Interim Action Work Plan
North Point/Phase III
Cascade Pole Site
Olympia, Washington

April 26, 2010

Prepared for

Port of Olympia

Landau Associates
130 2nd Avenue South
Edmonds, WA 98020
(425) 778-0907

TABLE OF CONTENTS

FIGURES

APPENDICES

INTRODUCTION

In 2000, the Washington State Department of Ecology (Ecology) and the Port of Olympia (Port) entered into Agreed Order No. DE 00TCPSR-753 (Order), which required the Port to take interim actions for contaminated marine sediments including construction of an upland containment cell for the dredged sediments. In 2004, the Order was amended requiring the Port to perform additional interim actions including construction of a new groundwater treatment system. A second amendment to the Order (2010) requires an interim action for the North Point/Phase III area.

This document presents the work plan for the North Point/Phase III capping interim action project that is the subject of the second amendment to the Order. The purpose of the Phase III capping project is to excavate contaminated soil associated with historic Cascade Pole site (Site) operations that is located outside the slurry wall containment area, contain the excavated soil within the containment area, and cover the contained soil with a low-permeability asphalt cap. This interim action will result in the containment of all contaminated soil within the slurry wall containment area and will complete capping of the containment area with a low-permeability cover.

The following sections of this work plan present a brief Site history, a summary of environmental characterization activities within the Phase III area, a summary of the remedial alternatives evaluated for cleanup of the Phase III area, and a description of the selected alternative.

SITE HISTORY

The Site is located approximately one mile north of downtown Olympia, at the northern end of the peninsula that extends into Budd Inlet, as shown on Figure 1. The Port owns all of the Site uplands and adjacent aquatic lands. The majority of the Site is currently paved and is used for log handling, marina parking, and a Port maintenance facility. Current Site features and the Phase III capping interim action area are shown on Figure 2.

From about 1939 through 1986, the Site was used for wood treating operations by various Port tenants. McFarland Cascade operated at the Site as the Cascade Pole Company from about 1957 until active operations ceased in 1986. Creosote, which is primarily composed of polycyclic aromatic hydrocarbons (PAHs), was the predominant wood preservative used in Site wood treating operations prior to 1967. From 1967 onward, pentachlorophenol (PCP) dissolved in a carrier oil became the primary wood preservative, although creosote was still used. The PCP wood treating solution was reportedly prepared at the Site by dissolving PCP in a medium aromatic oil to form a 5 percent PCP solution.

Throughout wood treating operations, creosote and PCP wood treating chemicals were released at the Site through operational discharges, spills, and drippings from treated wood. These releases resulted in contamination to soil, groundwater, and sediment, including the release of nonaqueous phase liquid (NAPL). The release of NAPL from wood treating operations resulted in a contamination “hot spot” in the area of the former wood treating operations in the northeastern portion of the Site. The hot spot area contains both dense NAPL (DNAPL), which tends to sink through the groundwater aquifer until it encounters a low-permeability layer (aquitard), and light NAPL (LNAPL), which floats on the water table. These NAPL sources provide ongoing releases of dissolved-phase contamination to groundwater long after NAPL releases cease.

Multiple interim actions have been implemented at the Site subsequent to the completion of the upland feasibility study (FS) in 1992 [ESE (Environmental Science & Engineering 1992)]. These interim actions were implemented to reduce the threat to human health and the environment and to prevent further spread of contamination from Site releases, consistent with the requirements of WAC 173-340-430. These interim actions are briefly described below and relevant features are shown on Figure 2:

- A groundwater extraction and treatment system was implemented in 1993 to provide hydraulic containment of Site groundwater. A 350-foot long steel sheetpile cutoff wall and product recovery trench were constructed along the northeastern shoreline of the Site at the same time to support containment and recovery of NAPL, and to prevent further release of NAPL to the marine environment.
- A 3,600-ft long bentonite slurry cutoff wall was constructed around the perimeter of the contaminated groundwater and upland NAPL area in 1997 to provide a physical barrier to contaminated groundwater and NAPL migration from the Site. The bentonite slurry cutoff wall extends vertically from near the ground surface to about 2 ft into the aquitard underlying the shallow aquifer.
- In conjunction with construction of the bentonite slurry wall in 1997, portions of the existing Site stormwater system were replaced with a new stormwater collection and detention system to convey stormwater from paved areas to surface water discharge, and to contain stormwater that may have come into contact with contaminated soil within the perimeter cutoff wall.
- A sediment interim action was conducted between 2000 and 2002. The sediment interim action consisted of the following primary elements:
  1. Construction of an approximately 4.5-acre containment cell in the northeast portion of the Site for disposal of the contaminated sediment and debris, and capping of the containment cell following sediment placement with a low-permeability flexible membrane liner
  2. Removal of approximately 40,000 cubic yards (yd^3) of contaminated marine sediment, including NAPL, and backfilling the dredged area with clean soil
  3. Construction of the second steel sheetpile wall (discussed above)
  4. Upgrades to the existing groundwater extraction, treatment, and monitoring systems
  5. Shoreline habitat improvements, including grading and planting of various saltmarsh and riparian plant species.
- The majority of the Site was paved with asphalt during a series of interim actions conducted between 1998 and 2008. The only portion of the Site located within the perimeter cutoff wall that remains uncapped with a low-permeability surface is the area that will be paved as part of the Phase III interim action addressed in this work plan.

PREVIOUS CHARACTERIZATION OF PHASE III AREA

Historical information indicates that the portion of the Phase III area located outside of the slurry wall was used for log storage, but wood treatment operations were not performed in this area. A total of 16 borings were completed in the Phase III area between November 2004 and January 2007 to characterize soil and groundwater quality outside of the slurry wall and the approximate locations of the borings are shown on Figure 3. Soil samples from the borings were submitted for chemical analysis of semivolatile organic compounds (SVOCs) including carcinogenic polycyclic aromatic hydrocarbons (cPAHs). One soil sample also was submitted for analysis of dibenzo-p-dioxins and dibenzofurans (dioxins). Groundwater samples were obtained from three of the direct-push borings and submitted for analysis of SVOCs including cPAHs. One groundwater sample also was submitted for analysis of volatile organic compounds (VOCs).

These investigations (Landau Associates 2005, 2007) identified the presence of cPAHs in shallow soil at concentrations exceeding the Model Toxics Control Act (MTCA) cleanup level for unrestricted land use in five of the 16 borings. Dioxins were also detected at a concentration exceeding the MTCA cleanup level for unrestricted land use in one shallow soil sample tested for these compounds. The borings in which cPAHs and/or dioxins were detected at concentrations exceeding cleanup levels are shown on Figure 3. It should be noted that the Phase III area was referred to as the Phase IV area in the previous investigation reports referenced above, and other documents that preceded this work plan.

The vertical extent of cPAHs in soil was evaluated in two borings; cPAHs were not detected at depths greater than 1 foot below ground surface (BGS). The vertical extent of dioxins and furans in Site soil was not evaluated by analytical testing. It is assumed that these constituents likely display a limited vertical distribution similar to cPAHs. VOCs and SVOCs were not detected in groundwater samples at concentrations exceeding MTCA cleanup levels.

EVALUATION OF PHASE III ALTERNATIVES

A FS to evaluate cleanup alternatives for the Phase III area was conducted in 2010 (GeoEngineers 2010); presented as Appendix A to this work plan. This section briefly summarizes the following three remedial alternatives evaluated for cleanup of the Phase III area:

- Alternative 1: Capping in-place with land use controls
- Alternative 2: Excavate and relocate contaminated soil inside the bentonite slurry cutoff wall
- Alternative 3: Excavate contaminated soil and transport offsite for treatment/disposal

ALTERNATIVE 1

Under Alternative 1, a protective cap would be constructed over the Phase III area. Long-term maintenance would be required to maintain the integrity of the cap, although no groundwater monitoring would be required because groundwater in the Phase III area is unaffected by Site releases. Institutional controls consisting of an environmental restrictive covenant would be required to assure the integrity of the cap.

ALTERNATIVE 2

Alternative 2 consists of excavation of contaminated soil in the portion of the Phase III area located outside the containment wall, containment of the excavated soil in the portion of the Phase III area located inside the containment wall, and soil compliance monitoring following excavation to confirm achievement of Site soil cleanup standards. Excavation would extend to a depth of 1.5 ft BGS, which is about 0.5 ft deeper than the greatest depth of soil contamination identified during previous environmental investigations. The area of excavation would extend to the ordinary high water line at the shoreline, but would not include the intertidal excavation; the intertidal area to the east of the Phase III area was remediated during the sediment interim action discussed above. The estimated soil volume excavated under this alternative would be about 1,000 yd^3.

Excavated soil would be consolidated and contained within the uncapped portion of area within the containment wall, located to the west of the sediment containment cell. The Phase III excavation area would be backfilled with clean soil following the completion of compliance monitoring to demonstrate that soil cleanup levels were achieved and would not be subject to land use restrictions. The portion of the Phase III area within the containment wall where the contaminated soil is placed would be paved with an asphalt cap and post-capping stormwater would be managed in the same manner as other Site capped areas.

ALTERNATIVE 3

Excavation for Alternative 3 would be the same as for Alternative 2. The excavated soil would be transported offsite to an appropriately licensed waste disposal facility. Because of its former operation as a wood treating facility, offsite disposal might trigger state dangerous waste or federal hazardous waste regulations, and require disposal at a RCRA Subtitle C hazardous waste disposal facility permitted to receive listed waste. Soil compliance monitoring would be the same as for Alternative 2. This option would allow unrestricted land use in Area 2 upon completion.

SELECTED ALTERNATIVE

Alternative 2 is the selected alternative for cleanup of the Phase III area. As previously discussed, the selected alternative will consist of excavation of contaminated soil in the portion of the Phase III area located outside the containment wall, containment of the excavated soil in the portion of the Phase III area located inside the containment wall, and soil compliance monitoring following excavation to confirm achievement of Site soil cleanup standards. Additionally, a shoreline trail will be constructed for public access along the northern shoreline of the Site. The primary features of the selected alternative and the previous Phase I and Phase II Site capping areas are illustrated on Figure 4.

The basis for design of the selected alternative is presented in the Supplemental Engineering Design Report (EDR) prepared for this interim action (GeoEngineers 2009), which is presented as Appendix B to this work plan. The selected alternative was evaluated to determine whether it meets the minimum requirements for a cleanup action to be considered compliant with the MTCA regulations, as specified in WAC 173-340-360(2). The MTCA minimum requirements include the following criteria:

- Protection of human health and the environment
- Compliance with cleanup standards
- Compliance with applicable state and federal laws
- Provision for compliance monitoring.
- Use of permanent solutions to the maximum extent practicable
- A reasonable restoration timeframe
- Consideration of public concerns.

These criteria are discussed in the following sections.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The selected alternative achieves soil cleanup standards through excavation of contaminated soil outside of the Site slurry wall, and containment of the excavated soil within the portion of the Site contained by the perimeter slurry wall and hydraulic control system. Excavation and capping will eliminate risk to human health and the environment in the Phase III area. The placement and capping of the contaminated soil within the Site containment area and capping of the remainder of the area within the containment wall with asphalt eliminates potential exposure through direct contact with contaminated soil. The institutional controls that will be applied to the Site containment area will protect human health and the environment following implementation of the interim action.

COMPLIANCE WITH CLEANUP STANDARDS

Under the selected alternative, all soil in the Phase III area outside of the Site slurry wall exceeding MTCA Method B cleanup standards will be excavated and placed inside the Site slurry wall for containment. The area of excavation will meet the MTCA cleanup standards and will not require use restrictions. All areas inside the Site slurry wall exceeding MTCA Method B cleanup standards will be capped with a low-permeable cap (e.g., asphalt) to prevent direct contact with contaminated soil. Use restrictions will be necessary to protect the cap. Groundwater in the portion of the Phase III area located outside the containment wall is not contaminated, so groundwater cleanup standards are currently being achieved in this area.

COMPLIANCE WITH APPLICABLE STATE AND FEDERAL LAWS

The selected alternative will be implemented in conformance with applicable laws and regulations.

COMPLIANCE MONITORING

Soil compliance monitoring will be implemented following soil excavation in the Phase III area to confirm compliance with soil cleanup standards. Confirmational soil samples will be collected to demonstrate achievement of soil cleanup standards following excavation and will be analyzed for cPAHs, PCP, and dioxins/furans. The Compliance Monitoring Plan for the selected alternative (Landau Associates 2009) is presented in Appendix C to this work plan. Groundwater compliance monitoring is not required because groundwater cleanup standards have already been achieved in this area.

USE OF PERMANENT SOLUTIONS TO THE MAXIMUM EXTENT PRACTICABLE

The selected alternative is considered permanent to the maximum extent practicable. Permanent cleanup will be achieved in the portion of the Phase III area located outside the containment wall through removal of all soil exceeding MTCA Method B cleanup levels and consolidation of the contaminated soil inside the containment area, consistent with MTCA [WAC 173-340-370(5)]. This will consolidate contaminated soil to the maximum extent practicable, and the portion of the Phase III area located inside the containment wall will then be contained using a low-permeability cap to both prevent direct contact and minimize surface water infiltration through the contaminated soil. Alternative 3 does not provide a substantively higher degree of permanence because containment is required in the portion of the Phase III area located inside the containment wall even if the contaminated soil from outside the containment area is removed from the Site

REASONABLE RESTORATION TIMEFRAME

WAC 173-340-360(4)(b) states that to determine whether a cleanup action provides for a reasonable restoration timeframe, the following factors should be considered:

- Potential risks posed by the Site to human health and the environment
- Practicability of achieving a shorter restoration timeframe
- Current and proposed future uses of the Site and surrounding areas
- Availability of alternative water supplies
- Effectiveness and reliability of institutional controls

- Ability to control and monitor migration of contaminants from the Site
- The toxicity of the hazardous substances at the Site
- Natural processes that reduce concentrations of hazardous substances and have been documented to occur at the Site or under similar conditions.

Implementing the selected alternative will eliminate potential risks to human health and environment for the Phase III area; long-term risks associated with the affected soil will be managed through containment inside the existing Site containment area. Cleanup standards will be achieved in the portion of the Phase III area located outside of the containment wall immediately following implementation of the interim action, so achieving a shorter restoration timeframe is not a consideration. The implementation of the interim action will not have any impacts on current or future Site uses and no institutional controls will be required in the portion of the Phase III area located outside the containment wall. It will not be necessary to control and monitor migration of contaminants in the portion of the Phase III area located outside the containment wall because complete removal will be conducted.

COMPLIANCE WITH MTCA

The MTCA requires that a report be prepared presenting the following information on a proposed interim action [WAC 173-340-430(7)]:

(a) A description of the interim action and how it will meet the criteria identified in subsections (1), (2) and (3) of WAC 173-340-430

(b) Information from the applicable subsections of the remedial investigation/feasibility study of WAC 173-340-350, including at a minimum:

(i) A description of existing site conditions and a summary of all available data related to the interim action; and

(ii) Alternative interim actions considered and an explanation why the proposed alternative was selected;

(c) Information from the applicable subsections of the design and construction requirements of WAC 173-340-400; and

(d) A compliance monitoring plan meeting the applicable requirements of WAC 173-340-410;

(e) A safety and health plan meeting the requirements of WAC 173-340-810; and

(f) A sampling and analysis plan meeting the requirements of WAC 173-340-820.

The Supplemental EDR, attached as Appendix B, describes the selected interim action and the preceding sections of this work plan address how the interim action meets the criteria in WAC 173-340-430(1), (2), and (3), addressing Item (a) above. The EDR provides a description of existing conditions, the results of relevant environmental investigations, and other alternative interim actions considered, addressing Item (b). The EDR also provides the basis for design and addresses construction considerations consistent with the requirements of WAC 173-340-400, addressing the requirements of Item (c). The attached Compliance Monitoring Plan (Landau Associates 2009; Appendix C) complies with the requirements of WAC 173-340-410 and WAC 173-340-820, addressing Items (d) and (f) above. A Site health and safety plan for investigation and compliance monitoring activities is already in place, and the contractor selected to implement the interim activity will be required to prepare a construction health and safely plan as part of the construction submittal process, addressing Item (e).

IMPLEMENTATION OF SELECTED INTERIM ACTION

The interim action activities, permitting requirements and reporting are presented in the following sections.

INTERIM ACTION ACTIVITIES

The following activities will be implemented during the interim action; for more details, please see Appendix B, the Supplemental EDR:

- Contaminated soil in the Phase III area will be excavated to a depth of approximately 1.5 ft below existing ground surface. The excavation will encompass all known areas of contaminated soil based on the results of Landau Associate's investigations (Landau Associates 2005, 2007).

- Soil samples will be collected from the remedial excavations to confirm that contaminated soil has been successfully removed from the Phase III area. Sampling frequency and procedures are outlined in Appendix C, the Compliance Monitoring Plan.

- Contaminated soil excavated in the Phase III area will be loaded directly into a truck for relocation inside the boundaries of the slurry wall. The contaminated soil will be capped with a low-permeable cap. Details of the cap design will be provided in the 60 percent Plans and Specifications to be provided to Ecology for review and approval in the second quarter of 2010.

- The Phase III area will be restored using clean imported structural fill after excavation activities are complete. The ground surface will be revegetated or otherwise restored in preparation for future site development.

PERMITTING

The Port is conducting the interim action under an Agreed Order with Ecology and is required to meet the substantive requirements of MTCA. In addition, the Port must meet all substantive requirements of local, state, and federal regulations. The substantive requirements of applicable regulations will be detailed in the 60 percent Plans and Specifications to be provided to Ecology for review and approval. Two requirements already identified are an NPDES permit for stormwater and a SEPA checklist.

Stormwater generated during the construction of the Phase III area interim action will be regulated under NPDES permit No. WA0040533. Public notice for the NPDES permit issuance will occur concurrently with public review for Amendment No. 2 of the Agreed Order for the Phase III area interim action. A Washington State Environmental Policy Act (SEPA) checklist has been prepared.

REPORTING

As part of the required Remedial Action Completion Report, the Port will submit a report at the conclusion of this project that documents the successful relocation and capping of contaminated soil in the Phase III area. The report will show the locations and analytical results of confirmatory soil samples.

* * * * * * * *

This work plan has been prepared under the supervision and direction of the following key staff.

LANDAU ASSOCIATES, INC.

Lawrence D. Beard, P.E.
Principal

LDB/tam

REFERENCES

ESE. 1992. *Final Revised Feasibility Study Volumes I & II.* Environmental Science & Engineering, Inc.

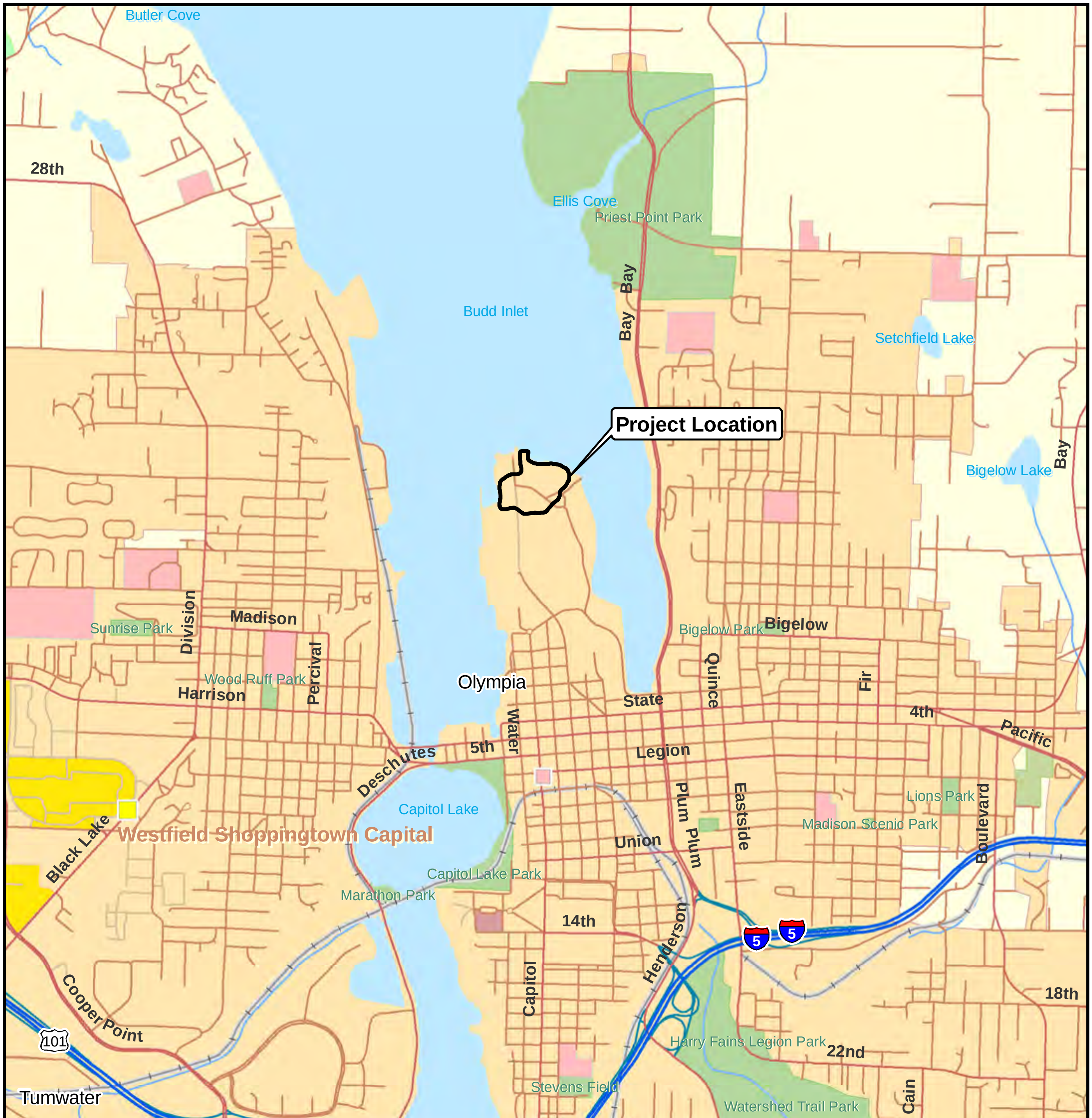
GeoEngineers. 2010. Letter to Don J. Bache, Port of Olympia, Olympia, Washington, re: *Evaluation of Soil Disposal and Capping Options, Phase III Areas of Cascade Pole Site, Olympia, Washington, File No. 0615-023-07.* Jay C. Lucas, Senior Geologist, and Stephen C.Woodward, L.G., Principal, GeoEngineers. March 3.

GeoEngineers. 2009. *Supplemental Engineering Design Report, North Point/Phase III Project, Cascade Pole Site, Olympia, Washington.* Prepared for the Port of Olympia. May 7.

Landau Associates. 2009. *Compliance Monitoring Plan, Confirmation Soil Sampling, North Point/Phase III Capping Area Investigation, Cascade Pole Company Site, Olympia, Washington.* May 5.

Landau Associates. 2007. *Supplemental Soil Investigation Report, North Point/Phase IV Capping Area, Cascade Pole Site, Olympia, Washington.* February 5.

Landau Associates. 2005. *Report, North Point/Phase IV Capping Area Investigation, Cascade Pole Company Site, Olympia, Washington.* February 3.



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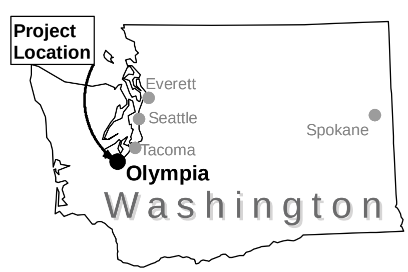


Data Source: ESRI 2006

Cascade Pole Site Olympia, Washington	**Vicinity Map**	Figure 1

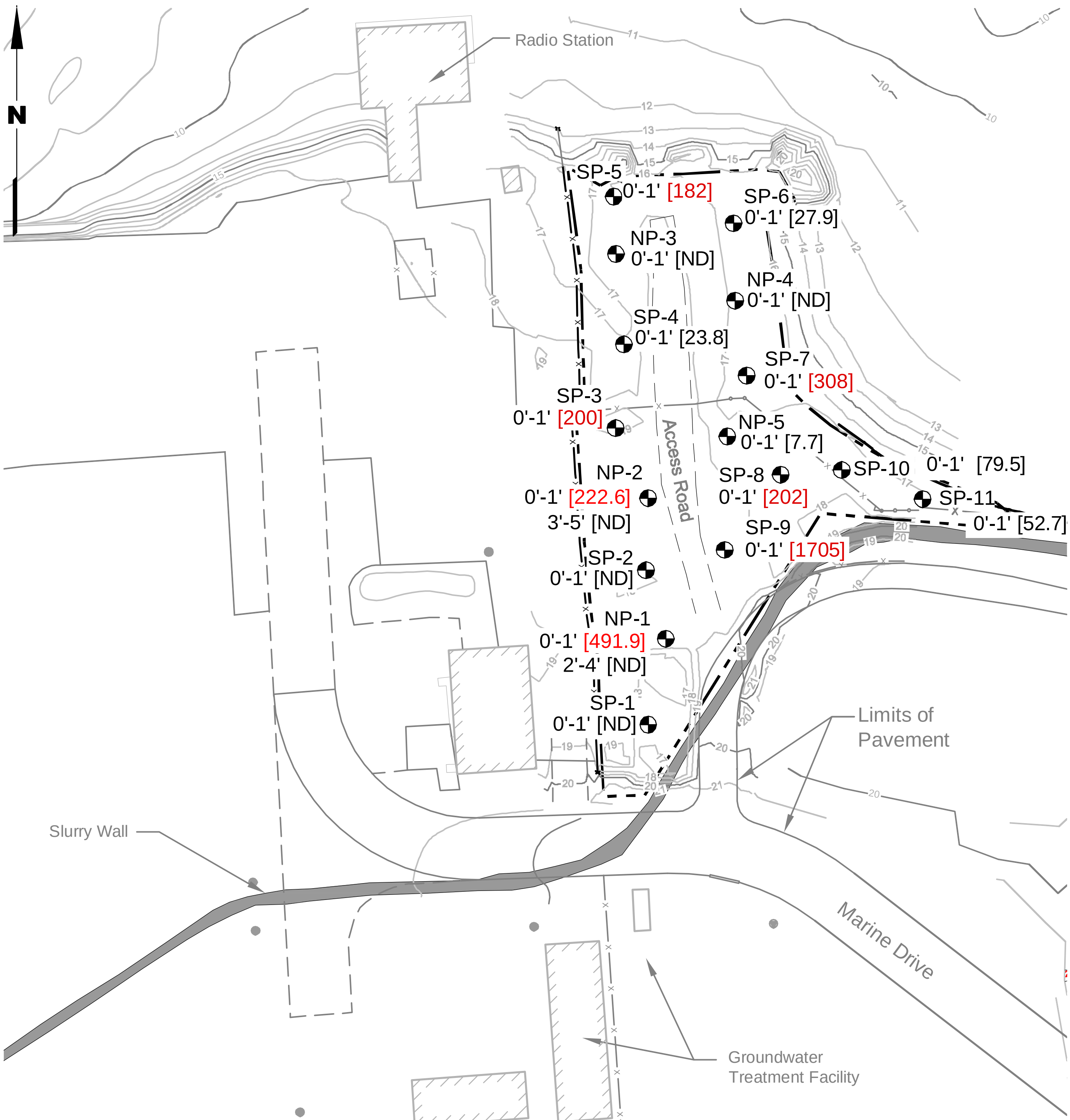
Y:\Projects\021035\MapDocs\Fig1.mxd 11/26/2008

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Base map source: Aerial Photo provided by Port of Olympia 2010

Cascade Pole Site Olympia, Washington	**Selected Alternative Phase III Capping Interim Action**	Figure 2



Legend

SP-4 ⊕ Soil Sampling Location from Initial and Supplemental Investigations

[23.8] CPAH Concentration in µg/kg (Results show in RED are above MTCA Method B cleanup levels for unrestricted land use).

— - - — Approximate Limits of Subject Property

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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Scale in Feet

Phase III Cap | V:\021\030\035\Phase III Cap\Fig 3.dwg (A) "Figure 3" 4/21/2010

Landau Associates

Cascade Pole Site
Olympia, Washington

Results of Investigations
Phase III Area

Figure
3

Phase III Cap | V:\021\030\035\Phase III Cap\Figs 2_4.dwg (A) "Figure 4" 4/21/2010

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Base map source: Aerial Photo provided by Port of Olympia 2010

Landau Associates

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Scale in Feet

Cascade Pole Site
Olympia, Washington

Selected Alternative Phase III Capping Interim Action

Figure
4

APPENDIX A

Feasibility Study

GeoEngineers
Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

March 3, 2010

Port of Olympia
915 Washington Street NE
Olympia, Washington 98501-6931

Attention: Don J. Bache

Subject: Evaluation of Soil Disposal and Capping Options
Phase III Area of Cascade Pole Site
Olympia, Washington
File No. 0615-023-07

INTRODUCTION

This letter presents an evaluation of three disposal and capping options for contaminated soil in the Phase III area at the Port of Olympia's (Port) Cascade Pole Site (CPS) located in Olympia, Washington. The CPS is located approximately 1 mile north of downtown Olympia, at the north end of Marine Drive on the northern portion of a peninsula of reclaimed land that extends into Budd Inlet (Figure 1). The CPS is comprised of the Phase II and Phase III areas (Figure 2).

The Port is conducting interim remedial actions at the CPS to address impacts by wood treatment chemicals. The interim remedial actions included construction of a sheet pile and bentonite slurry cutoff wall, and groundwater extraction system. Additionally, contaminated sediment was removed from Budd Inlet and placed in a bermed sediment containment cell, located in the Phase II area. The cutoff wall surrounds the Phase II area, part of the Phase III area and additional Port property to the southwest. Groundwater inside the cutoff wall is extracted and treated prior to discharge. The existing containment systems (cutoff wall, containment cell and groundwater extraction/treatment system) were selected, designed and implemented with Ecology oversight in accordance with Agreed Order No. DE 00TCPSR-753, associated amendments and the Cleanup Action Plan written in 2000. The Port has permanently capped the Phase II area in accordance with the draft Engineering Design Report (EDR) prepared by GeoEngineers (April, 15, 2004).

Remedial action is required in the Phase III area to address shallow soil that contains cPAHs and dioxins/furans related to the historical storage of treated wood (Landau 2005a and 2005b). The Port previously submitted to Ecology a supplemental EDR (GeoEngineers, 2009) for cleanup of the Phase III area. The supplemental EDR proposed that contaminated soil be removed from the Phase III area outside the cutoff wall and consolidated with existing contaminated media in the Phase III area inside the cutoff wall (Figure 2). Ecology requested additional justification for this Phase III area remedy. This document provides the additional justification and was prepared in general accordance with our agreement with the Port dated April 28, 2006.

SITE CHARACTERIZATION SUMMARY

The Phase III area outside the cutoff wall was characterized by Landau Associates (Landau) during two phases of work (Landau, 2005a and 2005b). Landau's investigations identified the presence of cPAHs in shallow soil at concentrations exceeding the Model Toxics Control Act (MTCA) cleanup level for unrestricted land use in seven out of fourteen borings. Dioxins and furans also were detected at concentrations exceeding the MTCA cleanup level for unrestricted land use in one soil sample tested for these compounds. The borings in which cPAHs and/or dioxins were detected at concentrations exceeding cleanup levels are shown in Figure 3.

The vertical extent of cPAHs in soil was evaluated in two borings. cPAHs were not detected at depths greater than 1 foot below ground surface. The vertical extent of dioxins and furans in site soil was not evaluated by analytical testing. It is assumed that these constituents likely display a limited vertical distribution similar to cPAHs. VOCs and SVOCs were not detected in groundwater samples at concentrations exceeding MTCA cleanup levels according to the Landau reports.

DESCRIPTION OF CAPPING AND DISPOSAL ALTERNATIVES

Remedial alternatives considered for the Phase III area were limited to soil capping and disposal scenarios based on the remedial action in the Phase II area, which was selected with Ecology oversight. As summarized earlier, contaminated soil, sediment and groundwater in the Phase II area has been successfully mitigated by containment. To satisfy MTCA, it will be necessary to maintain the cutoff wall, sediment containment cell cap and groundwater extraction system in the Phase II area for the foreseeable future. Therefore, the most practical alternative for the Phase III area is to relocate contaminated soil from locations outside the cutoff wall, to a location inside the cutoff wall (adjacent to the sediment containment cell), where it will be capped. This alternative (alternative #2 below) was compared with two other capping and disposal scenarios, as described below. This evaluation of remedial alternatives for the Phase III area incorporates some elements of the MTCA remedy selection process, but does not address all of the requirements for a feasibility study as defined in MTCA 173-340-350. The three remedial alternatives evaluated are as follows:

1. <u>Cap contaminated soil in-place with land use controls</u>

   Under this alternative the Phase III area outside the cutoff wall would be graded to provide proper drainage and a protective cap would be constructed in the areas of contaminated soil. Long term cap maintenance and groundwater monitoring would be required. A deed restriction would be required to assure the integrity of the cap is maintained and future land uses do not provide an exposure pathway for site contamination.

2. Excavate and relocate contaminated soil inside the cutoff wall

   Under this alternative contaminated soil would be removed from outside the cutoff wall, placed inside the cutoff wall and temporarily covered by a soil cap. Contaminated soil outside the cutoff wall would be excavated to a depth of approximately 1.5 feet, which is approximately 0.5 feet deeper than the greatest depth at which Landau identified contaminated soil in this area. The excavation would encompass all known areas of contaminated soil as shown on Figure 3. Successful removal of contaminated soil would be confirmed by sampling and testing during excavation. The estimated volume of contaminated soil that would be removed is approximately 1,000 cubic yards. Clean imported fill would be used to attain the desired grade throughout the remedial excavation area. This option would allow unrestricted land use of the Phase III area outside the cutoff wall after remedial excavation.

3. Excavate contaminated soil and transport off-site for treatment/disposal

   Excavation procedures under this option would be the same as alternative #2. The excavated soil would be transported off-site to a Subtitle C disposal facility permitted to receive listed hazardous waste. Confirmation soil sampling and backfilling would be the same as for alternative #2. This option would allow unrestricted land use upon its completion.

REMEDIAL ALTERNATIVE EVALUATION

The alternatives described above satisfy the threshold criteria in MTCA 173-340-360(2) (a) and are technically feasible to implement. In addition to MTCA threshold criteria, the alternatives were evaluated against the objectives developed for remediation of the Phase III area. The objectives are:

1. Allow unrestricted land use and future development of Phase III area
2. Remedy must be compatible with the remedy for the adjacent Phase II area
3. Remedy should not trigger off-site hazardous waste management requirements

A relative comparison of the alternatives based on environmental benefit, cost reasonableness, and the objectives identified above is presented in Table 1. Alternative #2 is the preferred alternative because:

- Alternative #2 is more protective of human health and the environment than alternative #1 because the existing containment systems inside the cutoff wall are more robust than merely capping soil in-place, outside the cutoff wall.
- Alternative #2 is equally protective of human health and the environment when compared to alternative #3 but at a lower cost. Alternative #2 also maximizes utilization of the existing containment systems inside the cutoff wall, which must be maintained in perpetuity. Additionally, alternative #2 does not trigger off-site hazardous waste management requirements, unlike alternative #3.
- Under alternative #2, the Phase III area outside the cutoff wall would not be subject to future land use restrictions, thereby facilitating future redevelopment.

- Centrally locating and capping contaminated media at one on-site location (inside the cutoff wall) is desirable under MTCA (WAC 173-340-370) for sites where hazardous substances remain on-site at concentrations exceeding cleanup levels.

REFERENCES

"North Point/Phase IV Capping Area Investigation, Cascade Pole Company Site, Olympia, Washington" prepared by Landau Associates, Inc. dated February 3, 2005a.

"Supplemental Soil Investigation Report, North Point/Phase IV Capping Area, Cascade Pole Site, Olympia, Washington" prepared by Landau Associates, Inc. dated October 24, 2005b.

"Draft Engineering Design Report, Marine Drive Realignment and Containment Cell Capping Project, Cascade Pole Site, Olympia, Washington" prepared by GeoEngineers, dated April 15, 2004.

"Supplemental Engineering Design Report, North Point/Phase III Project, Cascade Pole Site, Olympia, Washington" prepared by GeoEngineers, dated May 7, 2009.

"Amendment No. 1 to Agreed Order No. DE 00TCPSR-753" issued by Ecology, effective date of July 3, 2004.

LIMITATIONS

We have prepared this study for the exclusive use of the Port of Olympia, their authorized agents and regulatory agencies. This report is not intended for use by others and the information contained herein is not applicable to other sites. No other party may rely on the product of our services unless we agree in advance, and in writing, to such reliance. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

Our conclusions are based on widely space explorations completed by others. As always, it is possible that contamination may be present at locations not tested.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with our general agreement with the Port of Olympia and generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

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

We appreciate the opportunity to assist the Port of Olympia on this project. Please contact us if you have questions regarding this report.

Sincerely,
GeoEngineers, Inc.

Jay C. Lucas, LG
Senior Geologist

Stephen C. Woodward, LG
Principal

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Attachments:

Table 1 – Comparison of Soil Disposal and Capping Alternatives

Figure 1 – Vicinity Map

Figure 2 – Site Plan

Figure 3 – Phase III Area, Remedial Excavation Plan

cc:

Steve Hatton
Hatton Godat Pantier, Inc
1840 Barnes Blvd SW
Tumwater, Washington 98512

Mohsen Kourehdar
Department of Ecology
Toxics Cleanup Program
PO Box 47775
Olympia, Washington 98504-7775

TABLE 1
COMPARISON OF SOIL DISPOSAL AND CAPPING ALTERNATIVES

PHASE III AREA
CASCADE POLE SITE

Remedial Alternative	Activities to Complete	Advantages	Disadvantages	Summary	Relative Costs
#1 - Cap in place with land use controls	1) Permitting 2) Design and construct cap 3) Implement land use controls 4) Long term monitoring of groundwater 5) Long term cap maintenance	1) Fewer short term risks related to construction because remedial excavation is not required 2) Protects human health and the environment as long as cap integrity is maintained and institutional controls are observed 3) Off-site management of hazardous waste is not required	1) Restricts future land use in the Phase III area outside of cutoff wall 2) Requires long term monitoring of cap and groundwater 3) Potential future exposure of contaminated soil if cap integrity is not maintained 4) Lateral extent of contaminated soil at site is not reduced	Less permanent solution than other options and does not reduce quantity or toxicity of contaminated soil in the Phase III area outside of cutoff wall. Future use of the Phase III area outside of cutoff wall would be limited.	Capital: Moderate O&M: High
#2 - Relocate contaminated soil from Phase III area outside cutoff wall to inside cutoff wall	1) Permitting 2) Excavate contaminated soil and place inside cutoff wall; cap at that location 3) Confirmation soil sampling at limits of remedial excavations outside cutoff wall 4) Backfill remedial excavations to desired grade	1) Allows unrestricted land use in Phase III area outside cutoff wall without institutional controls 2) Consolidates contaminated soil at CPS in accordance with MTCA (WAC 173-340-370) 3) Maximizes utility of existing containment systems inside cutoff wall 4) Long term groundwater/cap monitoring outside cutoff wall not required 5) Off-site management of hazardous waste is not required	1) Potential higher short term risk compared to alternative #1 due to excavation and on-site handling of contaminated soil	The Phase III area outside cutoff wall would not be subject to future land use restrictions because MTCA soil cleanup levels would be achieved. This alternative consolidates contaminated soil inside the cutoff wall and utilizes existing containment systems at that location.	Capital: Moderate O&M: Low
#3 - Remove contaminated soil from Phase III area outside cutoff wall and transport off-site for treatment/ disposal	1) Permitting 2) Excavate contaminated soil and transport to off-site permitted treatment/disposal facility 3) Conduct confirmation soil sampling 4) Backfill remedial excavations to desired grade	1) Allows unrestricted land use in Phase III area outside cutoff wall without institutional controls 2) Long term groundwater/cap monitoring outside cutoff wall not required	1) Substantially higher costs associated with soil transport and treatment/disposal 2) Protection offered by off-site disposal facilities does not offer significantly greater protection than existing containment systems inside cutoff wall 3) Involves generation of hazardous waste and triggers off-site hazardous waste management requirements 4) Higher short term risk associated with hazardous waste transport to out-of-state facility	Phase III area outside cutoff wall would be available for unrestricted land use because MTCA soil cleanup levels would be achieved.	Capital: Highest O&M: Low

Note:

The cost information in this table should be considered conceptual and is intended to provide a sense of relative scale when evaluating the economics of each option.

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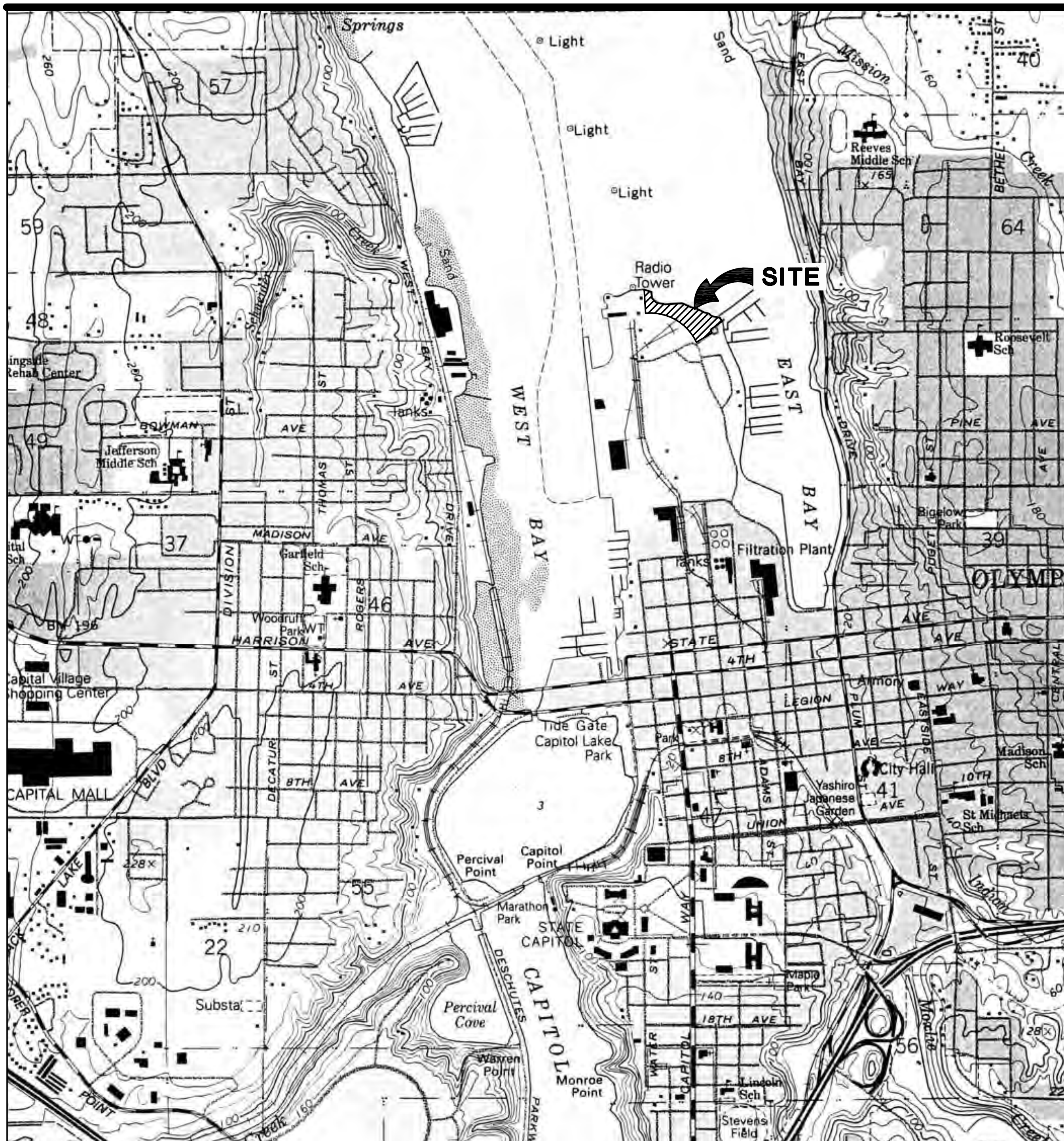

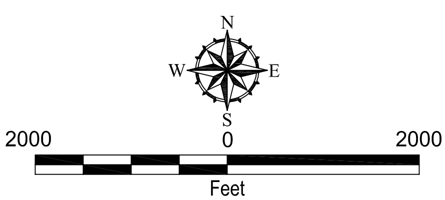

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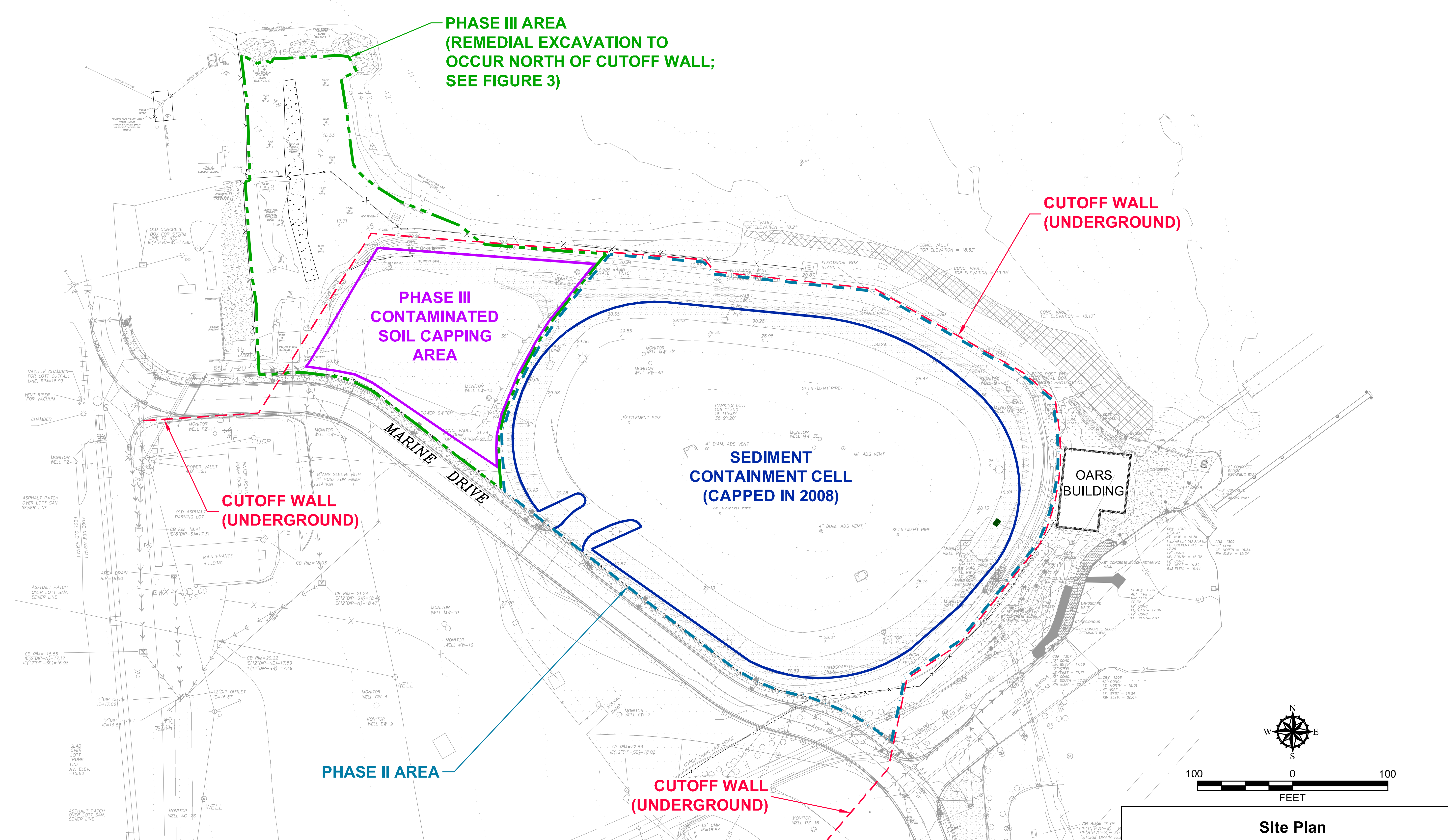
Vicinity Map

Port of Olympia
Olympia, Washington

GEOENGINEERS

Figure 1

Reference: USGS 7.5' topographic quadrangle map "Tumwater, Wash.," photorevised 1994.



Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Site Plan provided by Hatton Godat Pantier, Inc., dated 12/8/05.

Site Plan

Port of Olympia
Olympia, Washington

GeoEngineers

Figure 2

P:\0\0615023\06\CAD\061502306 Fig 2 Capping Options.dwg\TAB:Figure 2 modified on Mar 03, 2010 - 8:31am

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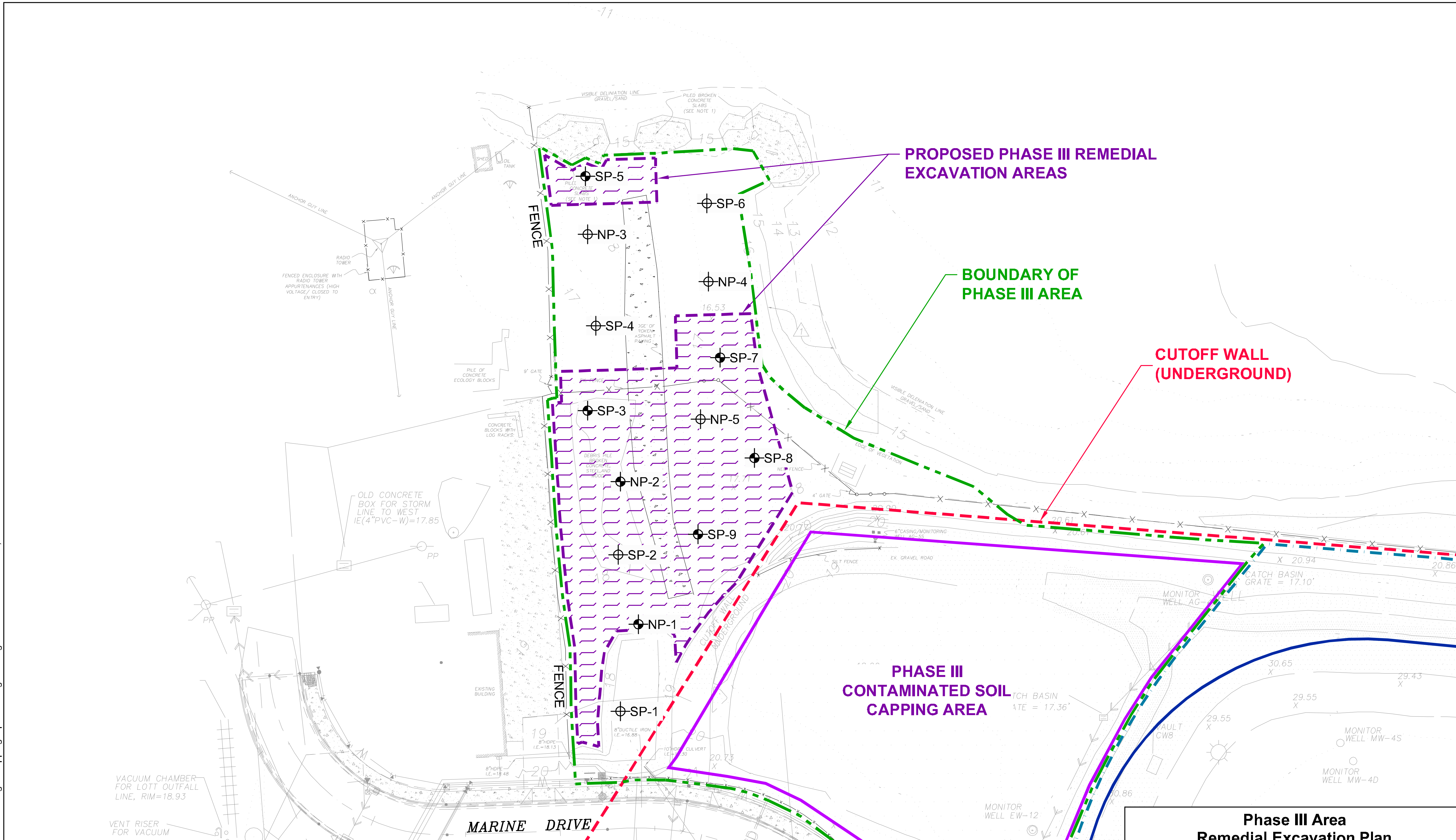

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2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Site Plan provided by Hatton Godat Pantier, Inc., dated 12/8/05.

Legend:

- Soil Boring completed by Landau Associates
- Soil Boring in which cPAH and/or dioxin concentrations in soil exceeded MTCA cleanup levels for unrestricted land use

Phase III Area
Remedial Excavation Plan

Port of Olympia
Olympia, Washington

GEOENGINEERS

Figure 3

P:\0615023\06\CAD\061502306 Fig 3 Capping Options.dwg\TAB:Figure 3 modified on Mar 03, 2010 - 8:30am

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APPENDIX B

Supplemental Engineering Design Report

GeoEngineers

May 7, 2009

Port of Olympia
915 Washington Street NE
Olympia, Washington 98501-6931

Attention: Don J. Bache

GeoEngineers is pleased to submit one unbound copy of our report titled "Supplemental Engineering Design Report, North Point/Phase III Project, Cascade Pole Site, Olympia, Washington." Our services were completed in general accordance with our agreement with the Port of Olympia dated September 20, 2005.

We have prepared this report for the exclusive use of the Port of Olympia, their authorized agents and regulatory agencies, as part of their evaluation of design options and environmental conditions at the subject site, and development of plans and specifications for site redevelopment. Within the limitations of scope, schedule, budget, and our agreement with the Port of Olympia, our services have been executed in accordance with generally accepted practices in the fields of geotechnical engineering and environmental science in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

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

Please refer to the Appendix B titled "Report Limitations and Guidelines for Use" for additional information pertaining to the use of this report.

We appreciate the opportunity to assist the Port of Olympia on this project. Please contact us if you have questions regarding this report.

Sincerely,

GeoEngineers, Inc.

Stephen C. Woodward, LG
Principal

Bo McFadden, PE, LEG
Principal

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One copy submitted

cc: Steve Hatton, Hatton Godat Pantier, Inc.

SUPPLEMENTAL ENGINEERING DESIGN REPORT
NORTH POINT/PHASE III PROJECT
CASCADE POLE SITE
OLYMPIA, WASHINGTON

MAY 7, 2009

FOR
PORT OF OLYMPIA

GEOENGINEERS

Supplemental Engineering Design Report
North Point/Phase III Project
Cascade Pole Site
Olympia, Washington
File No. 0615-023-06

May 7, 2009

Prepared for:

Port of Olympia
915 Washington Street NE
Olympia, Washington 98501-6931

Attention: Don J. Bache

Prepared by:

GeoEngineers, Inc.
Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
(206) 728-2674

GeoEngineers, Inc.

Stephen C. Woodward, LG
Principal

Bo McFadden, PE, LEG
Principal

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TABLE OF CONTENTS

Page No.

List of Figures

APPENDICES

SUPPLEMENTAL ENGINEERING DESIGN REPORT
NORTH POINT/PHASE III PROJECT
CASCADE POLE SITE
OLYMPIA, WASHINGTON
FOR
PORT OF OLYMPIA

INTRODUCTION

This Supplemental Engineering Design Report (EDR) summarizes our evaluation and recommendations for remedial activities in the North Point/Phase III area at the Port of Olympia's (Port) Cascade Pole Site (CPS) located in Olympia, Washington. The CPS is located approximately 1 mile north of downtown Olympia, at the north end of Marine Drive on the northern portion of a peninsula of reclaimed land that extends into Budd Inlet. The CPS is shown relative to surrounding physical features in Figure 1, Vicinity Map. This supplemental EDR addresses only the North Point/Phase III area. The general layout of the CPS upland site, including the North Point/Phase III area is shown in Figure 2.

PROJECT BACKGROUND

HISTORICAL OPERATIONS

Our understanding of the history of the CPS is based on a review of documents that were provided by the Port. The documents we reviewed are summarized in Appendix A. Based on our review of these documents and discussions with the Port, we understand that the CPS and surrounding upland property are comprised of fill that was placed between the 1920s and 1980s. Wood treatment was conducted at the CPS from the 1930s to the 1980s by various owners and operators, including the former Cascade Pole Company. Chemicals used in the wood treatment process consisted primarily of creosote and pentachlorophenol (PCP) in carrier oil made up of petroleum hydrocarbons.

INTERIM REMEDIAL ACTIONS

Site investigations and interim remedial actions have been completed at the CPS to mitigate impacts by wood treatment chemicals. A sheet pile and bentonite slurry cutoff wall was constructed around the former wood treatment site. A groundwater extraction system was installed inside the cutoff wall. Contaminated sediment was removed from Budd Inlet and placed in a bermed sediment containment cell located inside the cutoff wall. The sediment containment cell and portions of the uplands inside the containment wall are capped with a permanent cap (Figure 2).

UPLAND CAPPING OF THE CPS

The CPS has been capped in phases over the past years. The capping projects will prevent future contact with contaminated media and reduce surface water infiltration. The majority of the site uplands were capped with an asphalt cap from 1997 to 1999. This area is now used as a cargo yard.

The next phase of capping was termed the Phase I capping project. The main objective of this phase was to realign Marine Drive further northeast, to a location near the southwest perimeter of the sediment containment cell. In addition to constructing the realigned Marine Drive, property immediately southwest of the realigned road was paved for use as a cargo yard. This phase of the capping was completed in 2004.

The next phase of capping was completed in 2008 and was termed the Phase II capping. The primary objective of the Phase II capping project was to permanently cap the upland sediment containment cell and its perimeter embankments, all of which are located inside the boundary of the cutoff wall. The top of the upland sediment containment cell was capped with asphalt pavement and is being utilized as a parking lot and as a location for an AM radio tower. The flanks of the upland sediment containment cell were capped with imported soil and have been developed as park space. The area northwest of the sediment containment cell was not capped during Phase II activities, pending completion of the Phase III project described in this document.

REMEDIAL EXCAVATION IN PHASE III AREA

Contaminated soil was identified in the Phase III area, as described below. The contaminated soil will be removed from the Phase III area and placed in the portion of the Phase II area that has not yet been capped. The relocated contaminated soil will then be capped. This supplemental EDR describes the remedial excavation plans for the Phase III area.

SUPPLEMENTAL SITE INVESTIGATION

The Port commissioned an investigation to evaluate whether historic wood treatment operations impacted the North Point/Phase III area. This work was completed by Landau Associates (Landau) during three separate phases of work. Historical information presented in Landau's reports indicates that the Phase III area was used for log storage, but wood treatment operations were not performed in this area.

Landau completed 16 borings in the Phase III area. The approximate locations of the borings are shown in Figure 3. Soil samples from the borings were submitted for chemical analysis of semivolatile organic compounds (SVOCs) including carcinogenic polycyclic aromatic hydrocarbons (cPAHs). One soil sample also was submitted for analysis of dibenzo-p-dioxins and dibenzofurans (hereafter referenced as dioxins). Groundwater samples were obtained from three of the direct-push borings and submitted for analysis of SVOCs including cPAHs. One groundwater sample also was submitted for analysis of volatile organic compounds (VOCs).

Landau's investigations in the Phase III area identified the presence of cPAHs in shallow soil at concentrations exceeding the Model Toxics Control Act (MTCA) cleanup level for unrestricted land use in seven of the 16 borings. Dioxins also were detected at a concentration exceeding the MTCA cleanup level for unrestricted land use in one shallow soil sample tested for these compounds. The borings in which cPAHs and/or dioxins were detected at concentrations exceeding cleanup levels are shown in Figure 3.

The vertical extent of cPAHs in soil was evaluated in two borings; cPAHs were not detected at depths greater than 1 foot below ground surface. The vertical extent of dioxins and furans in site soil was not evaluated by analytical testing. It is assumed that these constituents likely display a limited vertical distribution similar to cPAHs. VOCs and SVOCs were not detected in groundwater samples at concentrations exceeding MTCA cleanup levels according to the Landau reports.

PROJECT DESIGN OBJECTIVES

The primary objective of this project is to excavate and relocate contaminated soil from the Phase III area to the Phase II area where it will be permanently capped during the project and by future site development. This action will achieve compliance with MTCA soil cleanup levels in the Phase III area, while consolidating contaminated soil and sediment in the Phase II area. At the conclusion of the remedial excavation and capping activities, contaminated soil and sediment will be isolated beneath either imported soil or pavement caps in the Phase II area, inside the existing cutoff wall.

The term “contaminated soil,” as used above, refers to soil that contains cPAHs, and by association dioxins and furans, at concentrations exceeding MTCA Method B soil cleanup levels for unrestricted land use. The objectives of this remedial action will be attained when contaminated soil has been successfully removed from the Phase III area, placed inside the cutoff wall and capped in the Phase II area. The successful removal of contaminated soil from the Phase III area will be documented by confirmatory soil sampling. Clean imported fill will be used to raise finished grades approximately 1 to 2 feet above present-day grades throughout the Phase III area during future development activities, after contaminated soil has been removed during the Phase III action. The final grade will be raised to produce a more attractive site for the future development.

Contaminated soil in the Phase III area could be capped in-place in a manner similar to that already proposed for the Phase II area. However, the Port proposes to relocate the contaminated soil inside the cutoff wall because of the following:

- The removal of contaminated soil from the Phase III area will address known potential risks to human health and the environment in this area.
- Centrally locating and capping contaminated media (soil and sediment) at one on-site location (Phase II area) will “minimize the potential for direct contact and migration of hazardous substances.” This is a preferred action under MTCA (WAC 173-340-370(5)) for sites where hazardous substances remain on-site at concentrations exceeding cleanup levels.
- The removal of contaminated soil from the Phase III area will provide a more permanent solution for this portion of the CPS than if the contaminated soil were capped in-place at this location.
- Removal of contaminated soil from the Phase III area will facilitate the future redevelopment of this property.

As with our previous design recommendations, one of the key objectives of this work is to remove contaminated soil from the Phase III area without triggering hazardous waste management requirements that often complicate remedial actions at wood treatment sites. Contaminated soil removed from the Phase III area will be placed in the Phase II excavation spoils area, northwest of the sediment containment cell, inside the cutoff wall, and will be temporarily capped in place by imported soil and secured in a fenced enclosure. Future development of this portion of the Phase II area will result in more permanent capping of the excavation spoils by low permeability pavement surfaces and/or buildings, as described later in this document.

Construction debris removed from the Phase III area may be capped in the Phase II area along with the excavation spoils. Alternatively, construction debris may be transported off-site for proper disposal or recycling after conducting analytical testing in accordance with the agreement with the Department of Ecology.

DESIGN RECOMMENDATIONS

GENERAL

The Port developed plans and specifications for capping the sediment containment cell and adjacent areas as part of the Phase II capping project. The Phase II capping was completed in late 2008. The plans and specifications from the Phase II project will be expanded to include remedial excavation activities and other earthwork proposed for the Phase III area.

The following sections of this report summarize proposed remedial excavation procedures and related earthwork in the Phase III area.

REMEDIAL EXCAVATION

Excavation Limits

Contaminated soil in the Phase III area will be excavated to a depth of approximately 1.5 feet below existing ground surface at the locations shown in Figure 3, Remedial Excavation Plan. The area of excavation will not extend to elevations below ordinary high water (OHW). The excavations will encompass all known areas of contaminated soil based on the results of Landau's investigations, including limited areas of uncontaminated soil (see samples SP-2 and NP-5). Uncontaminated soil characterized by samples SP-2 and NP-5 will not be segregated in order to minimize construction delays associated with selective excavation and soil handling. The proposed depth of excavation (1.5 feet) is approximately 0.5-foot deeper than the greatest depth at which Landau detected contaminated soil in the Phase III area.

The Port does not propose to conduct any additional investigation, remedial excavation or confirmatory soil sampling in the portions of the site characterized by soil samples SP-1, SP-4, SP-6, NP-3, NP-4, SP-10 and SP-11. Analytical results for these samples suggest that soil in these areas was not impacted by historical site activities.

The north and northeastern limits of the Phase III area excavations are bounded by the shoreline, above OHW. The southeastern boundary is the containment wall. The far southern boundary is the sidewalk adjacent to Marine Drive. The western boundary of the Phase III area excavation is the former CPS lease boundary delineated by the former tenants' fence.

Confirmatory Soil Sampling

Soil samples will be collected from the remedial excavations to confirm that contaminated soil has been successfully removed from the Phase III area. Sampling frequency and procedures will be outlined in the sampling and analysis plan developed by the Port.

Confirmatory soil samples will be submitted for chemical analysis of cPAHs using EPA Method 8270. The laboratory will not analyze for other SVOC constituents because previous testing has identified that the constituents of concern in the Phase III area are limited to cPAHs. The cPAH soil analytical results will be evaluated using the toxic equivalency (TEQ) approach specified in WAC 173-340-708(8). The TEQ values will be compared to the MTCA Method B cleanup level for benzo(a)pyrene (0.137 milligrams per kilogram) for unrestricted land use based on direct contact. The lateral and vertical (depth) extent of the remedial excavations will be increased, as appropriate, if any TEQ value for cPAHs exceeds the referenced MTCA cleanup level. Iterative episodes of remedial excavation and confirmatory soil sampling will be completed, if needed, until sample results indicate contaminated soil has been successfully removed from the Phase III area.

Confirmatory soil samples will not be submitted for chemical analysis of dioxins and furans at all sample points. Rather, the extent of cPAHs in site soil will be considered indicative of dioxin and furan extent. One soil sample from the location NP-1will be tested for dioxin and furan concentrations after excavation.

Soil Handling

Contaminated soil excavated in the Phase III area will be loaded directly into a truck for relocation to the Phase II area, inside the boundaries of the cutoff wall. It may be necessary to construct temporary stockpiles of excavated soil in the Phase II area, although this will not be the preferred approach. In the event that stockpiling becomes necessary, the stockpiles will be constructed on top of bermed liners and covered by liners. All stockpiles will be constructed and managed in a manner that contaminated soil will not be subject to transport by wind or rain. Although soil will be relocated from the Phase III area to locations inside the cutoff wall, soil will not be removed from the CPS.

Excavation Dewatering

The depth of excavation in the Phase III area is anticipated to be shallower than groundwater. Landau encountered groundwater at depths of approximately 2.5 to 3.5 feet below ground surface (bgs) in the northern and eastern portions of the site during November 2004. Groundwater was encountered at depths of approximately 5.5 to 7.75 feet bgs in the southwestern portion of the site. In the unlikely event that excavations must be extended below the groundwater table, the excavation activities will initially proceed without dewatering. Saturated soil, if removed from the Phase III area, will be transported and dumped inside the boundaries of the cutoff wall using lined trucks to prevent leakage during transport. Water that drains from this soil will infiltrate the ground surface within the boundaries of the cutoff wall. Groundwater inside the cutoff wall is managed by the existing hydraulic containment and treatment system. The soil, after dewatering, will then be placed in a manner suitable for capping.

In the event that dewatering is required to support the excavation and/or confirmatory soil sampling process, groundwater will be pumped from the excavation(s) into a storage tank. This water will be reinfiltrated in site soil inside the cutoff wall or treated in an on-site groundwater treatment system prior to discharge.

Site Restoration

The Phase III area will be restored using clean imported structural fill after excavation activities are completed. The finished grade in the Phase III area could be approximately 1 to 2 feet above present-day grades. The ground surface will be revegetated or otherwise restored in preparation for future site development. A portion of the Phase III area will also be used to continue a shoreline trail and public space initiated during the Phase II work. The remaining portions of the Phase III area will be secured by a fence until the area is developed for commercial use (structure and parking) at an undesignated time.

Disposition of Excavated Soil

Contaminated soil removed from the Phase III area will be placed in the Phase II excavation spoils area, northwest of the sediment containment cell inside the cutoff wall, as shown in Figure 2. A separation layer will be placed on top of this contaminated soil, and clean imported fill (soil cap) will be placed on top of the separation layer. The soil cap on the shoreline side of the Phase II spoils area will be at least 24-inches thick. The shoreline trail initially constructed during Phase II activities will be extended into this newly capped area. The remaining portions of the Phase II spoils area will be temporarily capped with imported soil and enclosed by a fence until this area is permanently capped during future site development activities. The permanent cap will consist of low permeability surfaces such as paved parking and walkways, and buildings. The Port will report to Department of Ecology the layout and type of the structures that will act as a permanent cap in this portion of the Phase II area at a future date.

Clean imported soil will be used to backfill the Phase III remedial excavations and otherwise achieve the desired finished grade after remedial activities are completed. The shoreline trail will be extended to the northern tip of the Phase III area, which will be improved for use as public space. The remaining portions of the backfilled Phase III area will be enclosed by a fence until future development occurs.

Reporting

As part of the required Remedial Action Completion Report, the Port will submit a report at the conclusion of this project that documents the successful relocation and capping of contaminated soil from the Phase III area to the Phase II area. The report will show the locations and analytical results of confirmatory soil samples.

SITE PREPARATION AND EARTHWORK

Stripping

Areas planned for remedial excavation will be stripped to remove vegetation and rootmass. Grass, brush and small trees will be cut above grade before commencing site stripping activities. Grass, brush and trees that do not come in contact with site soils will be transported off-site for recycling. We expect that the stripping depth will be on the order of 4 inches where grass and brush is present. The stripped material must be handled and disposed of as described below in the Construction Considerations section. Stripped material may be mulched and spread in thin layers within the deeper portions of fill being placed in the Phase II excavation spoils area.

Stripping will also include removal of construction debris, largely broken asphalt and concrete that is present in portions of the Phase III area. The asphalt area is indicated in Figure 2. Construction debris encountered in the Phase III area will be placed in the Phase II area for capping, or transported off-site for proper disposal or recycling after conducting analytical testing in accordance with the agreement with Department of Ecology. Broken asphalt and concrete pieces that will remain on site will be placed within the deeper portions of the fill in the excavation spoils area on the northwest side of the upland sediment containment cell. The asphalt and concrete will be broken into pieces no larger than about 6 inches and spread so that subsequent layers of soil fill the voids between the pieces.

Erosion and Sedimentation Control Measures

Effective erosion and sedimentation controls will be implemented during construction to reduce the risk of impacts to Budd Inlet, existing storm water systems and adjacent properties. In our opinion, the erosion potential of the Phase III on-site soils is low to moderate once they are disturbed. The erosion and sedimentation control measures used for this project will be in accordance with applicable state, county, and local regulations. These measures will include but not be limited to silt fencing, filter fabric fencing and temporary grading or berms. Stormwater from the site will be reinfiltrated to the ground to be captured by the site ground water extraction system. Stormwater will not be discharged from the site without complying with the discharge limits and other applicable terms of existing NPDES Permit Number WA-0040533. Prior to discharging any storm water from the site, the contractor also will be required to obtain written authorization from the Port of Olympia.

Site Preparation

The site preparation and earthwork will be completed during the drier summer months, if possible, to reduce grading costs. The on-site native silty sand and silts and clays have relatively high fines content (material passing the U.S. Standard No. 200 sieve) and are moisture sensitive. Operation of equipment on these soils will be difficult during periods of wet weather and this material will be readily softened when construction traffic operates on it. Shallow subgrade soils exposed after cuts are made will likely deteriorate, especially if site preparation work is done during periods of wet weather. The exposed subgrade at the base of remedial excavations will be evaluated before placing structural fill to verify that no excessively soft areas are present. Probing will be used to evaluate the subgrade.

Structural Fill

General

All new fill used to backfill remedial excavations, raise grades and construct soil caps will be clean (uncontaminated) imported soil placed and compacted as structural fill. The suitability of soil for use as structural fill will depend on its gradation, moisture content and the weather conditions during construction. The on-site soils consist of silty sand and sandy silt that will not likely be suitable for use as structural fill to support pavement areas unless construction takes place during the drier summer months and the soil has moisture content near optimum. Therefore, on-site soil and construction debris generated during remedial excavation in the Phase III area will be placed in the lowest portion of the Phase II excavation spoils area on the northwest side of the sediment upland containment cell.

Materials

Imported structural fill will consist of sand and gravel with less than about 5 percent fines (material passing U.S. Standard No. 200 sieve) by weight relative to the fraction of the material passing the ¾-inch sieve. Furthermore, the material will be free of debris, organic contaminants and rock fragments larger than 6 inches. Structural fill for embankments and trench and wall backfill will meet the specifications for gravel borrow as described in Section 9-03.14(1) of the current Washington State Department of Transportation (WSDOT) Standard Specifications for Road, Bridge and Municipal Construction. Select borrow, as described in Section 9-03.14(2) of the WSDOT Standard Specifications, may be used for structural fill during periods of dry weather. However, common borrow is typically moisture sensitive and will not be suitable for use as fill during wet weather. All imported soil used to cap the Phase II area and backfill the Phase III area will be analytically tested for CPS constituents before allowed on site.

Placement and Compaction

All structural fill will be mechanically compacted to a firm, non-yielding condition. Structural fill placed within 2 feet of finish subgrade elevation that could support pavement areas will be compacted to at least 95 percent of the maximum dry density (MDD), in accordance with American Society for Testing and Materials (ASTM) test method D-1557. This requirement is in recognition of future uses of the Phase II area that might include paved parking areas and driveways, and/or buildings. Because the location of future pavement areas is not known, all backfill within 2 feet of finish subgrade elevation will be compacted to at least 95 percent of MDD. Structural fill placed below a depth of 2 feet outside the pavement areas, including the excavation spoils area, will be compacted to 90 percent of MDD. Structural fill will be placed in loose lifts not exceeding 8 to 10 inches in thickness. Each lift will be conditioned to the proper moisture content and compacted to the specified density before placing subsequent lifts.

Permanent Cut and Fill Slopes

Permanent cut and fill slopes will be inclined no steeper than 2H: 1V. Permanent slopes will be planted or hydroseeded as soon as practicable after grading to reduce the risk of erosion.

UTILITY CONSTRUCTION

Some utility trenches will likely be necessary for site improvements in the Phase II and III areas. This will likely be for adjusting existing remediation systems and installing new irrigation lines within portions of the Phase II and III areas. The following sections discuss trench excavations, potential for dewatering, and trench backfill.

All temporary excavation slopes must comply with the provisions of Title 296 Washington Administrative Code (WAC), Part N, "Excavation, Trenching and Shoring." The contractor performing the work has the primary responsibility for protection of workmen and adjacent improvements.

Most of the trench excavations will likely be made as open cuts in conjunction with the use of trench boxes for shielding workers. Temporary open-cut slopes may be used in shallow trenches.

The stability of open-cut slopes is a function of soil type, groundwater level, slope inclination and nearby surface loads. The use of inadequately designed open cuts could impact the stability of adjacent roadway, nearby structures and existing utilities, and endanger personnel. The contractor will be in the best position to observe subsurface conditions continuously throughout the construction process and to respond to variable soil and ground water conditions. Therefore, the contractor will have the primary responsibility for deciding whether or not to use an open-cut slope rather than some form of temporary excavation support.

For planning purposes only, it is likely that temporary cut slopes of 1¼H: 1V (horizontal to vertical) can be used for dry excavations up to 8 feet deep and for the portion of the slope above any shoring system.

The above guidelines assume that surface loads such as construction equipment and storage loads will be kept a sufficient distance away from the top of the cut so that the stability of the excavation is not affected. The guidelines also assume no significant seepage present on the slope face. Flatter slopes and/or shoring will be necessary for those portions of the excavations which are subjected to significant seepage in order to maintain the stability of the cut.

Unsupported cut slopes will likely experience some sloughing and raveling if exposed to surface water. Berms, hay bales or other provisions will be installed along the top of the excavation to intercept surface runoff to reduce the potential for sloughing and erosion of cut slopes during wet weather.

CONSTRUCTION CONSIDERATIONS

MATERIAL HANDLING AND DISPOSAL

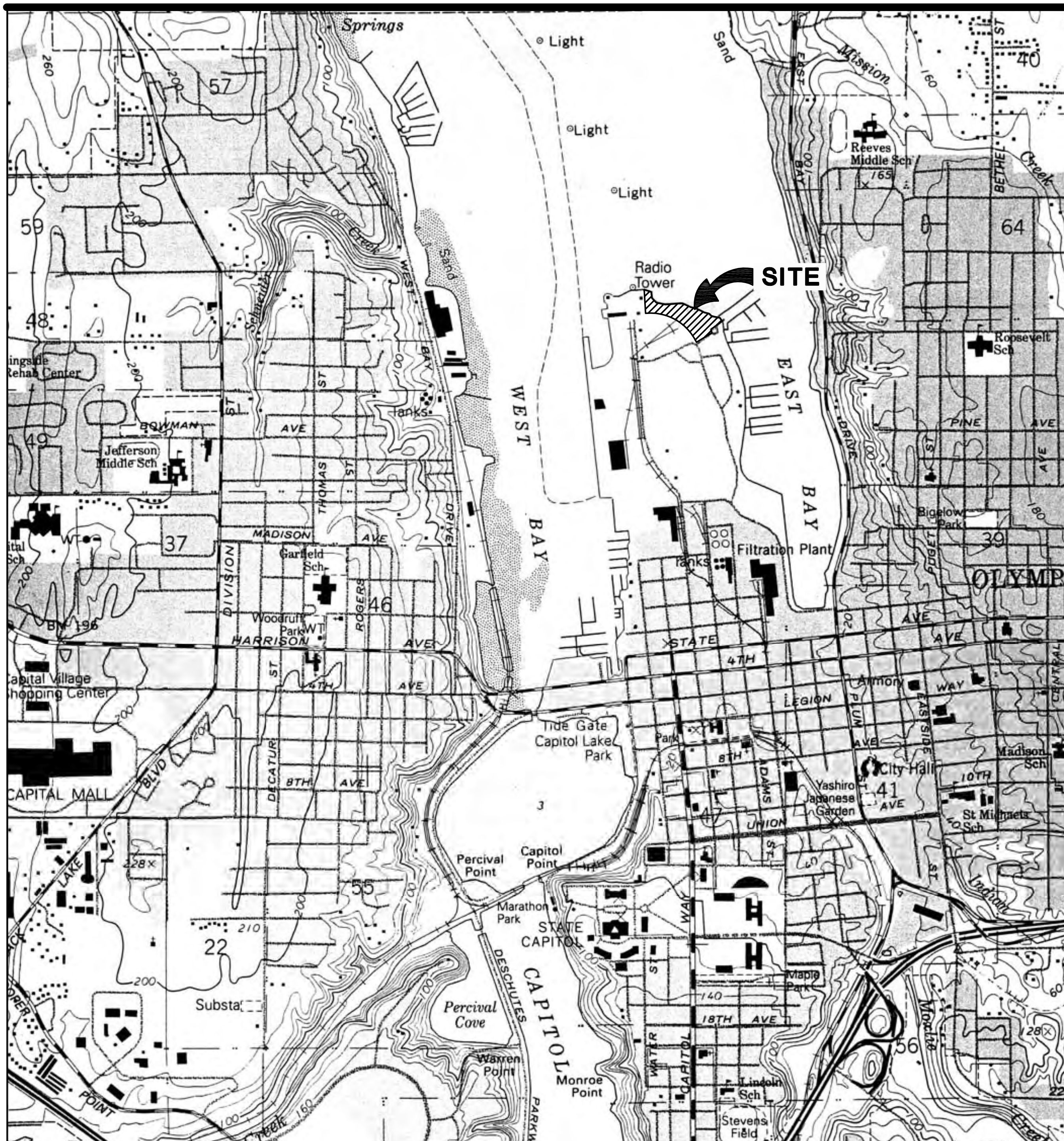
The Phase II and III areas contain contaminants associated with former wood treatment operations. Therefore, hazardous materials will be encountered during the remedial excavation. Materials of concern include all soil disturbed below the existing ground surface, stripped vegetation and embedded construction debris with encrusted site soil or sediment, and residuals (liquids and sludge) from equipment decontamination procedures. These materials will be considered hazardous and must be handled properly.

The contractor will be required to prepare a project construction plan, equipment decontamination plan and stormwater management plan to address environmental protection measures. These plans will satisfy site-specific requirements established in the contract specifications, and will be reviewed by a Port representative.

The contractor's project construction plan will describe the overall sequence and construction methods that will be used to complete construction operations. The plan will include detailed procedures for controlling, collecting, handling, disposing and treating residual contaminated soil/debris and liquids generated during excavation, transporting, offloading, and disposal operations. The equipment decontamination plan will provide design details for the contractor's equipment decontamination pad, including the pad dimensions, construction materials, and water collection, conveyance, and treatment systems. The plan will also describe operation and verification procedures to ensure that decontamination efforts are successful. The contractor's stormwater management plan will provide construction details and operation procedures for collection, conveyance, and treatment/disposal of stormwater runoff and for erosion and sediment control measures, as required to ensure that contaminated materials are properly managed and maintained within the site boundary. The plan will also address procedures for handling and storing hazardous materials used for construction purposes (e.g., fuel, oil, etc.), and for prevention, and as appropriate, response to hazardous material spills and/or accidental discharges.

CONSTRUCTION OBSERVATIONS

The Port will have a representative on site during construction to provide quality assurance. The Port's representative will be present during site stripping, probing of the exposed subgrade soils and during placement of structural fill. The Port's representative will evaluate the adequacy of the subgrade soils and identify areas needing further work, perform in-place moisture-density tests in the fill to determine if the work is being done in compliance with the compaction specifications, and advise on any modifications to procedure, which may be appropriate for the prevailing conditions.



CONTOUR INTERVAL 20 FEET

2000 0 2000
Feet

Reference: USGS 7.5' topographic quadrangle map "Tumwater, Wash.," photorevised 1994.

Vicinity Map

Port of Olympia
Olympia, Washington

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Figure 1

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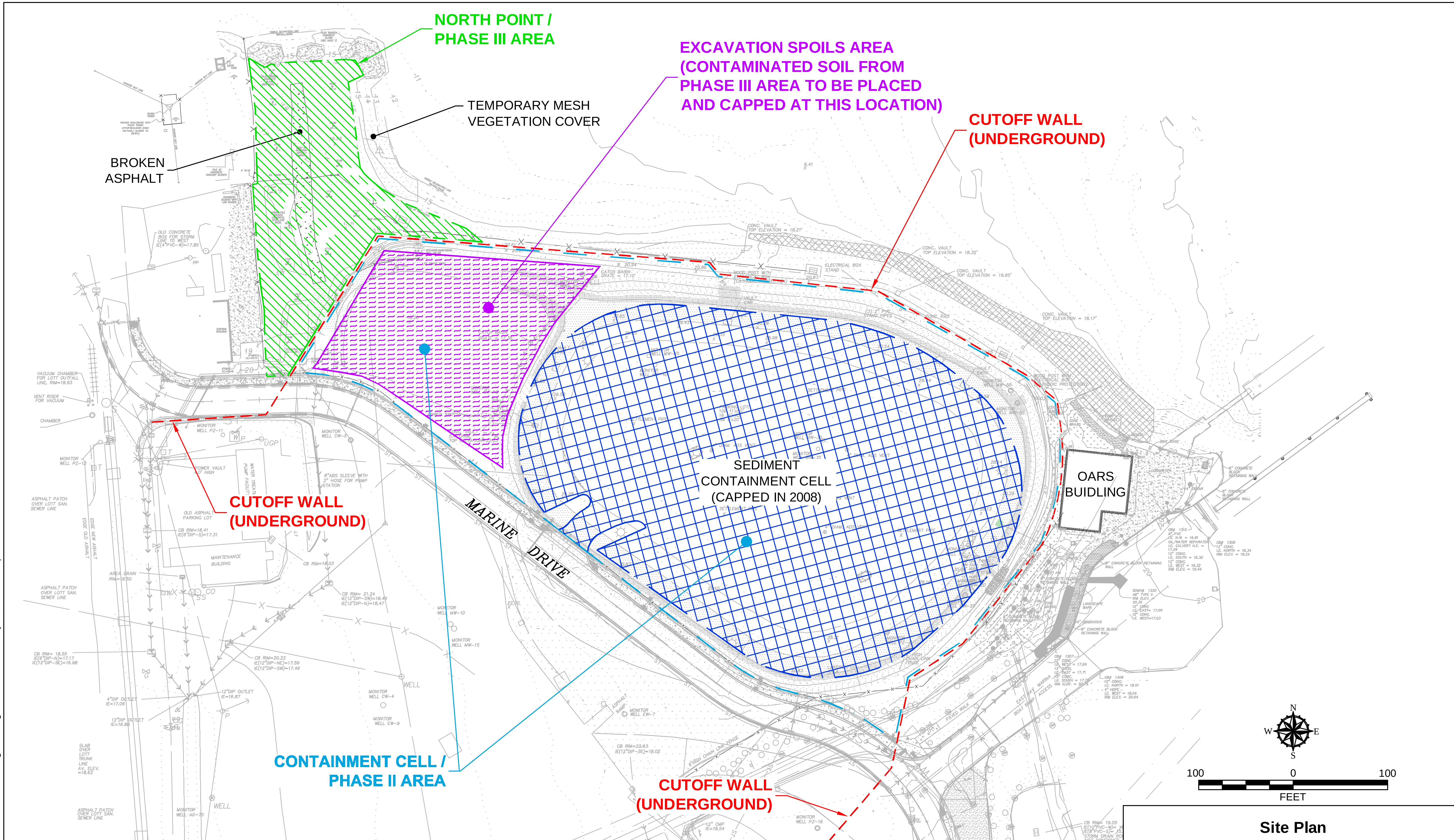

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Site Plan provided by Hatton Godat Pantier, Inc., dated 12/8/05.

Site Plan

Port of Olympia
Olympia, Washington

GeoEngineers

Figure 2

SCW : TJM

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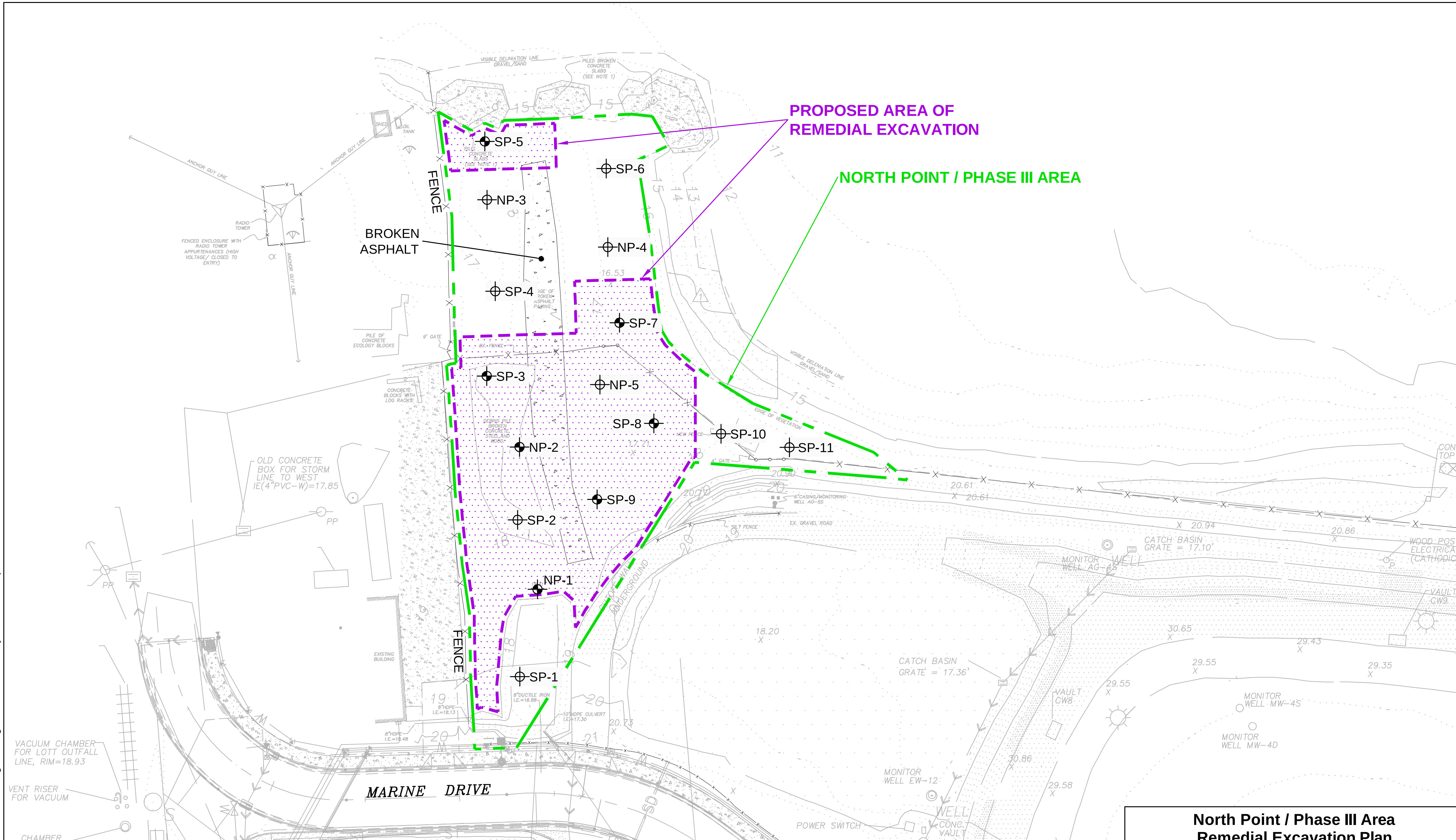

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Site Plan provided by Hatton Godat Pantier, Inc., dated 12/8/05.

Legend:

- Soil Boring completed by Landau Associates
- Soil Boring in which cPAH and/or dioxin concentrations in soil exceeded MTCA cleanup levels for unrestricted land use

N W E S

50 0 50

FEET

North Point / Phase III Area Remedial Excavation Plan

Port of Olympia
Olympia, Washington

GEOENGINEERS

Figure 3

SCW : TJM

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GEOENGINEERS

APPENDIX A
BIBLIOGRAPHY

APPENDIX A
BIBLIOGRAPHY

- “Preliminary Evaluation of Cascade Pole Sediment Consolidation” technical memorandum prepared by Landau Associates, Inc. dated January 21, 1997.
- “Geotechnical Engineering Design Services, Preliminary Design Tasks, Sediment Containment Cell, Cascade Pole Site, Port of Olympia, Washington” technical memorandum prepared by Landau Associates, Inc. dated February 10, 2000.
- “Summary of Construction Quality Assurance Monitoring Activities, Cascade Pole Sediment Containment Cell Construction Project, Port of Olympia, Olympia, Washington” prepared by Landau Associates, Inc. dated December 29, 2000.
- "Draft Engineering Design Report, Sediments Cleanup Action, Cascade Pole Site, Olympia, Washington" prepared by Landau Associates, Inc. dated February 1, 2001.
- Plans/specifications titled "Port of Olympia, Cascade Pole Site Sediments Remedial Action Project, Contract No. 269" prepared by Landau Associates, Inc. dated June 16, 2001.
- “Upland Containment Cell Final Design Grades and Partial Remedy to Drainage Panel Deficiencies, Cascade Pole Sediments Remedial Action Project, Port of Olympia, Olympia, Washington” technical memorandum prepared by Landau Associates, Inc. dated May 14, 2002.
- "Draft Remedial Action Completion Report, Cascade Pole Sediment Remediation Project, Olympia, Washington" prepared by Landau Associates, Inc. dated March 28, 2003.
- “North Point/Phase IV Capping Area Investigation, Cascade Pole Company Site, Olympia, Washington” prepared by Landau Associates, Inc. dated February 3, 2005.
- “Supplemental Soil Investigation Report, North Point/Phase IV Capping Area, Cascade Pole Site, Olympia, Washington” prepared by Landau Associates, Inc. dated October 24, 2005.

Note – The “Phase IV” area and activities referenced above are referred to as the “Phase III” area and activities in this report.

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APPENDIX B
REPORT LIMITATIONS AND GUIDELINES FOR USE

APPENDIX B
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

ENVIRONMENTAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES, PERSONS AND PROJECTS

This report has been prepared for exclusive use of the Port of Olympia, its authorized agents, and regulatory agencies. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, an environmental site assessment study conducted for a property owner may not fulfill the needs of a prospective purchaser of the same property. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and project site. No one except the Port of Olympia should rely on this environmental report without first conferring with GeoEngineers. This report should not be applied for any purpose or project except the one originally contemplated.

THIS ENVIRONMENTAL REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

This report has been prepared for the Cascade Pole site. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

RELIANCE CONDITIONS FOR THIRD PARTIES

No lending agency or other third party may rely on the product of our services, unless we agree in advance and in writing to such reliance. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

ENVIRONMENTAL REGULATIONS ARE ALWAYS EVOLVING

Some substances may be present in the site vicinity in quantities or under conditions that may have led, or may lead, to contamination of the subject site, but are not included in current local, state or federal regulatory definitions of hazardous substances or do not otherwise present current potential liability.

[1] Developed based on material provided by ASFE, Professional Firms Practicing in the GeoSciences, www.asfe.org.

GeoEngineers cannot be responsible if the standards for appropriate inquiry, or regulatory definitions of hazardous substance, change or if more stringent environmental standards are developed in the future.

Uncertainty May Remain Even After This Environmental Study is Completed

No environmental assessment can wholly eliminate uncertainty regarding the potential for contamination in connection with a property. Our interpretation of subsurface conditions in this study is based on field observations and chemical analytical data from widely-spaced sampling locations. It is always possible that contamination exists in areas that were not explored, sampled or analyzed.

Subsurface Conditions Can Change

This environmental report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, by new releases of hazardous substances, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations.

Soil and Groundwater End Use

The cleanup levels referenced in this report are site- and situation-specific. The cleanup levels may not be applicable for other sites or for other on-site uses of the affected media (soil and/or ground water). Note that hazardous substances may be present in some of the site soil and/or groundwater at detectable concentrations that are less than the referenced cleanup levels. GeoEngineers should be contacted prior to the export of soil or groundwater from the subject site or reuse of the affected media on site to evaluate the potential for associated environmental liabilities. We cannot be responsible for potential environmental liability arising out of the transfer of soil and/or groundwater from the subject site to another location or its reuse on site in instances that we were not aware of or could not control.

Most Environmental Findings are Professional Opinions

Our interpretations of subsurface conditions are based on field observations and chemical analytical data from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

Geotechnical, Geologic and Geoenvironmental Reports Should Not Be Interchanged

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

READ THESE PROVISIONS CLOSELY

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering, geology and environmental science) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

APPENDIX C

Compliance Monitoring Plan

Compliance Monitoring Plan
Confirmation Soil Sampling
North Point/Phase III
Capping Area Investigation
Cascade Pole Company Site
Olympia, Washington

May 5, 2009

Prepared for

Port of Olympia
915 Washington Street NE
Olympia, Washington 98507

LANDAU ASSOCIATES
130 2nd Avenue South
Edmonds, WA 98020
(425) 778-0907

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

This compliance monitoring plan (CMP) has been developed to provide soil compliance monitoring of the planned remedial excavation activities for the North Point/Phase III Capping Area (subject property) of the former Cascade Pole Company (CPC) site. This CMP is written to meet confirmation soil sampling activities specified in Consent Decree 90-2-1183-3 between the Washington State Department of Ecology (Ecology); the Cascade Pole Company, Inc.; and the Port of Olympia. The goal of the compliance monitoring is to evaluate whether impacted soil has been adequately removed from the subject property during the remedial action activities.

1.1 SITE BACKGROUND

The CPC site is a former wood treatment facility located on Port of Olympia property in Olympia, Washington. The subject property is located within the northwest corner of the CPC site, as shown on Figure 1. Chemicals used in the former wood treatment operations include creosote and pentachlorophenol. The subject property has historically been used for log storage during CPC operation and is not located in the vicinity of primary wood treating operations. Two investigations have been conducted at the subject property to evaluate if historical wood treatment operations have impacted the site (Landau Associates 2005a,b).

In November 2004, a soil and groundwater investigation was conducted at the subject property. Soil samples were collected from five locations (NP-1 through NP-5), and groundwater samples were collected from three of those locations. All samples were analyzed for semivolatile organic compounds (SVOCs), including carcinogenic polycyclic aromatic hydrocarbon compounds (cPAHs), and one soil sample was analyzed for dioxins and furans (dioxin). In addition, one groundwater sample was analyzed for volatile organic compounds (VOCs). The results of the initial investigation indicated that cPAHs were present at concentrations above the Model Toxics Control Act (MTCA) Method B cleanup level for unrestricted site use (0.137 mg/kg) within the upper 1 ft of soil along the southern portion of the subject property (NP-1 and NP-2). Dioxin was also reported at concentrations above the cleanup level for a sample collected from the upper 1 ft along the southern boundary (NP-1). Soil samples collected from lower depth intervals (2 to 5 ft below grade) indicate concentrations below the cleanup levels. The sample locations and results above the cleanup level are shown on Figure 1.

Based on the results of the initial investigation, a supplemental surface soil investigation was conducted in September 2005. A total of nine surface soil samples (SP-1 through SP-9) were collected from the upper 1-ft interval and analyzed for cPAHs to better delineate the extent of shallow soil contamination. The results of the supplemental investigation indicated the presence of cPAHs above the cleanup level across the southern half of the parcel and in an isolated area in the northwest portion of the parcel, as shown on Figure 1.

1.2 PLANNED REMEDIAL ACTION

Based on the extent of contamination delineated by the site investigation activities described above, the area shown on Figure 2 will be excavated to remove contaminated soil to the MTCA Method B cleanup levels. The excavated soil will be placed and contained at another location on the site, as described in the engineering design report (GeoEngineers 2006).

The excavation will extend to a depth of 1.5 ft below ground surface (BGS), although excavation may extend deeper depending on the results of the compliance monitoring described in this CMP.

2.0 SAMPLE LOCATIONS AND ANALYSIS

Compliance monitoring locations were selected to provide a sampling density similar to that achieved during previous area investigations. Soil samples will be collected from a total of 11 locations and analyzed for cPAHs using U.S. Environmental Protection Agency (EPA) Method 8270. Additionally, the soil sample collected from compliance monitoring location CM-11 will also be tested for dioxins/furans using EPA Method 8290. Compliance monitoring will be conducted upon the completion of the remedial excavation activities, with the exception of the area along the eastern property boundary between the shoreline and the slurry wall. The planned compliance monitoring locations are shown on Figure 2.

To evaluate the analytical data for cPAHs, the toxicity equivalency quotients (TEQ) of individual cPAHs will be calculated and summed for comparison to benzo(a)pyrene. The TEQ value will be evaluated using the MTCA Method B cleanup level for unrestricted site use (0.137 mg/kg). Similarly, the TEQ for dioxins/furans will be calculated based on conversion of other congeners to 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD), and the TEQ value will be compared against the MTCA Method B cleanup level for unrestricted site use (11 ng/kg).

If data exceed the cPAH cleanup level, the following statistical approach may be used to demonstrate compliance with the cleanup level:

- The upper 95 percent confidence limit (UCL) on the true mean shall be less than the soil cleanup level (confidence interval test).[1]
- No single sample concentration will be greater than two times the soil cleanup level.
- Less than 10 percent of the sample concentrations will exceed the soil cleanup level.

This approach follows statistical methods from Ecology guidance documents (Ecology 1992, 1993) and MTCA [WAC 173-340-740(7)(d)]. If compliance is not demonstrated, additional soil will be excavated from the area(s) containing the cleanup level exceedance(s). If additional excavation is required, the excavation area will be based on half the distance between the compliant sampling location and the non-compliant sampling location.

If further excavation is conducted, confirmation soil samples will be collected from the base of the re-excavated area(s) as described below. Following receipt and validation of the analytical results, the data will be compared to the cleanup screening level, or statistically evaluated using the approach described above. If the statistical approach is used, the new data will be substituted for the old data.

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[1] In accordance with WAC 173-340-740(7)(c)(iii), the appropriate statistical methods for calculating the UCL will be determined based on the distribution (i.e., normal or lognormal distribution) of the sample data for each indicator hazardous substance. Ecology's statistics software package (MTCAStat, Version 2.0) will be used to determine the distribution of the sample data and to perform the confidence interval test.

To minimize the number of potential excavation iterations, a second set of compliance monitoring samples will be collected at each location following the initial excavation. The second set of samples will be archived by the laboratory for potential testing if the initial sample does not achieve the cleanup level. The second sample will be collected from the 1- to 2-ft depth interval below the excavation bottom. If the initial sample fails, and additional excavation is planned at that location, the deeper sample will be tested prior to re-excavation to confirm that the planned additional excavation target depth will achieve the cleanup level.

If the deeper sample achieves the cleanup level, an additional 1 ft of soil would be excavated within the exceedance area and the analytical results for the deeper sample would be used as the compliance monitoring sample for that excavation area. If the deeper sample does not achieve the cleanup level, either 2 ft of additional soil would be excavated from the exceedance area and a compliance monitoring sample would be collected from the base of the new excavation for testing, or the Port would conduct additional investigation at that location to determine the vertical extent of contamination prior to conducting any additional excavation. If additional investigation indicates that the extent of contamination is such that further excavation is impracticable, the Port, in consultation with Ecology, will develop and implement a modified cleanup action for the affected area.

3.0 FIELD PROCEDURES

3.1 SAMPLE DESIGNATION

Sample locations will be preceded with the prefix "CM" for Compliance Monitoring and numerically sequenced from 1 to 11. Soil samples collected will receive a suffix denoting the top and bottom depth interval from which the sample was collected. For example, CM-3(0-1) will represent the soil sample collected from location CM-3 at a depth of 0 to 1 ft below existing site grade. . Similarly, the second compliance monitoring sample collected from 1 to 2 ft BGS will be labeled CM-3(1-2).

3.2 SOIL SAMPLING PROCEDURES

Soil samples will be collected at each compliance monitoring location by either hand augering methods or by utilizing a small backhoe excavator. Upon completing the sample excavation, the hole will be cleared of soil and one side wall will be scraped with a decontaminated stainless-spoon or trowel.

The soil sample will be placed in a decontaminated stainless-steel bowl and mixed with a stainless-steel spoon to homogenize the sample. Debris and or gravel larger than ¾-inch diameter will be removed from the homogenized mixture. The homogenized mixture will be placed in laboratory supplied containers.

3.3 SAMPLE LABELING, SHIPPING AND CHAIN-OF-CUSTODY

Sample container labels will be completed immediately before or immediately following sample collection. Container labels will include the following information:

- Project name
- Project number
- Sample ID
- Initials of the person collecting the sample
- Date and time of collection
- Analysis requested.

Samples will be transported to the designated analytical laboratory using the following procedures:

- Samples will be placed on ice in a sealed cooler immediately after collection.
- Each sample container will be individually packed in bubble wrap when placed in the cooler.
- The samples will be sent by courier to the analytical laboratory by Landau Associates within 24 hours of sample collection.
- All samples submitted for analysis will be accompanied by a Chain-of-Custody form.

3.4 EQUIPMENT DECONTAMINATION

Compliance monitoring soil sampling equipment (stainless-steel spoons and bowls) and hand auger or backhoe bucket will be decontaminated prior to sample collection using wet decontamination methods to minimize the possibility of cross contamination. Wet decontamination procedures are as follows for all hand sampling equipment:

- Wash equipment with Alconox/tap water solution
- Rinse with tap water
- Rinse with deionized water
- Repeat entire procedure or any parts of the procedure, as necessary
- Disposable gloves will be changed between each sampling location.

If a backhoe is used, the bucket will be decontaminated using a hot water pressure washer.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

This section of the CMP establishes quality assurance/quality control (QA/QC) objectives and procedures for the implementation of the subject site. The overall data quality objective (DQO) for the subject site is to establish confidence that data are of known, appropriate, and sufficient quality to support their intended use. To accomplish this goal, project data should be technically sound, statistically valid, and properly documented, having been evaluated against established criteria for the principal data quality indicators [DQIs; i.e., precision, accuracy, representativeness, completeness, and comparability (also referred to as PARCC)], as defined in quality control guidance documents (EPA 1998). The QA procedures presented in this plan were developed in accordance with EPA (1994a) guidance documents and were developed to accomplish the investigation DQO.

Laboratory analysis conducted during this investigation will be in accordance with standard EPA-approved methods. The targeted level of data quality is comparable to that obtained from the use of Contract Laboratory Program (CLP) methods (EPA 1994b,c), with the exception of the level of documentation required with submittal of the analytical results from the laboratory. The analytical, documentation, and validation procedures established in this QA plan are sufficient to achieve this level of data quality and, therefore, sufficient to support the appropriate conclusions from the data.

Current control limits established by EPA or Ecology and the laboratory for the cited analytical methods will be used for evaluating the principal DQIs. Precision will be evaluated using matrix spike duplicate, and laboratory control sample duplicates. Laboratory accuracy will be monitored through the use of batch matrix spike, laboratory control sample, and surrogate spike samples. Data acceptability will be determined on the basis of the results of a qualitative review of error sources and, therefore, will be case-specific.

The QA objectives for representativeness, completeness, and comparability will be achieved by:

- Collecting representative samples
- Implementing standardized and uniform field and laboratory procedures
- Analyzing laboratory method blanks to verify that the analytical results are representative of the sampled item and not influenced by cross-contamination
- Reporting data in conventional and standard units.

PARCC parameters are further defined and discussed later in this plan.

4.1 LABORATORY INSTRUMENT QA/QC PROCEDURES

The analytical laboratory is responsible for maintaining laboratory instruments in proper working order, including routine maintenance and calibration and training of personnel in maintenance and calibration procedures. Laboratory instruments will be properly calibrated with appropriate check standards and calibration blanks for each parameter before beginning each analysis. Instrument performance check standards, where required, and calibration blank results will be recorded in a laboratory logbook dedicated to each instrument. At a minimum, the preventive maintenance schedules contained in the EPA methods and in the equipment manufacturer's instructions will be followed. Laboratory calibration procedures and schedules will be as described in the laboratory QA/QC plan, which will be available for review upon request.

Multipoint initial calibration will be performed on each instrument at the beginning of the project, after each major interruption to the analytical instrument, and when any ongoing calibration does not meet control criteria. Ongoing calibration will be performed daily with every sample batch for metal and organic analysis and for conventional parameters (when applicable) to track instrument performance.

Laboratory instrument blanks or continuing calibration blanks provide information on the stability of the established baseline. Continuing calibration blanks will be analyzed immediately prior to continuing calibration verification at a frequency of 1 continuing calibration blank for every 10 samples analyzed at the instrument for inorganic analysis and every 21 hours for organic analysis. If the ongoing calibration is out of control, the analysis must come to a halt until the source of the control failure is eliminated or reduced to meet control specifications. All project samples analyzed while instrument calibration was out of control will be reanalyzed.

4.2 QA PROCEDURES FOR SAMPLE ANALYSIS

As noted above, the analytical methods are listed in Table 1. Changes in analytical methods will not be allowed without prior written documentation from the laboratory regarding the desired substitution and its rationale, and prior written acceptance by Landau Associates.

The project reporting limits are recognized to be goals, because instances may arise where high sample concentrations, nonhomogeneity of samples, or matrix interferences preclude achieving the desired quantitation limits and associated QC criteria. If this occurs, the laboratory will report the reason(s) for deviations from these reporting limits or noncompliance with QC criteria, and the missed goals will be noted during data validation.

4.3 QC SAMPLES

Laboratory QC samples will be used to evaluate data validity and representativeness. Laboratory QC samples will include laboratory method blanks and laboratory control samples.

A minimum of one laboratory method blank per 20 samples, or one every 12 hours, or one per batch of samples analyzed (if fewer than 20 samples are analyzed) will be analyzed for cPAHs and dioxins/furans using standard analytical methods to assess possible cross-contamination introduced during the analysis. In these analyses, the laboratory source of sample dilution water will be used when possible and appropriate. Laboratory method blanks will contain the same reagents used for the associated sample analysis. The generation and analysis of additional method, reagent, and glassware blanks may be necessary to verify that analysis procedures do not contaminate samples.

Laboratory control sample and control sample duplicate (LCS/LCSD) will be performed to provide information on accuracy and precision, and to verify that extraction and concentration levels are acceptable. LCS/LCSD spikes will follow EPA guidance for matrix spikes. A minimum of one laboratory control sample per 20 samples, not including QC samples, or one laboratory control sample per sample batch if fewer than 20 samples are obtained, will be analyzed.

4.4 QA/QC PROCEDURES USED TO ASSESS DATA

Analytical laboratory data will be reviewed to confirm that the QA objectives for the PARCC parameters are met. The PARCC parameters and the associated statistical tests used in the evaluation are included in the following sections.

Target control limits (the range within which project data of acceptable quality should fall) will be used to evaluate data acceptability as noted in this section. For data acceptance, control limits are considered to be goals only.

4.4.1 PRECISION

Precision is a measure of “the reproducibility of analyses under a given set of conditions” (EPA 1998). Precision is best expressed in terms of the standard deviation or RPD. QA/QC sample types that test precision include field and laboratory duplicates and matrix spike duplicates. The estimate of precision of duplicate measurements will be expressed as an RPD, which is calculated as follows:

$$RPD = \left| \frac{D_1 - D_2}{(D_1 + D_2) \div 2} \right| x100$$

where: D_1 = first sample value

D_2 = second sample value (duplicate)

The RPDs will be routinely calculated and compared with DQO control limits. For field duplicates, RPD control limits will be 35 percent (or, if duplicate sample values are within 5 times the quantitation limit, the control limit interval will be plus or minus two times the quantitation limit). For matrix spike/matrix spike duplicates, RPD control limits will be 30 percent for organic analytes and 20 percent for inorganic analytes.

4.4.2 ACCURACY

Accuracy is a measure of "the bias in a measurement system" (EPA 1998). Numerically, accuracy can be expressed as an average of measurements of the same property (X) with an accepted reference or true value (T), usually expressed as the difference between the two values (X–T); the difference as a percentage of the reference or true value [100 (X–T)/T]; or as a ratio (X/T). Accuracy of laboratory analysis is evaluated through the percent recovery of spiked (matrix or surrogate spike) samples, calculated as:

$$Percent\ Recovery = \frac{(Spiked\ Sample\ Result - Unspiked\ Sample\ Result)}{Amount\ of\ Spike\ Added}\ x\,100$$

The percent recovery will be routinely calculated and checked against DQO control limits as established by the most recent laboratory control data.

4.4.3 REPRESENTATIVENESS

Representativeness expresses "the degree to which data accurately and precisely represent selected characteristics" (EPA 1998). Representativeness can be evaluated using additional sampling locations and blanks.

4.4.4 COMPLETENESS

Completeness is a measure of "the amount of valid data obtained from a measurement system compared to the amount that could be expected to be obtained under 'normal' conditions" (EPA 1998). Completeness is calculated as the number of valid (i.e., nonrejected) data points divided by the total number of data points requested. The QA criterion for completeness for this investigation is 95 percent. Completeness will be routinely determined and compared to the QA objective as part of data validation.

4.4.5 COMPARABILITY

Comparability is an expression of the confidence with which one data set can be compared to another. QA procedures in this plan will provide for measurements that are consistent and representative of the media and conditions measured. All sampling procedures and analytical methods used for investigation activities will be consistent to provide comparability of results for samples and split samples. The units have been selected to provide for comparability of the data with previously generated relevant site data and pertinent criteria.

4.5 LABORATORY DATA REPORTS

Analytical laboratories supporting site environmental investigations will provide data reports that include the following elements:

- Case narrative, including discussions of adherence to prescribed protocols, nonconformity events, corrective measures, and/or data deficiencies
- Sample analytical results
- Surrogate recoveries
- Matrix spike/matrix spike duplicate results
- Laboratory duplicate results
- Blank results
- Sample custody documentation (including signed, original chain-of-custody records, and documentation of condition of custody seals)
- Analytical responsibility.

Analytical data from the laboratory will be reported in the units noted in Table 1. These units have been selected to provide for comparability of the data with previously generated relevant data and, to the extent possible, applicable criteria. The analytical laboratory will be required to routinely archive raw laboratory data, to the extent possible, including initial and continuing calibration data, chromatograms, quantitation reports, blank sheets, and sampling logs. Analytical data sheets will identify the field-designated sample identification number, the sample matrix, the analytical and preparatory methods used, dates of extraction, date and time of analysis, weight or volume of sample used for analysis, dilution factors, instruments used for analysis, percent moisture or solids in the sample, method reporting and quantitation limits, analytical results, and appropriate data qualifiers and their definitions. The reports will also include calibration data summaries and internal standard area summaries. The laboratory will provide, as requested, raw data required for data validation purposes.

All written analytical laboratory reports will be signed by the laboratory project manager and will be accompanied by electronic diskettes that allow direct uploading of the data into data tables and data validation spreadsheets. The use of electronic reports will assist in reducing data entry errors as the data are compiled and evaluated.

4.6 DATA QUALITY EVALUATION

Upon receipt of the sample analytical data from the laboratory, data quality evaluation will be conducted, as described below, and a brief report of the results of the evaluation will be prepared. If significant nonconformities are found, additional laboratory data will be evaluated by Landau Associates.

Data quality evaluation of the analytical laboratory report packages will consist of a summary evaluation for 100 percent of the data, conducted according to relevant portions of the EPA guidelines on data validation (EPA 1994b, c).

The sections above present statistical tests used to determine data precision, accuracy, and completeness during data evaluation. If a portion of the data is outside the limits specified in this QA plan, or if sample collection and/or documentation practices are deficient, corrective action(s) will be initiated. Corrective action will be determined by the investigation task leader in consultation with the project manager and may include rejection of the data and resampling, qualification of the data, or modification of field and/or laboratory procedures. Data qualification arising from data quality evaluation findings will be described in the data validation report, rather than in individual corrective action reports.

* * * * * * * *

This CMP has been prepared for the exclusive use of the Port of Olympia for specific application to the North Point/Phase III Capping Area Cleanup Action. No other party is entitled to rely on the information and recommendations included in this document without the express written consent of Landau Associates. Further, the reuse of information and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

This document has been prepared under the supervision and direction of the following key staff:

LANDAU ASSOCIATES, INC.

Christine Kimmel

Christine B. Kimmel, L.G.
Project Geologist

Lawrence D. Beard, P.E., L.G.
Principal

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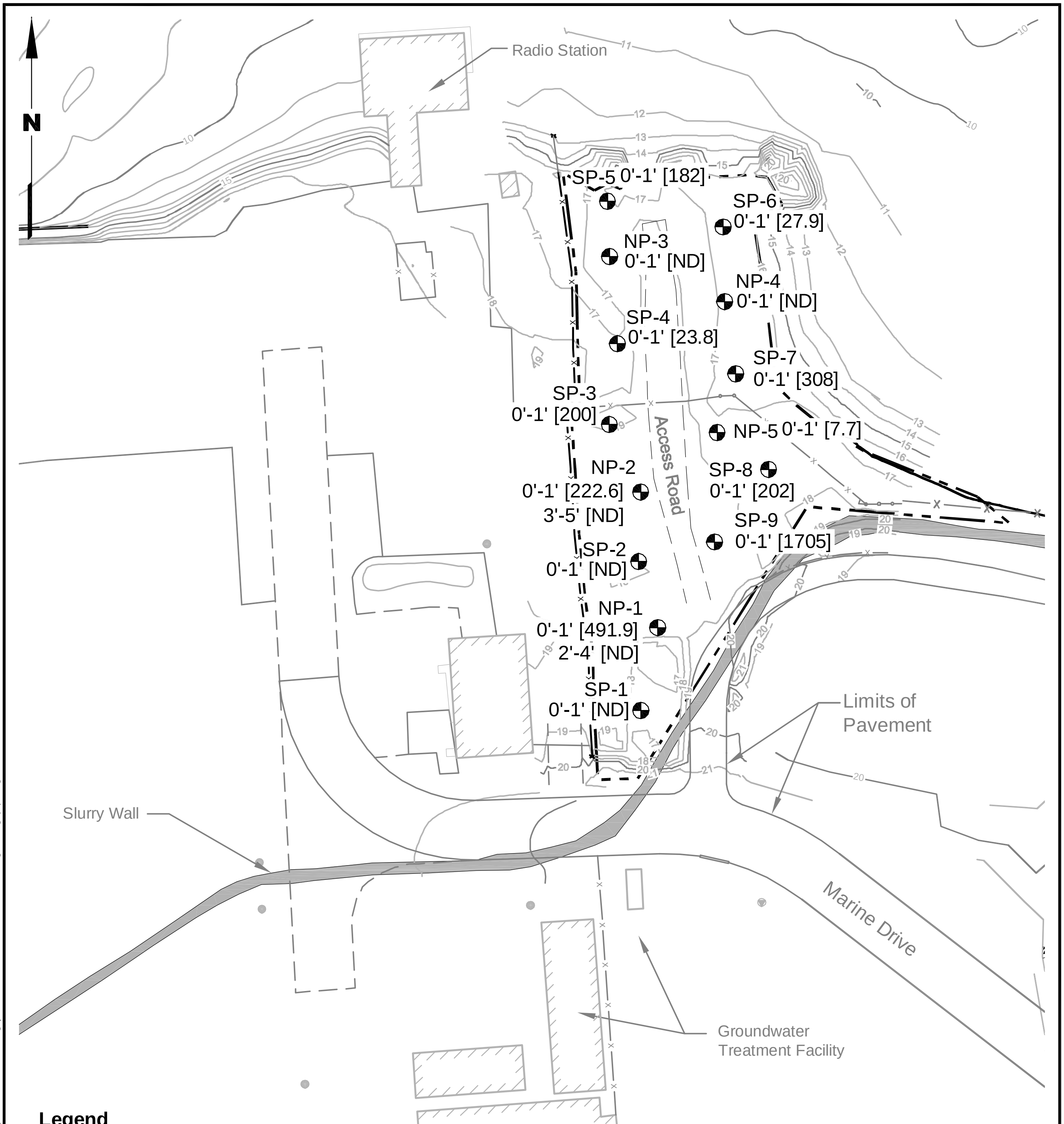

Legend

SP-4 ⊕ Soil Sampling Location from Initial and Supplemental Investigations

[23.8] CPAH Concentration in µg/kg (shaded results are above MTCA Method A cleanup levels for unrestricted land use).

— - - — Approximate Limits of Subject Property

Cascade Pole/North Point/Phase IV Compliance Monitoring | V:\021\030\034\D\PhaseIII\Fig1.dwg (A) "Figure 1" 4/30/2009

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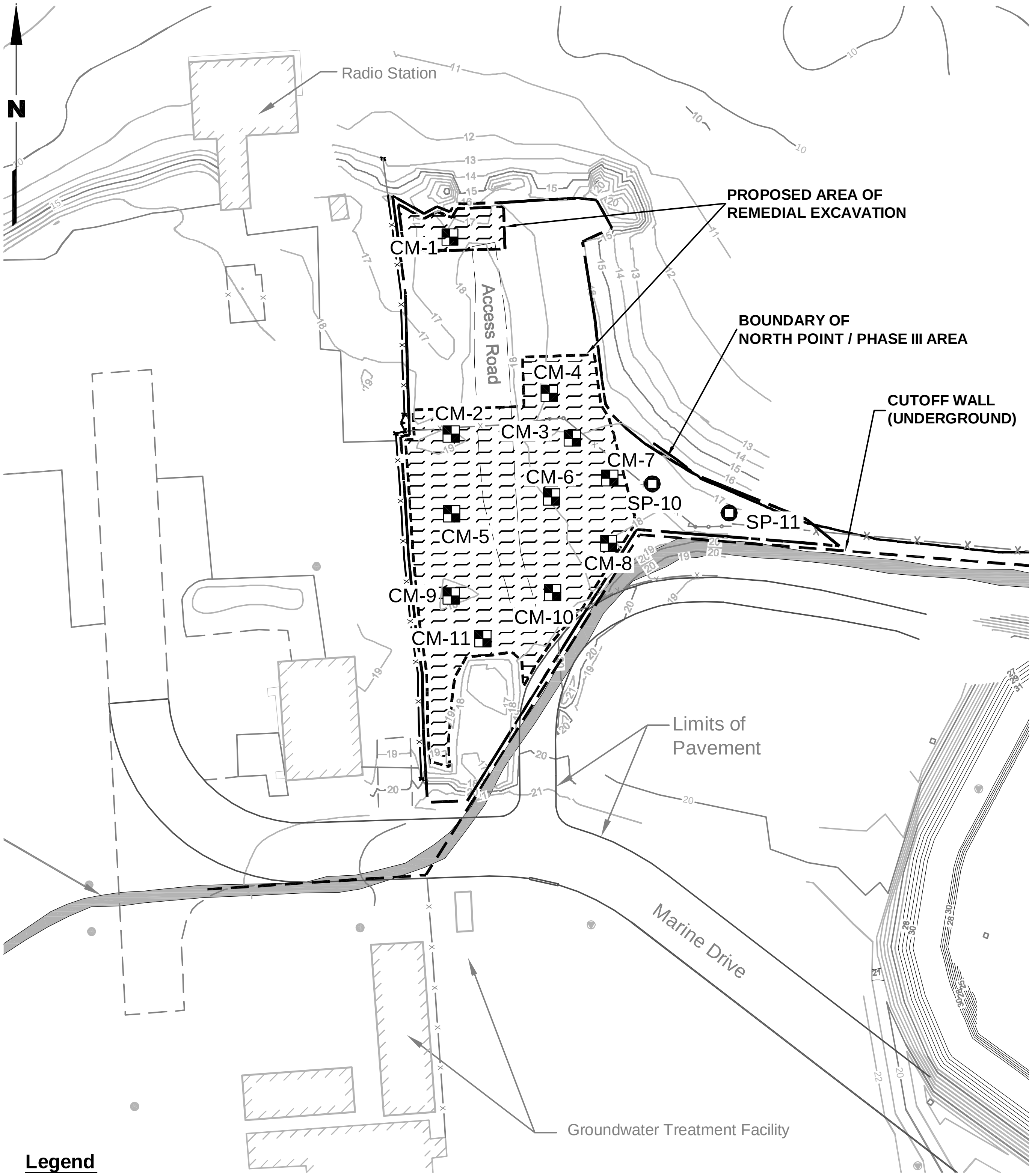
Cascade Pole Site Olympia, Washington	**North Point/Phase III** **Results of Previous Investigations**	Figure 1



Legend

CM-1 — Proposed Compliance Monitoring Location

SP-10 — Former Supplemental Investigation Sampling Location

Approximate Limits of Subject Property

0 80 160

Scale in Feet

Cascade Pole/North Point/Phase IV Compliance Monitoring | V:\021\030\034\D\PhaseIII\Fig2.dwg (A) "Figure 2" 4/30/2009

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Cascade Pole Site Olympia, Washington	**North Point/Phase III Proposed Compliance Monitoring Locations**	Figure 2

TABLE 1
SAMPLE CONTAINERS, PRESERVATIVES, HOLDING TIMES
NORTH POINT/PHASE IV CAPPING AREA
CASCADE POLE - OLYMPIA, WASHINGTON

Chemical Class	Analytical Method	Analyte	Container	Preservation	Maximum Holding Time (Days)	Reporting Limit Goals (µg/kg)
Soil						
cPAH	EPA 8270-SIM	Benzo(a)Anthracene	8 oz.	no preservative	14	64
		Benzo(a)Pyrene	8 oz.	no preservative	14	64
		Benzo(b)Fluoranthene	8 oz.	no preservative	14	64
		Benzo(k)Fluoranthene	8 oz.	no preservative	14	64
		Chrysene	8 oz.	no preservative	14	64
		Dibenz(a,h)Anthracene	8 oz.	no preservative	14	64
		Indeno(1,2,3-cd)Pyrene	8 oz.	no preservative	14	64