced diseases. Any limitation will be noted in verification letters sent by the attending physician to the employer.

Personnel handling potentially environmentally impacted sediment that may require the use of a respirator will participate in a respiratory protection program (WAC 296-800). The details of this use are defined in the DOF Corporate Health and Safety Program (DOF, 2020).

In addition to formal training, each team member will be briefed on Site-specific conditions during a safety meeting to be conducted at the beginning of the field program and when new members are added to the field team. In addition, a daily safety meeting will be conducted to brief all field staff prior to the start of the workday. Daily safety meeting topics will address planned activities for the day, address anticipated problems or changes in Site conditions, and inform field staff of any changes to the HASP. Site safety meetings will be conducted by the Site Safety Lead and recorded on the Daily Safety Briefing Form in **Appendix A**.

8.2 Personal Protective Equipment

Levels of PPE range from Level A to D, based on the type of contamination, anticipated concentration range, and planned work activity. The levels are summarized below:

- Level A requires the use of a fully encapsulated suit and full-face pressure demand self-contained breathing apparatus and supplies the highest level of respiratory, skin, and eye protection. Level A is not anticipated on this project and therefore the requirements are not covered in this plan.
- Level B requires maximum respiratory protection by the use of supplied air and dermal protections selected based on anticipated hazards. Level B is not anticipated on this project and therefore the requirements are not covered in this plan.



- Level C requires an air-purifying respirator that is specific to the COPCs, with dermal protection selection based on anticipated hazards.
- Level D is the basic work uniform. Based on Site conditions, a Modified Level D PPE program will be selected for the Site work, as summarized below:
 - Disposable nitrile inner gloves for sampling activities
 - Leather or grip outer gloves for working with tools
 - Neoprene steel-toed, chemically resistant, impermeable outer boots
 - Hard hat (if overhead hazards are present)
 - Safety glasses or goggles when exposure to splashes or sprays are possible
 - Hearing protection (ear plugs or muffs)
 - Type III or Type V USCG-approved personal flotation devices (when working on sampling vessel)
 - High visibility safety vests.

8.3 Safety Equipment

Additional safety supplies to be kept on board the sampling and support vessels, barge, and in the processing area, include:

- First-aid kit
- Eyewash kit
- Clean water
- Fire extinguisher (ABC type)

8.4 Safety Monitoring Program and Equipment

A site-specific safety monitoring program will be used as necessary to evaluate whether site conditions indicate a modification to the PPE level is required.

8.5 Safety Rules

All personnel working in the field will follow the rules and procedures listed below:

- Prior to any field operations, all personnel must review and provide an acknowledgement signature to this HASP. The Site Safety Lead will provide a safety procedure orientation prior to the start of the program and for new team members and will provide daily safety meetings.
- The sampling vessel pilot shall provide safety procedures on board the vessel prior to the start of the sampling program, to establish procedures to use in onboard emergencies.
- Copies of this HASP will be available onsite during the sampling program (on the sampling vessel and at the processing area). A waterproof copy of the completed Emergency Contacts (**Table 4-1**) section will also be posted onsite.
- The Site Safety Lead and the vessel pilot will monitor weather conditions. A radio capable of receiving the National Weather Service frequency for the Olympia area will be on board the vessel and monitored throughout the work shift. The Site Safety Lead will have the responsibility and the authority to halt operations if conditions are deemed unsafe.
- No eating, drinking, smoking, or wearing contact lenses in the exclusion zones.



8.6 Personal Protective Equipment Decontamination

Nitrile gloves will be disposed of between sampling events, while other disposable PPE such as Tyvek suits will be disposed in the contamination reduction zone. Non-disposal PPE (hard hats, boots, rain gear, etc.) will be decontaminated in the contamination reduction zone with a water and Alconox mix solution, which will be containerized for proper disposal. Prior to breaks, team members will wash their hands and face to minimize potential cross contamination.

Sampling equipment decontamination procedures are defined in the SAP.

8.7 Subcontractors

All contractors and subcontractors will adhere to DOF's HASP requirements at a minimum. Subcontractors are to work under their own HASPs, as well, unless otherwise arranged.

Subcontractors are responsible for providing health and safety (H&S) training for their employees. Examples include 40-hour hazardous waste training, supervisor training, 8-hour refresher training and certain continuing training. Verification of any required training shall be submitted by the subcontractor upon request.

In some circumstances, subcontractors may participate in site training. Site H&S orientations will include subcontractors when subcontractor personnel are required to know and understand project hazards and procedures. Any training required to address additional activities, which may expose subcontractor employees to additional hazards, is the responsibility of the subcontractor.



9 References

DOF. 2020. Corporate Health and Safety Program. November.

DOF. 2020. Corporate Health and Safety Policy. November.

Ecology. 2023. Draft Interim Action Plan, Port Angeles Rayonier Mill Study Area, Port Angeles Washington. Washington State Department of Ecology. November.

Ecology. 2024. Second Amendment to Agreed Order No. DE 6815. Washington State Department of Ecology. June 3.



Figures

PLOT TIME: 8/28/2024 8:17 AM MOD TIME: 8/23/2024 3:27 PM USER: Dan Pickering DWG: P:\Rayonier Pt Angeles CAD\2024 Work Plan\Figures\2024-08-23 RYAM_1_WP_VIN-LOC.dwg



VICINITY MAP



Plan View

0 300

Scale in Feet

Note

1. Background image date July 2023 - Google Earth Map.

Rayonier Advanced Materials Port Angeles, WA - Rayonier Mill Site
Pre-Remedial Design Work Plan
Project Location and Vicinity Map

DOF DALTON OLMSTED FUGLEVAND
FIGURE 1
August 28, 2024



Appendix A Health and Safety Forms

Health and Safety Plan Certification

By their signature, the following undersigned certify that this plan has been read, or otherwise communicated to them. They further certify that they completely understand this plan and will follow its procedures for the protection of the health and safety of all persons entering this site.

[illegible]

Site Safety Briefing

Date: _____ Time: _____ Location: _____

Shift: _____ Person Conducting Briefing: _____

1. **Health and Safety Topic** (*Safety Topic Main Points*):

2. **Recent Incidents** (*e.g., near misses, first aid cases, serious injuries, environmental incidents, etc.*):

3. **Hazard Control Measures** (*e.g., PPE changes, new site control measures, recommended work practices, etc.*):

4. **Other Issues:**

5. **Attendees** (print name):

1	6
2	7
3	8
4	9
5	10



Appendix B Project and Site Information Sheet

PROJECT AND SITE INFORMATION SHEET

Rayonier – Port Angeles September 2025

This sheet is intended to be posted in a high visibility location within the working areas of the site during operations. More information regarding Emergency Procedures is in section 4.1 of the Site- Specific Health and Safety Plan.

Site Address: E Ennis Creek Rd, Port Angeles, WA 98362

Boat Access: Site or at Port Angeles Boat Haven
832 W Boathaven Dr, Port Angeles, WA 98362

Nearest Hospital: Olympic Medical Center
(360) 417-7000
939 Caroline Street
Port Angeles, WA 98362

Life-threatening Emergency: 9-1-1

Poison Control: (800) 732-6985

DOF Project Managers: Natasya Gray (206) 375-0211 and Rob Webb (360) 908-1386

DOF Field Manager: Dan Pickering (206) 551-1441

DOF Health and Safety Manager: Anthony Cerruti (215) -767-7749

- Mitigate hazards through communication and action
- Report near misses or accidents to the Field Manager and/or Health and Safety Manager



Appendix C Activity Hazard Analysis

Activity Hazard Analysis

Project / Location: Port Angeles Rayonier Mill Site	Estimated Start Date: Summer 2025	Phase of Work: Pre-Remedial Design Investigation
Analysis Performed By: Anthony Cerruti	Date: 7/30/2024	Analysis Approved By: ADC
PRINCIPAL STEPS	POTENTIAL SAFETY / HEALTH HAZARDS	RECOMMENDED CONTROLS
Drive to site	Motor Vehicle Accidents	- Ensure that vehicle has sufficient fuel and is in good operating condition prior to leaving for the Site. - Practice safe driving. - Avoid distracted driving. Do not use mobile devices while driving. - Be aware of road and weather conditions before travel to the Site.
Park vehicle at site	Vehicle contact	- Use spotters when positioning vehicle if needed. - Gently tap horn to make others onsite aware prior to beginning backup process. - Scan surroundings thoroughly prior to stepping out of car.
Conduct site walk	Biological, uneven terrain, hidden obstacles, unsafe structures	- Review maps and develop plan to conduct site walk, scope area first from a distance. - Wear thick soled boots fit to feet properly to avoid injury. - Conduct survey in a team with one person as a spotter when another is bending over to inspect wells. - Don gloves prior to touching wells, use machete or long object where possible to reposition brush as needed. - Do not enter buildings that show signs of potential structural weakness. - Remain vigilant for signs of needles or other drug paraphernalia and avoid area if observed.

Site Safety Briefing

		- Consider wearing knee pads to protect knees while bending to access wells.
Unload equipment and materials from vehicle	Back strain from heavy lifting	- Use proper lifting techniques such as keeping the back straight, lifting with legs, limiting twisting, and getting help when moving bulky/heavy materials and equipment. - Use hand truck if needed. For loads greater than 50 pounds, use two people to lift.
	Handling of equipment could cause strain to worker.	- Use care when walking so that there are no sudden jerks or missteps that can cause the worker to strain to maintain control of the equipment. - Get assistance from other workers if needed. For loads greater than 50 pounds, use two people to carry. - Use leather or other work gloves when handling heavy items. - Wear safety shoes or boots when lifting items weighing more than 15 pounds.
Move equipment and materials to designated areas	Slip, trip, and fall hazards could be present.	- Maintain good housekeeping in work area. - Mark or remove all identified trip, slip, and fall hazards from sampling area. - Maintain proper illumination in work area.
Upland Core Processing	Transporting Cores, Opening core barrels for logging and sampling, waste disposal, decontamination	- Coordinate mobilization plan for core transport prior to start of work. - Lift with buddy system whenever necessary.

Site Safety Briefing

		- Utilize knowledgeable/experienced persons to cut core barrels using method approved by Field Manager given equipment planned for use (eg. aluminum core tubes, plastic liners, etc). - Only experienced personnel are to operate power equipment including circular saws and straight blade knives. Supervision by experienced personnel during the training phase is required for personnel who do not have prior experience. - Wear appropriate PPE. - Handle open core barrels with care since there is increased potential for sharp edges and chemical contaminant exposure.
On Water Core Collection	Navigating to location, recording electronic and physical data, working on the water	- Dispose waste in manner approved by Field Manager. - Only transport drums or waste containers with proper equipment intended for use (eg. drum dolly, forklift operated by certified operator). - Decontaminate equipment and PPE regularly following approved plan per the Field Manager.

Site Safety Briefing

	Utilizing crane for vibracore collection	- When cranes are used for vibracoring, the crane operation is solely the responsibility of the crane operator and rigging team. - Do not work or operate within a radius equal to 1.5x the length of the crane boom unless planned and approved by the Field Manager and directly supervised by the crane operator/rigging team. - Do not provide the crane/rigging team with direction beyond providing planned sample location information. - Wear appropriate PPE when coming into direct contact with contaminated media.
On Water Grab Sampling	Navigating to location, recording electronic and physical data, working on the water, decontamination	- Operate under the supervision and direction of the boat operator (subcontractor). - Avoid pinch points, on deck cables/lines, and hydraulic operated lift systems until directed by boat operator. - Communicate concerns preemptively to avoid escalation and increased risks (eg. motion sickness, exposure, biological interactions). - Wear appropriate PPE when coming into direct contact with contaminated media. - Decontaminate utilize process approved by Field Manager with appropriate equipment.



Appendix D Safety Data Sheets

Effective date: 11 May 2020

Revision: 11 May 2020

Trade Name: Alconox®

I Identification of the substance/mixture and of the supplier**I.1 GHS Product identifier**

Trade Name: Alconox®

Product number: 1101, 1103, 1104, 1104-1, 1112, 1112-1, 1125, 1150

I.2 Application of the substance / the mixture: Cleaning material/Detergent**I.2.1 Recommended dilution ratio:** 1 – 2% in water**I.3 Details of the supplier of the Safety Data Sheet****Manufacturer:**

Alconox Inc.
30 Glenn St
White Plains, NY 10603
(914) 948-4040

Supplier:**Emergency telephone number:**

ChemTel Inc

North America: 1-888-255-3924

International: +1 813-248-0573

2 Hazards identification**2.1 Classification of the substance or mixture:**

In compliance with EC regulation No. 1272, 29CFR1910/1200 and GHS requirements.

Hazard-determining components of labeling:

Tetrasodium Pyrophosphate
Sodium tripolyphosphate
Sodium Alkylbenzene Sulfonate

2.2 Label elements:

Eye damage, category 1.

Skin irritation, category 2.

Product at recommended dilution:

Eye irritation, category 2B

Hazard pictograms:**Signal word:** Danger**Hazard statements:**

H315 Causes skin irritation.

H318 Causes serious eye damage.

Precautionary statements:

P264 Wash skin thoroughly after handling.

Effective date: 11 May 2020

Revision: 11 May 2020

Trade Name: Alconox®

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P302+P352 If on skin: Wash with soap and water.

P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.

P321 Specific treatment (see supplemental first aid instructions on this label).

P332+P313 If skin irritation occurs: Get medical advice/attention.

P362 Take off contaminated clothing and wash before reuse.

P501 Dispose of contents and container as instructed in Section 13.

Hazardous Elements at Use Dilution:

Hazard Pictograms:

**Signal Word:** Warning**Hazard Statements:**

H320 Causes eye irritation

Precautionary statements:

P302+P352 If on skin: Wash with soap and water.

P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.

P501 Dispose of contents and container as instructed in Section 13

Additional information: None.**Hazard description****Hazards Not Otherwise Classified (HNOC):** May cause surfaces to become slippery if wet. Use caution in areas of foot traffic if on floors.**Information concerning particular hazards for humans and environment:**

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to EC regulation No. 1272, 29CFR1910/1200 and GHS Requirements, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients**3.1 Chemical characterization:** Not determined or not available.**3.2 Description:** None**3.3 Hazardous components (percentages by weight)**

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Skin Irrit. 2; H315 Eye Irrit. 2; H319	12-28
CAS number: 68081-81-2 or 68411-30-3	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2; H315 Eye Dam. 1; H318	8-22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Skin Irrit. 2; H315 Eye Irrit. 2; H319	2-16

Effective date: 11 May 2020

Revision: 11 May 2020

Trade Name: Alconox®

Hazardous components at use dilution (percentages by weight):

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Eye Irrit. 2; H319	0.12 - 0.28
CAS number: 68081-81-2 or 68411-30-3	Sodium Alkylbenzene Sulfonate	Eye Irrit. 2; H319	0.08 – 0.22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Eye Irrit. 2; H319	0.02 – 0.16

3.4 Additional Information: None.**4 First aid measures****4.1 Description of first aid measures****General information:** None.**After inhalation:**

Maintain an unobstructed airway.

Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.

Seek medical attention if symptoms develop or persist.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.

Remove contact lens(es) if able to do so during rinsing.

Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.

Seek medical attention if irritation, discomfort, or vomiting persists.

4.2 Most important symptoms and effects, both acute and delayed

None

4.3 Indication of any immediate medical attention and special treatment needed:

No additional information.

First aid measure at recommended dilution:**General information:** None.**After inhalation:**

Maintain an unobstructed airway.

Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.

Remove contact lens(es) if able to do so during rinsing.

After swallowing:

Rinse mouth thoroughly. Seek medical attention if irritation, discomfort, or vomiting develops.

5 Firefighting measures

Effective date: 11 May 2020**Revision:** 11 May 2020**Trade Name:** Alconox®**5.1 Extinguishing media****Suitable extinguishing agents:**

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents: None

5.2 Special hazards arising from the substance or mixture:

Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters**Protective equipment:**

Wear protective eye wear, gloves and clothing.

Refer to Section 8.

5.4 Additional information:

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.

Avoid contact with skin, eyes and clothing.

6 Accidental release measures**6.1 Personal precautions, protective equipment and emergency procedures:**

Ensure adequate ventilation.

Ensure air handling systems are operational.

6.2 Environmental precautions:

Should not be released into the environment.

Prevent from reaching drains, sewer or waterway.

6.3 Methods and material for containment and cleaning up:

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections: None**7 Handling and storage****7.1 Precautions for safe handling:**

No expected hazards under normal use condition.

Avoid breathing mist or vapor if aerosolized.

Do not eat, drink, smoke or use personal products when handling chemical substances.

7.2 Conditions for safe storage, including any incompatibilities:

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

Effective date: 11 May 2020
Trade Name: Alconox®

Revision: 11 May 2020

8 Exposure controls/personal protection



8.1 Control parameters:

- a) 7722-88-5, Tetrasodium Pyrophosphate, ACGIH TWA 10 mg/m³
- b) 7758-29-4, Sodium Tripolyphosphate, ACGIH TWA 10 mg/m³
- c) Dusts, non-specific OEL, Irish Code of Practice
 - (i) Total inhalable 10 mg/m³ (8hr)
 - (ii) Respirable 4 mg/m³ (8hr)
 - (iii) Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m³, (8hr)

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal use conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance.

Eye protection:

Safety goggles or glasses, or appropriate eye protection. Recommended to comply with ANSI Z87.1 and/or EN 166.

General hygienic measures:

Wash hands before breaks and at the end of work.
Avoid contact with skin, eyes and clothing.

Exposure Control and Personal Protective Equipment at recommended dilution:

Under normal use and operational conditions, no special personal protective equipment or engineering controls will be necessary. Handle with care.

9 Physical and chemical properties

Appearance (physical state, color):	White and cream colored flakes - powder	Explosion limit lower: Explosion limit upper:	Not determined or not available. Not determined or not available.
Odor:	Not determined or not available.	Vapor pressure at 20°C:	Not determined or not available.
Odor threshold:	Not determined or not available.	Vapor density:	Not determined or not available.
pH-value:	9.5 (1% aqueous solution)	Relative density:	Not determined or not available.

Effective date: 11 May 2020

Revision: 11 May 2020

Trade Name: Alconox®

Melting/Freezing point:	Not determined or not available.	Solubilities:	Not determined or not available.
Boiling point/Boiling range:	Not determined or not available.	Partition coefficient (n-octanol/water):	Not determined or not available.
Flash point (closed cup):	Not determined or not available.	Auto/Self-ignition temperature:	Not determined or not available.
Evaporation rate:	Not determined or not available.	Decomposition temperature:	Not determined or not available.
Flammability (solid, gaseous):	Not determined or not available.	Viscosity:	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.
Density at 20°C:	Not determined or not available.		

10 Stability and reactivity

- 10.1 Reactivity:** Not determined or not available.
10.2 Chemical stability: Not determined or not available.
10.3 Possibility hazardous reactions: Not determined or not available.
10.4 Conditions to avoid: Not determined or not available.
10.5 Incompatible materials: Not determined or not available.
10.6 Hazardous decomposition products: Not determined or not available.

11 Toxicological information

11.1 Information on toxicological effects:

Acute Toxicity:

Oral:

: LD50 > 5000 mg/kg oral rat - Product.

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Sodium Alkylbenzene Sulfonate: Causes skin irritation.

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye damage.

Tetrasodium Pyrophosphate: Risk of serious damage to eyes.

Product information at recommended dilution:

Eye irritation may occur upon direct contact with eyes. No specific hazards for skin contact, inhalation, or chronic exposure are expected within normal use parameters.

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

Effective date: 11 May 2020

Revision: 11 May 2020

Trade Name: Alconox®

STOT-single and repeated exposure: No additional information.**Additional toxicological information:** No additional information.**12 Ecological information****12.1 Toxicity:**

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.

Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.9 mg/l, 48 hours.

Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.

Tetrasodium Pyrophosphate: Fish, LC50 - other fish - 1,380 mg/l - 96 h.

Tetrasodium Pyrophosphate: Aquatic invertebrates, EC50 - Daphnia magna (Water flea) - 391 mg/l - 48 h.

12.2 Persistence and degradability: No additional information.**12.3 Bioaccumulative potential:** No additional information.**12.4 Mobility in soil:** No additional information.**General notes:** No additional information.**12.5 Results of PBT and vPvB assessment:****PBT:** No additional information.**vPvB:** No additional information.**12.6 Other adverse effects:** No additional information.**13 Disposal considerations****13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)****Relevant Information:**

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information**14.1 UN Number:**

None

ADR, ADN, DOT, IMDG, IATA

14.2 UN Proper shipping name:

None

ADR, ADN, DOT, IMDG, IATA

14.3 Transport hazard classes:

ADR, ADN, DOT, IMDG, IATA

Class: None**Label:** None**LTD. QTY:** None**US DOT****Limited Quantity Exception:**

None

Bulk:**RQ (if applicable):** None**Proper shipping Name:** None**Hazard Class:** None**Packing Group:** None**Marine Pollutant (if applicable):** No additional information.**Non Bulk:****RQ (if applicable):** None**Proper shipping Name:** None**Hazard Class:** None**Packing Group:** None**Marine Pollutant (if applicable):** No additional information.

Effective date: 11 May 2020

Revision: 11 May 2020

Trade Name: Alconox®

Comments: None	Comments: None
14.4 Packing group: ADR, ADN, DOT, IMDG, IATA	None
14.5 Environmental hazards:	None
14.6 Special precautions for user:	None
Danger code (Kemler):	None
EMS number:	None
Segregation groups:	None
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.	
14.8 Transport/Additional information:	
Transport category:	None
Tunnel restriction code:	None
UN "Model Regulation":	None

15 Regulatory information**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.****North American****SARA****Section 313 (specific toxic chemical listings):** None of the ingredients are listed.**Section 302 (extremely hazardous substances):** None of the ingredients are listed.**CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable****Spill Quantity:** None of the ingredients are listed.**TSCA (Toxic Substances Control Act):****Inventory:** All ingredients are listed as active.**Rules and Orders:** Not applicable.**Proposition 65 (California):****Chemicals known to cause cancer:** None of the ingredients are listed.**Chemicals known to cause reproductive toxicity for females:** None of the ingredients are listed.**Chemicals known to cause reproductive toxicity for males:** None of the ingredients are listed.**Chemicals known to cause developmental toxicity:** None of the ingredients are listed.**Canadian****Canadian Domestic Substances List (DSL):**

All ingredients are listed.

EU**REACH Article 57 (SVHC):** None of the ingredients are listed.

Effective date: 11 May 2020

Revision: 11 May 2020

Trade Name: Alconox®

Germany MAK: Not classified.**EC 648/2004** – This is an industrial detergent. Contains >30% phosphate, 15-30% anionic surfactant, <5% EDTA salts**EC 551/2009** – This is not a laundry or dishwasher detergent**EC 907/2006** – Contains no enzymes, optical brighteners, perfumes, allergenic fragrances, or preservative agents**Asia Pacific****Australia****Australian Inventory of Chemical Substances (AICS):** All ingredients are listed.**China****Inventory of Existing Chemical Substances in China (IECSC):** All ingredients are listed.**Japan****Inventory of Existing and New Chemical Substances (ENCS):** All ingredients are listed.**Korea****Existing Chemicals List (ECL):** All ingredients are listed.**New Zealand****New Zealand Inventory of Chemicals (NZOIC):** All ingredients are listed.**Philippines****Philippine Inventory of Chemicals and Chemical Substances (PICCS):** All ingredients are listed.**Taiwan****Taiwan Chemical Substance Inventory (TSCI):** All ingredients are listed.**16 Other information****Abbreviations and Acronyms:** None**Summary of Phrases****Hazard statements:**

H315 Causes skin irritation.

H318 Causes serious eye damage.

NFPA: 1-0-0**HMIS:** 1-0-0**At recommended dilution:****NFPA:** 1-0-0**HMIS:** 1-0-0**Precautionary statements:**

P264 Wash skin thoroughly after handling.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P302+P352 If on skin: Wash with soap and water.

P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.

P321 Specific treatment (see supplemental first aid instructions on this label).

P332+P313 If skin irritation occurs: Get medical advice/attention.

P362 Take off contaminated clothing and wash before reuse.

P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.



Appendix E Personnel Certifications

Certificate of Completion
Anthony Cerruti
has completed the requirements for
Adult and Pediatric First Aid/CPR/AED
conducted by:
Sound Beats CPR LLC
Date Completed: **08/21/2025**
Valid Until: **08/21/2027**
Certificate ID: **021UAFM**



Scan code or visit:

<https://www.redcross.org/take-a-class/qrcode?certnumber=021UAFM>

Certificate of Completion

This certifies that

ANTHONY D CERRUTI

Has Successfully completed

OSHA 40 Hour HAZWOPER Training

In Accordance With Federal OSHA Regulation 29 CFR 1910.120(e)

And State OSHA/EPA Regulations as well including 29 CFR 1926.65(e)

This course is approved for 40 Contact Hours (4 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) (Accreditation # 044)

Julius P. Griggs

Julius P. Griggs
Training Director

1604031163700

Certificate Number

4/3/2016

Issue Date



UNLIMITED, Inc.

OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley, CA 93063
888 309-SAFE (7233) or 805 306-8027 866-869-7097 (fax)
www.safetyunlimited.com

Annual Refresher Training Required

Want to be sure this certificate is valid? Visit safetyunlimited.com/verification



Certificate of Completion

Anthony Cerruti

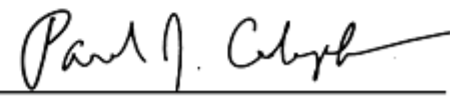
has satisfactorily passed an exam and completed an 8-hour supervisor training course entitled
HAZWOPER 8-Hour Supervisor - 1910.120 (e)
meeting the requirements identified in Title 29 CFR 1910.120 (OSHA HAZWOPER Regulations).
This course has been awarded 1.34 Industrial Hygiene CM Points by the American Board of Industrial
Hygiene-Approval Number 13334. This course is also eligible for .8 Continuance of Certification
(COC) points from the Board of Certified Safety Professionals.

Completion Date: 05/08/2021

Certificate Number: 578679

www.natlenvtrainers.com
info@natlenvtrainers.com
750 W Lake Cook Rd, Suite 350
Buffalo Grove, IL 60089
1-888-877-7130


Amy Bonilla
Vice President


Paul Colangelo
Training Facilitator

THE NATIONAL ENVIRONMENTAL TRAINERS

Daniel Pickering

has satisfactorily passed an exam and completed an 8-hour Supervisor training course entitled

Hazardous Waste Operations and Emergency Response

meeting the requirements identified in Title 29 CFR 1910.120 (OSHA HAZWOPER Regulations).

This course has been awarded 1.34 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is also eligible for .66 Continuance of Certification (COC) points from the Board of Certified Safety Professionals



April 10, 2012

Course Number 1002, Awarded 8 PDH's
Florida Board of Professional Engineers
CEU Provider Number 0004284

www.nationalenvironmentaltrainers.com

Signature of Instructor

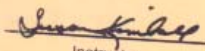
A handwritten signature in black ink, appearing to read "Clay A. Bednarz", is written over a light gray grid background.

Clay A. Bednarz, MS, RPIH

1900 W. Nickerson, Suite 315
Seattle, WA 98119
(206) 285-3373



This certifies that
Daniel J. Pickering
has satisfactorily completed
40 hours of training in
**Hazardous Waste Operations and
Emergency Response**
in compliance with OSHA 29 CFR 1910.120 and WAC 296-843


Instructor

PPE Levels: A, B, C, & D
Cert. Num: 113180
Class Date: Aug 1 - 5, 2011
Annual Refresher by: Aug 4, 2012

Certificate of Training

Anthony Cerruti

HAZARDOUS WASTE SITE OPERATIONS
8-HOUR REFRESHER
(WAC 296-843-200)

A rectangular box containing a handwritten signature in black ink that reads "E. Black".

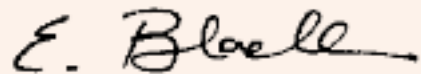
April 11, 2024

ELISABETH BLACK, CIH
EMB CONSULTING, LLC
EMBLACKCONSULTING@GMAIL.COM
206.915.2395

Certificate of Training

Daniel Pickering

HAZARDOUS WASTE SITE OPERATIONS
8-HOUR REFRESHER
(WAC 296-843-200)

A rectangular box containing a handwritten signature in black ink that reads "E. Black".

April 11, 2024

ELISABETH BLACK, CIH
EMB CONSULTING, LLC
EMBLACKCONSULTING@GMAIL.COM
206.915.2395

Certificate of Training

Rob Webb

HAZARDOUS WASTE SITE OPERATIONS
8-HOUR REFRESHER
(WAC 296-843-200)

A rectangular box containing a handwritten signature in black ink that reads "E. Black".

April 11, 2024

ELISABETH BLACK, CIH
EMB CONSULTING, LLC
EMBLACKCONSULTING@GMAIL.COM
206.915.2395



TCB Educational Services
1600 14th Ave.
Seattle, WA 98122

Certificate of Completion

NATASYA GRAY

has successfully completed the

Hazardous Materials/Hazardous Waste Site Operations

in accordance with 29 CFR 1910.120/Chapter 296-62 WAC (Part P)

Certificate #: 40HR-060799-1

Certified in Level: A, B, C, D

Date: June 9, 1999

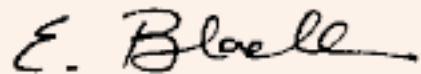
Instructor: _____

Gregory Vazquez

Certificate of Training

Natasya Gray

HAZARDOUS WASTE SITE OPERATIONS
8-HOUR REFRESHER
(WAC 296-843-200)

A rectangular box containing a handwritten signature in black ink that reads "E. Black".

April 11, 2024

ELISABETH BLACK, CIH
EMB CONSULTING, LLC
EMBLACKCONSULTING@GMAIL.COM
206.915.2395



Compliance Solutions

"Today's Training....Tomorrow's Solution"

10515 E 40th Ave, Suite 116, Denver Colorado
80239 Phone: 800-711-2706

Student Affiliation:

Philip Services

Certificate of Completion

This is to certify that

Natasya Gray

has successfully completed the classroom requirements for

8 Hour Site Supervisor

29 CFR 1910.120

Presented

Tuesday, November 16, 1999

Compliance Solutions Occupational Trainers, Inc.

Certificate Number: 20356

Neval Gupta
Vice President

Frank Gardner
Instructor

Amec Foster Wheeler Environment & Infrastructure
TRAINING COURSE CERTIFICATION

This is to certify that

Tasya Gray

Has completed training in the course
Hazardous Materials Refresher, 8 Hours
OSHA 1910.120(e)(8)

February 23, 2015
Date of Training

Phoenix, Arizona
Location of Training Materials



Instructor
Chad Barnes, PE (AZ), CHMM
West US HSE Manager
4600 E. Washington, Suite 600
Phoenix, Arizona 85034



**MEDICAL RECOMMENDATIONS FOR
USE OF RESPIRATORY PROTECTIVE
EQUIPMENT**

Applicant/Emp: DALTON OLMSTED & FUGLEVAN 33293 H Age: 39
Position Title: DOS: 12/02/15 DOB: 3/14/76
Date of Eval: Patient: GRAY, NATASYA
Contact: Case #: 682-207828 Ref #: HAZMATPE/GM
Evaluation Content: ☒ Questionnaire ☒ Physical ☐ PFT ☐ X-Ray Other: _____

Based on the elements indicated above, I have evaluated the aforementioned person in accordance with the provisions of OSHA 29 CFR 1910.134 and WAC 296-842, applicable to the use of respiratory protective equipment, and it is my opinion that he/she is: *(Check all that apply)*

☒ **Medically qualified for unrestricted use of the following respiratory protective devices:**
CATEGORY I Self-Contained; Air-Supplied (Continuous Flow, Demand and Pressure Demand);
Canister Mask; Chemical Cartridge and Mechanical Filter with and without Blower.

☐ **Medically qualified for restricted use of respiratory protective devices as indicated below:**

☐ **CATEGORY II**

Self-Contained	1-2 hours per day
Air-Supplied	
Continuous Flow	Unlimited
Demand	Up to 4 hours / day
Pressure Demand	Up to 4 hours / day
Canister Mask	1-2 hours per day
Chemical Cartridge	1-2 hours per day
Mechanical Filter	1-2 hours per day
Mechanical Filter w/ Blower	Unlimited

☐ **CATEGORY III**

Self-Contained	Never
Air-Supplied	
Continuous Flow	Emergency only
Demand	Emergency only
Pressure Demand	Emergency only
Canister Mask	Never
Chemical Cartridge	Never
Mechanical Filter	Never
Mechanical Filter w/ Blower	Emergency only

☐ **In need of the following additional evaluation to assess qualification:** _____
☒ **In need of Medical Follow-Up Examinations as frequently as every:** 2y
to include: _____

COMMENTS:

Fitting Considerations: ☐ Facial hair ☒ Glasses/Contact lenses ☐ Dentures/Facial deformity

I hereby certify that in accordance with OSHA 29 CFR 1910.134 and Washington Administrative Code (WAC 296-842), applicable to the use of respiratory protective equipment, I have informed the applicant/employee of the results of his/her evaluation and I have given him/her a copy of these recommendations.

Health Care Professional:

Name: Karin Baer ARNP
Signature: [Signature]
Date: 12/2/15

This form complies with OSHA requirements and the Washington Administrative Code (WAC 296-842), requirements for the use of respirators.



**HazMat Pre-placement, Periodic, Termination or Post-Exposure
Medical Evaluation Summary**

Employee: Natasya Gray Employer: Dalton, Dimsted, & Fuglestad

Telephone: Work (206) 375-0211 Home (206) 375-0211

Date of Examination: 12/2/15 SS#: 541-11-9804

Type of Examination: ☒ Pre-placement ☐ Periodic ☐ Termination ☐ Post-Exposure

The results of the HazMat Medical Evaluation performed on the above employee in accordance with 29 CFR 1910.120 are as follows. **Any employment decision based upon this examination is the responsibility of the employer.**

Y	N	Recommendations
☒	☒	There is / are condition(s) that would place the employee at risk of material health impairment from work in hazardous waste operations, emergency response, or respirator use.
☐	☒	Limitations are recommended for work in hazardous waste operations, emergency response, or respirator use.
☐	☒	Deferred pending further evaluation.
☒	☐	Employee has been informed of the results of this evaluation and of any conditions which require further examination or treatment.

Re-evaluate in 24 months (not to exceed 24 months)

Additional OSHA compliance evaluations performed (additional documents attached):

☒ Respiratory Protection

☐ Asbestos

☐ Benzene

☐ Bloodborne Pathogens

☐ Hearing Conservation

☒ Lead

☐ Other: _____

Limitations:

☒ No limitations

☐ Restricted respirator use as defined on attached U.S. HealthWorks *Respirator Use Clearance* form.

☐ Restrict from HAZMAT environment as described: _____

☐ Restrict from all HAZMAT environments

☐ Restrict from emergency response team

Physician: Karin Baer ARNP

Date: 12/2/15



Appendix E Inadvertent Discovery Plan

To be provided as a separate, standalone document, as acknowledged by Ecology in a letter dated August 26, 2025 (Ecology, 2025).