

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Port of Vancouver
COPY
FSN 1029

In the Matter of Remedial Action by:

Port of Vancouver - *Port of Vancouver Plywood*
3103 NW Lower River Road
Vancouver, WA 98660

AGREED ORDER

No. 99TCPSR-93

TO: Port of Vancouver

I.
JURISDICTION

This Agreed Order ("Order") is issued pursuant to the authority of RCW 70.105D.050(1).

II.
FINDINGS OF FACT

Ecology makes the following Findings of Fact, without admission of such facts by the Port of Vancouver.

1. The former Fort Vancouver Plywood (FVP) facility is located at the end of West Eighth Street and Port Way, in an industrial-zoned area along the bank of the Columbia River. Adjacent properties include Great Western Malting Company to the northwest, the former Brazier Forest Industries site to the northeast, and Burlington Northern Railroad tracks to the northeast and southeast across Port Way. The Columbia River bounds the southwestern edge of the property. Figure 1 (attached) shows the facility in relation to its surroundings.

2. Available information indicates that the site had been used for industrial purposes for over 70 years. Initially, wood cutting for a nearby ship building facility was done on the site. Since 1930, the site has been used for the manufacture of plywood. FVP operated a plywood mill at the site from at least 1955. Site activities included all processes necessary for the production of plywood from raw logs or green veneer.

The property consists of approximately 15.8 acres of paved and unpaved areas. The property has been surveyed (see Attachment A) and divided into two (2) cells as illustrated in Figures 2 and 3. Cell 1 is comprised of the eastern half of the site and Cell 2 is comprised of the western half of the site. This Agreed Order addresses Cell 2 only (site).

Former site buildings included a wood processing and plywood manufacturing plant, chemical storage structures, a boiler house, a maintenance shop, and fuel storage areas (Figure 2). The Port of Vancouver (Port) has owned the property since 1912.

3. FVP maintained several permits as part of its operations. A review of the Washington State Department of Ecology (Ecology) records indicates that since the early 1970s the facility had violations of the effluent limits of its National Pollution Discharge Elimination System (NPDES) permit. Ecology issued notice of violation and notice of penalty letters which were responded to by FVP. The facility also reported unintentional oil spills into the Columbia River on February 4, 1969 (2-4-69), December 17, 1969 (12-17-69), and July 24, 1989 (7-24-89). Due to the history of NPDES violations, the EPA added the FVP site to its preliminary NPL List. The EPA conducted a Preliminary Site Assessment and published a Preliminary

Assessment Report in June 1988 (Ecology & Environment, Inc.) which resulted in a site ranking of zero (0) and a recommendation of no further action. Ecology, also due to the NPDES violations, included FVP on its list of sites to rank, but has not yet ranked the site.

4. Based on an Environmental Site Assessment (ESA) and Practices Review prepared by Geraghty & Miller, Inc. (G & M) for FVP (report dated May 1991), the majority of chemicals were used and stored on Cell 2 and consisted of liquid phenol-formaldehyde glue resins and petroleum products (primarily lubricating oils and diesel fuel) and smaller quantities of solvents. Previous operations on Cell 2 also included for a period of time the storage and use of wood treating chemicals that contained pentachlorophenol (PCP). Although complete information regarding historical chemical use, storage, and disposal practices for the FVP site are unknown, the majority of chemical usage appears to have been associated with Cell 2. However, G & M noted two (2) former diesel fuel USTs and an above ground tank adjacent to the retail warehouse.

5. Hydrogeologic conditions in the vicinity of the site consist of an upper silty sand zone which typically contains shallow groundwater, an intervening clay and silt zone, and a deeper water-bearing unit composed of gravelly sand. The silt and clay zone form a local confining layer that is laterally continuous across the site, except directly adjacent to the Columbia River. The confining layer has also been encountered at two adjacent properties, Great Western Malting (GWM) and Brazier.

6. Impact to the deeper saturated zone by VOCs, primarily trichloroethene (TCE) and tetrachloroethylene (PCE), has been documented in the immediate vicinity of the GWM site. (Water from three Port wells in the immediate vicinity of the GWM property were sampled. Results in 1988 indicated the presence of 1,1,1-trichloroethane (111-TCA) in one well and 1,2-dichloroethane (1,2-DCA) in another well. Detected concentrations were below drinking water standards.) Based on Ecology files, a source of these contaminants appears to be a former dry cleaner in an industrial area located north of the site at 2001 NE Roosevelt Avenue in Vancouver, Washington. However, other offsite sources also exist.

7. In January 1996, FVP discontinued production of plywood products and began the process of selling their production equipment and remaining plywood products. In August 1996, FVP filed bankruptcy, dissolved and vacated the site. No waste disposal, environmental cleanup, demolition of unusable buildings and equipment, or other forms of site restoration were completed by FVP prior to vacating the site.

8. A preliminary site evaluation (PSE) was performed for the Port to review available information regarding previous site activities and events and to assess the potential for impact to site media (soil and groundwater). In addition, the PSE included limited sampling of soil and groundwater at locations where chemical impact appeared likely. The results of the PSE (Kennedy/Jenks Consultants 1996) identified several potential issues of concern at the site. The PSE concluded that further investigation of these and other site areas was necessary to evaluate potential impacts to site media and to assess potential threats to human health and the environment.

9. In addition, an asbestos and lead paint survey of the site buildings and structures was performed for purposes of demolition. The results of the asbestos and lead paint survey are summarized in a report prepared by Certified Environmental Consultants, Inc., in July 1996. Asbestos or lead paint issues that required corrective action were not identified at the site.

10. It is the intent of the Port to return this site to a usable condition as soon as possible. The site will continue to be used for industrial purposes. To adequately investigate the site, all structures and equipment but the office building were demolished and removed from the premises.

11. A remedial investigation and feasibility study (RI/FS) was completed at the site (Kennedy/Jenks Consultants 1999) to characterize the distribution of impacted site media. The results of the RI indicated the following:

- Two saturated zones were identified at the site: a shallow zone and a deeper aquifer. Groundwater in the shallow zone discharges to the Columbia River along the southern property boundary and is also present at upland locations of the site. However, the shallow zone cannot be used as a potable water source due to its low yield. The deeper aquifer is used locally as a potable water supply by the Port, and as a process water supply by its tenant, Great Western Malting Company. The two saturated zones are separated by a silt confining layer that is approximately 14 to 40 feet thick. A net downward vertical gradient exists between the two saturated zones.
- Cleanup levels identified for site media include MTCA Method C cleanup levels for soil, MTCA Method B surface water cleanup levels, Ecology's acute freshwater surface water quality standards and the National Toxics Rule for shallow groundwater that discharges to the Columbia River, and MTCA Method B residential cleanup levels for deeper groundwater. MTCA Method A cleanup levels for these media were used for lead.
- Widespread fill material containing building debris, ash, and other anthropogenic materials was encountered over most of the site.
- Four areas on the site were identified where COC exceed MTCA Method A/C soil cleanup levels.
- Soils along the Columbia River bank contain debris and concentrations of carcinogenic polycyclic aromatic hydrocarbons (cPAHs), petroleum compounds, and lead in excess of MTCA Method A/C industrial soil cleanup levels.
- Shallow groundwater from the site collected during the first round of sampling contained low concentrations of bis(2-ethylhexyl) phthalate (BEP) and total metals at concentrations exceeding surface water protection standards. However, with the exception of BEP and arsenic, these COC were not present at levels of concern in filtered groundwater samples. Consequently, the concentrations of these metals and cPAHs detected during sampling events appear to be attributable to turbid groundwater conditions and are not indicative of the shallow groundwater discharged to the Columbia River.
- Groundwater from the deeper saturated zone (the Unconsolidated Aquifer monitored by wells MW-12B and MW-13B) collected during groundwater sampling events contained low levels of vinyl chloride, BEP, and total arsenic at concentrations exceeding the MTCA Method B residential groundwater cleanup level. While a source for BEP has not been identified at the site, VOCs in the deeper zone appear to be originating from an offsite source. The total arsenic exceedences appear to be associated with sample turbidity rather than existing groundwater conditions. Filtered samples indicated slightly elevated arsenic and thallium concentrations. However, the concentrations are within the naturally occurring background range for these metals.

- Contaminant transport modeling indicates that it is not feasible for contaminants in the shallow saturated zone to migrate under natural conditions to the deeper aquifer at concentrations that would pose a threat to human health. However, there are indications that groundwater from the shallow zone may be in hydraulic communication with the deeper Unconsolidated Aquifer via old water supply wells and deep pilings (present near the site). Therefore, groundwater occurring in the shallow zone is also compared to MTCA Method B groundwater cleanup levels.

An FS was performed to evaluate potentially applicable remedial alternatives to address site conditions. Based on the results of the RI, soils from Cell 2 could pose a threat to both human health and the environment and, therefore, warrant remedial action in accordance with MTCA regulations. The selected remedial action for site soils includes soil removal from locations that exceed MTCA Method C soil cleanup levels and where soils are subject to leaching or erosion to the Columbia River. Excavated soils would be disposed of offsite at a permitted disposal facility. In addition, a low permeability asphalt and/or concrete pavement surface would be placed over Cell 2 to reduce the mobility of COCs present in other portions of the site at levels that are below soil cleanup standards. The combined remedial action will provide a high level of protection for potential human and ecological receptors as well as achieve parity with the cleanup action at adjoining Cell 1.

The RI indicated that remedial action for groundwater is not warranted for groundwater from either the shallow and deeper saturated zones. However, ongoing groundwater monitoring will be conducted to assess changing site conditions and evaluate the need for future remedial actions for groundwater. The monitoring schedule will be developed in cooperation with Ecology.

12. A draft Cleanup Action Plan (CAP) is included in this order as Attachment C. Prior to finalizing this order, Ecology will issue the draft order and CAP for a 30-day public comment period per WAC 173-340-600. The CAP requires the Port to remove and dispose of soils at the site that exceed cleanup levels or are subject to potential erosion and leaching of contaminants to the Columbia River, and install an impermeable pavement surface over the entire site to manage potential risks that may be associated with contaminants present in the remaining soil at concentrations exceeding MTCA Method B residential soil cleanup levels. In addition, the Port will file a Restrictive Covenant (Attachment D) which among other requirements, limits the use of the property to "only traditional industrial purposes".

13. Remediation of the site will be conducted under MTCA regulations with formal Ecology oversight.

III.

ECOLOGY DETERMINATIONS

1. The Port of Vancouver is an "owner or operator" as defined at RCW 70.105D.020(11) of a "facility" as defined in RCW 70.105D.020(4).
2. The facility is known as the former Fort Vancouver Plywood (FVP) facility, and is located at 901 Port Way in Vancouver, Washington.
3. The substances found at the facility as described above are "hazardous substances" as defined at RCW 70.105D.020(7).

4. Based on the presence of these hazardous substances at the facility and all factors known to Ecology, there is a release or threatened release of hazardous substances from the facility, as defined at RCW 70.105D.020(19).

5. By a letter dated November 20, 1996, Ecology notified the Port of Vancouver of its status as a "potentially liable person" under RCW 70.105D.040 after notice and opportunity for comment. By a letter of December 18, 1996, the Port of Vancouver waived its rights to notice and comment and accepted Ecology's determination that the Port of Vancouver is a "potentially liable person" under RCW 70.105D.040.

6. Pursuant to RCW 70.105D.030(1) and 70.105D.050, Ecology may require potentially liable persons to investigate or conduct other remedial actions with respect to the release or threatened release of hazardous substances whenever it believes such action to be in the public interest.

7. Based on the foregoing facts, Ecology believes the remedial activities required by this Order are in the public interest.

IV.

WORK TO BE PERFORMED

Based on the foregoing Facts and Determinations, it is hereby ordered that the Port of Vancouver perform the following activities and that these activities be conducted in accordance with Chapter 173-340 WAC unless otherwise specifically provided for herein.

The activities described in this Agreed Order are being performed under an Ecology Remedial Action Grant, demonstrating both Ecology's and the Port's support for the cleanup and reuse of existing industrial sites (i.e., "brownfields" redevelopment).

The activities in this Agreed Order are designed to remediate the potential risks posed to human health and the environment from the site. These cleanup actions and reuse will be protective of the adjacent Columbia River and its sediments. However, this Agreed Order does not address potential contamination of sediments which may or may not have been caused by upland activities. Ecology retains the right at some future date to address sediment contamination on the Washington side of the lower Columbia River in general, and at this site, in specific.

Based on the foregoing Facts and Determinations, it is hereby ordered that the Port conduct remedial activities at the site according to the requirements of this Order and the attached CAP (Attachment C), which is an integral and enforceable part of this Order and is incorporated by this reference. In order to carry out the remedial actions in the CAP, the Port shall produce the reports and carry out the activities specified in this section and the attached CAP. All activities shall be conducted in accordance with Chapter 173-340 WAC unless otherwise specifically provided for herein.

1. DRAFT ENGINEERING DESIGN REPORT. Within 60 days of the effective date of this order, prepare a draft engineering design report. This report shall be prepared by or under the direct supervision of a registered professional engineer and shall include any revisions required by Ecology in response to the draft Cap design and shall be submitted in accordance with WAC 173-340, Sections 400 and 410. The draft engineering design report shall include:

- a ☐ An introduction including a statement of the goals of the cleanup action with specific cleanup or performance requirements; a summary of general information and information from the RI/FS updated as needed to reflect current site conditions; identification of who will own, operate, and maintain the site and the cleanup action during and following construction; facility maps showing existing conditions and proposed location of the cleanup action; and a discussion of the characteristics, quantity and location of the materials to be remediated.
- b ☐ Schedule for construction of the remedial action and monitoring systems. Remedial Action shall begin in accordance with the Ecology approved schedule within the Engineering Design Report. Remedial action shall be substantially complete by December 31, 2000.
- c ☐ Plans for site grading and drainage, including a map showing final site elevations and drainage patterns.
- d ☐ Design for the pavement surface and associated stormwater control features. This shall include plan and elevation drawings showing construction details for the base course, pavement section and stormwater control facilities; materials to be used; a surface water flow pattern diagram; outfall locations; and elevations of significant features, including relationship of the structure to Ordinary High Water. The stormwater control facilities shall be designed to adequately convey and treat stormwater from at least a 6-month, 24-hour storm.
- e ☐ Engineering justification for design and operation parameters. In particular, provide engineering justification that the cap is durable enough to remain viable throughout all proposed site uses.
- f ☐ Procedures for minimizing the potential for hazardous materials spills and accidental discharge during excavation and construction. This shall include a description of measures taken to protect the Columbia River and its sediments from physical disturbances or contamination, and shall include use of erosion control devices as needed. This shall also include a description of measures taken to prevent spills or spreading of contaminated materials on the upland areas of the site, including provisions for decontaminating equipment, preventing erosion from stockpiled soils, and spill prevention during loading of vehicles.
- g ☐ A discussion of site-specific characteristics that may affect design, construction, or operation of the cleanup action, including: relationship of the proposed cleanup action to existing or potential future facility operations, probability of flooding or erosion from wave action, settling/subsidence, and soil and groundwater characteristics.
- h ☐ A discussion of methods for management or disposal of any treatment residual and other waste materials containing hazardous substances generated as a result of the cleanup action.
- i ☐ A worker safety and health plan per requirements of WAC 173-340-810.
- j ☐ Copies of all permits obtained regarding performance of the cleanup action.
- k ☐ Any information not provided in the remedial investigation/feasibility study needed to fulfill all applicable requirements of the State Environmental Policy Act (Chapter 43.21C RCW), and any additional information needed to address the applicable state, federal, and local requirements.
- l ☐ Additional information as needed to fulfill the substantive requirements of any permits required by the Washington Department of Fish and Wildlife for Hydraulic Project Approval. No work shall

occur below the Ordinary High Water mark between 1 March and 31 October of any years for protection of migrating juvenile salmonids.

- m ☐ Detailed final construction plans and procedural material specifications necessary for construction of the cleanup system as specified in the "Selected Cleanup Action" section of the Final Cleanup Action Plan (Attachment C) prepared in conformance with currently accepted engineering practices and techniques.
- n ☐ Specific quality control (QC) tests to be performed to document the construction as applicable, including specification for the testing or reference to specific testing methods, frequency of testing, acceptable results, and other documentation methods. This section shall include QC testing during asphalt cap construction and monitoring system installation.
- o ☐ Operation and maintenance plan. This shall present requirements to assure effective and permanent operation of the pavement surface and associated stormwater control facilities. This plan shall include an inspection schedule of quarterly inspections for the first year and semi-annual inspection subsequent years, criteria for evaluating the need for repair or maintenance, repair procedures. The operation and maintenance plan shall also identify who will be responsible for maintaining the remedial action and other relevant information identified in WAC 173-349-400(4)(c).
- p ☐ Compliance monitoring plan per WAC 173-340-410. This shall include a description of performance monitoring to confirm that the cleanup action has attained cleanup standards, and confirmation monitoring to ensure that the remedial action is preventing contaminants from reaching the Columbia River. All sampling and analysis shall be conducted under a sampling and analysis plan meeting the requirements of WAC 173-340-820. The compliance monitoring plan and sampling and analysis plan may be combined in one section and submitted with the Engineering Design Report or submitted as a separate document. The compliance monitoring plan shall include:
 - 1-1. Performance monitoring for upland site soils. Sampling shall be conducted at the bottom and sidewalls of the excavated areas. Enough samples shall be obtained to compare to borings and test pits from the RI/FS, and to show statistically that remaining soils meet the cleanup standards specified in the CAP. Soils samples shall be analyzed for contaminants of concern utilizing EPA SW-846 methods and Ecology specified methods for petroleum hydrocarbons.
 - 1-2. A methodology for additional excavation and verification sampling if original verification samples show that soils exceed cleanup standards.
 - 1-3. Confirmation monitoring for site groundwater per WAC 173-340-410 (1)(c), including a description of the frequency and duration of monitoring, and monitoring parameters. Groundwater shall be monitored at least three times a year for a period of 5 years. Appropriate methods shall be utilized to compare to cleanup standards as specified in the CAP, Attachment C.
 - 1-4. A methodology for evaluating sample results to determine whether cleanup standards have been met. Statistical analysis of samples shall be in accordance with Ecology *Publication No. 94-49, Guidance on Sampling and Data Analysis Methods*.

- 1-5 Provisions for reporting results of performance and confirmation sampling to Ecology.
Results of confirmation monitoring shall be provided to Ecology following each sampling event under the schedule identified in 1-3.

2. FINAL ENGINEERING DESIGN REPORT

The final Engineering Design Report shall incorporate Ecology's comments on the draft report. The final report shall be submitted to Ecology within 30 days of receiving Ecology's comments on the draft.

3. IMPLEMENT REMEDIAL ACTIONS

Implement cleanup actions as outlined in the Ecology-approved Final Engineering Design Report. During construction, detailed records including photographic documentation shall be kept of substantive aspects of the work performed, including construction techniques and materials used, items installed, and tests and measurements performed. The substantive requirements of WAC 173-340-400(7)(8) shall be met. During the construction of the Site cap segment of the remedial action, the Port's project coordinator or his/her designee will make oral reports at least every two weeks to the Ecology project manager or his/her on-site supervisor regarding progress. Any significant problems, deviation from plans, or emergency conditions will be reported to Ecology immediately.

4. CONSTRUCTION DOCUMENTATION

Within 90 days from the completion of construction, the engineer responsible for the supervision of cleanup activities shall prepare a final letter/report documenting the cleanup activities, including a description of where soils were removed, volumes removed, disposition of materials, performance sampling, backfill, grading, construction of the stormwater control features and the pavement surface, and other actions taken for the cleanup. If the final design of the pavement surface or associated stormwater control features differs from the plans in the Final Engineering Design Report, as-built drawings shall be prepared and submitted to Ecology. The report shall also contain an opinion from the project manager and the engineer, based on the testing results and inspections, as to whether the cleanup action has been constructed and performed in substantial compliance with the plans and specifications and related documents.

6. RECORD RESTRICTIVE COVENANT

Within 30 days of completing the remedial actions, a restrictive covenant functionally equivalent to the attached sample (Attachment D) shall be recorded in the Site property deed and a signed copy provided to Ecology. Ecology shall review and approve of the covenant language prior to the Port's recording it at the Clark County Auditor's Office.

7. POST CONSTRUCTION COMPLIANCE MONITORING AND REPORTING

In accordance with the plan and schedule in the Final Engineering Design Report, the Port shall implement the Compliance Monitoring Plan activities for post-construction groundwater monitoring.

8. SCHEDULE

1. Draft Engineering Design Report	Within 60 days of the effective date of this Agreed Order
2. Final Engineering Design Report	Within 30 days of receiving Ecology's comments on the draft report.
3. Implement Remedial Actions	According to the schedule in the approved Final Engineering Design Report.
4. Construction Documentation	Within 90 days of completion of construction.
5. Record Restrictive Covenant	Within 30 days of completion of remedial actions.
6. Post-construction monitoring and reporting.	According to the schedule in the approved Final Engineering Design Report.

V.

TERMS AND CONDITIONS OF ORDER

1. Definitions.

Unless otherwise specified, the definitions set forth in ch. 70.105D RCW and ch. 173-340 WAC shall control the meanings of the terms used in this Order.

2. Public Notices.

RCW 70.105.D,030(2)(a) requires that, at a minimum, this Order be subject to concurrent public notice. Ecology shall be responsible for providing such public notice and reserves the right to modify or withdraw any provisions of this Order should public comment disclose facts or considerations which indicate to Ecology that the Order is inadequate or improper in any respect.

3. Remedial Action Costs.

Port of Vancouver shall pay to Ecology costs incurred by Ecology pursuant to this Order. These costs shall include work performed by Ecology or its contractors for investigations, remedial actions, and Order preparation, oversight and administration. Ecology costs shall include costs of direct activities and support costs of direct activities as defined in WAC 173-340-550(2). Port of Vancouver shall pay the required amount within 90 days of receiving from Ecology an itemized statement of costs that includes a summary of costs incurred, an identification of involved staff, and the amount of time spent by involved staff members on the project. A general description of work performed will be provided upon request. Itemized statements shall be prepared quarterly. Failure to pay Ecology's costs within 90 days of receipt of the itemized statement of costs will result in interest charges.

4. Designated Project Coordinators.

The project coordinator for Ecology is:

Name: Dan Alexanian
Address: Southwest Regional Office
PO Box 47775, Olympia, WA 98504-7775

The project coordinator for Port of Vancouver is:

Name: Heidi Rosenberg
Address: PO Box 1180

The project coordinator(s) shall be responsible for overseeing the implementation of this Order. To the maximum extent possible, communications between Ecology and Port of Vancouver, and all documents, including reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Order, shall be directed through the project coordinator(s). Should Ecology or Port of Vancouver change project coordinator(s), written notification shall be provided to Ecology or the Port of Vancouver at least ten (10) calendar days prior to the change.

5. Performance.

All work performed pursuant to this Order shall be under the direction and supervision, as necessary, of a professional engineer or hydrogeologist, or similar expert, with appropriate training, experience and expertise in hazardous waste site investigation and cleanup. The Port of Vancouver shall notify Ecology as to the identity of such engineer(s) or hydrogeologist(s), and of any contractors and subcontractors to be used in carrying out the terms of this Order in advance of their involvement at the site. The Port of Vancouver shall provide a copy of this Order to all agents, contractors, and subcontractors retained to perform work required by this Order and shall ensure that all work undertaken by such agents, contractors and subcontractors will be in compliance with this Order.

Except where necessary to abate an emergency situation, the Port of Vancouver shall not perform any remedial actions at the former Fort Vancouver Plywood (FVP) leasehold site outside that required by this Order unless Ecology concurs, in writing, with such additional remedial actions.

WAC 173-340-400(7)(b)(i) requires that "construction" performed on the site must be under the supervision of a professional engineer registered in Washington.

6. Access.

Ecology or any Ecology authorized representative shall have the authority to enter and freely move about the site at all reasonable times for the purposes of, inter alia: inspecting records, operation logs, and contracts related to the work being performed pursuant to this Order; reviewing the progress in carrying out the terms of this Order; conducting such tests or collecting samples as Ecology or the project coordinator may deem necessary; using a camera, sound recording, or other documentary type equipment to record work done pursuant to this Order; and verifying the data submitted to Ecology by the Port of Vancouver. By signing this Agreed Order, the Port of Vancouver agrees that this Order constitutes reasonable notice of access, and agrees to allow access to the site at all reasonable times for purposes of overseeing work performed under this Order. Ecology shall allow split or replicate samples to be taken by the Port of Vancouver during an inspection unless doing so interferes with Ecology's sampling. The Port of Vancouver shall allow split or replicate samples to be taken by Ecology and shall provide seven (7) days notice before any sampling activity.

7. Public Participation.

The Port of Vancouver shall prepare and/or update a public participation plan for the site. Ecology shall maintain the responsibility for public participation at the site. The Port of Vancouver shall help coordinate and implement public participation for the site.

8. Retention of Records.

The Port of Vancouver shall preserve in a readily retrievable fashion, during the pendency of this Order and for ten (10) years from the date of completion of the work performed pursuant to this Order, all records, reports, documents, and underlying data in its possession relevant to this Order. Should any portion of the work performed hereunder be undertaken through contractors or agents of the Port of Vancouver, the Port of Vancouver agrees to include in their contract with such contractors or agents a record retention requirement meeting the terms of this paragraph.

9. Dispute Resolution.

The Port of Vancouver may request Ecology to resolve disputes which may arise during the implementation of this Order. Such request shall be in writing and directed to the signatory, or his/her successor(s), to this Order. Ecology resolution of the dispute shall be binding and final. The Port of Vancouver is not relieved of any requirement of this Order during the pendency of the dispute and remains responsible for timely compliance with the terms of the Order unless otherwise provided by Ecology in writing.

10. Reservation of Rights/No Settlement.

This Agreed Order is not a settlement under ch. 70.105D RCW. Ecology's signature on this Order in no way constitutes a covenant not to sue or a compromise of any Ecology rights or authority. Ecology will not, however, bring an action against the Port of Vancouver to recover remedial action costs paid to and received by Ecology under this Agreed Order. In addition, Ecology will not take additional enforcement actions against the Port of Vancouver to require those remedial actions required by this Agreed Order, provided the Port of Vancouver complies with this Agreed Order.

Ecology reserves the right, however, to require additional remedial actions at the site should it deem such actions necessary.

Ecology also reserves all rights regarding the injury to, destruction of, or loss of natural resources resulting from the releases or threatened releases of hazardous substances from the former Fort Vancouver Plywood (FVP) facility.

In the event Ecology determines that conditions at the site are creating or have the potential to create a danger to the health or welfare of the people on the site or in the surrounding area or to the environment, Ecology may order the Port of Vancouver to stop further implementation of this Order for such period of time as needed to abate the danger.

11. Transference of Property.

No voluntary or involuntary conveyance or relinquishment or title, easement, leasehold, or other interest in any portion of the site shall be consummated by the Port of Vancouver without provision for continued implementation of all requirements of this Order and implementation of any remedial actions found to be necessary as a result of this Order.

Prior to transfer of any legal or equitable interest the Port of Vancouver may have in the site or any portions thereof, the Port of Vancouver shall serve a copy of this Order upon any prospective purchaser, lessee, transferee, assignee, or other successor in such interest. At least thirty (30) days prior to finalization of any transfer, the Port of Vancouver shall notify Ecology of the contemplated transfer.

12. Compliance with Applicable Laws.

A. All actions carried out by the Port of Vancouver pursuant to this Order shall be done in accordance with all applicable federal, state, and local requirements, including requirements to obtain necessary permits, except as provided in paragraph B of this section.

B. Pursuant to RCW 70.105D.090(1), the substantive requirements of chapters 70.94, 70.95, 70.105, 75.20, 90.48, and 90.58 RCW and of any laws requiring or authorizing local government permits or approvals for the remedial action under this Order that are known to be applicable at the time of issuance of the Order have been included in **Attachment B** and are binding and enforceable requirements of the Order.

The Port of Vancouver has a continuing obligation to determine whether additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order. In the event the Port of Vancouver determines that additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order, it shall promptly notify Ecology of this determination. Ecology shall determine whether Ecology or the Port of Vancouver shall be responsible to contact the appropriate state and/or local agencies. If Ecology so requires, the Port of Vancouver shall promptly consult with the appropriate state and/or local agencies and provide Ecology with written documentation from those agencies of the substantive requirements those agencies believe are applicable to the remedial action. Ecology shall make the final determination on the additional substantive requirements that must be met by the Port of Vancouver and how the Port of Vancouver must meet those requirements. Ecology shall inform the Port of Vancouver in writing of these requirements. Once established by Ecology, the additional requirements shall be enforceable requirements of this Order. The Port of Vancouver shall not begin or continue the remedial action potentially subject to the additional requirements until Ecology makes its final determination.

Ecology shall ensure that notice and opportunity for comment is provided to the public and appropriate agencies prior to establishing the substantive requirements under this section.

C. Pursuant to RCW 70.105D.090(2), in the event Ecology determines that the exemption from complying with the procedural requirements of the laws referenced in RCW 70.105D.090(1) would result in the loss of approval from a federal agency which is necessary for the state to administer any federal law, the exemption shall not apply and the Port of Vancouver shall comply with both the procedural and substantive requirements of the laws referenced in RCW 70.105D.090(1), including any requirements to obtain permits.

VI.

SATISFACTION OF THIS ORDER

The provisions of this Order shall be deemed satisfied upon the Port of Vancouver's receipt of written notification from Ecology that the Port of Vancouver has completed the remedial activity required by this Order, as amended by any modifications, and that all other provisions of this Agreed Order have been complied with.

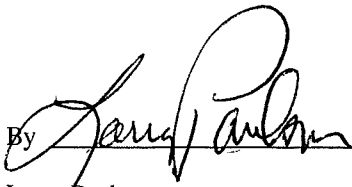
VII.

ENFORCEMENT


1. Pursuant to RCW 70.105D.050, this Order may be enforced as follows:
 - A. The Attorney General may bring an action to enforce this Order in a state or federal court.
 - B. The Attorney General may seek, by filing an action, if necessary, to recover amounts spent by Ecology for investigative and remedial actions and orders related to the site.
 - C. In the event the Port of Vancouver refuses, without sufficient cause, to comply with any term of this Order, the Port of Vancouver will be liable for:
 - (1) up to three times the amount of any costs incurred by the state of Washington as a result of its refusal to comply; and
 - (2) Civil penalties of up to \$25,000 per day for each day it refuses to comply.
 - D. This Order is not appealable to the Washington Pollution Control Hearings Board. This Order may be reviewed only as provided under Section 6 of ch. 70.105D RCW.

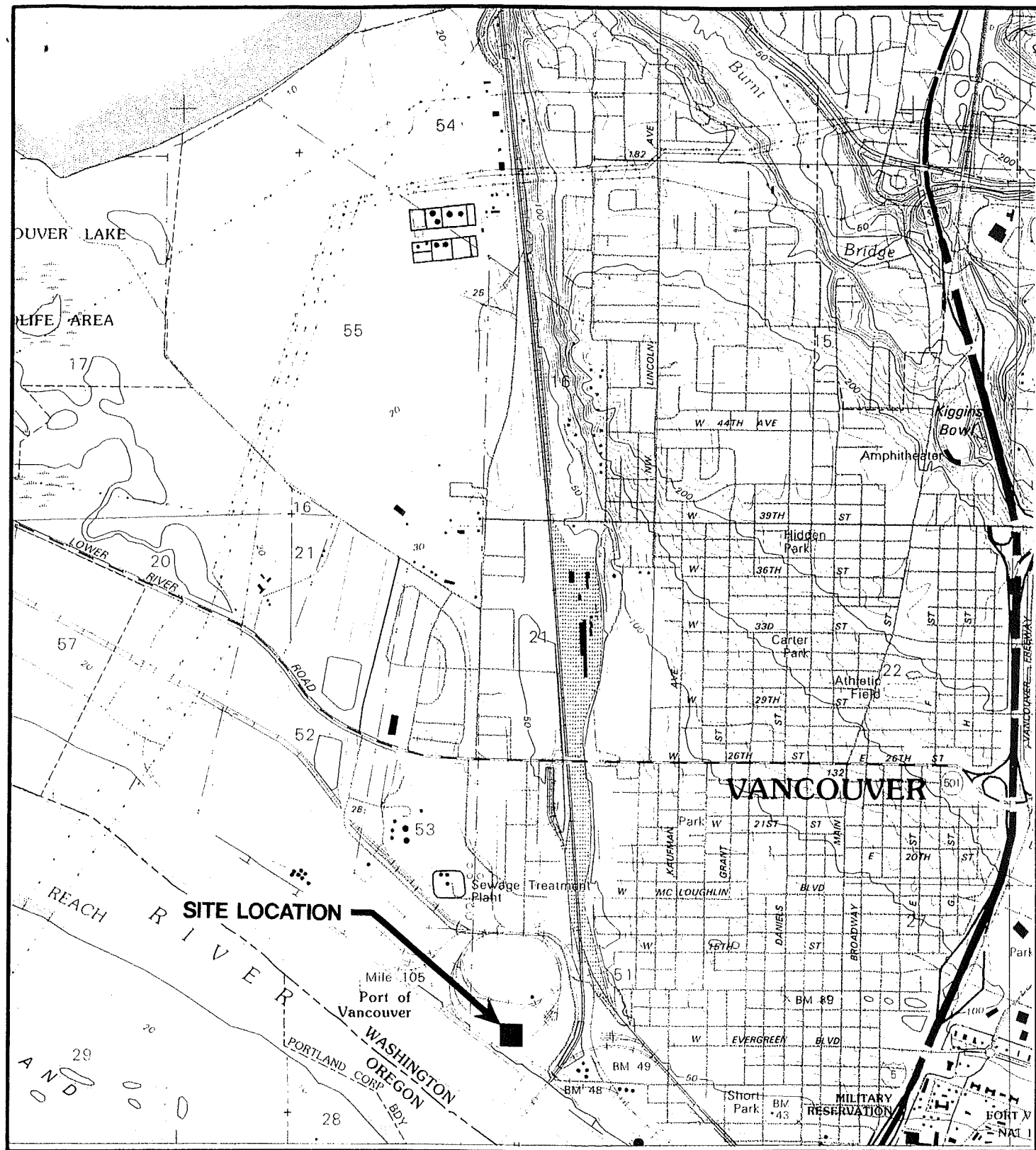
Effective date of this Order: 2/11/2000

PORT OF VANCOUVER

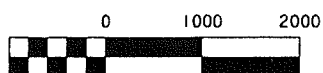
By 
Larry Paulson
Executive Director
Port of Vancouver
Vancouver, Washington

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

By 
David B. Jansen, P.E.
Section Manager
Toxics Cleanup Program
Southwest Regional Office



SCALE 1:24,000



APPROXIMATE SCALE IN FEET

CONTOUR INTERVAL 10 FEET



Kennedy/Jenks Consultants

FORT VANCOUVER PLYWOOD
VANCOUVER, WA

SITE LOCATION MAP

966035.00/P6SK001

REFERENCE: USGS 7.5' TOPOGRAPHIC QUADRANGLE
VANCOUVER, WA-OR 1990.

FIGURE 1

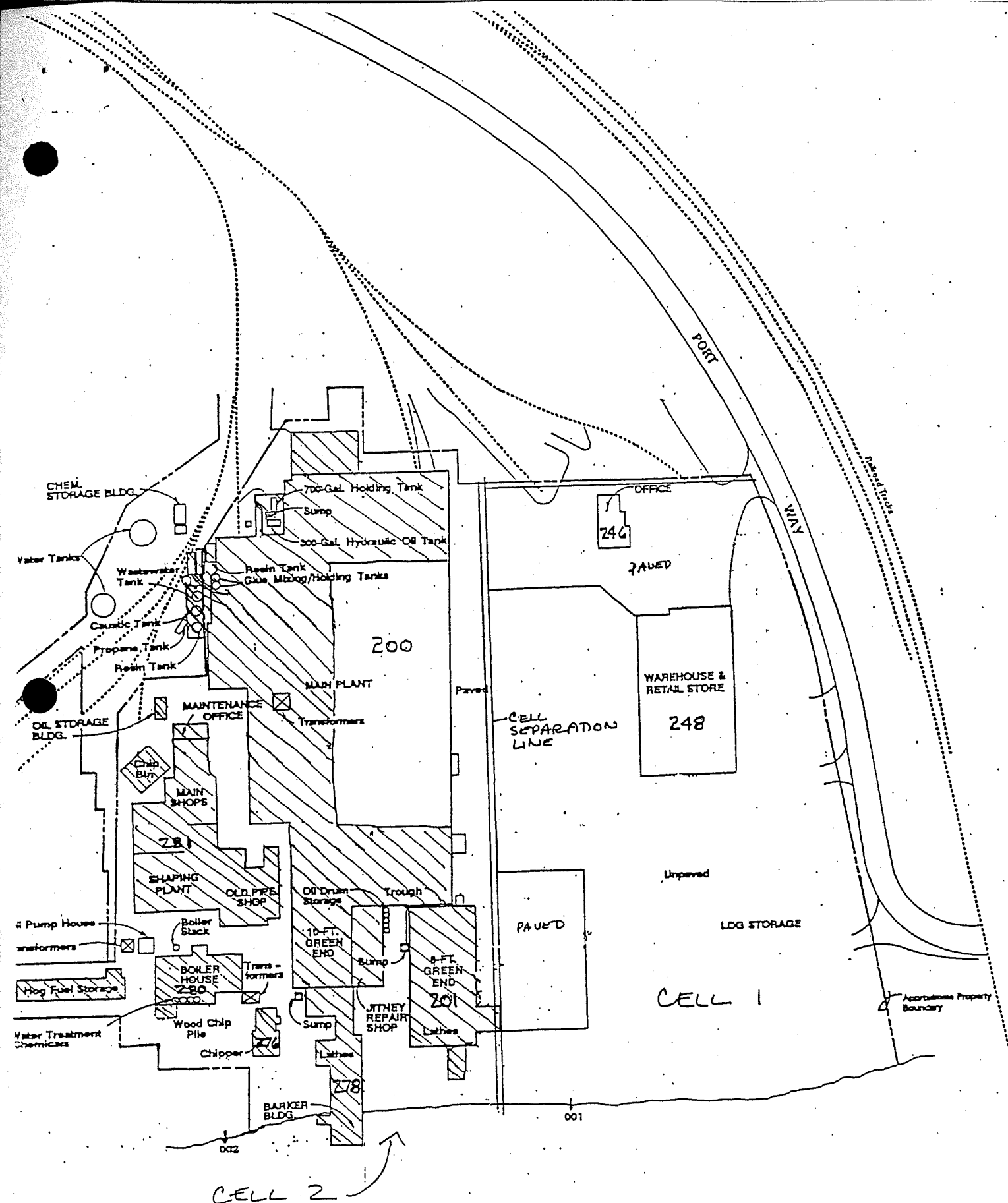
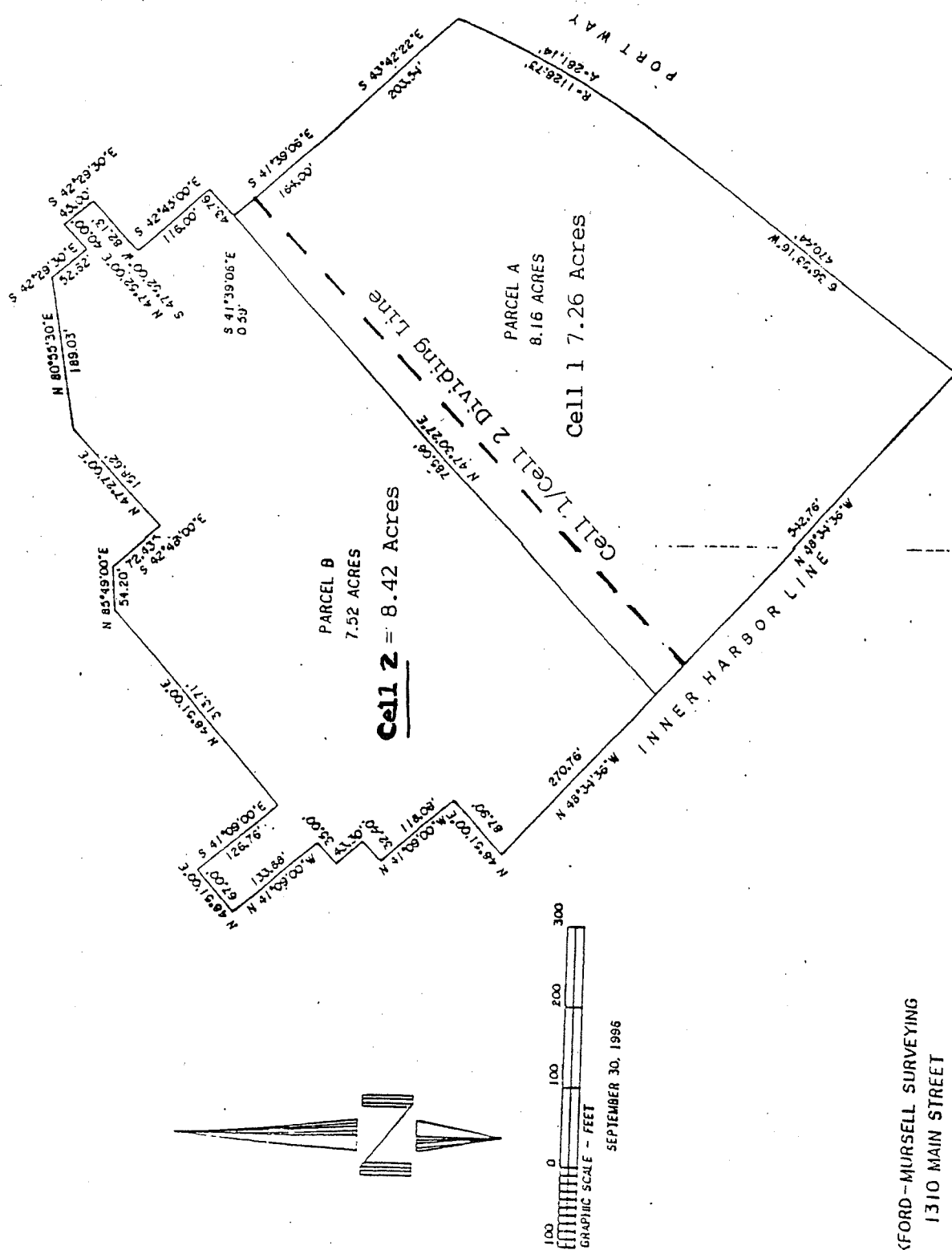


FIGURE 2

PORT OF VANCOUVER - FORT VANCOUVER PLYWOOD SITE

SECTION 28, TOWNSHIP 2 NORTH, RANGE 1 EAST, W.M.

CLARK COUNTY, WASHINGTON



BICKFORD - MURSELL SURVEYING
1310 MAIN STREET
VANCOUVER, WASHINGTON 98660
PHONE 360-693-1361
FAX 360-693-2041

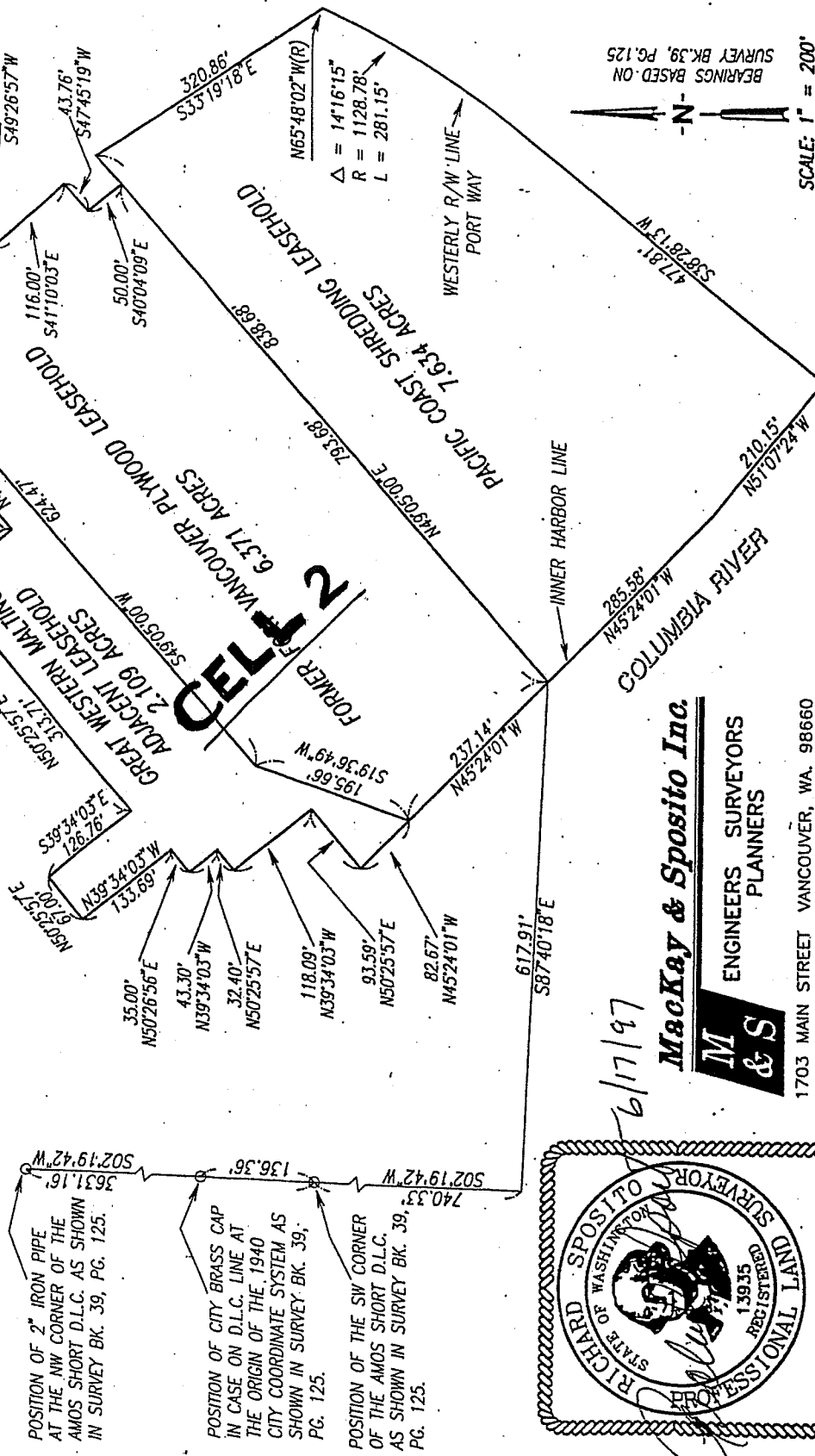
FIGURE 3-1

SKETCH SHOWING NEW LEASEHOLDS OF FORMER FORT VANCOUVER PLYWOOD SITE

IN A PORTION OF THE AMOS SHORT D.L.C

LYING IN THE EAST HALF OF SECTION 28, T.2N., R.1E., W.M.

**CITY OF VANCOUVER
CLARK COUNTY, WASHINGTON**



BEARINGS BASED ON
SURVEY BK. 39, PG. 125

SCALE: 1" = 200'
JUNE 16, 1997
12352SS4

6/17/97

MacKay & Sposito Inc.



**ENGINEERS SURVEYORS
PLANNERS**

1703 MAIN STREET VANCOUVER, WA. 98660
(360)695-3411 FAX 695-0833 (503)289-6726



FIGURE 3-2

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WASHINGTON
(360) 695-3411FAX
(360) 695-0833OREGON
(503) 289-6726SW EMAIL OFFICE
msinc@e-z.netLEGAL DESCRIPTIONPORT OF VANCOUVER

CELL 2 (western portion)

GREAT WESTERN MALTING ADDITIONAL LEASEHOLDVANCOUVER, WASHINGTON

That portion of the Amos Short Donation Land Claim No. 51 lying in the East Half of Section 28, Township 2 North, Range 1 East, Willamette Meridian, City of Vancouver, Clark County, Washington, described as follows:

Beginning at a 2 inch iron pipe marking the Northwest corner of said Short Donation Land Claim as shown in Book 39 of Surveys at Page 125, records of said county; thence along the West line of said Short Donation Land Claim South 02° 19' 42" West, 3631.16 feet to the Southwest corner thereof; thence continuing along the Southerly projection of said West line, South 02° 19' 42" West, 740.33 feet; thence South 87° 40' 18" East, 617.91 feet to the Inner Harbor Line as shown on the 1981 Supplemental Maps of Vancouver Harbor on file in the Office of the Commissioner of Public Lands at Olympia and also shown in unrecorded Survey Book "D" at Page 155-C, records of said county; thence along said Inner Harbor Line North 45° 24' 01" West, 237.14 feet to the True Point of Beginning; thence continuing along said Inner Harbor Line North 45° 24' 01" West, 82.67 feet; thence North 50° 25' 57" East, 93.59 feet; thence North 39° 34' 03" West, 118.09 feet; thence North 50° 25' 57" East, 32.40 feet; thence North 39° 34' 03" West, 43.30 feet; thence North 50° 26' 56" East, 35.00 feet; thence North 39° 34' 03" West, 133.69 feet; thence North 50° 25' 57" East, 67.00 feet; thence South 39° 34' 03" East, 126.76 feet; thence North 50° 25' 57" East, 313.71 feet; thence North 87° 23' 57" East, 54.20 feet; thence South 41° 13' 03" East, 72.43 feet; thence North 49° 01' 57" East, 158.62 feet; thence North 82° 30' 27" East, 64.99 feet; thence South 49° 05' 00" West, 624.47 feet; thence South 19° 36' 49" West, 195.66 feet to the True Point of Beginning.

Containing 2.109 acres



Mackay & Sposito Inc.

12352ld2

6-16-97

NB/ir



ENGINEERS

SURVEYORS

PLANNERS

1703 MAIN STREET VANCOUVER, WASHINGTON 98660

WASHINGTON
(360) 695-3411

FAX
(360) 695-0833

OREGON
(503) 289-6726

EMAIL
msinc@e-z.net

LEGAL DESCRIPTION

PORT OF VANCOUVER

CELL 2 (eastern portion)

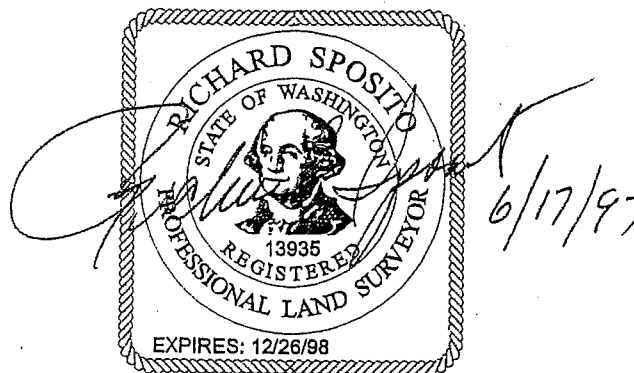
FORMER FORT VANCOUVER PLYWOOD LEASEHOLD

VANCOUVER, WASHINGTON

That portion of the Amos Short Donation Land Claim No. 51 lying in the East Half of Section 28, Township 2 North, Range 1 East, Willamette Meridian, City of Vancouver, Clark County, Washington, described as follows:

Beginning at a 2 inch iron pipe marking the Northwest corner of said Short Donation Land Claim as shown in Book 39 of Surveys at Page 125, records of said county; thence along the West line of said Short Donation Land Claim South 02° 19' 42" West, 3631.16 feet to the Southwest corner thereof; thence continuing along the Southerly projection of said West line, South 02° 19' 42" West, 740.33 feet; thence South 87° 40' 18" East, 617.91 feet to the Inner Harbor Line as shown on the 1981 Supplemental Maps of Vancouver Harbor on file in the Office of the Commissioner of Public Lands at Olympia and also shown in unrecorded Survey Book "D" at Page 155-C, records of said county and the True Point of Beginning; thence along said Inner Harbor Line North 45° 24' 01" West, 237.14 feet; thence leaving said Inner Harbor Line North 19° 36' 49" East, 195.66 feet; thence North 49° 05' 00" East, 624.47 feet; thence North 82° 30' 27" East, 124.04 feet; thence South 40° 54' 33" East, 52.62 feet; thence North 49° 26' 57" East 40.00 feet; thence South 40° 54' 33" East, 45.00 feet; thence South 49° 26' 57" West, 82.13 feet; thence South 41° 10' 03" East, 116.00 feet; thence South 47° 45' 19" West, 43.76 feet; thence South 40° 04' 09" East, 50.00 feet, to the Northwesterly line of the "Proposed Pacific Coast Shredding Leasehold" parcel; thence along said Northwesterly line South 49° 05' 00" West, 793.68 feet to the True Point of Beginning.

Containing 6.371 acres.



ATTACHMENT B

Substantive requirements for complying with State and Local Permits

Permits pertinent to this action:

1. City of Vancouver Grading Permit
2. State Hydraulic Project Approval, Washington Department of Fish and Wildlife (WDFW)
3. State Water Quality Standards Modification, Ecology
4. State NPDES Stormwater Baseline General Permit for Construction, Ecology

Other regulations pertinent to this action:

5. State of Washington, Hazardous Waste Management, Ecology
6. Local Health Department - Solid Waste Regulations

1. City of Vancouver Grading Permit (Contact: Jon Wagner, 360-696-8005)

- Any grading, excavation or filling activities associated with Construction shall be performed according to the Stormwater Pollution Prevention Plan (Erosion and Sediment Control Plan) required under the NPDES Baseline Stormwater Permit for Construction.

2. State Hydraulic Project Approval (HPA), Washington State Department of Fish and Wildlife (Contact: Ken Mohoric, 360-906-6730)

- The Port shall secure an HPA for in water work and shall notify the Area Habitat Biologist by fax at 360-576-6072 or mail at least three (3) working days prior to the start of in water work activities. The notification shall include the Port's name, project location, starting date for work, and reference the HPA number. The Port shall comply with all requirements of the HPA.

3. State Water Quality Standards Modification, Ecology (Contact: Marilou Pivrotto, 360-407-6787)

- All in water work shall comply with the Corps of Engineers Section 10 Letter of Permission. The activities must comply with all conditions contained in the Washington Department of Fisheries/Wildlife Hydraulic Project Approval.
- The contractor shall follow and implement all specifications for erosion and sediment control specified by the Port. Adjustments to planned erosion and sediment control may be necessary to successfully control off-site movement of material.
- Turbid water generated from Construction activities shall not be discharged directly to the Columbia River. If necessary, sediment traps shall be used to allow the turbid water to settle for a minimum of two hours before discharge.
- Proper erosion and sediment control practices shall be used on the construction site and adjacent areas to prevent upland sediments from entering the river channel.
- All bank areas disturbed by the project construction will be restored with clean durable rip/rap or given some other equivalent type of protection against erosion.
- All planned sediment and erosion control measures shall be adjusted to meet field conditions at the time of construction.
- Periodic inspection and maintenance of all sediment control structures must be provided. Sediment control measures shall be in working condition at the end of each working day. After any significant rainfall, sediment control structures shall be inspected for integrity. Any damaged devices shall be repaired immediately.
- Work in or near the waterway shall be done so as to minimize turbidity, erosion, other water quality impacts, and river bed deformation.
- Properly dispose of all construction debris on land in such a manner that it cannot enter into the river or cause water quality degradation to state waters.

- Extreme care shall be taken to prevent any petroleum products, fresh cement, lime, or concrete, chemicals, or other toxic or deleterious materials from entering the water in any manner. Construction activities on the waterway will be boomed to prevent impacts to the river.
 - Mobile equipment that enters the water shall be maintained such that a visible sheen from petroleum products will not appear. Any discharge of oil, fuel, or chemicals into state waters, or onto land with a potential for entry into state waters, is prohibited. All oil, fuel, or chemical storage tanks shall be diked and located on impervious surfaces so as to prevent spills from escaping to surface waters or ground waters of the state. Waste liquids shall be stored under cover, such as tarpaulins or roofs. Fuel hoses, oil drums, oil or fuel transfer valves and fittings, etc., shall be checked regularly for drips or leaks, and shall be maintained and stored properly to prevent spills into state waters. Proper security shall be maintained to prevent vandalism. In the event of a discharge of oil, fuel, or chemicals into state waters, or onto land with a potential for entry into state waters, containment and cleanup efforts shall begin immediately and be completed as soon as possible, taking precedence over normal work. Cleanup shall include proper disposal of any spilled material and used cleanup materials.
 - Spills into state waters, spills onto land with a potential for entry into state waters, or other significant water quality impacts, shall be reported immediately to the Department of Ecology, Southwest Regional Office at (360) 407-6300 (24-hour phone number).
 - If distressed or dead fish are noticed in the vicinity, the Port shall immediately notify the Department of Ecology, Southwest Regional Office at (360) 407-6300, and take immediate action to identify and eliminate toxic sources that are causing the problem. The Port is only responsible for eliminating sources where the Port or an agent of the Port has some responsibility.
 - If at any time during the work the Port or an agent of the Port finds buried chemical containers, such as drums, or any unusual conditions indicating disposal of chemicals, the Port shall immediately notify the Department of Ecology, Southwest Regional Office at (360) 407-6300 (24-hour phone number).
 - The Port's Environmental Manager or her designated Environmental Consultant shall be on-site, or on-call and readily accessible to the site, at all times while construction activities are occurring that may affect the quality of ground and surface waters of the state.
 - Copies of this Order shall be kept on the job site and readily available for reference by Port personnel, the construction superintendent, construction managers and foremen, and state and local government inspectors.
 - Five (5) days advance notification must be given by telephone to the Department of Ecology site manager (360-407-6249) before work in the waterway commences. Marilou Pivrotto, water quality inspector for Ecology, must be notified at (360) 407-6787 at least 24 hours prior to commencement of in water work.
4. **State NPDES Stormwater Baseline General Permit for Construction, Ecology (Contact: LoRee Randall, 360-407-6294)**
- The Port shall comply with applicable special conditions S1 through S10 of the general permit for stormwater discharges associated with construction activities, including the preparation of a Stormwater Pollution Prevention Plan (SWPPP). The Port shall also comply with applicable general conditions G1 through G24 of the general permit.
5. **State of Washington, Hazardous Waste Management, Ecology (Contact: Lisa Rozmyn, 360-407-6343)**
- The remedial action shall provide for management or disposal of dangerous wastes or hazardous wastes in a manner in compliance with regulations under Chapter 173-303-WAC. Wastes shall be designated and managed in compliance with the site Work Plans. Hazardous waste manifests shall be used to track the transfer and disposal of hazardous wastes.
6. **Local Health Department - Solid Waste Regulations (Contact: Gary Bickett, 360-696-8428)**
- This project shall comply with Southwest Washington Health District provisions for acceptance of any soils to be disposed of at a landfill in the state of Washington, according to criteria developed for the specific facility.

ATTACHMENT C

CLEANUP ACTION PLAN

FORMER FORT VANCOUVER PLYWOOD SITE - CELL 2
PORT OF VANCOUVER, WASHINGTON

JANUARY 2000

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1	Site Location Map
2	Site Map
3	Distribution of Ash and Debris
4	Soils With COC Exceeding MTCA Method A/C Industrial Soil Cleanup Levels

1 INTRODUCTION

This cleanup action plan (CAP) describes the proposed remediation at Cell 2 of the Former Fort Vancouver Plywood (FVP) leasehold property located at the Port of Vancouver (Port) in Vancouver, Washington. The subject property is located at the end of West Eighth Street and Port Way in an industrial zoned area along the bank of the Columbia River (refer to Figure 1).

This CAP has been prepared to satisfy the requirements of the Model Toxics Control Act (MTCA) prepared by the Washington Department of Ecology (Ecology) in accordance with WAC 173-340-360 (Ecology 1996). The purposes of the CAP are to: (1) describe the site, including a summary of its history and the extent of contamination as presented in the remedial investigation and feasibility study (RI/FS); (2) identify the site-specific cleanup standards; (3) summarize the remedial alternatives presented in the FS; and (4) identify and describe the selected alternative for site remediation.

Thorough descriptions of the site and the remedial alternatives set forth are found in the RI/FS (Kennedy/Jenks Consultants 1999). The RI/FS was performed in accordance with current MTCA regulations as part the Agreed Order (No. DE97TC-S163) between the State Department of Ecology (Ecology) and the Port.

In summary, the proposed remediation includes the following activities:

- Remove "hot spots" and dispose of soils exceeding MTCA Methods A/C industrial soil cleanup levels and soils potentially susceptible to leaching or erosion in shoreline areas. When complete, this activity will remove approximately 20,000 cubic yards of impacted shallow soils.
- Install an impermeable asphalt/concrete cap over the entire site to prevent human contact and surface water contact with shallow soils.
- Provide institutional controls to manage low-level residual risks (if any) that may be present after completion of the remedial activities.

Additional details regarding the proposed remedial alternative are provided in Sections 5 and 6.

2 SITE DESCRIPTION

The entire property consists of approximately 15.8 acres of primarily unpaved areas. Cell 2 (hereinafter referred to as "the site") comprises the western half of the FVP leasehold (approximately 8 acres) and was most recently occupied by a wood processing and plywood manufacturing plant, chemical storage structures, a boiler house, a maintenance shop, and fuel storage areas. The site is unpaved (Figure 2).

FVP leased portions of the site from the Port since 1960. Additional parcels (including the warehouse/retail store) were added to FVP's lease in 1980. Activities reportedly performed by FVP at the site included the manufacture of plywood (including timber processing, cleaning, gluing, and wood treatment), chemical storage, operation of a boiler, and maintenance activities. After discontinuing all activities and selling the remaining plywood

and production equipment, FVP vacated the site in July 1996. In 1998, the Port demolished all of the structures on Cell 2 except the pump house that is operated by the Port.

3 SITE CHARACTERIZATION

In 1998 and 1999, the Port performed an RI/FS at the site pursuant to Agreed Order No. 97TC-S163 (Order) between the Port and the Washington State Department of Ecology (Ecology). The results of the RI/FS, presented in a report dated December 1999 (Kennedy/Jenks Consultants 1999), indicated that site soils and groundwater contain several chemicals of concern (COC). These include petroleum hydrocarbons, metals (primarily arsenic, lead, and thallium), volatile organic compounds (VOCs), and polycyclic aromatic hydrocarbons (PAHs). The FS evaluated various alternatives to address chemically impacted site media. The results of the FS are summarized in Section 5.0. The results of the RI (hydrogeology, soil quality, and groundwater quality) are summarized in the following sections.

3.1 Site Hydrogeology

Two water-bearing zones were encountered within the upper 65 feet of soils explored beneath the site. These include a shallow water table unit (shallow zone) and a deeper, confined aquifer referred to herein as the Unconsolidated Aquifer (USGS 1993). The two saturated zones are separated by a lower-permeability confining layer that ranges in thickness from approximately 14 to 40 feet. The measured vertical hydraulic conductivity of the confining layer ranges from 5.2×10^{-8} to 3.6×10^{-7} centimeters per second (cm/s). The Unconsolidated Aquifer was encountered below the confining layer at depths ranging from 36 to 60 feet below ground surface (bgs). The vertical hydraulic conductivity for the Unconsolidated Aquifer was measured at approximately 2×10^{-3} cm/s, approximately 4 to 5 orders of magnitude higher than the overlying confining layer.

The general direction of the hydraulic gradient (and presumed direction of groundwater flow) in the shallow zone is to the south, toward the Columbia River. Based on the available monitoring data, the magnitude of the shallow zone horizontal hydraulic gradient at the site was calculated to range from approximately 0.01 to 0.02 feet per foot (ft/ft). The direction of the hydraulic gradient and presumed groundwater flow in the deeper Unconsolidated Aquifer appear to be toward the west in response to groundwater pumping by the Port and the Port's tenants. A net downward vertical gradient exists between the shallow zone and the deeper Unconsolidated Aquifer.

Near-surface (upper 10 feet) soils beneath the site consist predominantly of sand with varying amounts of silt. Considerable amounts of anthropogenic debris, including rubble (brick and concrete), wood ash, and trash, have been identified in the upper 10 feet of soil. Subsurface debris was encountered at several locations beneath the site but was most abundant near the Columbia River bank and in the vicinity of the former main plant building in the eastern portion of the site (refer to Figure 3).

3.2 Soil Quality

During the RI, a comprehensive characterization was performed of the horizontal and vertical extent of the chemical impacts to soil and groundwater. Sample analyses were

based on field screening results of soil samples in accordance with the decision tree presented in the Ecology-approved Work Plan (Kennedy/Jenks 1997). When the RI was completed, all suspected areas of concern identified in the Work Plan had been sampled. In addition, sampling/ characterization was performed at all other site locations using a grid-based sampling approach.

The RI included the following activities:

- Collection of 18 near-surface soil grab samples from nine locations situated along the former west railroad spur and a Port water line.
- Excavation of 130 test pit trenches to depths up to 12.5 feet bgs and collection and analysis of soil samples to assess soil impacts at areas of specific concern identified in the Work Plan.
- Advancement of 43 soil probes to depths ranging from approximately 12 to 37 feet bgs and collection of soil samples and reconnaissance groundwater samples for chemical analysis.
- Drilling of 2 soil borings to 20 feet bgs and collection of soil samples and reconnaissance groundwater samples for chemical analysis.
- Sampling of three Strata-Probe core holes along the Columbia River bank.
- Installation and sampling of 14 shallow-zone monitoring wells (C2MW-1 through C2MW-11 and C2MW-14 through C2MW-16) and two wells (C2MW-12B and C2MW-13B) completed in the Unconsolidated Aquifer.

Ecology's MTCA Method A/C industrial soil cleanup levels, established in accordance with WAC 173-340-745, have been identified as the applicable cleanup criteria for soils at the site. In four site areas, COC were detected in soil at concentrations exceeding MTCA Method A/C cleanup levels as identified in Ecology's Cleanup Level and Risk Calculations database (CLARC II; Ecology 1996b; refer to Figure 4). These areas include:

- Columbia Riverbank /Buried Debris Areas. Soils containing concentrations of carcinogenic polycyclic aromatic hydrocarbons (cPAHs), petroleum compounds, and lead in excess of MTCA Method A/C industrial soil cleanup levels were detected along the southern portion of the Columbia Riverbank. Concentrations of cPAH compounds ranged from non-detect to 111,500 mg/kg in the Columbia Riverbank area with cPAH concentrations from one location (Test Pit TP-52) exceeding the MTCA Method C industrial soil cleanup level of 18,000 µg/kg. All other SVOC concentrations were either below detectable levels or detected at concentrations below MTCA Method C industrial soil cleanup levels. Total lead was detected at concentrations ranging from non-detect to 7,660 mg/kg, with lead concentrations from two locations exceeding the MTCA Method A industrial soil cleanup level of 1,000 mg/kg.
- PCP Dip Tank Area. Elevated lead concentrations were detected in shallow (upper 5 feet) soils in the vicinity of the former PCP dip tank (see Figure 4-1). Maximum lead concentrations of 2,110 mg/kg and 1,740 mg/kg were detected from samples

SP-8-3 and SP-8-5 collected at 3 and 5 feet bgs, respectively. These concentrations exceed the MTCA Method A industrial soil cleanup level of 1,000 mg/kg. Samples collected beneath these samples contained lead at concentrations below 20 mg/kg. No other shallow sample collected in the PCP dip tank area contained concentrations of lead in excess of 32 mg/kg. The limited horizontal and vertical extent of lead-impacted soil indicates a localized exceedance with minimal vertical migration.

- West Rail Spur Alignment Area. Elevated cPAH concentrations were detected in the shallow soil sample (upper 6 inches) at sampling location RRT-3, with a maximum total cPAH concentration of 281,800 µg/kg. This concentration exceeds the MTCA Method C industrial soil cleanup level of 18,000 µg/kg. Concentrations of total cPAHs in deeper samples (collected at 5.0 feet below grade) in the area were below detectable levels, indicating that minimal vertical migration has occurred.
- East Rail Spur Alignment Area. Soils containing concentrations of total cPAHs and lead in excess of MTCA Method A/C industrial soil cleanup levels were detected along the alignment of the former east rail spur. Elevated concentrations of total cPAHs (above industrial cleanup levels) were detected in shallow soil samples (3 to 6 feet deep) at test pits TP-82, TP-84, and TP-117. The highest total cPAH concentration was 21,350 µg/kg in sample TP-84-3.0 (collected at a depth of 3 feet bgs). Total cPAH concentrations in these locations exceed the MTCA Method C industrial soil cleanup level of 18,000 µg/kg. Total cPAHs in deeper samples (collected at 7 to 10 feet below grade) were detected at concentrations of less than 1,000 µg/kg. Lead concentrations were detected in shallow soil samples collected from test pits TP-82, TP-83, TP-84, and TP-117 at concentrations exceeding the MTCA Method A industrial soil cleanup level of 1,000 mg/kg. Lead concentrations in deeper samples (collected at 7 to 8 feet below grade) were detected at concentrations ranging from 3 to 69 mg/kg, which are below the MTCA industrial soil cleanup level.

In general, each area contained anthropogenic debris. Other debris-containing areas of the site were also identified during the RI, but the concentrations of COC in soils were below potentially applicable cleanup levels.

As indicated above, previous development activities at the Port and GWMC may have resulted in hydraulic communication between the shallow zone and the Unconsolidated Aquifer. Consequently, MTCA Method B soils cleanup levels for groundwater protection is also considered an applicable cleanup standard. COC exceeding these standards include primarily cPAHs and metals (primarily, arsenic, beryllium, chromium, copper and lead), refer to Figure 5.

3.3 Groundwater Quality

Groundwater cleanup standards for the shallow zone are based on protection of surface water in the Columbia River [i.e., MTCA Method B surface water standards, Ecology surface water quality standards (SWQS), or National Toxics Rule values]. For shallow zone groundwater, a conditional point of compliance is established at the point where the

groundwater discharges to surface water. [Note: For the purposes of this CAP, the conditional point of compliance will be evaluated in shallow-zone wells installed adjacent to the bank of the Columbia River (C2MW-9, C2MW-10, and C2MW-11).] Groundwater in the deeper Unconsolidated Aquifer (monitored by wells C2MW-12B and C2MW-13B) is used as a potable water supply source; consequently, MTCA Method A/B residential cleanup levels are used to assess potential adverse impacts to this saturated zone. Refer to Section 4 for additional details regarding development of groundwater cleanup levels.

3.3.1 Shallow Zone – Columbia Riverbank Wells

- Groundwater samples from shallow zone wells located at the conditional point of compliance contained low concentrations of organic compounds. Bis (2-ethylhexyl)phthalate (BEP) was detected at a concentration of 3.9 µg/l in Well C2MW-11 during the November 1998 event and at a concentration of 6.7 µg/l during the March 1999 event. These concentrations exceed the Method B residential surface water cleanup level of 3.56 µg/l and the National Toxics Rule standard of 1.8 µg/l. All other BEP concentrations were below cleanup levels. BEP is the only organic compound to exceed surface water quality standards in shallow zone point of compliance wells. A source for BEP at the site has not been identified. BEP is frequently used in the manufacture of a variety of plastic and vinyl products, is known to be ubiquitous in the environment, and is a common laboratory contaminant. It is also present in hydraulic oil which was used at the site.
- In general, total metal concentrations in shallow zone point-of-compliance wells were higher than dissolved metal concentrations. Total metal concentrations exceeded their respective cleanup levels for arsenic, beryllium, chromium (VI), copper, lead, and thallium. With the exception of arsenic, dissolved metals concentrations were below the MTCA Method B surface water and groundwater cleanup levels, Ecology's acute SWQC, and the corresponding National Toxics Rule values. Turbid groundwater conditions were encountered in the majority of shallow zone monitoring wells, but it appears unlikely that turbid groundwater is indicative of groundwater discharged to the Columbia River. Consequently, dissolved metal concentrations appear to be more representative of the mobile contaminant levels that are likely to be transported with the groundwater. Each detected dissolved metal concentration is within the naturally occurring background range for these metals in groundwater. Therefore, metals concentrations observed in groundwater appear to be indicative of natural conditions.

3.3.2 Unconsolidated Aquifer

- Low concentrations of organic compounds were detected in groundwater samples from Unconsolidated Aquifer wells. Vinyl chloride was detected at a concentration of 6.8 µg/l during the November 1998 sampling event and at a concentration of 7.8 µg/l during the March 1999 sampling event. Both concentrations exceed the Method B groundwater limit of 2 µg/l. Vinyl chloride is a degradation product of trichloroethene (TCE) and tetrachloroethene (PCE). A source for vinyl chloride at the site has not been identified. Ecology has attributed VOCs in the deeper saturated zone to an off-site source (Agreed Order, Findings of Fact). BEP was detected in well C2MW-13B during both sampling events at concentrations of 1.7 µg/l and 8.1 µg/l, respectively. The March 1999 sampling event concentration of 8.1 µg/l exceeds the MTCA Method B residential

groundwater cleanup level of 6.25 µg/l. As stated previously, a source for BEP has not been identified at the site.

- Total arsenic concentrations detected in wells MW-12B and MW-13B in Unconsolidated Aquifer wells exceeded the MTCA Method B residential groundwater cleanup level of 1 µg/L. Method B residential cleanup levels were also exceeded for arsenic and thallium in the filtered samples in both wells during both events. Thallium was detected at a concentration of 1.6 µg/l in the filtered sample from Well C2MW-13B during the March 1999 monitoring event. This concentration exceeds the MTCA Method B groundwater cleanup level of 1.12 µg/l. No other total or dissolved metal concentrations exceeded Method B residential groundwater cleanup levels. Each detected dissolved metal concentration is within the naturally occurring background range for these metals in groundwater. Therefore, metals concentrations observed in groundwater may be indicative of natural conditions.

4 CLEANUP STANDARDS

Cleanup standards were developed for the site based on Chapter 173-340 WAC. The use of Method C industrial soil cleanup standards (except for lead, which is based on Method A) in accordance with WAC 173-340-745 is justified for the following reasons: the site cleanup is not characteristic of a routine cleanup under WAC 173-340-130; the site is located in a heavy industrial area, adjacent to other industrial properties; the site is zoned for industrial use; and deed restrictions will limit future site use to industrial activities. MTCA Method C industrial soil cleanup levels are based on dermal exposure and ingestion by site workers. Soil cleanup levels determined for site COC that exceeded these levels are summarized in Table 1.

Groundwater in the shallow zone cannot be used for drinking water due to low yield (Kennedy/Jenks 1998). Because shallow groundwater discharges to the Columbia River, groundwater cleanup standards for the shallow zone are based on protection of surface water. Consequently, appropriate surface water standards will be used for comparison criteria (i.e., MTCA Method B surface water standards, Ecology's SWQS, or EPA's National Toxics Rule values). For shallow zone groundwater, a conditional point of compliance is established at the point where the groundwater discharges to surface water.

In addition to shallow groundwater discharges to the Columbia River, there are indications that groundwater from the shallow zone may be in hydraulic communication with the deeper Unconsolidated Aquifer. Therefore, groundwater occurring in the shallow zone is also compared to MTCA Method B groundwater cleanup levels.

Groundwater in the deeper Unconsolidated Aquifer is used as a potable and industrial water supply source; consequently, MTCA Methods A/B residential cleanup levels are used to assess potential adverse impacts to the Unconsolidated Aquifer. Cleanup standards for groundwater are summarized in Table 2.

In addition to protection of human health from direct contact exposure, contaminant concentrations remaining in soil after the cleanup is completed must also support maintenance of acceptable water quality (see standards in Table 2).

The point of compliance for impacted site media will be as follows:

- Soil - throughout the site to a depth of 15 feet below grade (the reasonable maximum depth of soil excavation for development purposes) based on WAC 173-340-740(6)(c). Addressing COC in site soils should also reduce existing concerns regarding exposure of potential ecological receptors to chemicals in surface water which could potentially discharge from the site. The point of compliance for surface water protection should be soils adjacent to shoreline areas which could be in contact with surface water in the Columbia River, or site soils which could be subject to erosion by the Columbia River.
- Surface Water Runoff - at the point of discharge from the site to surface waters of the state (the Columbia River) based on WAC 173-340-730(6). (Note: No surface water discharges were observed at the site during the RI.)
- Shallow Zone Groundwater - for comparison to surface water standards, in surface water as close as technically possible to the point of discharge to the Columbia River based on WAC 173-340-720(6)(d). (Note: For practical purposes, the point of compliance will be established in onsite shallow zone monitoring wells C2MW-9, C2MW-10, and C2MW-11 located adjacent to the Columbia River.) As discussed above, shallow zone groundwater is not a potable water source due to low yield. However, as discussed previously, there are indications that shallow zone groundwater may be in communication with groundwater in the deeper Unconsolidated Aquifer, which is used as a potable water source. To address this concern groundwater cleanup levels for protection of humans via ingestion are addressed by establishing points of compliance in the Unconsolidated Aquifer (discussed in the next section).
- Unconsolidated Aquifer Groundwater - in groundwater from the Unconsolidated Aquifer throughout the site based on WAC 173-340-720(6)(b).

Compliance monitoring requirements are discussed in Section 6.3.

5 SUMMARY OF REMEDIAL ALTERNATIVES

The MTCA requires, at a minimum, that all cleanup actions protect human health and the environment, comply with cleanup standards, comply with applicable state and federal laws, and provide for compliance monitoring. In addition, all cleanup actions must consider, to the maximum extent practicable, implementation time, cost effectiveness, permanent solutions, and resource recovery technologies.

A number of potential remediation technologies were screened in the FS to select the most effective, implementable, and cost-effective alternatives for more detailed evaluation. After initial screening of remedial technologies, the FS developed three remedial alternatives to address potential human health and environmental risks associated with the site. These alternatives are described below.

5.1 Alternative 1: Excavation and Offsite Disposal of Contaminated Soils/ Institutional Controls/ Groundwater Monitoring

This alternative involves excavating contaminated soils from the areas of the site where soil concentrations exceed MTCA Method C industrial cleanup levels (MTCA Method C Exceedance Areas) and the Columbia River bank area. Soil containing COC above the cleanup levels or subject to erosion/leaching would be loaded into trucks or railcars, covered, and transported to a permitted offsite disposal facility. Imported material would be used to backfill the excavation. Scheduled groundwater monitoring will be performed for 3 to 5 years to assess changing site conditions and evaluate the need for future groundwater controls.

Remediation of soil and a statistical analysis [WAC 173-340-740(7)(d)] of residual soil concentrations would be expected to show that soil throughout the site meets the cleanup levels and applicable or relevant and appropriate requirements (ARARs). This alternative would also include institutional controls (i.e., deed restrictions) because site soils with low COC concentrations (below MTCA Method C) would not be removed. The pavement surface would be repaired as needed to achieve the intent of the remedial action.

5.2 Alternative 2: Excavation and Removal of Contaminated Soils/Asphalt Cap/ Institutional Controls/Groundwater Monitoring

This alternative includes removing the same soil areas as identified in Alternative 1. After the excavations were backfilled, the site would be graded, compacted, and covered with 3 inches of suitable base course material and 3 inches of asphalt. Asphalt pavement would cover the entire site. Stormwater controls will be installed to collect surface water and convey it to a stormwater collection system. The stormwater collection system will treat stormwater to meet local, state, and federal requirements. Scheduled groundwater monitoring will be performed for 3 to 5 years to assess changing site conditions and evaluate the need for future groundwater controls because low levels of COC (i.e., VOC, BEP, and metals) were detected in groundwater. The need for longer-duration groundwater monitoring at this time is unknown and will depend on the monitoring results obtained during the initial period.

Remediation of soil and a statistical analysis [WAC 173-340-740(7)(d)] of residual soil concentrations would be expected to show that soil throughout the site meets cleanup levels and ARARs. This alternative will also include institutional controls (i.e., deed restrictions) because site soils with low COC concentrations (below MTCA Method C) will not be removed. A registered engineer will inspect the pavement and identify necessary repairs at a frequency prescribed by Ecology. The results of the inspections will be provided to Ecology.

5.3 Alternative 3: Excavation/Thermal Treatment of Soils Containing Organic Compounds/ Solidification of Beach Area Soils

This alternative includes excavation of the same soil areas identified in Alternative 1. While clean soil would be stockpiled for backfill material, soil containing organic COC above the cleanup level would be thermally treated at an onsite treatment facility. Soils containing inorganic COC (metals) would be treated onsite using a mobile solidification unit. The treated soil and stockpiled clean material would be used to backfill the excavation. Clean

imported soil (pit run) would be placed over the solidified soils. Scheduled groundwater monitoring will be performed for 3 to 5 years to assess changing site conditions and evaluate the need for future groundwater controls. The need for longer-duration groundwater monitoring at this time is unknown and will depend on the monitoring results obtained during the initial monitoring period.

Remediation of soil and a statistical analysis [WAC 173-340-740(7)(d)] of residual soil concentrations would be expected to show that soil throughout the site meets the cleanup level. This alternative would also include institutional controls (i.e., deed restrictions), because site soils with low concentrations of COC (yet above MTCA Method B soil cleanup levels) would not be removed.

6 SELECTED CLEANUP ACTION

Each alternative examined in the FS should reduce potential adverse impacts to human health and the environment resulting from impacted soil and groundwater conditions at the site. However, it is Ecology's opinion that Alternative 2 provides the greatest level of protection to human health and the environment as well as achieving parity with the cleanup action at the adjoining Cell 2 site.

6.1 Detailed Description of the Selected Cleanup Action

The selected alternative involves removal and offsite disposal of impacted soils and capping the site with low-permeability material. Impacted soils present at concentrations exceeding MTCA Method C industrial soil cleanup levels and soils along the Columbia River bank that are subject to erosion or leaching will be excavated and disposed of at the Columbia Ridge Landfill (RCRA Subtitle D facility) or other comparably protective disposal facility. Soils meeting Ecology's designation criteria for lead as a Dangerous Waste in accordance with WAC 173-303 will be stabilized prior to disposal to demonstrate these materials no longer display Dangerous Waste characteristics.

The cap system will serve to isolate contaminated residual materials from surface water, prevent infiltration through residual soils, and eliminate the potential for worker exposure to the residual contaminated material. While the actual cap design will be determined as part of the remedial design, the cap is expected to consist of a suitable layer of base course rock and gravel overlain by an asphalt and/or concrete layer of appropriate thickness, strength, and low-permeability characteristics. Seams and edges of the cap will be engineered to reduce effective permeability and the potential for cracking of the cap. The pavement surface will be designed so that all precipitation on the paved surfaces is routed to the stormwater conveyance system. Specific details of this alternative will be presented in the Final Design Engineering Report.

Because COC concentrations in groundwater are generally low in comparison to cleanup standards and ARARs, active groundwater remediation is not proposed at this time. The removal of impacted soils and installation of a cap are expected to improve groundwater conditions in the long-term period following remediation. This alternative includes groundwater monitoring, which will be used to assess changing groundwater conditions at the site.

A key component of the selected cleanup action is the scheduled inspection and maintenance of the pavement surface. An Operation and Maintenance Plan will be prepared by the Port as part of the remedial design phase. This plan will specify a schedule for cap inspections and maintenance to ensure that the cap functions as intended. This plan will also address the regular maintenance and operation of the stormwater collection system. Any breach of the cap surface will be repaired in a timely fashion to prevent infiltration of stormwater.

Institutional controls prohibiting activities that may compromise the integrity of the cap system without Ecology's approval will be placed on the site; such approval will be granted by Ecology only after a public comment period. Because industrial soil cleanup standards will be used, a restrictive covenant limiting site use to industrial activities will be placed on the property deed. The cap will be designed so that its loading capabilities are of suitable strength to support the proposed future activities.

The activities anticipated for the cleanup action are as follows:

- Excavate and dispose of soils from the Method C Exceedance areas and the Columbia River shoreline areas.
- Grade the site and install stormwater collection/conveyance facilities.
- Place imported crushed aggregate over the compacted soil, followed by the asphalt pavement surface.
- Implement institutional controls.

6.2 Compliance Monitoring

The proposed cleanup alternative involves removal of contaminated soils and containment of soils containing chemical constituents at concentrations exceeding MTCA Method B residential soil cleanup levels. Therefore, requirements of WAC 173-340-740(6)(d) and WAC 173-340-740(7) must be met, including compliance monitoring during the interim period prior to cap installation. As part of the remedial design phase, the Port will prepare a compliance monitoring plan as specified in WAC 173-340-410. The compliance monitoring plan will include:

- Performance monitoring in accordance with WAC 173-340-410(1)(b) during interim action soil removal activities. Performance monitoring will include collection of sidewall and bottom samples from the excavation to ensure compliance with MTCA Method C industrial soil cleanup levels as specified in Section 5.0.
- Confirmational monitoring in accordance with WAC 173-340-410(1)(c) following completion of the remedial action (including installation of pavement surface). Confirmational monitoring will include scheduled groundwater monitoring of onsite wells completed in the shallow zone and the Unconsolidated Aquifer to ensure the long-term integrity of the containment system. In addition, confirmational monitoring will be performed on stormwater effluent discharged to the Columbia River.

Specific details of the compliance monitoring plan will be provided in the Final Engineering Report.

7 JUSTIFICATIONS/DETERMINATIONS

The MTCA requires that any alternative selected for site remediation must, at a minimum, meet four threshold requirements: protect human health and the environment; comply with cleanup standards; comply with applicable state and federal laws; and provide for compliance monitoring.

7.1 Protection of Human Health and the Environment

The risks identified during the RI/FS process are: (1) potential human health impacts from ingestion and inhalation of onsite soils that contain elevated concentrations of metals and organic compounds, and (2) potential water quality impacts to the Columbia River resulting from discharge of shallow zone groundwater and surface water from the site containing elevated concentrations of COC, and (3) potential human health impacts from ingestion of groundwater from the Unconsolidated Aquifer that may contain elevated concentrations of metals and organic compounds

The selected cleanup action will remove the most contaminated soils which could potentially leach contaminants to the shallow zone or be ingested by future site workers. The pavement surface will minimize potential human health risks from ingestion and inhalation of COC in soil. The pavement surface will also eliminate infiltration of surface water which could potentially contribute to contaminant leaching and ultimate discharge to the Columbia River or the Unconsolidated Aquifer.

7.2 Compliance with Cleanup Standards

The selected alternative is designed to comply with the remedial action objectives listed in Section 5.0 above.

7.3 Compliance with Applicable or Relevant Requirements (ARARs)

This evaluation criterion is used to determine the degree to which the selected cleanup action complies with federal and state standards and regulations. The following ARARs apply to the site:

Local and State Laws and Regulations

1. MTCA Cleanup Regulations
2. State Chapter 70.105 RCW
3. Hazardous Waste Cleanup - MTCA, Chapter 70.105D RCW
4. State Environmental Policy Act Regulations, Chapter 197-11 WAC

5. Minimum Standards for Construction and Maintenance of Water Wells, Chapter 173-160 WAC
6. Water Pollution Control Act, Chapter 90.48 RCW
7. National Pollution Discharge Elimination System (NPDES) Permit Program Regulations, Chapter 173-220 WAC
8. Water Quality Standards for Surface Waters of the State of Washington, Chapter 173-201A WAC
9. Dangerous Waste Regulations, Chapter 173-303 WAC
10. Washington Clean Air Act, Chapter 70.94 RCW
11. Washington Industrial Safety and Health Act (WISHA), Chapter 296-62 WAC
12. Hydraulic Code Rules, Chapter 220-110 WAC
13. Shoreline Management Act Regulations, Chapter 173-14-28 WAC

Federal Laws and Regulations

1. Resource Conservation and Recovery Act (RCRA)
2. Criteria for Municipal Solid Waste Landfills, RCRA Subtitle D, 40 CFR Part 258
3. Occupational Safety and Health Act (OSHA), 29 CFR Subpart 1910.120
4. Federal Water Pollution Control Act of 1972 (Clean Water Act) and National Toxics Rule (amendments to Water Quality Standards Regulation)
5. Water Quality Act of 1987:
 - Section 308. Establishes water quality criteria for toxic pollutants.
 - Section 401. A water quality certification is required for any activity that may result in a discharge into surface waters.
 - Section 402. Establishes the NPDES permit process for discharges to surface water bodies.
 - Section 404. Required when planning to locate a structure in waters of the U.S.

The selected cleanup action complies with all ARARs listed above. Other ARARs, such as air quality regulations, will be complied with as an integral part of the remedial design and implementation steps.

7.4 Short-Term Effectiveness

Short-term effectiveness considers how each alternative would impact human health and the environment during the implementation (construction) phase and prior to attainment of cleanup standards.

Implementation of the proposed cleanup action involves various earth-moving activities. The earthwork may have an impact on the community via exposure to airborne dust. This potential impact will be mitigated through use of control measures such as watering to reduce dust generation. The earthwork also may increase mobility of soil particles which could be discharged to surface water. Mitigation of this potential pathway will involve using standardized best management practices (BMPs) for construction.

Offsite disposal of impacted soils and capping should result in immediate elimination of potential human exposure pathways. The cap should effectively isolate contaminated materials from surface water runoff. Capping should eliminate the human health concerns associated with ingestion of contaminated material.

7.5 Long-Term Effectiveness

Long-term effectiveness is evaluated in terms of the magnitude of residual risk and the adequacy and reliability of the cleanup action.

Implementation of the selected alternative (offsite disposal and capping) will prevent contact between precipitation/surface water runoff and contaminated soils. Because residuals will remain onsite, maintenance of the engineering controls and continued monitoring are crucial to long-term reliability. There is a high degree of confidence that the isolation and containment measures will be effective in controlling mobility of COC when coupled with appropriate long-term operation, maintenance, and monitoring to remedy any potential damage to the cap system due to settlement, erosion, or other causes. In addition to monitoring, the selected alternative provides for periodic routine inspections and maintenance of the cap system to ensure its integrity and effectiveness. Institutional controls, including restrictive covenants, will limit the long-term use of the site to industrial purposes.

7.6 Reduction of Toxicity, Mobility, or Volume

This evaluation criterion addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility, and volume of the hazardous substances present. Impacted soils that contain COC at concentrations exceeding MTCA Method C industrial soil cleanup levels, or soils located along the bank of the Columbia River that are subject to erosion, will be removed and disposed at a permitted offsite facility. These activities will eliminate or substantially reduce the long-term mobility of COC in soils from the most impacted areas of the site. Soils displaying dangerous waste characteristics for lead will be treated prior to disposal, further decreasing their potential mobility. Treatment of soils will slightly increase the volume of materials submitted for disposal.

The cleanup action will also eliminate human contact and the contact of stormwater with contaminated soil through the use of a physical barrier (cap system), thereby limiting the mobility of contaminants.

7.7 Implementability/Technical Feasibility

This alternative employs conventional technologies and thus should be readily implemented. Capping has been performed at other similar sites. Maintenance requirements for the cap system should not pose any technical difficulties.

7.8 Cost

The relative costs for the alternatives determined in the FS are given in the table below.

Summary of Estimated Costs for Alternatives

Alternative	Description	Estimated Total Present Worth (\$)
1	Excavation / Removal / Offsite Disposal / Institutional Controls	1,507,000
2	Excavation / Removal / Offsite Disposal / Asphalt Cap / Institutional Controls	2,514,000
3	Excavation / Thermal Treatment / Solidification / Institutional Controls	2,689,000

7.9 Elimination of Other Alternatives

Alternatives 1 and 3 were not selected because they may not adequately protect human health and the environment.

7.10 State and Community Acceptance

State and community acceptance will be evaluated based on the comments received during the public comment period. Based on the information gathered from the public, Ecology may decide to modify the CAP to arrive at a final CAP.

7.11 Cleanup Action Requirements

The selected cleanup action is designed to meet the following requirements:

1. Protect human health and the environment.
2. Comply with cleanup standards per WAC 173-340-700 through 760.
3. Comply with applicable state and federal laws per WAC 173-340-710.
4. Provide compliance monitoring per WAC 173-340-410.
5. Use permanent solutions to the maximum extent practicable per WAC 173-340-360(4), (5), (7), and (8).

6. Provide a reasonable restoration time frame per WAC 173-340-360(6).
7. Consider public concerns, if any, raised during public comment on the cleanup action plan per WAC 173-340-360(10) through (13).

8 SCHEDULE FOR IMPLEMENTATION/UPCOMING ACTIVITIES

Ecology will negotiate an Agreed Order with the Port of Vancouver, in accordance with MTCA, to cover the remedial design, remedial construction, confirmational monitoring, operation and maintenance, and all other work phases. Public participation, including a 30-day public comment period and public notice, will accompany the MTCA Agreed Order.

9 REFERENCES

Kennedy/Jenks Consultants. 1997. Final Remedial Investigation Work Plan and Sampling and Analysis Plan, Fort Vancouver Plywood Site, dated September 1997. Prepared by Kennedy/Jenks Consultants for the Port of Vancouver.

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Washington State Department of Ecology. 1996a. Model Toxics Control Act - Cleanup Regulations, Chapter 173-340 WAC, Amended January 1996, Publication No. 94-06.

Washington State Department of Ecology. 1996b. Model Toxics Control Act Cleanup Level and Risk Calculations (CLARC II) Updated. Dated February 1996. Prepared by the Washington Department of Ecology. Ecology publication No. 94-145.

TABLE 1

**Maximum Detected Contaminant Concentrations in Soil
Exceeding MTCA Method A/C Cleanup Levels**
Former Fort Vancouver Plywood Leasehold - Cell 2
Vancouver, Washington

Chemical of Concern	Columbia Riverbank/Buried Debris Areas Maximum Detected Concentration	PCP Dip Tank Area Maximum Detected Concentration	West Rail Spur Alignment Area Maximum Detected Concentration	East Rail Spur Alignment Area Maximum Detected Concentration	MTCA Method C Soil Cleanup Levels ^(a)
Petroleum Hydrocarbons (mg/kg)					
TPH-diesel	8,200	NE ^(b)	NE	240	200 ^(c)
TPH-oil range	21,000	NE	NE	680	200 ^(c)
Metals (mg/kg)					
Lead	7,660	2,110	NE	4,220	1,000 ^(c)
Semivolatile Organic Compounds (µg/kg)					
Benzo(a)-anthracene	20,000	NE	53,000	NE	18,000
Chrysene	24,000	NE	56,000	NE	18,000
Benzo(b)-fluoranthene	NE	NE	44,000	NE	18,000
Benzo(k)-fluoranthene	NE	NE	38,000	NE	18,000
Benzo(a)-pyrene	20,000	NE	52,000	NE	18,000
Indeno(1,2,3-cd)pyrene	NE	NE	31,000	NE	18,000
Total cPAHs	111,500	NE	281,800	21,350	18,000

Notes:

(a) Interim action plan cleanup goals are equivalent to the MTCA Method C industrial soil cleanup levels.

(b) NE indicates analyte concentration did not exceed indicated cleanup level.

(c) No MTCA Method C cleanup level is available; therefore, MTCA Method A cleanup level for industrial soils is presented.

TABLE 2
Groundwater Cleanup Level and ARARs
Former Fort Vancouver Plywood Site
Vancouver, Washington

Chemical of Concern	Shallow Zone Cleanup Level	Unconsolidated Aquifer Cleanup Level
Volatile Organic Compounds (µg/L)		
1,1-Dichloroethane	N/A	800
cis-1,2-Dichloroethene	N/A	80
1,1-Dichloroethene	0.057(1.0)	0.0729/(1.0)
1,1,1-Trichloroethane	4.17x10 ⁵	7,200
Chloroethane	N/A	N/A
Acetone	N/A	800
Metals (µg/L)		
Antimony	14	6.4
Arsenic	0.018/(1)	0.0583/(1)
Beryllium	0.0793/(2)	0.0203/(2)
Cadmium	15.84	8
Chromium	1,648.18/15	16,800/80
Copper	60.31	592
Lead	268.6	5.0/(10)
Mercury	0.14	4.8
Nickel	610	320
Selenium	20	80
Silver	34.75	80
Thallium	1.56	1.12
Zinc	357.07	4,800
Semivolatile Organic Compounds (µg/L)		
bis (2-Ethylhexyl)phthalate	1.8	6.25
Naphthalene	<1.0	320
Acenaphthylene	N/A	N/A
Fluorene	1,300	640
Phenanthrene	N/A	N/A
Anthracene	9,600	4,800
Fluoranthene	90	640
Pyrene	960	480
Benzo(a)anthracene	0.0028/(1)	0.012/(1)
Chrysene	0.0028/(1)	0.012/(1)
Benzo(b)fluoranthene	0.0028/(1)	0.012/(1)
Benzo(k)fluoranthene	0.0028/(1)	0.012/(1)
Benzo(a)pyrene	0.0028/(1)	0.012/(1)
Indeno(1,2,3-cd)pyrene	0.0028/(1)	0.012/(1)
Dibenzo(a,h)anthracene	0.0028/(1)	0.012/(1)
Benzo(g,h,i)perylene	N/A	0.012/(1)
Total cPAHs	0.0028/(1)	0.012/(1)

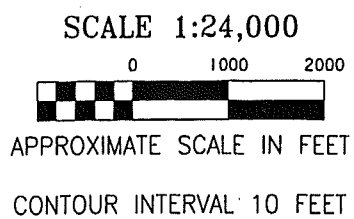
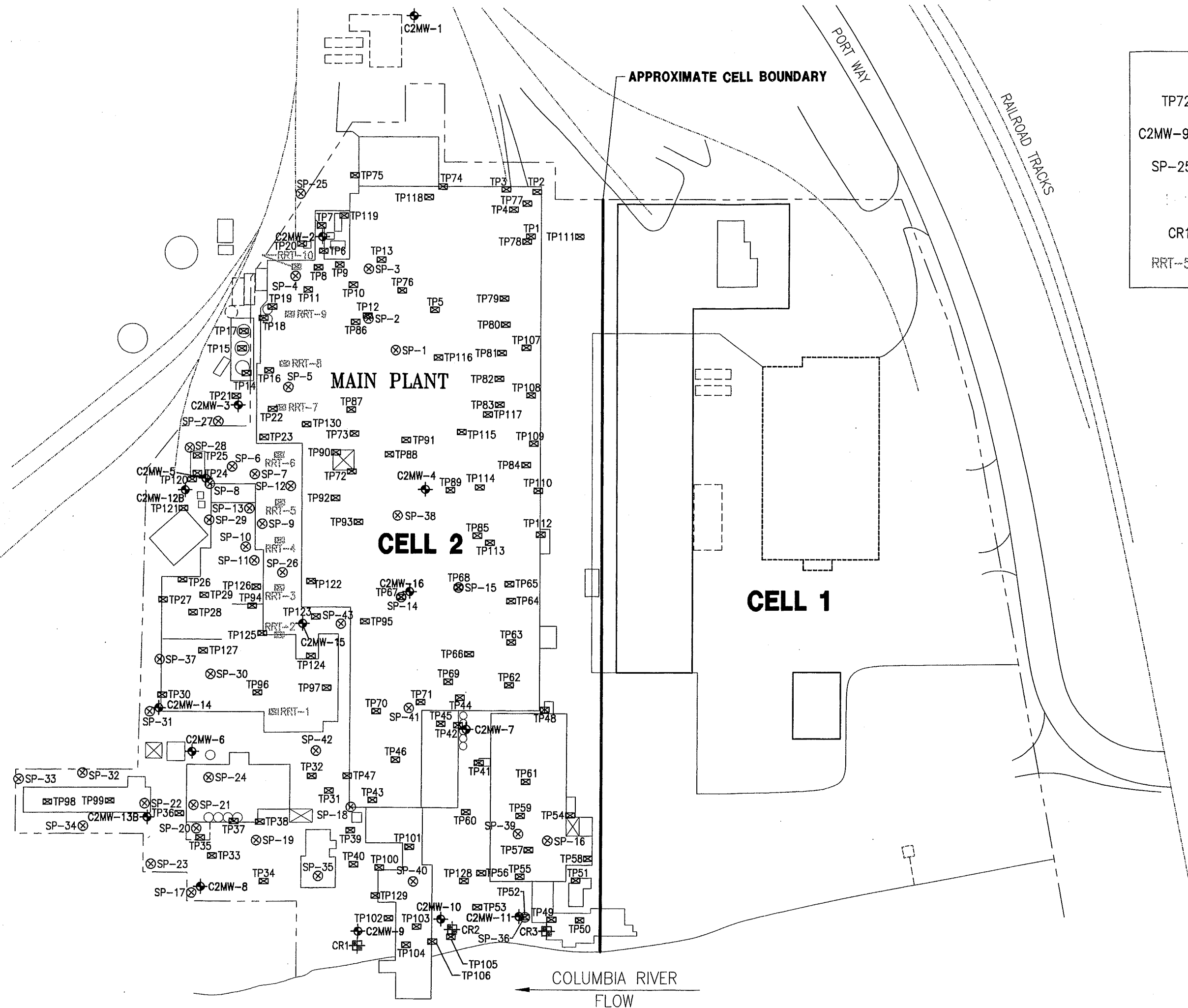
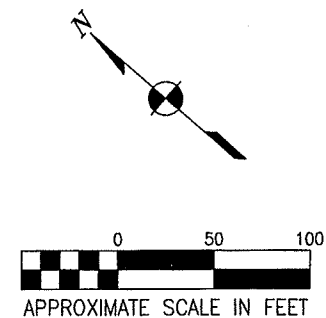


FIGURE 1



LEGEND

TP72	CELL 2 TEST PIT LOCATION
C2MW-9	MONITORING WELL LOCATION
SP-25	SOIL PROBE LOCATION
	SOIL BORING LOCATION
CR1	COLUMBIA RIVER BANK SAMPLE LOCATION
RRT-5	GRAB SAMPLE



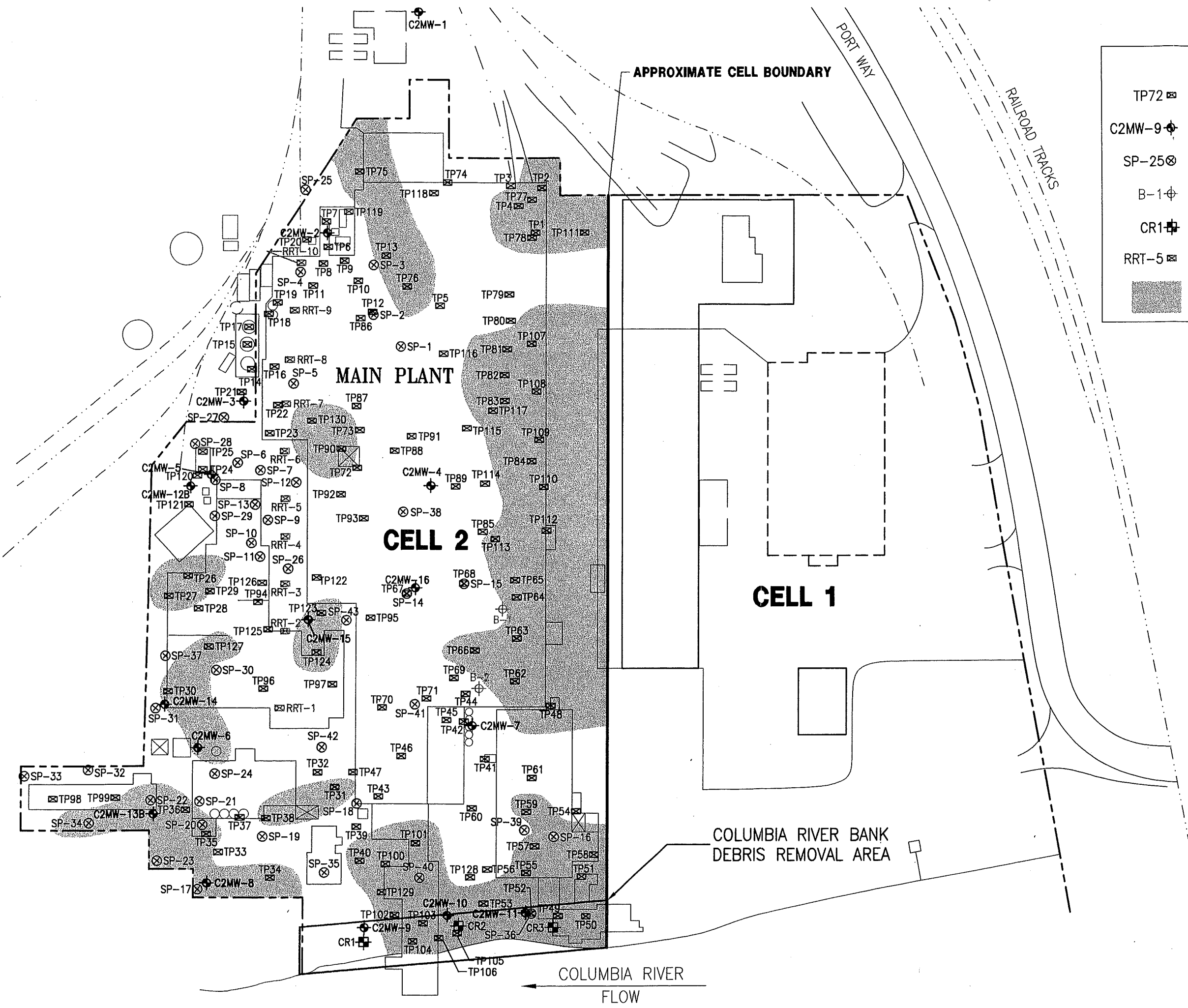
Kennedy/Jenks Consultants

FORMER FORT VANCOUVER PLYWOOD
VANCOUVER, WA

SAMPLING LOCATION MAP

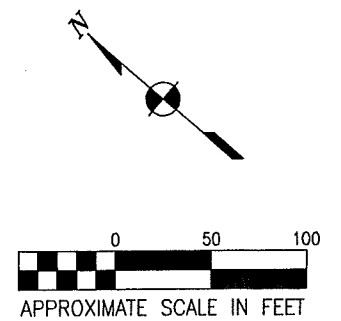
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FIGURE 2



LEGEND

- TP72 ☒ CELL 2 TEST PIT LOCATION
- C2MW-9 ⚡ MONITORING WELL LOCATION
- SP-25 ⊗ SOIL PROBE LOCATION
- B-1 ⊕ SOIL BORING LOCATION
- CR1 ⊕ COLUMBIA RIVER BANK SAMPLE LOCATION
- RRT-5 ☒ GRAB SAMPLE
- ☒ DISTRIBUTION OF BURIED DEBRIS/FILL MATERIAL



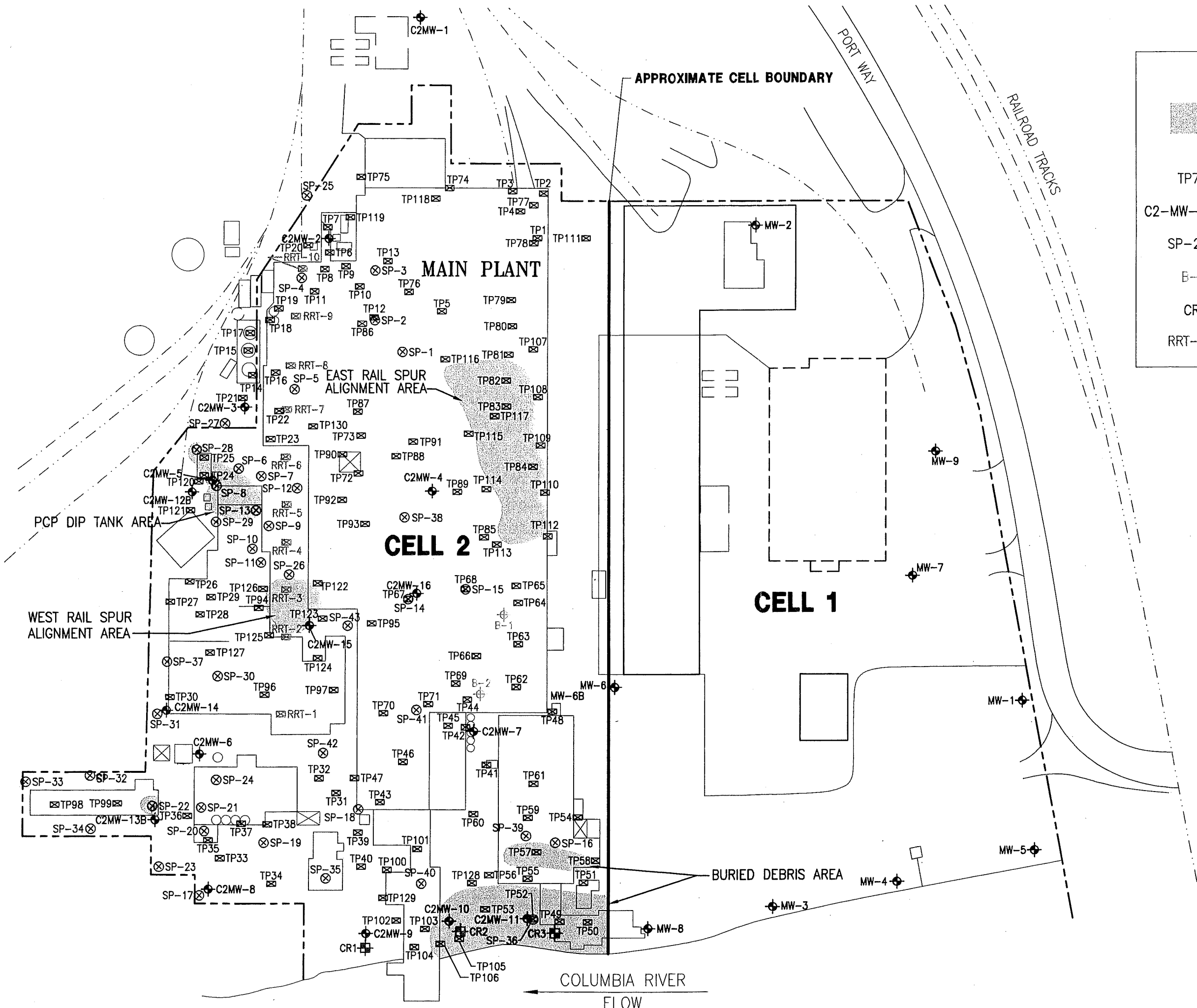
- NOTES:**
- 1) ALL LOCATIONS ARE APPROXIMATE.
 - 2) REFER TO REPORT TEXT FOR A DESCRIPTION OF DEBRIS/FILL MATERIAL.

Kennedy/Jenks Consultants
FORMER FORT VANCOUVER PLYWOOD
VANCOUVER, WA








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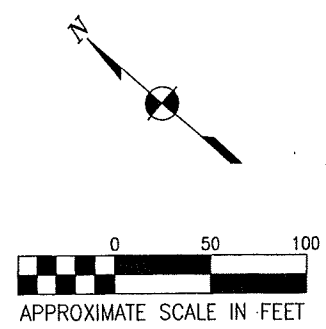
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FIGURE 3



LEGEND

-  AREAS OF SOIL WITH COC EXCEEDING MTCA METHOD C INDUSTRIAL SOIL CLEANUP LEVEL
-  CELL 2 TEST PIT LOCATION
-  MONITORING WELL LOCATION
-  SOIL PROBE LOCATION
-  SOIL BORING LOCATION
-  COLUMBIA RIVER BANK SAMPLE LOCATION
-  GRAB SAMPLE



Kennedy/Jenks Consultants

FORMER FORT VANCOUVER PLYWOOD
VANCOUVER, WA

**SOILS WITH COC EXCEEDING
MTCA METHOD C INDUSTRIAL
SOIL CLEANUP LEVEL**

966035.01/P9SK027A

FIGURE 4

ATTACHMENT D

RESTRICTIVE COVENANT

**Former Fort Vancouver Plywood Site
901 Port Way, Vancouver, Washington
The Port of Vancouver, USA, Owner**

RESTRICTIVE COVENANT
Former Fort Vancouver Plywood Site
901 Port Way, Vancouver, Washington
The Port of Vancouver, USA, Owner

This Declaration of Restrictive Covenant is made pursuant to RCW 70.105D.030(1)(f) and (g) and WAC 173-340-440 by the Port of Vancouver, USA, its successors and assigns, and the State of Washington Department of Ecology, its successors and assigns (hereafter "Ecology").

Work to clean up the property (hereafter "Remedial Action") is described in the Agreed Order entered into between the Port of Vancouver and Ecology (Agreed Order No. 99TCPSR-93), and the attachments to the Agreed Order and in documents referenced in the Agreed Order. These documents are on file at Ecology's Southwest Regional Office.

This Restrictive Covenant is required because the Remedial Action resulted in residual concentrations of metals, petroleum hydrocarbon compounds, and volatile organic compounds which exceed the Model Toxics Control Act Method A Residential Cleanup Level for soil established under WAC 173-340-740. This Restrictive Covenant is also required because a conditional point of compliance has been established for shallow groundwater discharging from the site to the Columbia River in accordance with WAC 173-340-720(6)(d).

The undersigned, The Port of Vancouver, USA, is the fee owner of real property (hereafter "Property") in the County of Clark, State of Washington, that is subject to this Restrictive Covenant. The Property is legally described in Attachment A of this Restrictive Covenant and made a part hereof by reference.

The Port of Vancouver makes the following declaration as to limitations, restrictions, and uses to which the Property may be put and specifies that such declarations shall constitute covenants to run with the land, as provided by law and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in the Property (hereafter "Owner").

Section 1. The following restrictions apply to the property:

1. "The Property shall be used only for traditional industrial uses, as described in RCW 70.105D.020(23) and defined in and allowed under the City of Vancouver's zoning regulations codified in the City of Vancouver Municipal Code, Chapter 20 as of the date of this Restrictive Covenant."
2. "Shallow-zone groundwater from the property shall not be used e.g., domestic, agricultural, or any use as a potable water supply source."
3. "Any activity on the Property that results in the release or exposure to the environment of the contaminated soil that was contained as part of the Remedial Action, or create a new exposure pathway, is prohibited. Some examples of activities that are prohibited in the capped areas include: drilling, digging, placement of any objects or use of any equipment which deforms or stresses the surface beyond its load bearing capability, piercing the surface with a rod, spike or similar item, bulldozing or earthwork."

Section 2. Any activity on the Property that interferes with the integrity of the Remedial Action and continued protection of human health and the environment is prohibited.

Section 3. Any activity on the Property that results in the release or exposure to the environment of a hazardous substance that remains on the Property as part of the Remedial Action, or create a new exposure pathway, is prohibited without prior written approval from Ecology.

Section 4. The Owner of the property must give thirty (30) days advance written notice to Ecology of the Owner's intent to convey any interest in the Property. No conveyance of title, easement, lease, or other interest in the Property shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the Remedial Action.

Section 5. The Owner must restrict leases to uses and activities consistent with the Restrictive Covenant and notify all lessees of the restrictions on the use of the Property.

Section 6. The Owner must notify and obtain approval from Ecology prior to any use of the Property that is inconsistent with the terms of this Restrictive Covenant. Ecology may approve any inconsistent use only after public notice and comment.

Section 7. The Owner shall allow authorized representatives of Ecology the right to enter the Property at reasonable times for the purpose of evaluating the Remedial Action; to take samples, to inspect remedial actions conducted at the property, and to inspect records that are related to the Remedial Action.

Section 8. The Owner of the Property reserves the right under WAC 173-340-440 to record an instrument that provides that this Restrictive Covenant shall no longer limit use of the Property or be of any further force or effect. However, such an instrument may be recorded only if Ecology, after public notice and opportunity for comment, concurs.

[NAME OF PROPERTY OWNER]

[DATE SIGNED]

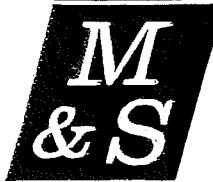
[NOTE: The Property Owner must have this Restrictive Covenant notarized.]

ATTACHMENT A

12352.LD3

RECEIVED
6/16/97
NB/lr

Mackay & Sposito Inc.



ENGINEERS SURVEYORS PLANNERS

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(360) 695-0833

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(503) 289-6726

SW EMAILING OFFICE
msinc@e-z.net

LEGAL DESCRIPTION

PORT OF VANCOUVER

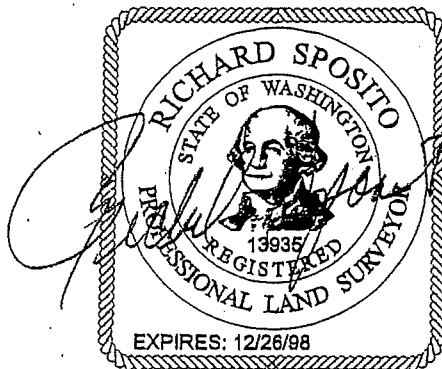
CELL 2 (western portion)

GREAT WESTERN MALTING ADDITIONAL LEASEHOLD
VANCOUVER, WASHINGTON

That portion of the Amos Short Donation Land Claim No. 51 lying in the East Half of Section 28, Township 2 North, Range 1 East, Willamette Meridian, City of Vancouver, Clark County, Washington, described as follows:

Beginning at a 2 inch iron pipe marking the Northwest corner of said Short Donation Land Claim as shown in Book 39 of Surveys at Page 125, records of said county; thence along the West line of said Short Donation Land Claim South 02° 19' 42" West, 3631.16 feet to the Southwest corner thereof; thence continuing along the Southerly projection of said West line, South 02° 19' 42" West, 740.33 feet; thence South 87° 40' 18" East, 617.91 feet to the Inner Harbor Line as shown on the 1981 Supplemental Maps of Vancouver Harbor on file in the Office of the Commissioner of Public Lands at Olympia and also shown in unrecorded Survey Book "D" at Page 155-C, records of said county; thence along said Inner Harbor Line North 45° 24' 01" West, 237.14 feet to the True Point of Beginning; thence continuing along said Inner Harbor Line North 45° 24' 01" West, 82.67 feet; thence North 50° 25' 57" East, 93.59 feet; thence North 39° 34' 03" West, 118.09 feet; thence North 50° 25' 57" East, 32.40 feet; thence North 39° 34' 03" West, 43.30 feet; thence North 50° 26' 56" East, 35.00 feet; thence North 39° 34' 03" West, 133.69 feet; thence North 50° 25' 57" East, 67.00 feet; thence South 39° 34' 03" East, 126.76 feet; thence North 50° 25' 57" East, 313.71 feet; thence North 87° 23' 57" East, 54.20 feet; thence South 41° 13' 03" East, 72.43 feet; thence North 49° 01' 57" East, 158.62 feet; thence North 82° 30' 27" East, 64.99 feet; thence South 49° 05' 00" West, 624.47 feet; thence South 19° 36' 49" West, 195.66 feet to the True Point of Beginning.

Containing 2.109 acres



6/17/97

Mackay & Sposito Inc.

12352ld2

6-16-97

NB/ir



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LEGAL DESCRIPTION

PORT OF VANCOUVER

CELL 2 (eastern portion)

FORMER FORT VANCOUVER PLYWOOD LEASEHOLD

VANCOUVER, WASHINGTON

That portion of the Amos Short Donation Land Claim No. 51 lying in the East Half of Section 28, Township 2 North, Range 1 East, Willamette Meridian, City of Vancouver, Clark County, Washington, described as follows:

Beginning at a 2 inch iron pipe marking the Northwest corner of said Short Donation Land Claim as shown in Book 39 of Surveys at Page 125, records of said county; thence along the West line of said Short Donation Land Claim South 02° 19' 42" West, 3631.16 feet to the Southwest corner thereof; thence continuing along the Southerly projection of said West line, South 02° 19' 42" West, 740.33 feet; thence South 87° 40' 18" East, 617.91 feet to the Inner Harbor Line as shown on the 1981 Supplemental Maps of Vancouver Harbor on file in the Office of the Commissioner of Public Lands at Olympia and also shown in unrecorded Survey Book "D" at Page 155-C, records of said county and the True Point of Beginning; thence along said Inner Harbor Line North 45° 24' 01" West, 237.14 feet; thence leaving said Inner Harbor Line North 19° 36' 49" East, 195.66 feet; thence North 49° 05' 00" East, 624.47 feet; thence North 82° 30' 27" East, 124.04 feet; thence South 40° 54' 33" East, 52.62 feet; thence North 49° 26' 57" East 40.00 feet; thence South 40° 54' 33" East, 45.00 feet; thence South 49° 26' 57" West, 82.13 feet; thence South 41° 10' 03" East, 116.00 feet; thence South 47° 45' 19" West, 43.76 feet; thence South 40° 04' 09" East, 50.00 feet, to the Northwesterly line of the "Proposed Pacific Coast Shredding Leasehold" parcel; thence along said Northwesterly line South 49° 05' 00" West, 793.68 feet to the True Point of Beginning.

Containing 6.371 acres.

