HALEY ALDRICH

www.haleyaldrich.com

REPORT ON

CUSTOM PLYWOOD MILL SITE CLEANUP SITE IDENTIFICATION NO. 4533 PHASE III SUBTIDAL SEDIMENT CLEANUP SAMPLING AND ANALYSIS PLAN/ QUALITY ASSURANCE PROJECT PLAN FIDALGO BAY ANACORTES, WASHINGTON

by

Haley & Aldrich, Inc. & Marine Surveys and Assessments
Seattle, Washington Port Townsend, Washington

for

Washington State Department of Ecology
Olympia, Washington

File No. 0202972-000
November 2022

HALEY & ALDRICH, INC.
3131 ELLIOTT AVENUE
SUITE 600
SEATTLE, WA 98121
206.324.9530

SIGNATURE PAGE FOR

REPORT ON

CUSTOM PLYWOOD MILL SITE CLEANUP SITE IDENTIFICATION NO. 4533
FIDALGO BAY
ANACORTES, WASHINGTON

PREPARED FOR

WASHINGTON STATE DEPARTMENT OF ECOLOGY
OLYMPIA, WASHINGTON

PREPARED BY:

Jessica Blanchette
Project Biologist
Haley & Aldrich, Inc.

Bryan DeCaterina
Marine Scientist/ Dive Safety Officer
Marine Surveys and Assessments

REVIEWED AND APPROVED BY:

N. John Bingham
Senior Project Manager
Haley & Aldrich, Inc.

Table of Contents

List of Tables

List of Appendices

1. Introduction

This Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) was developed for the Washington State Department of Ecology (Ecology) for nearshore remediation performance and confirmation monitoring at the Custom Plywood site (Site). This SAP/QAPP describes the sampling locations, field sampling procedures, laboratory analytical methods, data evaluation procedures, and QC criteria to support the interim remedial activities.

The scope of services described in the SAP is designed to determine the current concentration of dioxins/furans in the sand cap placed in 2021 and inform further remedial action.

2. Background

The Custom Plywood Site is one of several Anacortes Area Bay-Wide priority sites for Fidalgo/Padilla Bays being addressed by the Toxics Control Program (TCP) under the Puget Sound Initiative (PSI). The Site includes property owned by GBH covering approximately 6.6 acres of upland and 34 acres of intertidal and subtidal areas.

As described in the Remedial Investigation (RI) and Cleanup Action Plan (CAP), the Custom Plywood Site was the location of lumber and plywood milling operations beginning in about 1930. Through the years, the property changed hands several times, and was rebuilt and added onto until Custom Plywood became an operating entity sometime before 1991. The facility was used as a sawmill and plywood manufacturing plant until most of the wooden structures in the main plant area, many of which were built in the 1940s, were consumed in a fire on 28 November 1992. The current Site layout is shown in Appendix A.. Milling activities produced wood waste and chemical contaminants affecting Site soils and groundwater that are the focus of the remedial action.

2.1 SITE ENVIRONMENTAL CONDITIONS

Phase II remedial action addressed slowing active erosion of the shoreline by placing Ecology blocks, extending the existing jetty, building a protective spit, and adding dunegrass to targeted areas. Upon beginning Phase III, the beach appears to have retained the dunegrass and slowed the significant erosion of the upper beach.

Deeper in the subtidal zone, extensive eelgrass beds are documented on and adjacent to the Custom Plywood property. These beds are contiguous with the larger Fidalgo Bay eelgrass population. The eelgrass beds appeared in good condition where present but seemed limited in coverage due to previous site use in shallow subtidal areas. The shoreward extent of eelgrass coverage has been limited by the occurrence of wood waste, debris, and high-organic-content sediment within the project footprint.

2.2 SITE SOIL AND GROUNDWATER CONTAMINANTS

Sediment containing wood waste has been an ongoing source of contamination in the aquatic environment at the site. Wood waste accumulation in nearshore areas and near former overwater structures exceeded 6 feet in places. In sufficient quantities, wood waste can represent an environmental pollutant and deleterious substance per criteria in the Sediment Management Standards (SMS; Washington Administrative Code [WAC] 173-240-200(17)). As part of the sediment profile, wood waste in the biologically active zone can adversely affect benthic habitat by potentially generating sulfide, ammonia, phenols, and related degradation products harmful to marine biota. The seaward extent and magnitude of wood waste in quantities sufficient to promote adverse impacts is uncertain. This was further addressed in the May 2011 supplemental sediment field investigation report and in an investigation conducted in January 2012 to fill additional data gaps in the aquatic area at the site. Dioxins/furans are the other notable contaminants in the aquatic environment. Near-surface sediment throughout the aquatic portion of the site has been impacted by dioxin/furan concentrations exceeding Fidalgo Bay background levels. Deeper portions of the sediment profile are also affected as shown in the May 2011 and January 2012 supplemental field investigations. Elevated dioxin/furan concentrations have been encountered in deeper sediment associated with relatively thick nearshore accumulations of

wood waste. As the thickness and general quantity of wood waste decreases seaward, dioxins/furans are more likely restricted to surface sediment because of secondary redistribution following in-water fill placement or erosion of nearshore deposits.

3. Project Objectives and Summary

The primary objective for the Phase III remedial action at the Site focused on substantially eliminating, reducing, and/or controlling unacceptable risks to the environment posed by constituents of concern (COCs) to the extent feasible and practicable. Applicable exposure pathways and receptors of interest for human health include current and future site users, including workers and visitors, and shellfish consumers of marine biota and marine sediment/waters.

Applicable ecological exposure pathways and receptors include organisms in the biologically active zone exposed to sediment by direct contact and food chain uptake. Related ecologically focused cleanup objectives for bay-wide remediation also include:

- providing suitable substrate for promoting recovery/recruitment of aquatic organisms in remediated areas; and
- minimizing habitat (i.e., eelgrass) and water quality impacts during construction.

During Phase IIIA of the project, 4.3 acres were capped with 8 inches of sand material and 1.75 acres were capped with 2 inches of sand material, 0.6 acres of which were in eelgrass. Sediment sampling is proposed to assess the current dioxins/furans concentration in the recently capped areas. In addition, two samples will be collected within the boundary proposed for sand capping during Phase IIIB and one composite sample will be analyzed from a wood waste deposit found along the southwestern border of the project site.

4. Project Team and Responsibilities

Key staff members and their project functions are listed below.

- Hun Seak Park – Ecology Project Manager
- N. John Bingham, P.E. – Project Manager
- Bryan DeCaterina (Marine Surveys and Assessments) – Field Lead
- Jessica Blanchette and N. John Bingham – On-site Construction Managers

Chemical analysis will be primarily performed by Analytical Resources (ARI) laboratory located in Tukwila, Washington. ARI is accredited by the State of Washington.

5. Field Sampling

The timing of the sediment sampling is expected to take place in November 2022 by Marine Surveys and Assessments (MSA) and Haley & Aldrich, Inc. (Haley & Aldrich) scientists. Due to the shallow water depths at the site, presence of eelgrass, and minimization of disturbing the recently-placed sand cap, sediment core samples will be collected by hand using diver retrieval methods.

Positioning
Horizontal control for sampling will use a Bad Elf Flex (model BE-GPS-5500) GPS, using real time kinematic (RTK) for vertical positioning, which is integrated with the Washington State Real Time Network. Target stations will be marked using anchored surface buoys.

Proposed sample locations can be found in Appendix A. Sample locations will be selected based on real-time conditions and a best fit, then actual locations will be collected using GPS. Samples proposed within the eelgrass bed will be re-positioned to avoid above-mudline eelgrass shoots, and instead collected from a nearby representative area with either patchy distribution of eelgrass or no eelgrass present to minimize incidental damage.

Decontamination Procedures
The sediment collection device and all processing tools will be decontaminated prior to field sampling to ensure that no external contamination source could introduce any kind of water or airborne contaminants.

Decontamination procedures include:

- Rinse and pre-clean sampling equipment with potable water.
- Wash and scrub sampling equipment in a solution of Alconox® soap and potable water.
- Rinse sampling equipment with potable water and then rinse again three times with distilled water.
- Place all sampling equipment in sterilized high-density polyethylene (HDPE) buckets.
- Contact of the sample device or processing tools with potentially contaminated surfaces will be avoided.

Sampling utensils and compositing bowls will be decontaminated prior to first use and, if being reused, between target stations using the first three steps above, then covered with aluminum foil until needed. Nitrile gloves will be worn during core processing, compositing, and sample handling. Gloves will be changed or decontaminated before first use and between target stations.

Sampling Procedures
Sediment core samples will be taken representatively from the top 10 centimeters using a handheld core sampling device designed and owned by Grette Associates, LLC (Photograph 1). MSA scientific divers will enter the water and descend on each sample marker in teams of two for safety. Dive teams will collect at least one independent, representative 10-centimeter core sample from each location, or more to meet minimum analytical volume. Each core sample will be transferred to a sterilized 1-gallon Ziplock brand bag, with care to contain all fine sediments, and taken immediately to the surface. Each sample bag will be transferred to the vessel support staff for inspection and labeling, and then left to

settle until processing. Other qualitative information, including sample depth and location, will be recorded on the sample log by the vessel support staff. At each sampling location, MSA divers will also attempt to measure that location's cap thickness, to the greatest extent feasible, using a ruler to measure the stratification most likely associated with the thin layer cap material. If underwater visual techniques are unsuccessful due to site visibility or material sloughing or mixing, other techniques may be implemented pending field conditions to bring a core to the surface that preserves sediment layers. All samples will be stored on board the dive vessel, in a decontaminated cooler containing wet ice, for no longer than 12 hours before processing.

Photograph 1. Four-inch hand corer.

Sample Processing

Once all samples have been collected for that day, sample coolers will be transferred to land for processing. After sample bags have completely settled, water will be carefully decanted off each bag. Samples will then be transferred into dedicated decontaminated stainless-steel bowls using decontaminated utensils. If replicate samples are required to reach the required volume, both replicate samples will be homogenized together; otherwise, single samples will be homogenized. Once samples have been added to the mixing bowl, the sample will be stirred and homogenized until a consistent color and texture is achieved to form the composite sample. Each sample will be placed in appropriate containers obtained from ARI analytical laboratory. Each sample container will be clearly labeled with the project name, sample/composite identification, type of analysis to be performed, date and time, and initials of person(s) preparing the sample and referenced by entry into the sample log and chain-of-custody form. The sample containers will then be stored on wet ice until delivery to the analytical laboratory. All disposable sampling materials will be placed in a heavy-duty garbage bag, labeled, and disposed of following sampling. Excess sediment following laboratory analysis will be disposed of as waste and will not be returned to the water.

5.1 INVESTIGATION-DERIVED WASTE MANAGEMENT

Contaminated or potentially contaminated materials generated during field work will be managed in accordance with applicable federal, state, and local regulations. Investigation-derived waste (IDW) will be handled in accordance with applicable regulations and in a manner consistent with ultimate disposition.

IDW is anticipated to include the following categories of waste:

- Non-hazardous solid waste, including personal protective equipment (PPE; e.g., gloves), paper towels, other disposable materials, etc.;
- Sediment IDW; and
- Liquid IDW from decontamination wastewater.

Non-hazardous solid waste will be double-bagged in heavy duty garbage bags, sealed with duct tape, and disposed of in an on-site dumpster for solid waste disposal in a municipal landfill. Liquid IDW from decontamination will be minimized by using pre-decontaminated supplies to the greatest extent feasible. Resulting IDW liquid from decontamination will be containerized for later disposal. Excess sediment from sampling will be returned to the source area from which they originated.

5.2 SAMPLE CONTAINERS AND LABELS

Sample container requirements vary according to analyte. Precleaned sample containers will be provided by the analytical laboratory. Sample containers shall be cleaned following the requirements described in Specifications and Guidance for Contaminant-Free Sample Containers (U.S. Environmental Protection Agency [EPA] 1992 OSWER Directive 92.0-05a). Sample containers will be 500 milliliters (mL) per sample contained in amber glass.

5.3 FIELD DOCUMENTATION

Field notes will be maintained during sampling and processing operations. The following will be included in the field notes:

- Site name and location;
- Date and time;
- Names of the person collecting and logging the samples;
- Weather conditions;
- Date, time, and identification of each sample, including number of jars and tests requested;
- Details of sample collection, including GPS coordinates; actual sampling point locations will be recorded on a sketch map;
- Any deviation from the approved SAP; and
- General observations.

6. Sample Handling Procedures

6.1 SAMPLE PRESERVATION AND HOLDING TIMES

Samples will be preserved according to the requirements of the specific analytical methods to be employed, and all samples will be extracted and analyzed within method-specified holding times. Holding times for dioxins/furans are 14 days until extraction or 40 days after extraction if held at 4 degrees Celsius (C), 1 year if held at -18 degree C.

6.2 CHAIN-OF-CUSTODY PROCEDURES

Chain-of-custody forms will be used to document the collection, custody, and transfer of samples from their initial collection location to the laboratory, and their ultimate use and disposal. Entries for each sample will be made on the custody form after each sample is collected.

Sample custody procedures will be followed to provide a documented record that can be used to follow possession and handling of a sample from collection through analysis. A sample is considered to be in custody if it meets at least one of the following conditions:

- The sample is in someone's physical possession or view;
- The sample is secured to prevent tampering (i.e., custody seals); and/or
- The sample is locked or secured in an area restricted to authorized personnel.

A chain of custody form will be completed in the field as samples are packaged. At a minimum, the information on the custody form shall include the sample number, date and time of sample collection, sampler, analysis, and number of containers. Two copies of the custody form will be placed in the cooler prior to sealing for delivery to the laboratory with the respective samples. The other copy will be retained and placed in the project files after review by the Project Chemist. Custody seals will be placed on each cooler or package containing samples so the package cannot be opened without breaking the seals.

6.3 DELIVERY OF SAMPLES TO ANALYTICAL LABORATORY

After sample containers have been filled, they will be packed on ice in coolers. The coolers will be transferred to ARI laboratory in Tukwila, Washington, for chemical analysis. Specific procedures are as follows:

- Samples will be packaged and shipped in accordance with U.S. Department of Transportation regulations as specified in 49 Code of Federal Regulations (CFR) 173.6 and 49 CFR 173.24;
- Individual sample containers will be packed to prevent breakage;
- The coolers will be clearly labeled with sufficient information (name of project, time and date container was sealed, person sealing the cooler, and the Haley & Aldrich office name and address) to enable positive identification;
- A sealed envelope containing custody forms will be enclosed in a plastic bag and taped to the inside lid of the cooler;
- Signed and dated custody seals will be placed on all coolers prior to shipping;

- Samples will either be shipped by courier or will be hand delivered to the laboratory by Haley & Aldrich personnel; and
- Upon transfer of sample possession to the testing laboratories, the custody form will be signed by the persons transferring custody of the coolers. Upon receipt of samples at the laboratory, the shipping container custody seal will be broken and the laboratory sample-receiving custodian will compare samples to information on the chain-of-custody form and record the condition of the samples received.

7. Laboratory Analytical Methods

Samples will be analyzed according to EPA methods as described in the Sediment Cleanup User's Manual (SCUM II) as summarized below. Analysis for dioxins/furans will be analyzed with EPA 8290/1613 methods.

Laboratory methods and practical quantitation limits (PQL; reporting limits) for dioxin/furan congeners are presented in Table 1 below.

Table 1. Chlorinated dioxin/furan congeners methods and limits

Parameter	Preparation Method	Analysis Method	Sediment Reporting Limits (ng/kg dw)	Practical Quantitation Limits (Average)
PCDD				
2,3,7,8-TCDD	EPA 1613B	EPA 1613B	1	0.7
1,2,3,7,8-PeCDD	EPA 1613B	EPA 1613B	1	2.8
1,2,3,4,7,8-HxCDD	EPA 1613B	EPA 1613B	1	3.0
1,2,3,6,7,8-HxCDD	EPA 1613B	EPA 1613B	1	3.0
1,2,3,7,8,9-HxCDD	EPA 1613B	EPA 1613B	1	3.0
1,2,3,4,6,7,8-HpCDD	EPA 1613B	EPA 1613B	2.5	3.7
OCDD	EPA 1613B	EPA 1613B	10	7.5
PCDF				
2,3,7,8-TCDF	EPA 1613B	EPA 1613B	1	0.7
1,2,3,7,8-PeCDF	EPA 1613B	EPA 1613B	1	3.0
2,3,4,7,8-PeCDF	EPA 1613B	EPA 1613B	1	3.0
1,2,3,4,7,8-HxCDF	EPA 1613B	EPA 1613B	1	2.9
1,2,3,6,7,8-HxCDF	EPA 1613B	EPA 1613B	1	2.9
1,2,3,7,8,9-HxCDF	EPA 1613B	EPA 1613B	1	3.0
2,3,4,6,7,8-HxCDF	EPA 1613B	EPA 1613B	1	3.0
1,2,3,4,6,7,8-HpCDF	EPA 1613B	EPA 1613B	1	3.1
1,2,3,6,7,8,9-HpCDF	EPA 1613B	EPA 1613B	1	3.2
OCDF	EPA 1613B	EPA 1613B	2	7.1
PCDD				
2,3,7,8-TCDD	EPA 3540C	EPA 8290	1	1.0
1,2,3,7,8-PeCDD	EPA 3540C	EPA 8290	1	5.0
1,2,3,4,7,8-HxCDD	EPA 3540C	EPA 8290	1	5.0
1,2,3,6,7,8-HxCDD	EPA 3540C	EPA 8290	1	5.0
1,2,3,7,8,9-HxCDD	EPA 3540C	EPA 8290	1	5.0
1,2,3,4,6,7,8-HpCDD	EPA 3540C	EPA 8290	2.5	5.0
OCDD	EPA 3540C	EPA 8290	10	10.0
PCDF				

Table 1. Chlorinated dioxin/furan congeners methods and limits				
Parameter	**Preparation Method**	**Analysis Method**	**Sediment Reporting Limits (ng/kg dw)**	**Practical Quantitation Limits (Average)**
2,3,7,8-TCDF	EPA 3540C	EPA 8290	1	1.0
1,2,3,7,8-PeCDF	EPA 3540C	EPA 8290	1	5.0
2,3,4,7,8-PeCDF	EPA 3540C	EPA 8290	1	5.0
1,2,3,4,7,8-HxCDF	EPA 3540C	EPA 8290	1	5.0
1,2,3,6,7,8-HxCDF	EPA 3540C	EPA 8290	1	5.0
1,2,3,7,8,9-HxCDF	EPA 3540C	EPA 8290	1	5.0
2,3,4,6,7,8-HxCDF	EPA 3540C	EPA 8290	1	5.0
1,2,3,4,6,7,8-HpCDF	EPA 3540C	EPA 8290	1	5.0
1,2,3,6,7,8,9-HpCDF	EPA 3540C	EPA 8290	1	5.0
OCDF	EPA 3540C	EPA 8290	2	10.0
Notes: *ng/kg = nanogram per kilogram; dw = dry weight*				

The purpose of this proposed sampling is to inform the ongoing remediation process and not to establish sediment cleanup objectives or screening levels as screening levels for this project have been previously determined.

8. Quality Assurance and Quality Control

The quality of analytical data generated is assessed by the frequency and type of internal quality control (QC) checks developed for analysis type. The quality of laboratory measurements will be assessed by reviewing results for analysis of method blanks, matrix spikes (MSs), duplicate samples, laboratory control samples, surrogate compound recoveries, instrument calibrations, performance evaluation samples, interference checks, etc., as specified in the analytical methods to be used. The following general procedures will be followed for dioxin/furan analyses:

- Laboratory blank measurements at a minimum frequency of 5 percent or one per batch of 20 samples or fewer for each matrix;
- MS analysis to assess accuracy at a minimum frequency of 5 percent or one per batch of 20 samples or fewer for each matrix;
- MS duplicate or laboratory duplicate to assess precision at a minimum frequency of 5 percent or one per batch of 20 samples or fewer for each matrix;
- Surrogate or labeled compound spikes in each sample for organics analysis to assess accuracy; and
- Laboratory control sample analysis or a certified reference material (CRM), if appropriate CRM is available, with each analytical batch to assess accuracy in the absence of any matrix effect at a minimum frequency of 5 percent or one per batch of 20 samples or fewer for each matrix. Acceptance criteria for the CRM results (based on the 95 percent confidence interval) must be provided by the laboratory. If results fall outside the acceptance range, the laboratory may be required to re-extract and reanalyze the associated samples.

8.1 DATA QUALITY INDICATORS

The overall quality assurance objectives for field sampling, field measurements, and laboratory analysis are to produce data of known and appropriate quality. The procedures and QC checks specified herein will be used so that known and acceptable levels of accuracy and precision are maintained for each data set. This section defines the objectives for accuracy and precision for measurement data. These goals are primarily expressed in terms of acceptance criteria for the QC checks performed.

The quality of analytical data generated is controlled by the frequency and type of internal QC checks developed for analysis type. Laboratory results will be evaluated by reviewing results for analysis of method blanks, MSs, duplicate samples, laboratory control samples, calibrations, performance evaluation samples, interference checks, etc., as specified in the analytical methods to be used.

8.1.1 Precision

Precision is the degree of reproducibility or agreement between independent or repeated measurements. Analytical variability will be expressed as the relative percent difference (RPD) between laboratory replicates and between MS and matrix spike duplicate (MSD) analyses. RPD will be used to measure precision for this investigation and is defined as follows:

$$RPD = \left(\frac{D_1 - D_2}{\frac{D_1 + D_2}{2}} \right) * 100$$

Where,

D_1	=	Sample value
D_2	=	Duplicate sample value

8.1.2 Accuracy

Accuracy is the agreement between a measured value and its true or accepted value. While it is not possible to determine absolute accuracy for environmental samples, the analysis of standards and spiked samples provides an indirect assessment of accuracy.

Laboratory accuracy will be assessed as the percent recovery of MSs, MSDs, surrogate spiked compounds (for organic analyses), and laboratory control samples. Accuracy will be defined as the percentage recoverable from the true value and is defined as follows:

$$\%\ Recovery = \left(\frac{SSR - SR}{SA} \right) * 100$$

Where,

SSR	=	Spiked sample result
SR	=	Sample results (not applicable for surrogate recovery)
SA	=	Amount of spike added

8.1.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Care will be taken in the design of the sampling program to confirm sample locations are selected properly, sufficient numbers of samples are collected to accurately reflect conditions at the site, and samples are representative of sampling locations. A sufficient volume of sample will be collected at each sampling point to minimize bias or errors associated with sample particle size and heterogeneity.

8.1.4 Completeness

Completeness is the percentage of measurements made that are judged to be valid. Completeness will be calculated separately for each analytical group, e.g., metals or polycyclic aromatic hydrocarbons (PAHs). Results must also contain all QC check analyses required to verify the precision and accuracy of results to be considered complete. Data qualified as estimated during the validation process will be considered complete. Nonvalid measurements will be results that are rejected during the validation review or samples for which no analytical results were obtained. Completeness will be calculated for each analysis using the following equation:

$$Completeness = \left(\frac{valid\ data\ points\ obtained}{total\ data\ points\ planned} \right) * 100$$

The target goal for completeness is a minimum of 95 percent. Completeness will be monitored on an ongoing basis so that archived sample extracts can be reanalyzed, if required, without remobilization.

8.1.5 Comparability

Comparability is the degree to which data from separate data sets may be compared. For instance, sample data may be compared to data from background locations, to established criteria or guidance, or to data from earlier sampling events. There has been little consistency among historical studies used to estimate background chemical concentrations. For example, intervals defined as surface soil have varied often ranging from 1 to 6 inches or more in depth. In addition, analytical methods have not been consistent across studies.

Sample collection will be performed in a consistent manner by field personnel at all sampling locations to verify all data collected as part of this study are comparable. Comparability is attained by careful adherence to standardized sampling and analytical procedures, based on rigorous documentation of sample locations (including depth, time, and date).

The use of standardized methods to collect and analyze samples, along with laboratory instrument calibration against National Institute for Standards and Technology (NIST) and EPA traceable standards will also confirm comparability, particularly for comparison of data collected from this study (within-study comparability).

Comparability also depends on other data quality characteristics. Only when data are judged to be representative of the environmental conditions, and when precision and accuracy are known, can data sets be compared with confidence.

8.2 DATA QUALITY ASSURANCE REVIEW

A project chemist with the Haley & Aldrich team will perform an independent data quality review of the chemical analytical results provided by ARI. This report will assess the adequacy of the reported detection limits in achieving the project screening levels for sediment; the precision, accuracy, representativeness, and completeness of the data; and the usability of the analytical data for project objectives. Exceedances of analytical control limits will be summarized and evaluated.

A data evaluation review will be performed on all results using QC summary sheet results provided by the laboratory for each data package. The data evaluation review is based on the QC Requirements previously described and follows the format of the EPA National Functional Guidelines for Inorganic (EPA 2010) Superfund Data Review and EPA National Functional Guidelines for Organic (EPA 2008) Superfund Data Review modified to include specific criteria of individual analytical methods. The laboratory will be contacted to obtain raw data (instrument tuning, calibrations, instrument printouts, bench sheets, and laboratory worksheets) for review if any problems or discrepancies are discovered during the routine evaluation. The following is an outline of the data evaluation review format:

- Verify that sample numbers and analyses match the chain-of-custody request;
- Verify sample preservation and holding times;
- Verify that laboratory blanks were performed at the proper frequency and that no analytes were present in the blanks;

- Verify that laboratory duplicates, MSs, surrogate compounds, and laboratory control samples were run at the proper frequency and that control limits were met; and
- Verify that required detection limits have been achieved.

Data qualifier flags, beyond any applied by the laboratory, will be added to sample results that fall outside the QC acceptance criteria. An explanation of data qualifiers to be applied during the review is provided below:

U The compound was analyzed for, but was not detected. The associated numerical value is the sample reporting limit.

J The associated numerical value is an estimated quantity because QC criteria were slightly exceeded.

UJ The compound was analyzed for, but not detected. The associated numerical value is an estimated reporting limit because QC criteria were not met.

T The associated numerical value is an estimated quantity because reported concentrations were less than the practical quantitation limit (lowest calibration standard).

R Data are not usable because of significant exceedance of QC criteria. The analyte may or may not be present; resampling and/or reanalysis are necessary for verification.

9. Data Analysis and Reporting

9.1 LABORATORY REPORTS

The laboratory data reports will consist of summary sample and QC results to allow independent data review of analytical results. Each laboratory data report will include the following:

- Case narrative identifying the laboratory analytical batch number, matrix and number of samples included, analyses performed and analytical methods used, and description of any problems or exceedance of QC criteria and corrective action taken. The laboratory manager or their designee must sign the narrative.
- Copy of chain-of-custody forms for all samples included in the analytical batch.
- Tabulated sample analytical results with units, data qualifiers, percent solids, sample weight or volume, dilution factor, laboratory batch and sample number, Haley & Aldrich sample number, and dates sampled, received, extracted, and analyzed all clearly specified.
- Blank summary results indicating samples associated with each blank.
- MS/MSD result summaries with calculated percent recovery and relative percent differences.
- Surrogate compound recoveries, when applicable, with percent recoveries.
- Laboratory control sample results, when applicable, with calculated percent recovery.
- Performance evaluation or certified reference material sample results, if applicable, with acceptance limits.
- Electronically formatted data deliverable (CD) results.

The project analytical data will be submitted to Ecology's Environmental Information Management (EIM) database after the data quality and validation has been completed by the laboratory and by Haley & Aldrich.

References

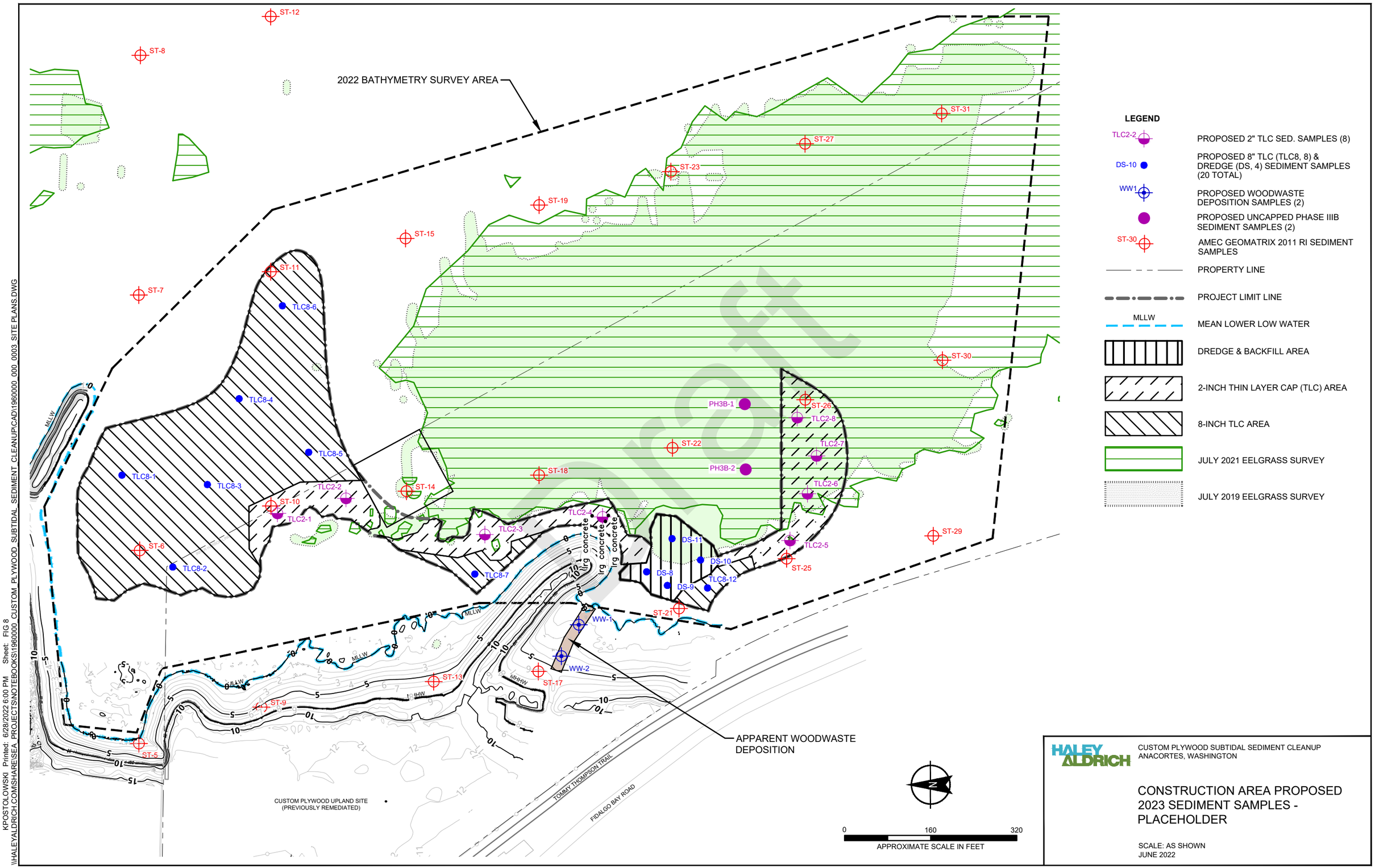
1. EPA 1992 Specifications and Guidance for Contaminant-Free Sample Containers. OSWER Directive 92.0-05A.

2. EPA 2008. US EPA Contract Laboratory Program National Functional Guidelines for Organic Superfund Data Review. EPA-540-R-08-01, June 2008.

3. EPA 2010. US EPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review. EPA-540-R-10-011, January 2010.

\\haleyaldrich.com\share\sea_projects\Notebooks\1960000_Custom_Plywood_Subtidal_Sediment_Cleanup\Deliverables\Reports\SAP-QAPP\Final\2022_1111_HAI_CustomPlywood2022SAP_QAPP_F.docx

APPENDIX A
Proposed Sample Locations



HALEY ALDRICH

CUSTOM PLYWOOD SUBTIDAL SEDIMENT CLEANUP
ANACORTES, WASHINGTON

CONSTRUCTION AREA PROPOSED 2023 SEDIMENT SAMPLES - PLACEHOLDER

SCALE: AS SHOWN
JUNE 2022