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# TRANSMITTAL

To: **Steve Teel, LHG**
**Department of Ecology**
**Toxics Cleanup Program**
**Southwest Regional Office**
**PO Box 47775**
**Olympia, WA 98504-7775**

Date: **July 29, 2009**
Project Number: **235- 157-7 024 (04/04)**
Project Name: **Solid Wood Incorporated Site (West Bay Park) RI/FS and Interim Action**

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**We are transmitting the following materials:**

(2) RI/FS and AI Work Plan Addendum No. 3 – Post-Removal Piling Sediment Sampling and Analysis Plan

(2) Figure 1 Solid Wood Incorporated Site Plan

**Comments:**

Sincerely,

David Dinkuhn, P.E. Parametrix

cc:

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# TECHNICAL MEMORANDUM

| | |
|---|---|
| Date: | July 28, 2009 |
| To: | Steve Teel, LHG – Department of Ecology |
| From: | David Dinkuhn, P.E. – Parametrix |
| Subject: | RI/FS and IA Work Plan Addendum No. 3 – Post-Removal Piling Sediment Sampling and Analysis Plan |
| cc: | Julie McQuary – City of Olympia<br>Tom Morrill – City of Olympia<br>David Hanna – City of Olympia |
| Project Number: | 235-1577-024 (04/02) |
| Project Name: | Solid Wood Incorporated Site (West Bay Park) RI/FS and Interim Action |

## SOLID WOOD INCORPORATED SITE RI/FS AND IA WORK PLAN ADDENDUM NO. 3 – POST PILING REMOVAL SEDIMENT SAMPLING AND ANALYSIS PLAN

### INTRODUCTION AND BACKGROUND INFORMATION

This technical memorandum presents a Post Piling Removal Sampling and Analysis Plan (SAP) for the Solid Wood Incorporated Site located in Olympia, Washington. This SAP provides specific procedures for the collection (and analysis) of sediment samples from beach sediments following removal of piling from the site. Preparation of this SAP and follow-on sediment sampling are requirements of the site's Agreed Order (No. DE-08-TCPSR-5415). This SAP constitutes Addendum No. 3 to the project's Remedial Investigation/Feasibility Study (RI/FS) and Interim Action (IA) Work Plan (work plan; Parametrix 2008).

As part of the upcoming Interim Action at the site, approximately 277 piling located in the intertidal zone are to be removed (Figure 1). The IA is currently scheduled to start in August 2009 and should be completed within 8 weeks. During previous RI/FS sampling in May/June 2008, sediments adjacent to the piling were collected and analyzed for Sediment Management Standards (SMS) constituents and total petroleum hydrocarbons (TPH). TPH concentrations exceeded the Washington State Department of Ecology's (Ecology) screening level of 100 milligrams per kilogram (mg/kg) in the majority of the sediment samples analyzed. No individual constituent exceeded SMS or Apparent Effects Threshold (AET) chemical criteria (an exception is fluoranthene in one sample). To further evaluate TPH concentrations in the sediments, additional sediment samples will be collected and characterized immediately following piling removal.

This SAP is a companion document to the RI/FS and IA Work Plan and presents procedures specific to sediment sampling and analysis. The SAP was developed to comply with the SMS, in particular Ecology's Sediment Sampling and Analysis Plan Appendix (SSAPA; Ecology 2008).

## OBJECTIVES AND DESIGN OF THE SEDIMENT INVESTIGATION

The objective of the sediment investigation is to provide an assessment of surface sediment quality following the removal of piling from the beach at the site. Seven samples will be collected from the stations shown on Figure 1. Five of the stations will be located where previous sediment samples contained TPH exceeding the TPH screening criteria. These five stations will be co-located with sediment samples SD-12, SD-14, SD-15, SD-16, and SD-17. The purpose of the remaining two stations is to further characterize piling sediments in the vicinity. Results for these post-removal sediment samples will be considered representative of post-removal sediment conditions and will be used to make decisions on whether or not further steps to address sediments are necessary.

All seven sediment samples will be analyzed for polycyclic aromatic hydrocarbons (PAHs; SMS constituents), diesel and lube oil range hydrocarbons, pentachlorophenol (PCP), total organic carbon (TOC), total solids, total sulfides, ammonia, grain size, and total volatile solids. If any SMS criterion or TPH screening concentration is exceeded in any sample, a follow-on biological test will be performed on that sample using sediments collected from the same station. Sufficient sediment volume will be collected during sampling and archived at the laboratory so that follow-on biological testing may be performed once chemical results are available. If biological tests are required, bioassays will be performed on samples from at least three locations so that the sediments may be screened for potential concern using the procedures contained in the SMS (WAC 173-204-510). If less than three sediment samples fail the chemical criteria, biological tests will be conducted on the sediment samples with the highest chemical concentrations. The selection of biological tests will be made in consultation with Ecology.

Reference sediments will be collected from an Ecology-approved Carr Inlet reference station. Information provided by Ecology (PSEP 1991) regarding sediment grain size and organic content will be used to select a reference station with sediments similar to site sediments. The reference sediments will be collected within 2 days of site sediments and submitted to the biological laboratory for archiving. It is anticipated that the reference sediments will be collected from a subtidal area using a boat and a Van Veen (or similar) grab sampler.

Biological tests will consist of a 10-day amphipod solid phase survival test, a 20-day polychaete solid phase survival and growth test, and a sediment larval test conducted according to Puget Sound Estuary Program Guidelines (PSEP 1995). Test species will be selected based on the requirements of Table 6 of the SSAPA and the results of grain size analyses. Since the sediments potentially contain PAHs, the biological tests will be exposed to ultra-violet radiation according to Appendix D of the SSAPA.

## FIELD SAMPLING METHODS

For the five sediment samples to be collected from the same locations as previous samples, sample stations will be re-established by survey within plus or minus 1 foot of the original locations. The remaining two sample stations will be located by survey using the locations shown on Figure 1.

All sediment samples shall be discrete and will be collected from the top 10 centimeters of sediments using new, disposable polyethylene bowls and scoops at each station. All stations are located in the intertidal zone, and sampling will be conducted by hand during low tide. Sample collection shall target the fine-grained portion of sediments. Any unrepresentative material (e.g., large woody debris, shells, and rocks) will be removed at the discretion of the sampler. Samples for chemical analysis will be placed into three pre-labeled 8-ounce glass jars. Samples for biological tests shall be placed in borosilicate glass containers. Sufficient borosilicate containers will be filled so that a sample volume of approximately 8 liters is collected. Detailed notes regarding the sample composition shall be recorded in the field notebook.

Following sampling, the location of each sediment sample will be recorded using a hand-held global; positioning system (GPS) device and will also be sketched on a field map.

## SAMPLE HANDLING PROCEDURES

All sediment samples will be placed in a cooler and held at approximately 4 degrees C until they are received by the analytical laboratories. Upon sample receipt, the laboratories will comply with storage temperatures and maximum holding times required for the specific analyses to be performed (Table 1).

**Table 1. Sample Storage Temperatures and Maximum Holding Times for Sediment Sample Analyses**

| Sample Analysis | Storage Temperature | Maximum Holding Time |
|---|---|---|
| Grain size | Cool, 4°C | 6 months |
| Total solids | Cool, 4°C | 14 days |
| Total volatile solids | Cool, 4°C | 7 days |
| Total organic carbon | Cool, 4°C | 14 days |
| Ammonia | Cool, 4°C | 7 days |
| Total sulfides | Cool, 4°C (1 N zinc acetate) | 7 days |
| Diesel and lube oil range organics | Cool, 4°C | 14 days |
| PAHs | Cool, 4°C | 14 days until extraction<br>40 days after extraction |
| Biological tests | Cool, 4°C<br>Cool, 4°C, nitrogen atmosphere | 14 days<br>8 weeks |

Chain-of-custody procedures and sample shipping will be conducted in accordance with the work plan.

## LABORATORY ANALYTICAL METHODS

Chemical analysis will be performed by OnSite Environmental, Inc. of Redmond, Washington. Biological testing will be performed by Newfields NW of Port Gamble, Washington. Both laboratories are Ecology certified. Table 2 summarizes the applicable sample preparation methods, analytical methods, and reporting limits for SMS chemicals and conventional sediment variables. Detection limits should be at a level sufficient to meet the SMS screening levels. Note that grain size analysis will be included in the analysis for each sample collected.

**Table 2. Sample Preparation Methods, Analytical Methods, and Reporting Limits for Sediments**

| Chemical | Recommended Sample Preparation Methods | Recommended Analytical Methods | Sediment Practical Quantitation Limits[1] |
|---|---|---|---|
| **ORGANICS** | | | |
| **Petroleum (mg/kg dry wt)** | | | |
| Diesel range organics | NWTPH-Dx | NWTPH-Dx | 32 |
| Lube oil range organics | NWTPH-Dx | NWTPH-Dx | 64 |
| **LPAHs (µg/kg dry wt)** | | | |
| Naphthalene | 3550 | 8270 SIM | 20 |
| Acenaphthylene | 3550 | 8270 SIM | 20 |
| Acenaphthene | 3550 | 8270 SIM | 20 |
| Fluorene | 3550 | 8270 SIM | 20 |
| Phenanthrene | 3550 | 8270 SIM | 20 |
| Anthracene | 3550 | 8270 SIM | 20 |
| 2-Methylnaphthalene | 3550 | 8270 SIM | 20 |
| **HPAHs (µg/kg dry wt)** | | | |
| Fluoranthene | 3550 | 8270 SIM | 20 |
| Pyrene | 3550 | 8270 SIM | 20 |
| Benz(a)anthracene | 3550 | 8270 SIM | 20 |
| Chrysene | 3550 | 8270 SIM | 20 |

(Table Continues)

**Table 2. Sample Preparation Methods, Analytical Methods, and Reporting Limits for Sediments (Continued)**

| Chemical | Recommended Sample Preparation Methods | Recommended Analytical Methods | Sediment Practical Quantitation Limits[1] |
|---|---|---|---|
| Total benzofluoranthenes | 3550 | 8270 SIM | 20 |
| Benz(a)pyrene | 3550 | 8270 SIM | 20 |
| Indeno(1,2,3-cd)pyrene | 3550 | 8270 SIM | 20 |
| Dibenz(a,h) anthracene | 3550 | 8270 SIM | 20 |
| Benz(ghi)perylene | 3550 | 8270 SIM | 20 |
| **Conventional Sediment Variables** | | | |
| Total Volatile Solids (%) | – | PSEP | 0.1 |
| Total Solids (%) | – | PSEP | 0.1 |
| Total Sulfides (mg/kg) | – | Plumb 1981 | 1 |
| Ammonia (mg/kg) | – | Plumb 1981 | 1 |
| Grain Size | – | Modified ASTM with Hydrometer | – |
| Total organic carbon (TOC) (mg/kg) | – | EPA 9060 | 0.1 |

Notes:

[1] Laboratory Practical Quantitation Limits (PQLs) on a Dry Weight Basis

## QUALITY ASSURANCE AND QUALITY CONTROL REQUIREMENTS

Quality assurance and quality control (QA/QC) procedures for chemical analysis are discussed in detail in the written analytical protocols for each chemical. The recommended frequency of specific quality control procedures and associated control limits are summarized in Tables 11 and 13 of Ecology's SSAPA (Ecology 2008). Table 14 of the SSAPA describes QC requirements for biological testing.

Quality control procedures for chemical analyses include analytical instrument calibration, sample holding times, blank analyses to identify potential sample contamination in the laboratory, duplicate analyses to test analytical precision, and analyses of spikes and standards to test analytical accuracy. Quality control procedures for biological testing include monitoring of water quality during the tests to ensure parameters such as temperature and dissolved oxygen remain within set limits and performance standards for mortality/survivorship in reference sediments/seawater.

In addition to the internal quality control reviews provided by the analytical laboratory (in accordance with the analytical protocols), the Project QA Manager will conduct an internal quality assurance review. The internal review of chemical and biological test data will follow the lower level (e.g., QA1) review procedures developed for the Puget Sound Dredged Disposal Analysis (PTI, 1989). The review will be documented using checklists showing the quality control procedures that were verified.

## DATA ANALYSIS, RECORD KEEPING, AND REPORTING REQUIREMENTS

Sediment chemistry results will be tabulated for all measured analyses, including conventional sediment variables. For organic chemicals whose numerical criteria are TOC-normalized, separate tables will be prepared for the dry-weight and TOC-normalized concentrations. The data tables will identify the sampling locations and dates of sample collection. Appropriate data qualifiers will be attached to chemical concentrations, and detection limits will be reported for undetected analyses. Results will be compared to the SMS and AET screening criteria presented in Tables 3-11 and 3-12 of the work plan. Results exceeding applicable sediment quality criteria will be clearly identified.

For biological test data, a summary will be provided that interprets the results compared to the biological effects criteria identified in the SMS rule. Samples that exceed criteria and their respective values will be clearly identified. Laboratory test data will be tabulated and reported including all test, reference, negative control, and positive control data.

The results of sediment sampling and analysis will be provided in a brief written report that includes a sampling station map, GPS coordinates for all sampling locations, description of field procedures, and the sediment and biological test results and interpretations described above. Appendices will include a memorandum describing the results of the QA1 data review, laboratory analytical reports, copies of field logs and sample logs, and copies of chain-of-custody forms. Laboratory chemical and bioassay data will be tabulated in Ecology EIM template format and uploaded into the EIM database.

All work plans, field notes, and data reports will be maintained by the City of Olympia for a minimum of 10 years.

## REFERENCES

Ecology. 2008. Washington State Department of Ecology, Sediment sampling and analysis plan appendix, guidance on the development of sediment sampling and analysis plans meeting the requirements of the sediment management standards (Chapter 173-204 WAC). Ecology Publication No. 03-09-043. February.

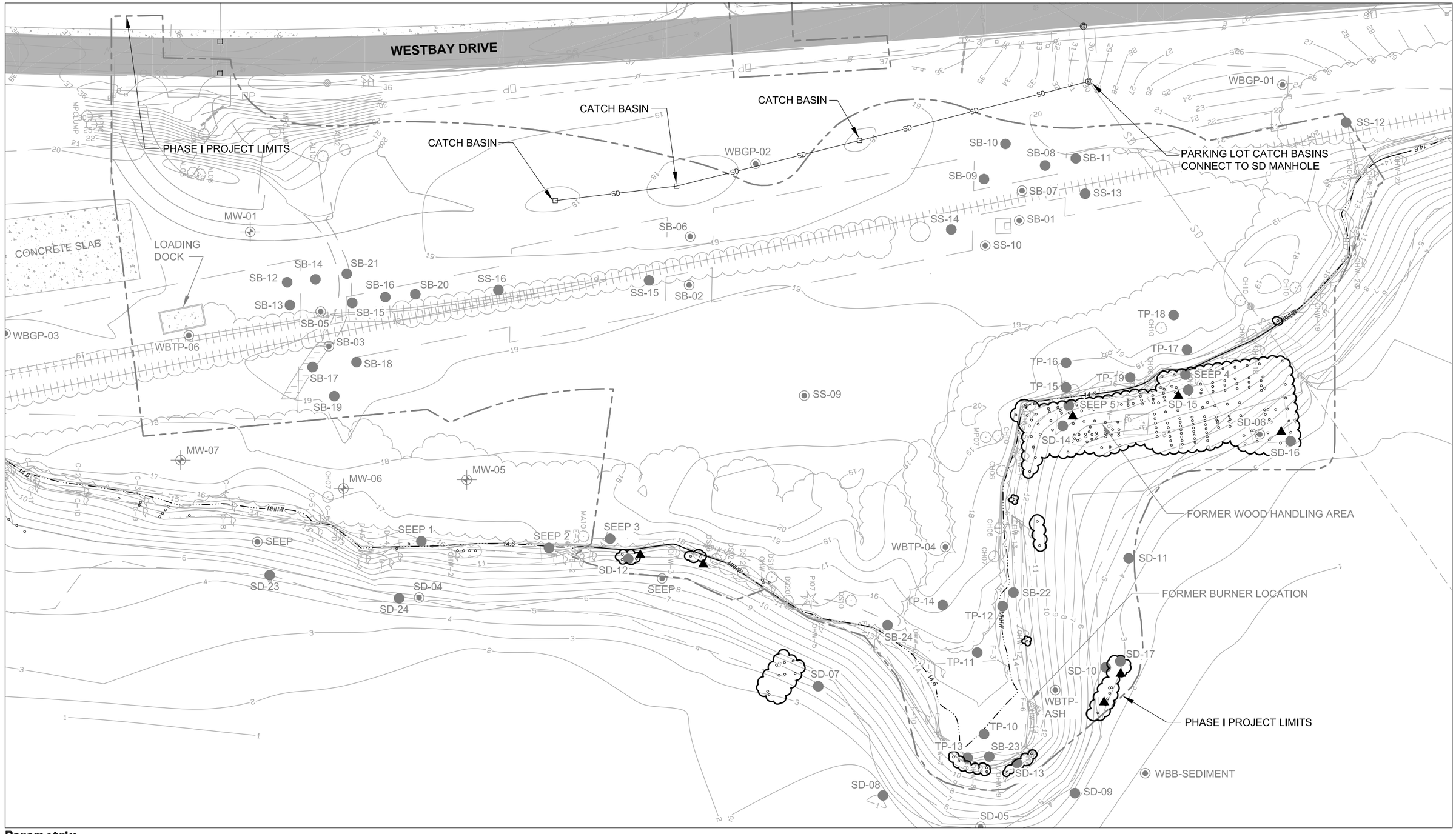
Parametrix. 2008. Work plan for remedial investigation/feasibility study and interim action, solid wood incorporated site (West Bay Park). Prepared for City of Olympia Parks, Arts, and Recreation Department. October.

PSEP. 1995. Recommended guidelines for conducting laboratory bioassays on Puget Sound sediments. Interim Final Report. Puget Sound Estuary Program, U.S. Environmental Protection Agency Region 10, Seattle, Washington.

PSEP. 1991. Reference area performance standards for Puget Sound. Puget Sound Estuary Program, U.S. Environmental Protection Agency Region 10, Seattle, Washington. EPA 910/9-91-041.

PTI. 1989. Puget Sound dredged disposal analysis guidance manual: Data quality evaluation for proposed dredged material disposal projects. Prepared for the Washington Department of Ecology, Olympia, Washington by PTI Environmental Services. Bellevue, Washington.

Attachments: Figure 1




**Parametrix** DATE: 08/28/08 08:01am FILE: BR1577024P03T01F-1(20)

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SCALE IN FEET

**LEGEND**

| | |
|---|---|
| WBGP | 2004 GEOPROPE SAMPLING LOCATIONS |
| WBTP | 2004 TEST PIT SAMPLING LOCATION |
| OUTFALL/SEEP | 2004 SEDIMENT AND SURFACE WATER SAMPLING LOCATION |
| | 2007 PHASE II ESA SAMPLING LOCATION |
| | MONITORING WELL |
| | RI/FS SAMPLING LOCATION |
| | EXISTING PILING TO BE REMOVED |
| | POST PILING REMOVAL SAMPLE LOCATIONS |

| | |
|---|---|
| SD | SEDIMENT SAMPLING LOCATION |
| SS | SURFACE SOIL SAMPLING LOCATION |
| SB | SOIL BORING LOCATION |
| TP | TEST PIT LOCATION |
| SEEP | SEEP SAMPLING LOCATION |

**Figure 1**
**Solid Wood Incorporated Site**
**(West Bay Park)**
**Olympia, Washington**
**Piling Sediment Sampling Locations**