ENGINEERING DESIGN REPORT

SITE REMEDIATION PLAN
FORMER HAMBLETON BROTHERS LOG YARD

Prepared for
PORT OF CAMAS-WASHOUGAL
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MAUL
FOSTER
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The material and data in this report were prepared under the supervision and direction of the undersigned.

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ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
CAP	cleanup action plan
CEC	Certified Environmental Consulting, Inc.
CUL	cleanup level
Ecology	Washington State Department of Ecology
Evren	Evren Northwest, Inc.
FEMA	Federal Emergency Management Agency
FSA	focused site assessment
MFA	Maul Foster & Alongi, Inc.
MTCA	Model Toxics Control Act
Order	Agreed Order No. DE 9935
PCB	polychlorinated biphenyl
Port	Port of Camas-Washougal
Site	former Hambleton Brothers Log Yard
UIC	underground injection control
VOC	volatile organic compound

1 INTRODUCTION

On behalf of the Port of Camas-Washougal (the Port), Maul Foster & Alongi, Inc. (MFA) has prepared this engineering design report for remediation of the former Hambleton Brothers Log Yard (Site) (Facility Site No. 4399598) in Washougal, Washington (see Figure 1). This document has been prepared under the authority of Agreed Order No. DE 9935 (the Order) between the Port and the Washington State Department of Ecology (Ecology) to satisfy the requirements of the Model Toxics Control Act (MTCA), and addresses the substantive requirements of Washington Administrative Code 173-340, 350, and 360 (MTCA).

This report is meant to fulfill Ecology's requirement for an engineering design report summarizing the remedial action design as specified in the cleanup action plan (CAP) (Ecology, 2013). In addition, during the public comment period for the Order, a former Hambleton Brothers employee described observing burial of transformers on the Site. This engineering design report also addresses the assessment of an area where transformers may be buried, and the removal (if necessary) of these transformers, if discovered.

1.1 Site Description and Setting

The Site is located in Washougal, Washington, on property owned by the Port. The Site is bordered by State Route 14 and vacant private property (part of the former log yard operations) to the north and South 2nd Street to the west, with an undeveloped vacant lot to the east (also owned by the Port). The Columbia River borders the Site to the south. Adjoining properties to the west of 2nd Street are a commercial hotel, a vacant building slated for commercial use, and the Port office. Properties located north of State Route 14 are in mixed commercial, residential, and light industrial use.

The Site was a portion of a larger property operated as a lumber mill from approximately 1948 to 2010 which included log storage, sawmill operations, planing, lumber storage, shipping, and other activities incidental to lumber mill operations. The lumber mill ended production in 2010 because of economic conditions; the Site currently consists of an open lot surfaced primarily with gravel and asphalt, various soil stockpiles, a former log pond, concrete debris from foundations of former structures, and various amounts of stockpiled organic debris from sawmill operations. The riverbank along the south boundary of the Site is vegetated with trees, shrubs, and grasses; bank slopes are generally steep from historical fill operations on the Site.

1.2 Project Purpose and Need

The Port plans to improve the site as a mixed-use commercial development. In order to allow development of the Site, some environmental cleanup actions identified by Ecology must be completed. Site investigations began in 2002 and are summarized in Section 1.3; the former owner had the buildings demolished before the Port's purchase of the Site. In 2011, MFA conducted a focused site assessment (FSA) on behalf of the Port to assess the nature and extent of contamination in soil, sediment, and groundwater; Section 2.4 describes the environmental conditions identified in the FSA. In 2013, Ecology issued the CAP that outlined the specific remedial actions to be completed; Section 4 describes the selected remedial actions in detail.

1.3 Basis of Design

The design is based on environmental assessments and investigations that were completed at the Site from 2002 to the present. The following is a list of the relevant reports, permits, and documents that were used to determine the appropriate remedial action and that serve as the basis of design for the project:

- Phase I Environmental Site Assessment (Certified Environmental Consulting, Inc. [CEC] and Evren Northwest, Inc. [Evren], 2006)
- Preliminary Work Plan for Log Pond Decommissioning (CEC and Evren, 2008)
- Draft Initial Independent Cleanup Report and Risk Assessment (CEC and Evren, 2009)
- Cultural Resource Reconnaissance (Appendix A)
- Wetland Assessment (Appendix B)
- Focused Site Assessment (MFA, 2012)
- Terrestrial Ecological Evaluation (MFA, 2013)
- CAP (Ecology, 2013)
- Magnetic Survey (Appendix C)
- Geotechnical Site Investigation (Appendix D)

1.4 Selected Remedial Action

The proposed cleanup action for the Site includes sampling and characterizing liquids and sediment from the log pond and then draining, hauling, and disposing of the liquid as appropriate. A base of structural material (crushed concrete and compacted gravel) will then be installed in the bottom of the pond to provide a firm support for fill placement. Impacted materials on the Site, including a stockpile (500 cubic yards) and soil from the adjacent Killian property (100 cubic yards), will be consolidated in the pond. Other impacted, and/or clean, materials from site grading and excavation will be consolidated in the pond as capacity allows in order to achieve the design subgrade elevation. The filled log pond, the mill area, and the aggregate recycling area will be capped with a minimum of 2 feet of clean soil. The soil cap will be underlain by a geotextile demarcation layer.

Institutional controls will be implemented to protect the public and to control future use of the Site. These will include a soil management and cap maintenance plan, as well as a covenant prohibiting the use of groundwater beneath the Site for potable purposes. Section 4.2.7 describes the institutional controls in detail.

Additional cleanup action may be required in the former aggregate recycling area in the southeast corner of the Site. A geophysical site investigation (magnetic survey), completed in 2013, revealed several magnetic anomalies (Appendix C). The anomalies could potentially contain buried electrical transformers, as discussed by a former Hambleton Brothers employee. These areas will be investigated during construction and addressed as described in this report.

2 EXISTING CONDITIONS

2.1 Property Location

The Site consists of two land parcels (property identification numbers 73134179 and 73134153) in the City of Washougal, Clark County, Washington, in sections 12 and 13 of township 1 north and range 3 east, and section 7 of township 1 north range 3 east of the Willamette Meridian (see Figure 1). Both land parcels are owned by the Port. The combined parcels form an L shape.

The Site is outside the Federal Emergency Management Agency (FEMA) 100-year floodplain boundary. No part of the remedial action area extends below the ordinary high water line of the Columbia River.

2.2 Topography and Climate

The Property is generally flat, with a slight slope to the south, toward the Columbia River. The Columbia River is at the Property's southern boundary, at the bottom of an approximately 32-foot downward slope.

According to gauges in Washougal, rainfall averages 84 inches annually, with average summer temperatures in the mid-70s (degrees Fahrenheit) and average winter temperatures in the mid-30s (degrees Fahrenheit) (WRCC, 2013).

2.3 Geology and Hydrogeology

The Property is located on Quaternary alluvial deposits composed of coarse-grained outwash deposits (gravel, cobbles, boulders) from the Missoula Floods. These deposits were observed in boring and test pit log depths of up to 45 feet below ground surface (bgs), as discussed in the 2009 independent cleanup and remedial action report (CEC and Evren, 2009). The 2009 boring logs also indicated that local fill deposits of up to 6 feet bgs were observed throughout the Site. The fill deposits included construction debris, wood fragments, metal fragments, metal equipment, and glass. These fill deposits were at times intermixed with the local material.

A geotechnical investigation was completed for the site in 2014 by Apex Companies; the site geotechnical report (Appendix D) contains an updated summary of the geological and hydrogeological conditions relating to the Site.

2.4 Environmental Conditions

The FSA (MFA, 2012) identified petroleum hydrocarbons (diesel- and residual-range organics), metals (lead and mercury), polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs, i.e., methylene chloride and tetrachloroethene), and/or carcinogenic polycyclic aromatic hydrocarbons as indicator hazardous substances on the Site. The nature and extent of contamination are summarized in the CAP (Ecology, 2013), and the FSA report (MFA, 2012) provides additional details[1]. Impacted soils are limited to a stockpile located in the southeast corner of the Site, shallow surface soils in the former aggregate recycling area, surface soils adjacent to the former log pond, and sediments in the former log pond.

As discussed previously, buried electrical transformers may be located on the southeast corner of the Site. The presence and extent of contamination related to the transformers are unknown and will be identified during construction.

An area on the adjacent land parcel (formerly owned by the Port) has a small area of stained soil that will be removed and consolidated in the pond. The soil is in the vicinity of a former oil storage tank. Sampling was conducted on the soils, and results showed no exceedances of cleanup levels (CULs); however, the Port will perform the excavation as a precautionary measure. Approximately 100 cubic yards of material from this area will be consolidated in the pond.

2.5 Stormwater

Stormwater runoff on the Site is assumed to be retained on site and disposed of via surface infiltration. Infrastructure is limited to two known inlets, two manholes, and one 6-inch-diameter outfall to the Columbia River (see attached drawings). Stormwater discharge from the outfall has not been observed; the only known upstream manhole contains a mechanical filtration system, which is filled with debris and does not appear to accept stormwater. Another inlet and another manhole are located in the northeast portion of the Site. The manhole is suspected to be an underground injection control (UIC), although the exact configuration is unknown. Contributing drainage to this structure is unknown, and a discharge point could not be located. If the structure is determined to be a UIC, it will be decommissioned according to Ecology guidelines.

2.6 Structures and Surfaces

An existing conditions plan is included with the drawings attached to this report. No structures exist on the Site. Concrete foundation remnants exist adjacent to the former log pond, and other concrete, asphalt, and gravel surfaces are spread throughout the Site. If other site features are discovered during construction, they will be protected or investigated and then decommissioned or demolished appropriately.

[1] Table 1 following the report shows contaminants of concern and applicable cleanup levels.

2.7 Wetlands

A site investigation completed by ELS in 2011 determined that no jurisdictional wetlands exist on the Site. The report is included as Appendix B.

2.8 Cultural Resources

A cultural resource reconnaissance study completed in 2011 by AINW (Appendix A) did not reveal any significant cultural resources on the Site. Although no cultural resources have been discovered to date, an unanticipated discovery action plan (Appendix E) was prepared to address potential historic or archaeologically significant items that may be revealed during construction.

3 PROJECT ORGANIZATION AND SCHEDULE

3.1 Project Organization

The following organization shall apply to the project:

- Regulator—Ecology; Scott Rose
- Owner—Port; David Ripp, Executive Director
- Engineer—MFA; Jacob Faust, PE
- Surveyor—KC Development; Cindy Halcumb, PLS
- Geotechnical engineer—Apex Companies; Stu Albright
- Site work contractor—to be determined
- Transformer remediation contractor—to be determined

3.2 Schedule

The project design and permitting are anticipated to be completed by June 2014. The Port will solicit contractor bids for the work in June 2014, with anticipated construction between September and October 2014. Note that construction will be somewhat dependent on weather, with the hope that dry weather will allow the log pond water to evaporate and allow construction without the need for dewatering.

4 REMEDIAL ACTION

4.1 Remedial Action Objectives

Soil and groundwater have been contaminated as a result of past activities at the Site. People are typically exposed to contaminated soil via dermal contact, inhalation of soil particles, or incidental ingestion of soil; or to groundwater by direct contact or ingestion. Potential human receptors (i.e., those potentially encountering complete human health exposure pathways) include on-site commercial workers, on-site construction workers, and on-site recreationists.

The following remedial action objectives are intended to prevent or minimize these risks:

- Direct contact, inhalation, or ingestion of contaminated soil by human or ecological receptors
- Direct contact, inhalation, or ingestion of harmful vapors by human or ecological receptors
- Direct contact or ingestion of contaminated groundwater by human or ecological receptors

4.2 Remedial Action Components

The remedial action components described in this section will be implemented to meet the cleanup standards described in the CAP (Ecology, 2013) and to address potentially buried transformers. Methods for completing the work are described in Section 5 of this report. The locations of remedial components described in this section are shown on Figure 2 and on the attached drawings. In addition, the magnetic anomalies that could potentially be buried transformers are shown on Figure 3.

4.2.1 Dewater Log Pond

Log pond liquid will be characterized and disposed of as appropriate. Dewatering is anticipated to take place in late summer or fall, when water levels are lowest, to limit the amount of disposal required. Dewatering will be required before consolidation of impacted soil materials in the pond.

4.2.2 Consolidate Impacted Materials in Log Pond

The former log pond will be used to consolidate impacted soil to the maximum extent practical. The log pond has approximately 3,500 cubic yards of capacity available for consolidation of impacted soils and other debris suitable for structural fill. Some soils originally intended for capping may be consolidated in the log pond to reduce above-grade cap placement and maintain existing site grades (i.e., excavate soils, then place a 2-foot-thick cap). The following estimated quantities, listed in preferential order and as pond capacity allows, will be consolidated in the evacuated log pond:

- Impacted stockpile (500 cubic yards)
- Impacted soils from adjacent property (100 cubic yards)
- Impacted soils adjacent to log pond (600 cubic yards)
- Impacted soils in former aggregate recycling area (700 cubic yards [top 2 feet])
- Soils from potential transformer burial area (unknown)
- Crushed demolition debris including concrete and gravel (1,500 cubic yards)

Materials determined to have high organic content or other undesirable properties will not be placed in the log pond. Once eligible materials are consolidated in the log pond, a 2-foot-thick, clean soil cap underlain by demarcation fabric will be installed over the log pond area. The final cap will be constructed to blend into surrounding grades to the maximum extent practical.

4.2.3 Cap Former Aggregate Recycling Area

The former aggregate recycling area will be capped with 2 feet of clean material. The cap will be underlain by a demarcation layer to delineate the interface between clean and potentially impacted soils. One to 2 feet of the impacted surface soil may be removed and consolidated in the log pond in order to reduce the amount of aboveground cap placement; aboveground cap placement creates a high point on the site that may inhibit construction activities for future development and could create stormwater drainage issues in the interim. The potential electrical transformer burial area is located beneath the aggregate recycling area, so some of the underlying soil may be excavated and handled as part of the investigation described in Section 5.4, which would also lower the subgrade before capping.

4.2.4 Cap Impacted Soils Adjacent to Log Pond

Impacted soils around the log pond will be capped with 2 feet of clean material. The cap will be underlain by a demarcation layer to delineate the interface between clean and potentially impacted soils. One to 2 feet of the impacted soil may be removed and consolidated in the log pond in order to reduce the amount of aboveground cap placement. The soil cap will be constructed to blend smoothly with the log pond area soil cap and surrounding grades to provide a more usable base surface for future construction and development.

4.2.5 Impacted Soils on Adjacent Property

Approximately 100 cubic yards of soil located on the adjacent Killian's property will be excavated and consolidated in the log pond. The soils are located in the vicinity of a former fuel oil storage tank. Samples of the soil analyzed during the FSA determined that low levels of polycyclic aromatic hydrocarbons are present below MTCA CULs; however, the soil had a petroleum-hydrocarbon-like odor. The Port will excavate the soils and combine them with impacted soils in the log pond. The excavation will be backfilled with clean soil to match existing grades.

4.2.6 Remediation of Possible Buried Electrical Transformers

A geophysical site investigation (Appendix C) revealed the location where electrical transformers may be buried beneath the former aggregate recycling area (see Figure 3). If these transformers exist, they could contain PCBs that will require remediation. Additionally, if the transformers were to degrade and leak oil, the surrounding soils could also be contaminated with PCBs, oils, or other contaminants. During construction, the area will be investigated further to determine the presence and location of the transformers, and appropriate steps as described in Section 5.4 will be taken to adequately remediate any resultant impacts.

4.2.7 Institutional Controls

The following institutional controls will be implemented to manage and restrict future use of the Site:

- Soil Management Plan—A soil management and cap maintenance plan will be developed to outline procedures for maintaining the cap and for handling impacted soils during potential future excavation and site work. The soil management plan will be included with the remedial action completion report to properly address cleanup actions completed at the Site.
- Groundwater Restriction—A restrictive covenant will be employed to prohibit the use of Site groundwater for potable purposes.
- Groundwater Monitoring—A groundwater monitoring plan will be included with the construction completion report. Groundwater monitoring is anticipated to be completed on an 18-month schedule following site cleanup until CULs are achieved.
- Vapor Intrusion—If methylene chloride is detected in log pond sediment above MTCA Method A CULs, vapor intrusion restrictions will be instituted for any structures built above the pond area.

4.3 Additional Site Work

Additional work will be completed that is incidental to the remedial action or that may otherwise be required for site cleanup and stormwater runoff control. Work will include demolition of concrete and asphalt, consolidation and removal of wood waste and organic debris, modification of the stormwater system, and site grading.

4.3.1 Demolition

Impervious surfaces, rubble, and other debris are located throughout the Site. Approximately 1.5 acres of asphalt paving currently cover the Site. Concrete rubble from former building foundations and other miscellaneous slabs also remains adjacent to the log pond and at the southeast corner of the Site. To facilitate remediation and remedy protection, concrete and asphalt will be demolished and graded or backfilled with clean soil. Demolished materials will be crushed and used as inert fill materials or will be exported from the Site.

4.3.2 Organic Material Removal

Woody, organic material (bark chips, sawdust, logs, etc.) from lumber mill operations is persistent throughout the Site. Organic material is stockpiled at several locations around the Site and is mixed into the surficial layers of soil and gravel. Stockpiled organic materials will be consolidated and removed from the Site for disposal at an approved facility as budget allows to accommodate cleanup and remedy protection.

4.3.3 Stormwater System Modifications

The stormwater system will be modified to ensure on-site retention and infiltration of stormwater. The existing inlet and manhole (potential UIC) in the northwest portion of the Site will be demolished and backfilled with clean material. Pipes will be removed where practical or grouted and decommissioned in place.

The stormwater inlet adjacent to the log pond will be removed. The downstream manhole and outfall will remain in place and reserved for future development. Any inlet pipes will be plugged to prevent inflow of stormwater in the interim condition.

Low points, berms, and swales will be constructed to promote drainage to low points, encourage surface infiltration, and prevent stormwater from leaving the Site. Berms will be constructed to retain all stormwater onsite as shown on Figure 4 (storage calculations are summarized in Table 3). Runoff calculations are included in Appendix F.

4.3.4 Site Grading

Site grading will be limited to cap areas, demolition areas, and as necessary to promote drainage and prevent stormwater from leaving the Site. Grading will involve excavation of stockpiles, consolidating materials in the log pond, placing cap soil, smoothing site grades incidental to remedial and demolition activities, and constructing berms or swales for interim stormwater management. Site grading is shown in the attached drawings.

4.3.5 Monitoring Well Decommissioning

On-site groundwater monitoring wells MW-3, MW-5, and MW-6 will be decommissioned as part of the remedial action. Monitoring well MW-7 will remain to allow for ongoing groundwater monitoring. Monitoring wells will only be decommissioned after the buried electrical transformer investigation and removal (Section 4.2.6) is complete.

5 REMEDIAL ACTION CONSTRUCTION METHODS

5.1 Log Pond Dewatering

The log pond will be dewatered before placement of fill. The liquid volume in the pond varies by season and is assumed to fluctuate because of surface water runoff and direct precipitation (no groundwater or river surface elevation effects). The minimum volume of water in the pond was calculated according to the most recent topographical survey;[2] the estimated minimum volume of liquid that will require pumping and disposal from the pond is 59,000 gallons.[3] Maximum volume was also calculated based on the water surface elevation from a previous survey;[4] the estimated maximum volume of liquid requiring pumping and disposal is 525,000 gallons. Because of the significant range in potential volume, the pond preferably will be dewatered in late summer or early fall to minimize the quantity of liquid disposal.

Pond liquid will first be pumped into temporary storage tanks. The liquid will then be characterized to determine appropriate disposal methods. Samples will be analyzed as follows:

- For arsenic and lead by USEPA Method 6020
- For petroleum hydrocarbons by NWTPH-Dx and NWTPH-Gx

If results show that the liquid is clean of contaminants, it may be used for dust suppression during construction. If results identify contaminants in the liquid above MTCA CULs, followup analysis will be completed as necessary for off-site disposal and the liquid will be loaded to tanker trucks and hauled to an appropriate disposal facility.

After dewatering, pond sediments will be sampled for VOCs because of historical detections of methylene chloride (Ecology, 2013). If VOCs are detected above MTCA Method A CULs, institutional controls will be adopted, as discussed in Section 4.2.7. Sediment samples will be analyzed for chemicals by the following method:

- For VOCs by USEPA Method 8260B with USEPA Method 5035 sample preparation

5.2 Impacted-Soil Consolidation

On-site impacted and inert materials will be consolidated in the log pond as described in Section 4.2.2. The log pond will first be dewatered as described in the previous section. Next, the log pond bottom will be prepared as described in the geotechnical report (Appendix D) as follows:

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[2] Survey report prepared by KC Development, January 4, 2014. Survey data collected in December 2013.
[3] The pond has been observed nearly empty in late season conditions (September), but volume estimates assume dewatering before this occurs.
[4] Survey prepared by KC Development, February 9, 2012. Survey data collected in January 2012.

- Install a layer of geogrid over the existing log pond sediments.
- Install and compact a 24-inch-thick layer of permeable ballast or crushed concrete to provide a base stabilization layer for fill placement.
- Install a 6-inch-thick layer of crushed surfacing base course as a filter layer.

Upon preparation of the log pond bottom, the impacted materials will be consolidated first, then inert demolition materials (concrete), followed by other excess soils or gravel. Concrete may be crushed and used as a base stabilization layer as described in the geotechnical report. Fill will then be placed in lifts no greater than 8 inches and compacted to at least 85 percent of the maximum dry density for native soils (American Society for Testing and Materials D 1557, Modified Proctor Test). Materials placed in the log pond shall not exceed a maximum organic content of five percent. Once material consolidation is complete, a clean soil cap will be installed as described in Section 5.3.

5.3 Site Grading and Cap Placement

Site preparation will begin before the start of earth-moving activities. Generally, site preparation will include the installation of erosion and sediment controls, consistent with the requirements of the Ecology and City of Washougal erosion-control standards. Perimeter sediment-control best management practices will prevent sediment from entering roadways, adjacent properties, and the Columbia River. The perimeter sediment control that will be used at the Site is temporary sediment-control (silt) fencing. Sediment-control fencing will be placed along the property line and/or the limits of construction. Wet season (October 1 through April 30) best management practices will be implemented, if construction extends beyond October 1 (e.g., cover stockpiles with plastic sheeting during periods of extended rain and when the area is to be left exposed for more than two days).

The existing concrete pads, foundation, and asphalt surfaces will be demolished using standard construction equipment. The concrete material will be crushed and can be reused as aggregate for preparation of the log pond fill area.

It is expected that standard construction equipment, including bulldozers, loaders, trucks, and compaction equipment, will be used to construct the remedial caps. The construction contractor will be responsible for the means and methods of remedial action implementation, consistent with the plans and specifications, including selection of the appropriate equipment.

Generally, the soil cap placement will include subgrade preparation and grading, installation of the demarcation fabric, and placement of soil or gravel in 8-inch lifts. Impacted soils will not be removed from the Site during this remedial action.

Appropriate dust-control methods will be employed during subgrade preparation and site grading. Dust control will rely primarily on soil wetting and use of gravel work roads.

Three stockpiles (two on site, one on the adjacent eastern site) will be utilized to establish site grades and construct the caps (see Figure 2). Two on-site stockpiles of clean soil (approximately 3,500 cubic yards total) will be used first for fill and cap construction; once all on-site materials have been used, the off-site stockpile will be used as necessary for site grading and cap construction. Additional materials, including gravel and rock, will be imported and stockpiled on site for use in log pond preparation. Procedures for cap placement include the following:

- Place demarcation fabric.
- Dump and spread clean gravel or soil in 1-foot lifts.
- Compact each lift consistent with the specifications.
- Apply hydromulch and seed mix to the completed soil cap.

Site grading will be limited to consolidation of soils in the log pond, establishment of surrounding site grades in cap areas, smoothing of demolition areas (concrete and asphalt), and other grading necessary to prevent stormwater from leaving the Site (construction of small berms or depressions).

5.4 Remediation of Electrical Transformers

The former aggregate recycling area has been identified as a potential location of buried electrical transformers. The area will be investigated and remediated as necessary to meet remedial goals, which will be discussed with Ecology during implementation. This work will be performed by a contractor specializing in remediation of buried containers and having the required knowledge of electrical transformer remediation. The contractor will be required to submit a work plan specifying the appropriate actions for remediation of potential buried transformers and surrounding impacted soils.

The investigation will focus on areas identified as having strong magnetic anomalies, as shown in the geophysical site investigation (Appendix C). Burial depths are estimated at 5 to as much as 20 feet bgs. Soils will be excavated with caution to minimize the potential for damaging buried materials and releasing contaminants. All excavated soils will be stockpiled on the asphalt pad immediately west of the investigation area (see Figure 3). Stockpiles will be covered with plastic if anticipated to remain for more than three days, or if the weather forecast predicts precipitation events that could cause erosion of the stockpiles.

If debris resembling an electrical transformer is encountered at any point during the excavation, soil removal will focus in the vicinity of the debris until it can be identified. If the debris is identified as inert (metal pieces, pipes, etc.), it will be removed and taken off site for recycling. If the debris is identified as a transformer or other potentially contaminated material (barrels, containers, underground storage tank, etc.), the following actions will be taken:

- The item will be observed for damage (holes, dents, leaks).
- Soil samples will be obtained from the excavation and submitted for laboratory analysis.
- The extent and nature of impacts, if applicable, will be characterized.
- Any fluids will be removed from objects before the objects are removed from the excavation.
- An approved contractor will remove contaminated materials and dispose of them in appropriate facilities.

Soils excavated around any potentially contaminated items will be stockpiled separately, sampled, and sent for laboratory analysis as follows:

- For diesel-range organics by Method NWTPH-Dx
- For PCBs by USEPA Method 8082

PCBs and lead above MTCA CULs were previously detected in the area, and petroleum hydrocarbons could be a component of the fluid in the transformers, if present. Nonhazardous soils will be consolidated in the log pond or placed back into the investigation (if deeper than 2.0 feet bgs) and capped with other site soils or returned to the excavation as backfill and compacted according to the recommendations in the geotechnical report (see Appendix D).

Other excavated soil (not adjacent to buried suspect materials) will be reused to backfill the excavation and placed according to the recommendations in the geotechnical report. Once final surface grades are established, the demarcation fabric and soil cap will be installed as described in Section 5.3.

5.5 Monitoring Well Decommissioning

Monitoring wells MW-3, MW-5, and MW-6 will be decommissioned, following applicable state law, by overdrilling and filling the resulting boring with a bentonite grout or by other means approved by the state. Figure 2 shows the location of the monitoring wells to be decommissioned.

6 APPLICABLE REGULATIONS AND PERMITTING

The work will be performed with Ecology's oversight under the Order. State law exempts parties from having to acquire state and local permits or approvals for cleanup actions that are conducted under an agreed order (Revised Code of Washington 70.105D.09). The purpose of this is to avoid duplicative review between Ecology and local regulators and to expedite approved cleanup actions. The substantive requirements of local laws and regulations must be met, but strict adherence to the procedural processes is not required.

Substantive requirements of local laws and permits that would otherwise be required to perform this work include the following:

- Shoreline Permit (City of Washougal)
- Grading Permit (City of Washougal)

The requirements of these permits will be adhered to, and the City of Washougal will be included in communications pertaining to the applicable requirements.

The project will remain above the ordinary high water mark of the Columbia River and will be completed above the FEMA 100-year floodplain. Therefore, no federal permits will be required for the project.

Ecology has completed a State Environmental Policy Act review for the project and related activities on the Site.

A National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit will be obtained before the start of construction. The NPDES permit is a national permit administered by the state of Washington Department of Ecology. The permit for the remedial action will be combined with the Phase 2 waterfront revitalization project (waterfront trail construction) to avoid a second permit process for construction occurring on the site in sequential years.

7 WORK SEQUENCING

The remedial work is anticipated to take place according to the following sequence:

- Install erosion-control measures and prepare site.
- Begin investigation of possible transformers.
- Dewater log pond.
- Demolish impervious surfaces and stormwater structures, and stockpile / dispose of demolition materials.
- Prepare log pond bottom for fill placement.
- Decommission monitoring wells (after transformer investigation/removal is complete and after Port authorization).
- Consolidate impacted stockpile in log pond.
- Consolidate impacted soils (other than from stockpile) in log pond area.
- Consolidate other inert materials in log pond area.
- Install soil caps over impacted soil areas.
- Grade berms for stormwater control.
- Install soil cap over pond fill area.
- Smooth remaining site grades where disturbed.
- Hydroseed disturbed soil areas.
- Clean up and demobilize from Site.

The Contractor will be responsible for determining the final work sequencing to complete the project. An anticipated cost to complete the prescribed work is included in Table 2 following the report.

LIMITATIONS

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

REFERENCES

CEC and Evren. 2006. Phase I environmental site assessment (ESA). Prepared for Hambleton Lumber Company. Certified Environmental Consultants, Inc., Vancouver, Washington, and Evren Northwest, Inc., Portland, Oregon. July 13.

CEC and Evren. 2008. Preliminary work plan for log pond decommissioning. Prepared for Hambleton Lumber Company. Certified Environmental Consultants, Inc., Vancouver, Washington, and Evren Northwest, Inc., Portland, Oregon. August 8.

CEC and Evren. 2009. Draft initial independent cleanup report and risk assessment. Prepared for Hambleton Lumber Company. Certified Environmental Consultants, Inc., Vancouver, Washington, and Evren Northwest, Inc., Portland, Oregon. October 16.

Ecology. 2013. Cleanup action plan, Hambleton Bros Log Yard, Washougal, WA. Washington State Department of Ecology, Lacey, Washington. May.

MFA. 2012. Focused site assessment report. Prepared for the Port of Camas-Washougal. Maul Foster & Alongi, Inc., Vancouver, Washington. January 16.

WRCC. 2013. Western Regional Climate Center. http://www.wrcc.dri.edu/, April.

MFA. 2013. Terrestrial and ecological evaluation. Prepared for the Port of Camas-Washougal. Maul Foster & Alongi, Inc., Vancouver, Washington. May 17.

TABLES

Table 1
Summary of Cleanup Levels
Former Hambleton Lumber Mill
Washougal, Washington

Indicator Hazardous Substances	Soil CULs (mg/kg)
Metals	
Lead	250
Mercury	2
Polychlorinated Biphenyls	
Total PCBs	1
Petroleum Hydrocarbons	
DRO	2000
RRO	2000
Carcinogenic Polycyclic Aromatic Hydrocarbons	
Benzo(a)anthracene	NV
Benzo(a)pyrene	0.1
Benzo(b)fluoranthene	NV
Benzo(k)fluoranthene	NV
Chrysene	NV
Dibenzo(a,h)anthracene	NV
Indeno(1,2,3-cd)pyrene	NV
cPAH TEC	0.1
Volatile Organic Compounds	
Methylene chloride	0.02

NOTES:

cPAH TEC = carcinogenic polycyclic aromatic hydrocarbon toxicity equivalent concentration.

CUL = cleanup level.
DRO = diesel-range organics.
mg/kg = milligrams per kilogram.
µg/L = micrograms per liter.
NV = no value.
PCB = polychlorinated biphenyl.
RRO = residual-range organics.

TABLE 2
ENGINEER'S PRELIMINARY COST ESTIMATE

Title:	**Remedial Cost Estimate**		
Project:	Hambleton Bros Log Yard Remediation		
Client:	Port of Camas-Washougal		
Project #/Task:	0229.04.08	Initial	
Prepared By:	Zachary Pyle, EIT	ZP	
Checked By:	Jacob Faust, PE	JF	
Date:	5/6/2014		
Revision #.:	0		

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360.433.0251 (f)
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Cost Estimate Summary—Engineer's Estimate

Schedule "A"—Temporary Erosion and Sediment Control	**$**	**4,899**
Schedule "B"—Demolition	**$**	**37,676**
Schedule "C"—Pond Dewatering	**$**	**20,020**
Schedule "D"—Pond Base Preparation	**$**	**36,185**
Schedule "E"—Consolidate Materials in Pond	**$**	**26,880**
Schedule "F"—Install Soil Caps	**$**	**16,865**
Schedule "G"—Other Site Modifications	**$**	**18,810**
Schedule "H"—Finish Grading and Site Reclamation	**$**	**7,600**
Schedule "I"—Potential Transformer Remediation	**$**	**250,000**
Schedule "J"—Soft Cost	**$**	**138,249**
Total:	**$**	**557,184**

Assumptions:

1. Unit costs based on available data from similar projects, and commercial cost estimating sources.
2. Costs are to be considered feasibility level and should not be used for actual construction estimating.
3. Capping and surcharge loading will be used to consolidate partially dried sludge.
4. Competent subgrade material exists below existing lagoon floor liner.
5. Contingency of 15% applied to all direct costs.
6. Costs are rounded to the nearest whole dollar.
7. All costs assume materials are furnished and installed by the contractor.
8. Transformer remediation costs obtained from contractor quotes. Assumes 20 buried transformers, removal and disposal of surrounding impacted soils.

Table 3
Stormwater Storage Calculations
Former Hambleton Bros. Log Yard Remedial Action
Washougal, Washington

Assumptions:

1. SBUH method used to determine design storm runoff volume.
2. Infiltration not inlcuded in calculation for conservative design approach.
3. Runoff curve number obtained from NRCS TR-55 document, Table 2-2a.
4. Storage designed for final site condition. Stormwater will be stored primarily in excavations and existing low areas before fill placement and cap installation.
5. Runoff Volume calculated using HydroCAD version 10.0 software.
6. Continuous hydrologic model not required for calculation showing 100% onsite retention of stormwater. No flowrate-dependent BMPs are inlcuded in ESCP design.

Constants:

Contributing Area	2.19 Acres	
Design Storm	2-yr, 24-hr	
Design Storm Depth	2.8 inches	
Runoff Curve No.	79	Open Space, Poor Condition, <50% grass)
Time of Concentration	5 minutes	

Runoff Calculation

Total Runoff Volume	8,276 cubic feet

Available Storage Volume (see Figure 4)

Upper Storage Area	4,670 cubic feet
Middle Storage Area	2,268 cubic feet
Lower Storage Area	6,075 cubic feet
Total Storage	13,013 cubic feet

FIGURES

Site Address: 335 South A Street, Washougal, Washington
Source: US Geological Survey (1990) 7.5-minute topographic quadrangle: Camas & Washougal
A portion of the David C. Parker DLC No. 48; situated in the SW 1/4 of the SE 1/4 of Section 12 and in the NE 1/4 of the NE 1/4 of Section 13, Township 1 N, Range 3E, W.M., Clark County, Washington

Note: Site boundary is approximate.

Legend

Site Boundary

Figure 1
Site Location

Port of Camas-Washougal
Washougal, Washington

0 1,000 2,000
Feet

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Path: X:\0229.04\08 Remedial Action\Projects\Fig1 Site Location.mxd
Print Date: 5/6/2014
Approved By: lfaust
Produced By: rmaronn
Project: 0229.04.08

Figure 2
Site Features

Port of Camas-Washougal
Washougal, Washington

Legend

- Monitoring Well
- Manhole
- Outfall
- Catch Basin
- Stockpile
- Fill
- Aggregate Recycling Area

Remediation Areas

- *Impacted Log Pond Sediment*
- *Impacted Mill Area Soil*
- *Impacted Aggregate Recycling Area Soil*
- Site Boundary
- Property Boundary

Notes:
1. Site features were interpreted from aerial photography and gathered from Figures 2, 3, and 11 of the Initial Independent Cleanup Report and Risk Assessment by Certified Environmental Consulting, Inc. and Evren Northwest (October 16, 2009).
2. Potential fill based on site contact interview.
3. UST = Underground Storage Tank.
4. Property boundary is approximate and based on legal description provided by KC Development (Sept. 10, 2012).
5. Site boundary is approximate.

0 75 150
Feet

Source: Aerial photograph obtained from USDA 2013 NAIP.

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Project: 0229.04.08-02 Produced By: rmaronn Approved By: ahughes Print Date: 3/26/2014 Path: X:\0229.04.08 Remedial Action\Projects\Fig2 Site Features 20140326.mxd

Path: X:\0229.04\08_Remedial_Action\Projects\Fig3_Magnetic Anomaly Locations_20140326.mxd

Source: Aerial imagery obtained from Esri ArcGIS Online.

Notes:
1. Site boundary is approximate.
2. Magentic anomalies surveyed by Zonge International, Inc. (July 2013).

Legend

- Manhole
- Catch Basin
- Magnetic Anomaly
- Stockpile
- Aggregate Recycling Area
- Fill
- Site Boundary

Figure 3
Magnetic Anomaly Locations

Port of Camas-Washougal
Washougal, Washington

0 35 70
Feet

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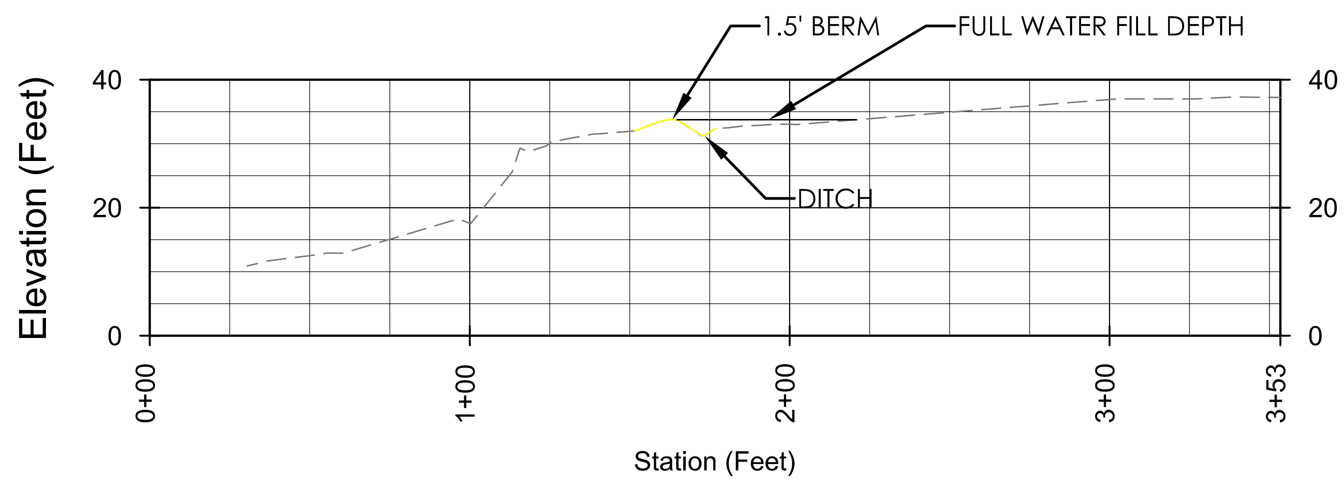
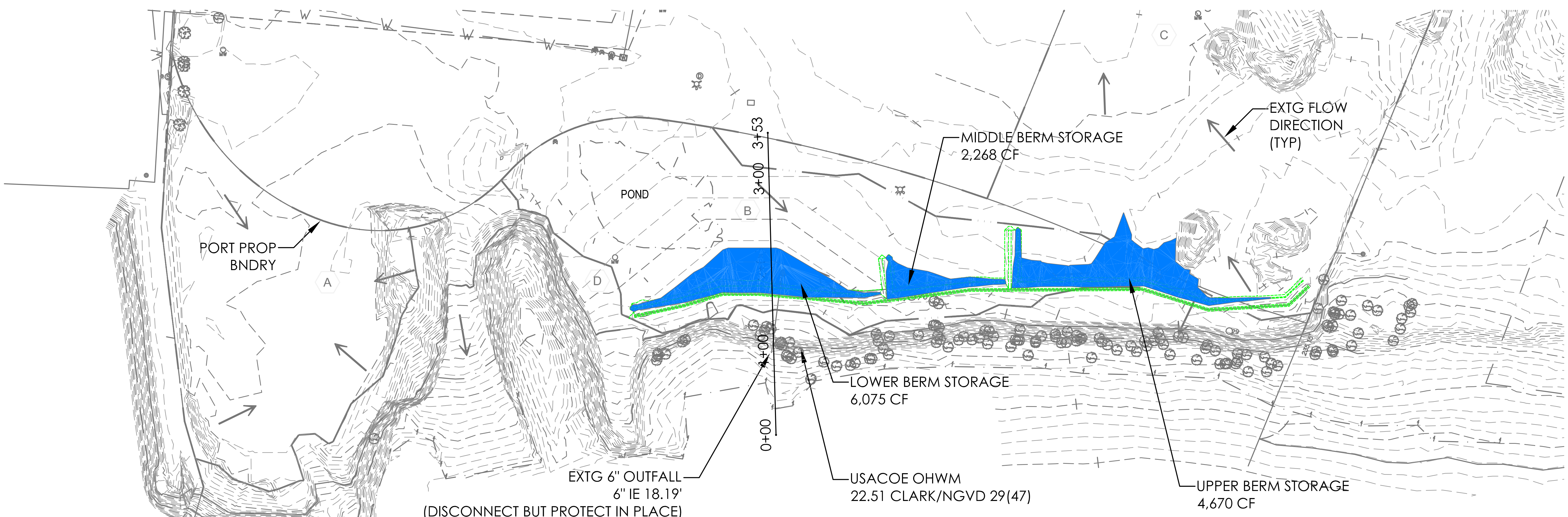
Project: 0229.04.10-01 Produced By: rmaronn Approved By: jfaust Print Date: 3/26/2014



PROFILE VIEW OF SECTION Alignment - (6)2
HORIZONTAL SCALE: 1" = 60' VERTICAL SCALE: 1" = 30'
VERTICAL EXAGGERATION: 2



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Printed by:Jacob Faust

Date: 7/2/2014 1:58:09 PM

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This figure prepared as supplemental visual information only and should not be used for construction purposes. Only plan sheets approved, stamped and signed by a registered professional engineer in the state of governing jurisdiction shall be used for construction. Additionally, only plans approved by the applicable governing jurisdiction(s) shall be used for final construction unless otherwise expressly noted in writing by the engineer of record.

0 120' 240'

NOTE: BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

Figure 4
STORMWATER VOLUME CONTAINMENT AREA

Former Hambleton Bros. Log Yard - Remedial Action
Washougal, WA

DRAWINGS

REMEDIAL ACTION

FORMER HAMBLETON BROS. LOG YARD

PREPARED FOR:

PORT OF CAMAS-WASHOUGAL

WASHOUGAL, WA

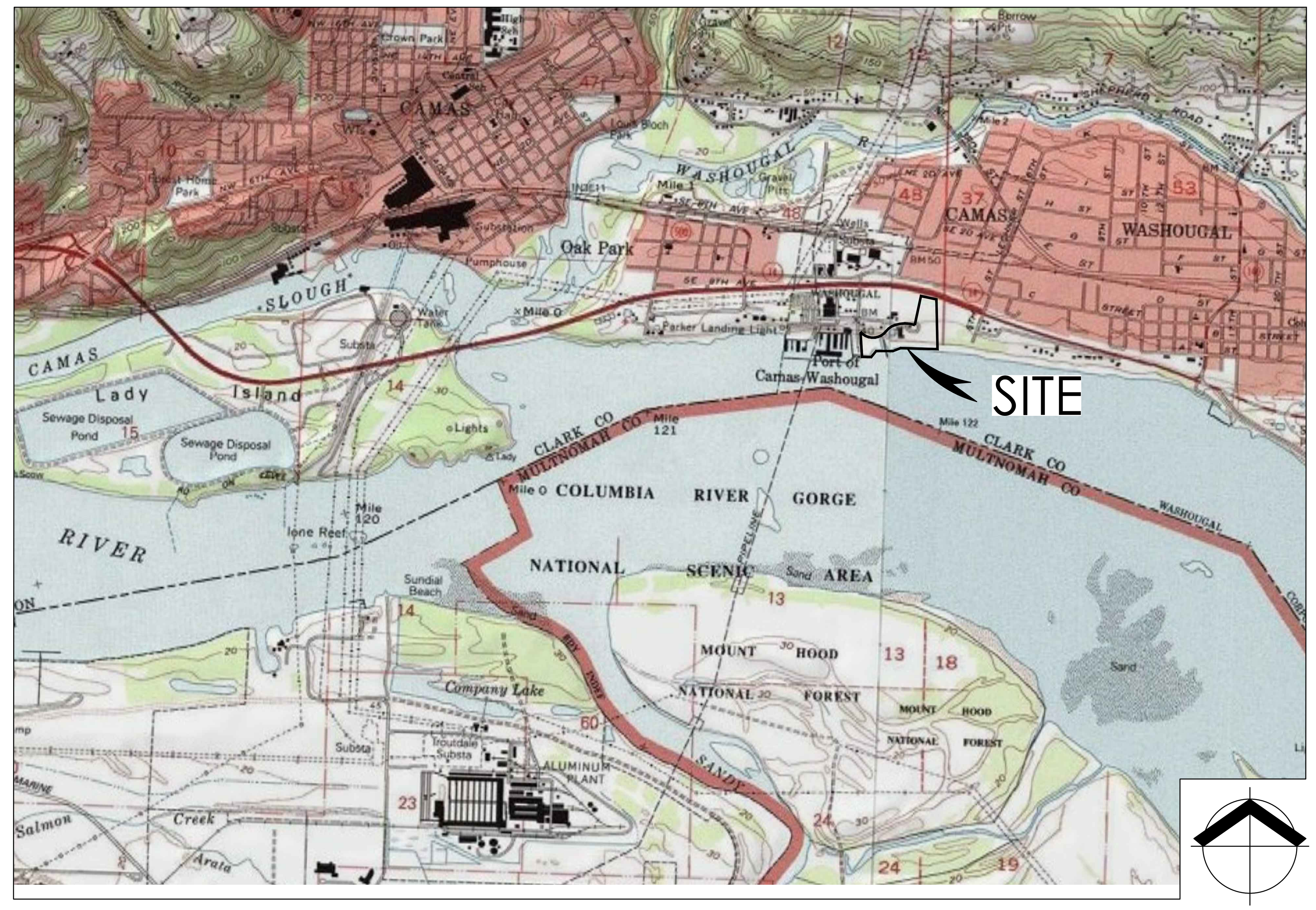
PROJECT CONTACTS

CLIENT	ENGINEER
PORT OF CAMAS-WASHOUGAL 24 SOUTH A STREET WASHOUGAL, WA 98671 P: 360-825-2196 DAVID RIPP, EXECUTIVE DIRECTOR david@portcw.com	MAUL, FOSTER & ALONGI, INC. 400 E. MILL PLAIN BLVD. SUITE 400 VANCOUVER, WA 98660 P: 360-694-2691 JACOB FAUST, PE jfaust@maulfoster.com
SURVEYOR	**GEOTECHNICAL ENGINEER**
KC DEVELOPMENT P.O. BPX 398 P: 360-834-2519 CINDY HALCUMB cindy@kcdevelopment.net	APEX COMPANIES 3015 SW FIRST AVENUE PORTLAND, OF 97201 P: 503-924-4704 STUART ALBRIGHT, PE SAlbright@apexcos.com
AGENCY	
WASHINGTON DEPARTMENT OF ECOLOGY PO BOX 47775 OLYMPIA, WA 98504 P: 360-407-6347 SCOTT ROSE, LG - UNIT SUPERVISOR sros461@ecy.wa.gov	

PROJECT SUMMARY

SITE LOCATION:
SOUTH 2ND STREET
WASHOUGAL, WA

PROJECT DESCRIPTION:
THE PORT OF CAMAS-WASHOUGAL PLANS TO IMPROVE THE SITE FOR USE AS A MIXED-USE COMMERCIAL DEVELOPMENT. IN ORDER TO PREPARE THE SITE FOR DEVELOPMENT, THE PORT WILL COMPLETE ENVIRONMENTAL CLEANUP ACTIONS THAT WILL ALLOW FOR THE INTENDED FUTURE USE. THE REMEDIATION WILL INVOLVE CONSOLIDATING CONTAMINATED SOILS AND INERT DEBRIS IN A FORMER LOG POND, INSTALLING A SOIL CAP OVER CONTAMINATED SOILS, AND INVESTIGATION AND REMOVAL OF POSSIBLE BURIED ELECTRICAL TRANSFORMERS.



VICINITY MAP

APPX. SCALE: 1" = 2000'

SHEET INDEX

GENERAL NOTES

1. SURVEY PERFORMED BY KC DEVELOPMENT, JANUARY 2014.
2. HORIZONTAL DATUM: WASHINGTON STATE PLANE COORDINATE SYSTEM SOUTH ZONE, NAD 83/91. ELEVATION DATUM: CLARK/NGVD29(47).
3. CONTRACTOR TO VERIFY ALL UTILITY LOCATIONS AND DEPTHS PRIOR TO CONSTRUCTION. A MINIMUM OF TWO FULL BUSINESS DAYS PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL CALL 811 (UTILITY NOTIFICATION CENTER) FOR LOCATION MARK-UP OF EXISTING UTILITIES.
4. ALL CONSTRUCTION, MATERIALS, AND WORKMANSHIP SHALL CONFORM TO THE LATEST STANDARDS AND PRACTICES OF THE CITY OF WASHOUGAL AND THE LATEST EDITION OF THE "STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION" PREPARED BY WSDOT/APWA.
5. IN CASE OF A CONFLICT BETWEEN THE REGULATORY STANDARDS OR SPECIFICATIONS, THE MORE STRINGENT REQUIREMENT WILL PREVAIL.
6. ANY CHANGES TO THE DESIGN AND/OR CONSTRUCTION SHALL BE APPROVED BY THE OWNER OR ENGINEER.
7. APPROVAL OF THESE PLANS DOES NOT CONSTITUTE AN APPROVAL OF ANY OTHER CONSTRUCTION NOT SPECIFICALLY SHOWN ON THE PLANS. PLANS FOR STRUCTURES SUCH AS BRIDGES, BUILDINGS, TANKS, VAULTS, ROCKERIES, AND RETAINING WALLS MAY REQUIRE A SEPARATE REVIEW AND APPROVAL BY THE BUILDING DEPARTMENT PRIOR TO CONSTRUCTION.
8. A COPY OF THESE APPROVED PLANS SHALL BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
9. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ALL CONSTRUCTION EASEMENTS AND PERMITS NECESSARY TO PERFORM THE WORK.
10. THE CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION STAKING.
11. PUBLIC AND PRIVATE DRAINAGE WAYS SHALL BE PROTECTED FROM POLLUTION. NO MATERIAL IS TO BE DISCHARGED TO OR DEPOSITED IN STORMWATER SYSTEMS, THAT MAY RESULT IN VIOLATION OF STATE OR FEDERAL WATER QUALITY STANDARDS.
12. ALL CONSTRUCTION WITHIN THE PUBLIC RIGHT-OF-WAY SHALL HAVE AN APPROVED PUBLIC RIGHT-OF-WAY WORK PERMIT PRIOR TO ANY CONSTRUCTION ACTIVITY WITHIN THE RIGHT-OF-WAY.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACTOR. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST ADOPTED EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) PUBLISHED BY THE U.S. DEPARTMENT OF TRANSPORTATION. TWO-WAY TRAFFIC MUST BE MAINTAINED AT ALL TIMES ON THE ADJACENT PUBLIC STREETS.
14. ANY PUBLIC OR PRIVATE CURB, GUTTER, SIDEWALK, OR ASPHALT DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED TO CITY OF WASHOUGAL STANDARDS AND PRACTICES.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF ADJACENT UTILITIES WHICH MAY INCLUDE, BUT ARE NOT LIMITED TO, WATER, SANITARY SEWER, STORMWATER, POWER, TELEPHONE, CABLE TV, GAS, IRRIGATION, AND STREET LIGHTING. THE CONTRACTOR SHALL NOTIFY RESIDENTS AND BUSINESSES 48 HOURS IN ADVANCE OF ANY WORK AFFECTING ACCESS OR SERVICE AND SHALL MINIMIZE INTERRUPTIONS TO DRIVEWAYS FOR RESIDENTS AND BUSINESSES ADJACENT TO THE PROJECT.
16. ALL LAWN AND VEGETATED AREAS DISTURBED WILL BE RESTORED TO ORIGINAL CONDITION. ANY DISTURBANCE OR DAMAGE TO OTHER PROPERTY ON ADJACENT PARCELS OR IN THE PUBLIC RIGHT-OF-WAY SHALL ALSO BE REPAIRED OR RESTORED TO ORIGINAL CONDITION WITH NO COST ADDITION TO THE CONTRACT.

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PORT OF CAMAS-WASHOUGAL

FORMER HAMBLETON BROS. LOG YARD REMEDIAL ACTION
PORT OF CAMAS-WASHOUGAL
WASHOUGAL, WASHINGTON

ISSUE	DATE	DESCRIPTION
	07/01/14	ISSUED FOR PERMIT
####		---
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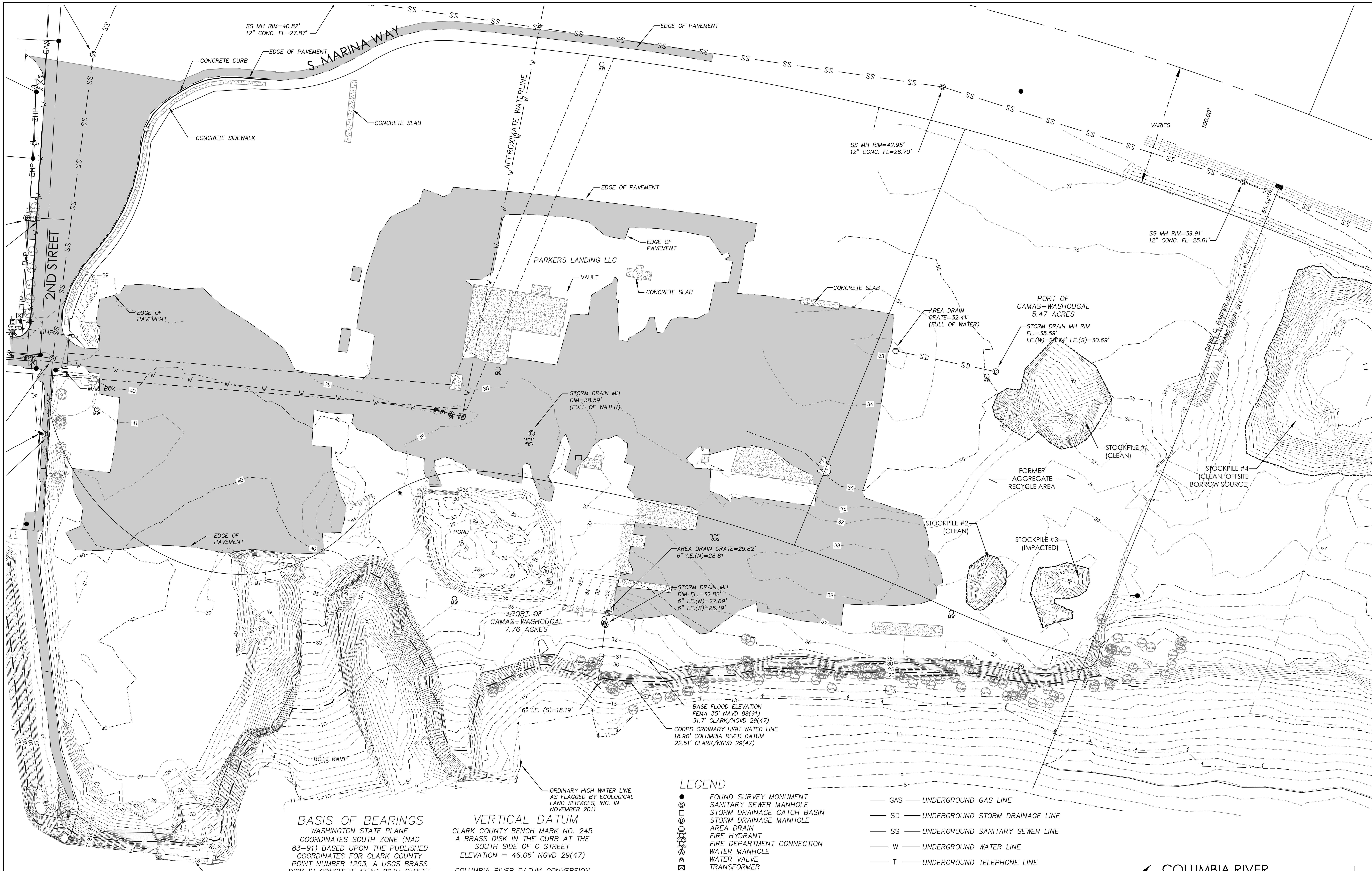
PROJECT: 0229.04.08
DESIGNED: J. FAUST
DRAWN: J. FAUST
CHECKED: A. HUGHES
SCALE
SCALE AS NOTED
NOTE: BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.
SHEET TITLE
COVER
SHEET
C0

PERMIT SET



SITE LOCATION

A PORTION OF THE DAVID C. PARKER DLC NO. 48;
SITUATED IN THE SE 1/4 OF THE SE 1/4 OF SECTION 12
AND IN THE NE 1/4 OF THE NE 1/4 OF SECTION 13,
TOWNSHIP 1 NORTH, RANGE 3 EAST, W.M.,
CLARK COUNTY, WASHINGTON

JANUARY 4, 2014

BASIS OF BEARINGS

WASHINGTON STATE PLANE COORDINATES SOUTH ZONE (NAD 83-91) BASED UPON THE PUBLISHED COORDINATES FOR CLARK COUNTY POINT NUMBER 1253, A USGS BRASS DISK IN CONCRETE NEAR 29TH STREET AND THE RAILROAD TRACKS IN WASHOUGAL, AND THE BEARING TOWARDS CLARK COUNTY POINT NUMBER 1300, A BRASS DISK IN A MONUMENT BOX LOCATED AT THE CENTERLINE INTERSECTION OF SE 283RD STREET AND SE 23RD STREET.

GROUND TO GRID
CONVERSION=1.0000574969035

VERTICAL DATUM

CLARK COUNTY BENCH MARK NO. 245 A BRASS DISK IN THE CURB AT THE SOUTH SIDE OF C STREET ELEVATION = 46.06' NGVD 29(47)

COLUMBIA RIVER DATUM CONVERSION REFERENCE:
U.S. ARMY CORPS OF ENGINEERS BENCH MARK NUMBER 1002-31, A BRASS DISK ON THE CONCRETE LANDING OF THE PUBLIC ACCESS TO THE SUMMER DOCKS AT THE CAMAS/WASHOUGAL MARINA.
20.23' COLUMBIA RIVER DATUM
23.84' NGVD 29(47)

LEGEND

- FOUND SURVEY MONUMENT
- SANITARY SEWER MANHOLE
- STORM DRAINAGE CATCH BASIN
- STORM DRAINAGE MANHOLE
- AREA DRAIN
- FIRE HYDRANT
- FIRE DEPARTMENT CONNECTION
- WATER MANHOLE
- WATER VALVE
- TRANSFORMER
- ELECTRIC BOX
- POWER POLE
- LIGHT
- GUY WIRE
- GAS VALVE
- TELEPHONE PEDESTAL
- MONITORING WELL
- SIGN
- DECIDUOUS TREE W/ D.B.H. IN INCHES
- CONIFEROUS TREE W/ D.B.H. IN INCHES

- — GAS — UNDERGROUND GAS LINE
- — SD — UNDERGROUND STORM DRAINAGE LINE
- — SS — UNDERGROUND SANITARY SEWER LINE
- — W — UNDERGROUND WATER LINE
- — T — UNDERGROUND TELEPHONE LINE
- — OHP — OVERHEAD POWER LINE
- FENCE LINE
- CONCRETE SURFACE

NOTES:
UNDERGROUND UTILITIES ARE APPROXIMATE, SHOWN ON THE BASIS OF SURFACE STRUCTURES, AS-BUILT MAPPING, AND UTILITY LOCATES BY OTHERS.

PERMIT SET

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PORT OF CAMAS-WASHOUGAL

FORMER HAMBLETON BROS. LOG YARD REMEDIAL ACTION

PORT OF CAMAS/WASHOUGAL
WASHOUGAL, WASHINGTON

ISSUE	DATE	DESCRIPTION
0	07/01/14	ISSUED FOR PERMIT

PROJECT: 0229.04.08
DESIGNED: J. FAUST
DRAWN: J. FAUST
CHECKED: A. HUGHES

SCALE
0 60' 120'
NOTE: BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

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EXISTING CONDITIONS

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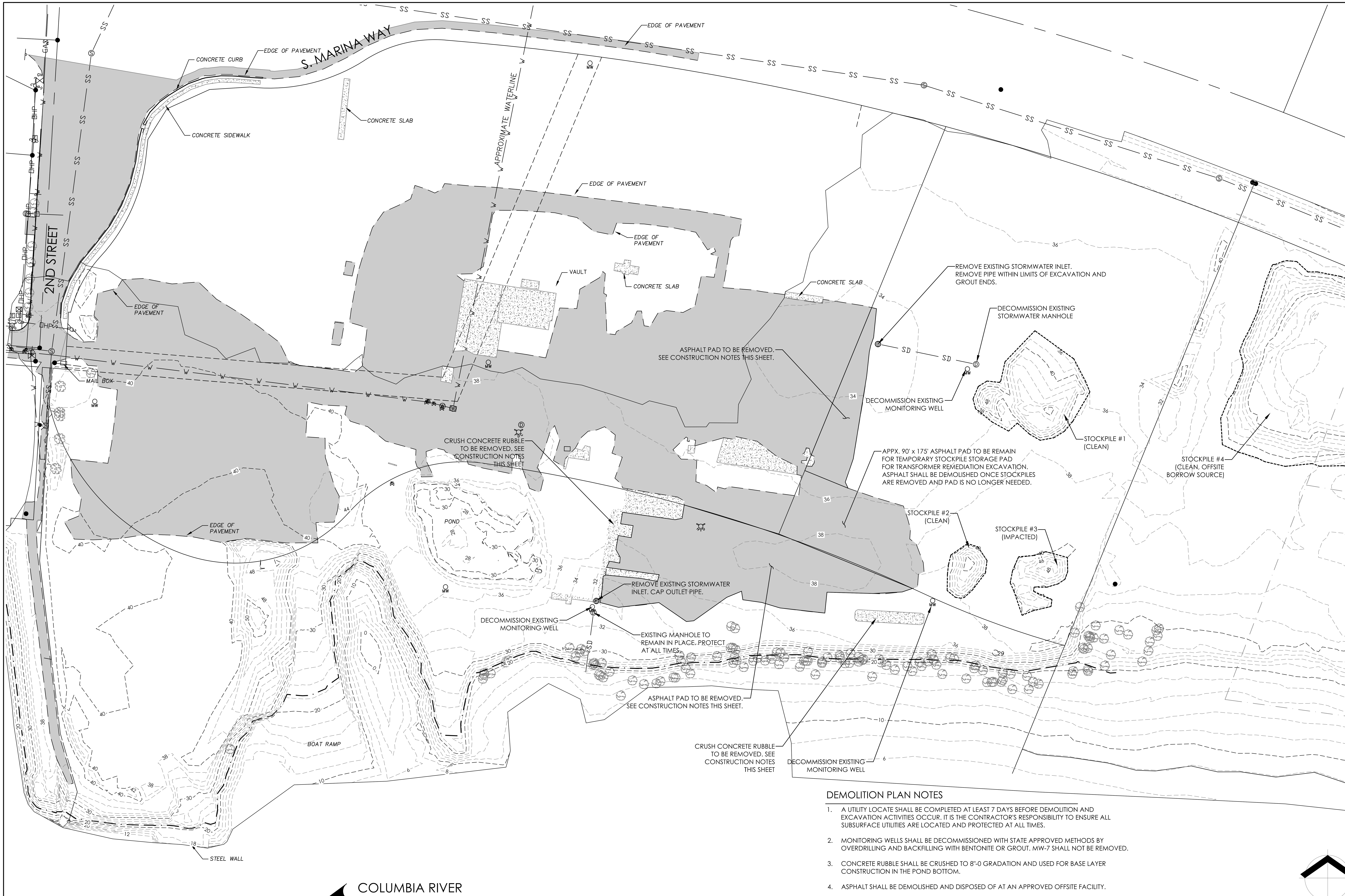

DEMOLITION PLAN NOTES

1. A UTILITY LOCATE SHALL BE COMPLETED AT LEAST 7 DAYS BEFORE DEMOLITION AND EXCAVATION ACTIVITIES OCCUR. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE ALL SUBSURFACE UTILITIES ARE LOCATED AND PROTECTED AT ALL TIMES.
2. MONITORING WELLS SHALL BE DECOMMISSIONED WITH STATE APPROVED METHODS BY OVERDRILLING AND BACKFILLING WITH BENTONITE OR GROUT. MW-7 SHALL NOT BE REMOVED.
3. CONCRETE RUBBLE SHALL BE CRUSHED TO 8"-0 GRADATION AND USED FOR BASE LAYER CONSTRUCTION IN THE POND BOTTOM.
4. ASPHALT SHALL BE DEMOLISHED AND DISPOSED OF AT AN APPROVED OFFSITE FACILITY.
5. STORMWATER STRUCTURES TO BE REMOVED SHALL BE BACKFILLED WITH CLEAN STRUCTURAL FILL SOIL.
6. WOODY DEBRIS SHALL BE STRIPPED IN AREAS OF SOIL CAP PLACEMENT AND SURFACE GRADING.

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ISSUE	DATE	DESCRIPTION
	07/01/14	ISSUED FOR PERMIT

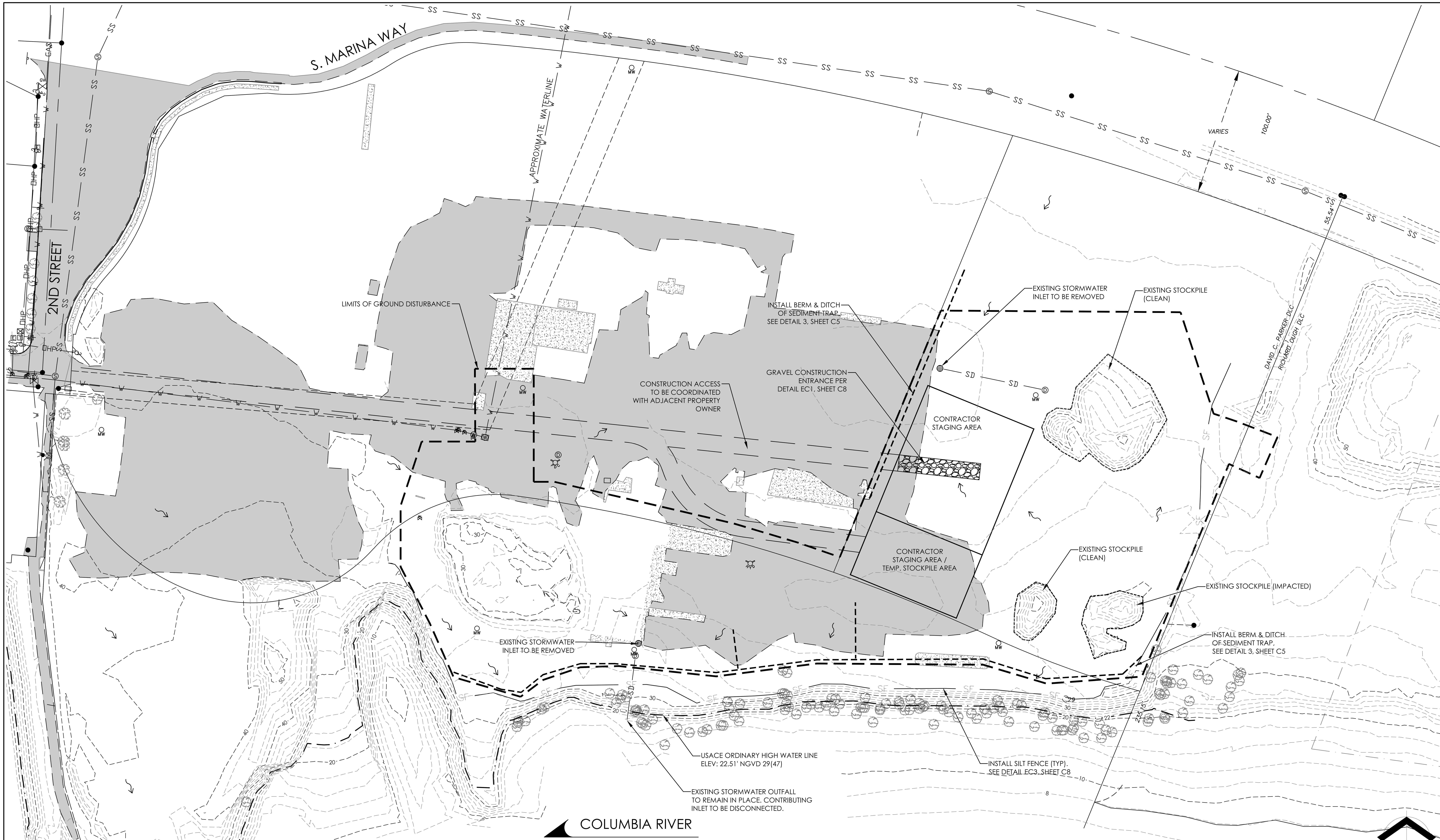
PROJECT: 0229.04.08
DESIGNED: J. FAUST
DRAWN: J. FAUST
CHECKED: A. HUGHES

SCALE
0 60' 120

NOTE: BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

SHEET TITLE
DEMOLITION PLAN

SHEET
C2



STANDARD NOTES FOR EROSION CONTROL PLANS:

1. APPROVAL OF THIS EROSION/SEDIMENTATION CONTROL (ESC) PLAN DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT ROAD OR DRAINAGE DESIGN (E.G. SIZE AND LOCATION OF ROADS, PIPES, RESTRICTORS, CHANNELS, RETENTION FACILITIES, UTILITIES, ETC.).
2. THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
3. THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE FLAGGED CLEARING LIMITS SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF CONSTRUCTION.
4. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO INSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.
5. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
6. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.
7. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN THE 48 HOURS FOLLOWING A MAJOR STORM EVENT.
8. AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A TRAPPED CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT LADEN WATER INTO THE DOWNSTREAM SYSTEM.
9. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
10. TEMPORARY STOCKPILES REMAINING IN PLACE FOR MORE THAN 7 DAYS SHALL BE COVERED PER DETAIL EC2, SHEET C8.

STANDARD NOTES FOR SEDIMENT FENCE:

1. THE SEDIMENT FENCE FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND BOTH ENDS SECURELY FASTENED TO THE POST.
2. THE SEDIMENT FENCE SHALL BE INSTALLED TO FOLLOW THE CONTOURS WHERE FEASIBLE. THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF 8 FEET APART AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 24 INCHES.
3. WHEN STANDARD STRENGTH FILTER FABRIC IS USED, A WIRE SUPPORT FENCE SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY-DUTY WIRE STAPLES AT LEAST 1 INCH LONG, TIE WIRE OR HOG RINGS. THE WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF 4 INCHES AND SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE.
4. THE STANDARD STRENGTH FILTER FABRIC SHALL BE STAPLED OR WIRED TO THE FENCE, AND 12 INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
5. WHEN EXTRA-STRENGTH FILTER FABRIC AND CLOSER POST SPACING ARE USED, THE WIRE MESH SUPPORT FENCE MAY BE ELIMINATED. IN SUCH A CASE, THE FILTER FABRIC IS STAPLED OR WIRED DIRECTLY TO THE POSTS WITH ALL OTHER PROVISIONS OF THE ABOVE STANDARD NOTE FOR STANDARD STRENGTH FILTER FABRIC APPLYING.
6. SEDIMENT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.
7. SEDIMENT FENCES SHALL BE INSPECTED BY CONTRACTOR IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.

PERMIT SET

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PORT OF CAMAS-WASHOUGAL

FORMER HAMBLETON BROS. LOG YARD REMEDIAL ACTION

PORT OF CAMAS-WASHOUGAL
WASHOUGAL, WASHINGTON

ISSUE	DATE	DESCRIPTION
	07/01/14	ISSUED FOR PERMIT

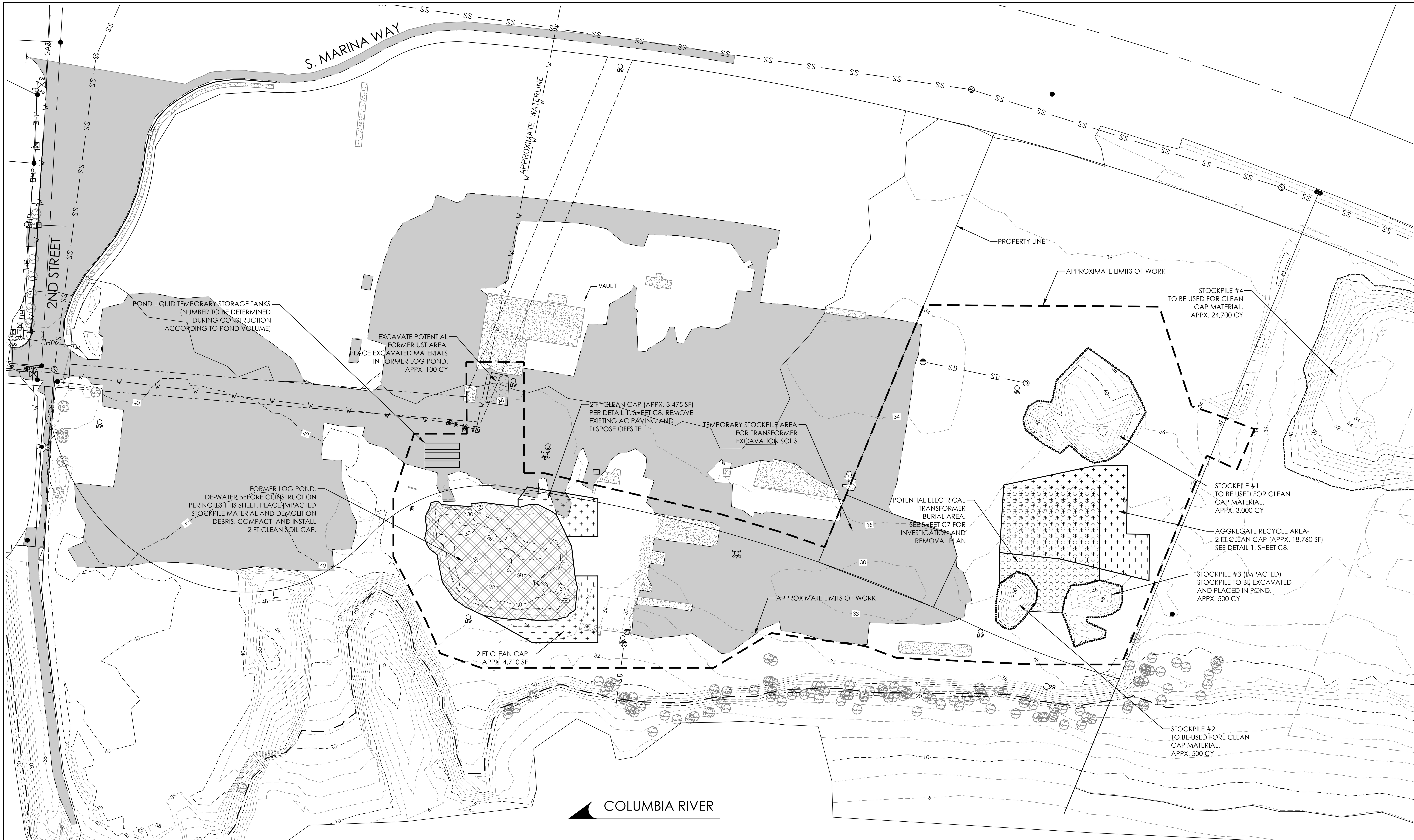
PROJECT: 0229.04.08
DESIGNED: J. FAUST
DRAWN: J. FAUST
CHECKED: A. HUGHES

SCALE
0 60' 120'

NOTE: BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALE ACCORDINGLY.

SHEET TITLE
EROSION AND SEDIMENT CONTROL PLAN

SHEET
C3



POND DEWATERING NOTES:

1. POND AREA TO BE DEWATERED BEFORE PLACEMENT OF FILL.
2. LIQUID TO BE PUMPED TO TEMPORARY STORAGE TANKS AND CHARACTERIZED FOR DISPOSAL.
3. SPECIAL CARE SHALL BE TAKEN TO AVOID DISTURBING SEDIMENTS IN THE POND; SEDIMENTS ARE KNOWN TO CONTAIN CONTAMINANTS AS DESCRIBED IN THE ENGINEERING DESIGN REPORT AND CLEANUP ACTION PLAN.
4. IF SAMPLING RESULTS SHOW NO CONTAMINANTS OF CONCERN, WATER MAY BE USED FOR DUST SUPPRESSION DURING CONSTRUCTION.
5. IF SAMPLING RESULTS SHOW PRESENCE OF CONTAMINANTS, LIQUID SHALL BE LOADED TO TANKER TRUCKS AND DISPOSED OF OFFSITE AN APPROVED FACILITY.
6. ONLY A CONTRACTOR APPROVED TO HAUL WASTEWATER SHALL BE ALLOWED TO LOAD AND HAUL LIQUID FROM THE SITE.

POND FILL NOTES:

1. ONCE DEWATERED, IMPACTED FILL, NON-ORGANIC DEMOLITION DEBRIS, AND OTHER SITE SOILS WILL BE CONSOLIDATED IN THE POND AND CAPPED.
2. THE POND BOTTOM SHALL BE PREPARED BY INSTALLING GEOGRID OVER THE SEDIMENT, THEN PLACING A MINIMUM 18-INCH LAYER OF PERMEABLE BALLAST OR CRUSHED CONCRETE PER DETAIL 2, SHEET C8.
3. THE BASE LAYER SHALL BE TAMPED AND COMPACTED UNTIL FIRM AND UNYIELDING. ONCE A FIRM BASE IS ESTABLISHED, A MINIMUM 6-INCH LAYER OF CRUSHED SURFACING BASE COURSE SHALL BE INSTALLED AS A FILTER LAYER.

SITE PLAN GENERAL NOTES:

1. ALL TREES AND EXISTING UTILITIES SHALL BE PROTECTED AT ALL TIMES DURING CONSTRUCTION.
2. EXPLORATION FOR TRANSFORMER LOCATIONS SHALL BE COMPLETED AT THE DIRECTION OF THE ENGINEER. REMEDIATION OF ANY DISCOVERED TRANSFORMERS SHALL BE COMPLETED PER THE APPLICABLE PROJECT SPECIFICATIONS.

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PORT OF CAMAS-WASHOUGAL

FORMER HAMBLETON BROS. LOG YARD REMEDIAL ACTION

PORT OF CAMAS/WASHOUGAL

WASHOUGAL, WASHINGTON

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SCALE
0 60' 120'
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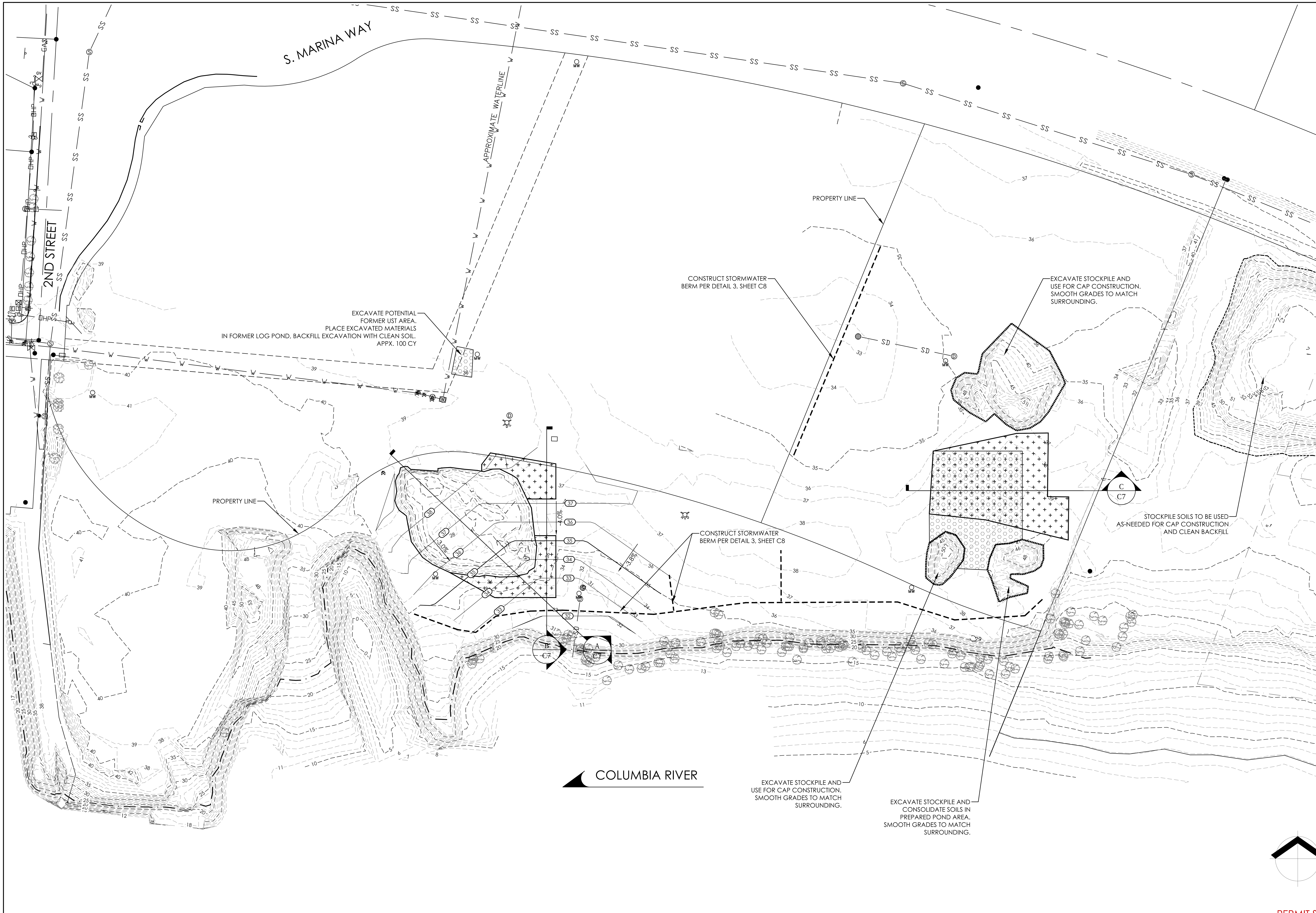
SHEET TITLE
SITE PLAN

SHEET
C4

PERMIT SET

PLOTTED ON: 2014-07-02 2:45 PM PLOTTED BY: Lia Ovelar FILENAME: G:\00_MFA Civil 3D\00_PROJECTS\0229.04 Port of Camas-Washougal\SWPPP\SITE.dwg



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PORT OF CAMAS-WASHOUGAL

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SCALE
0 60' 120'

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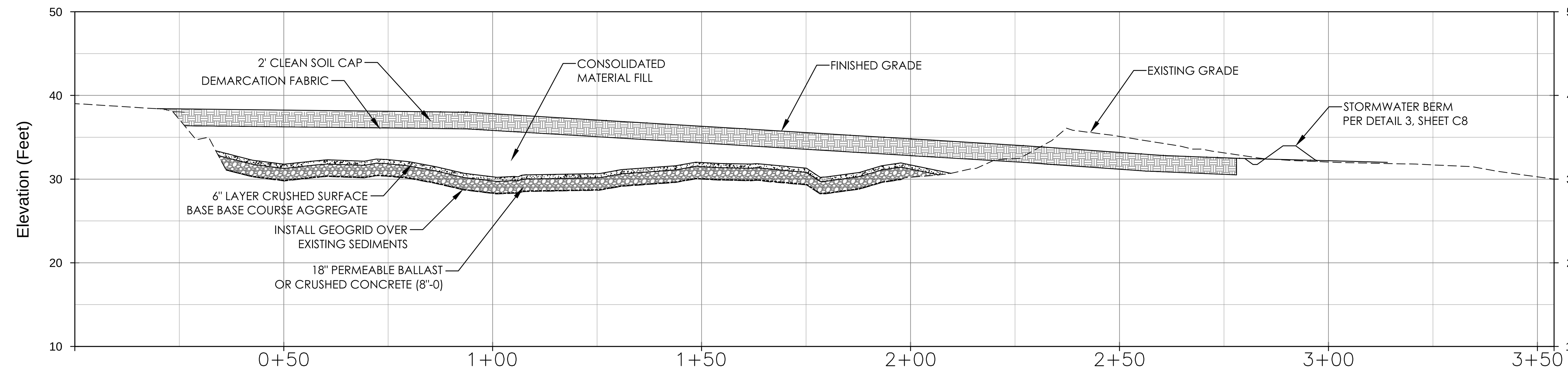
SHEET TITLE
GRADING AND CAPPING PLAN

SHEET
C5

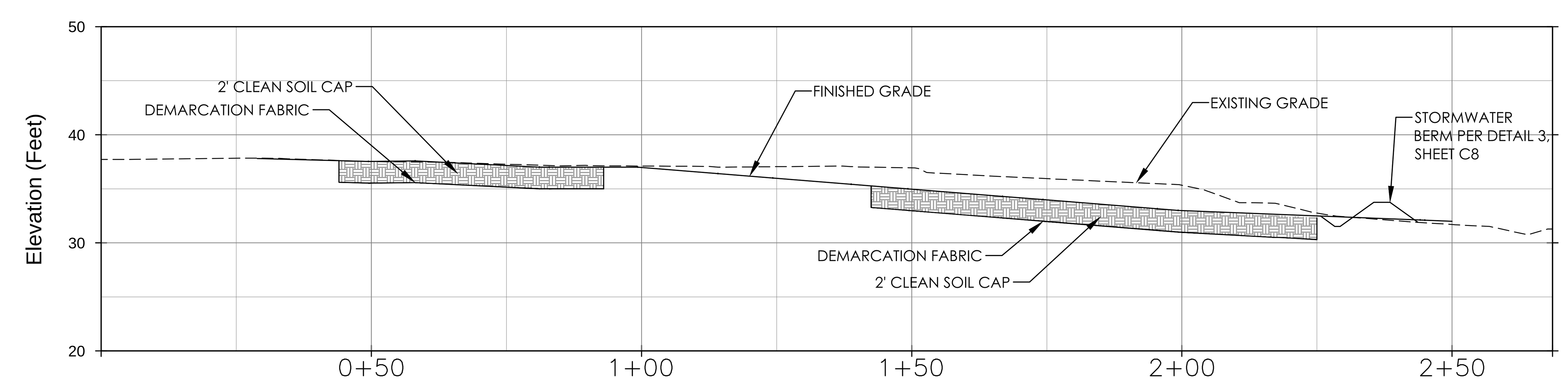
PLOTTED ON: 2014-07-02 2:41 PM PLOTTED BY: Lia Ovelar FILENAME: G:\00_MFA Civil 3D\00_PROJECTS\0229.04 Port of Camas-Washougal\SWPPP\C-GRAD.dwg



A / C5

POND AREA FILL, CAP, AND GRADING SECTION

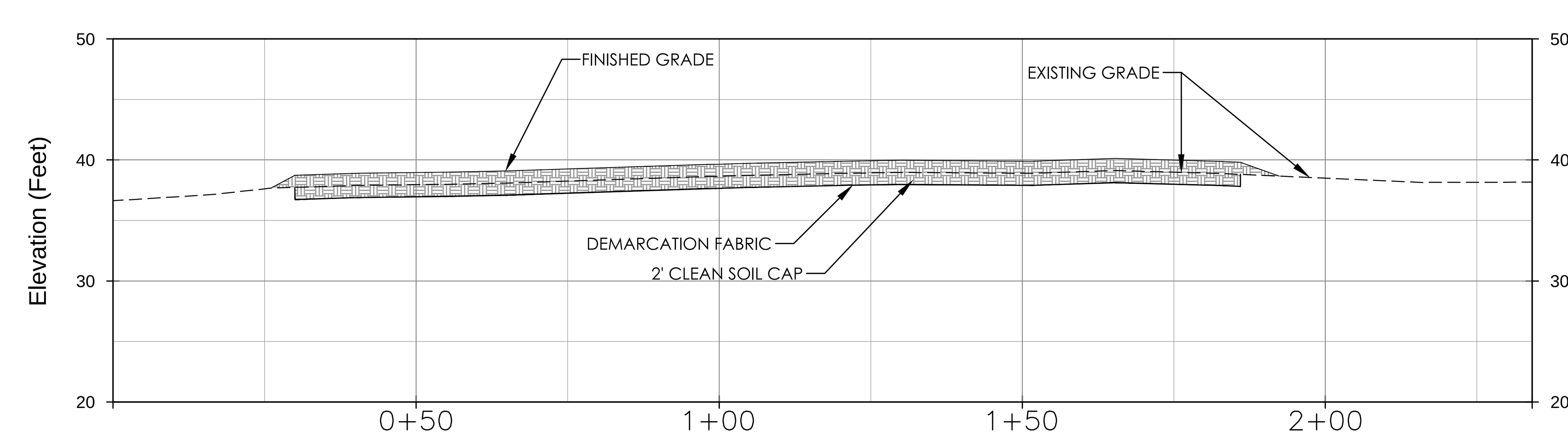
HORIZONTAL: 1" = 20'
VERTICAL: 1" = 10'



B / C5

POND AREA CAP AND GRADING SECTION

HORIZONTAL: 1" = 20'
VERTICAL: 1" = 10'



C / C5

FORMER AGGREGATE RECYCLE AREA CAP SECTION

HORIZONTAL: 1" = 20'
VERTICAL: 1" = 10'

PERMIT REVIEW

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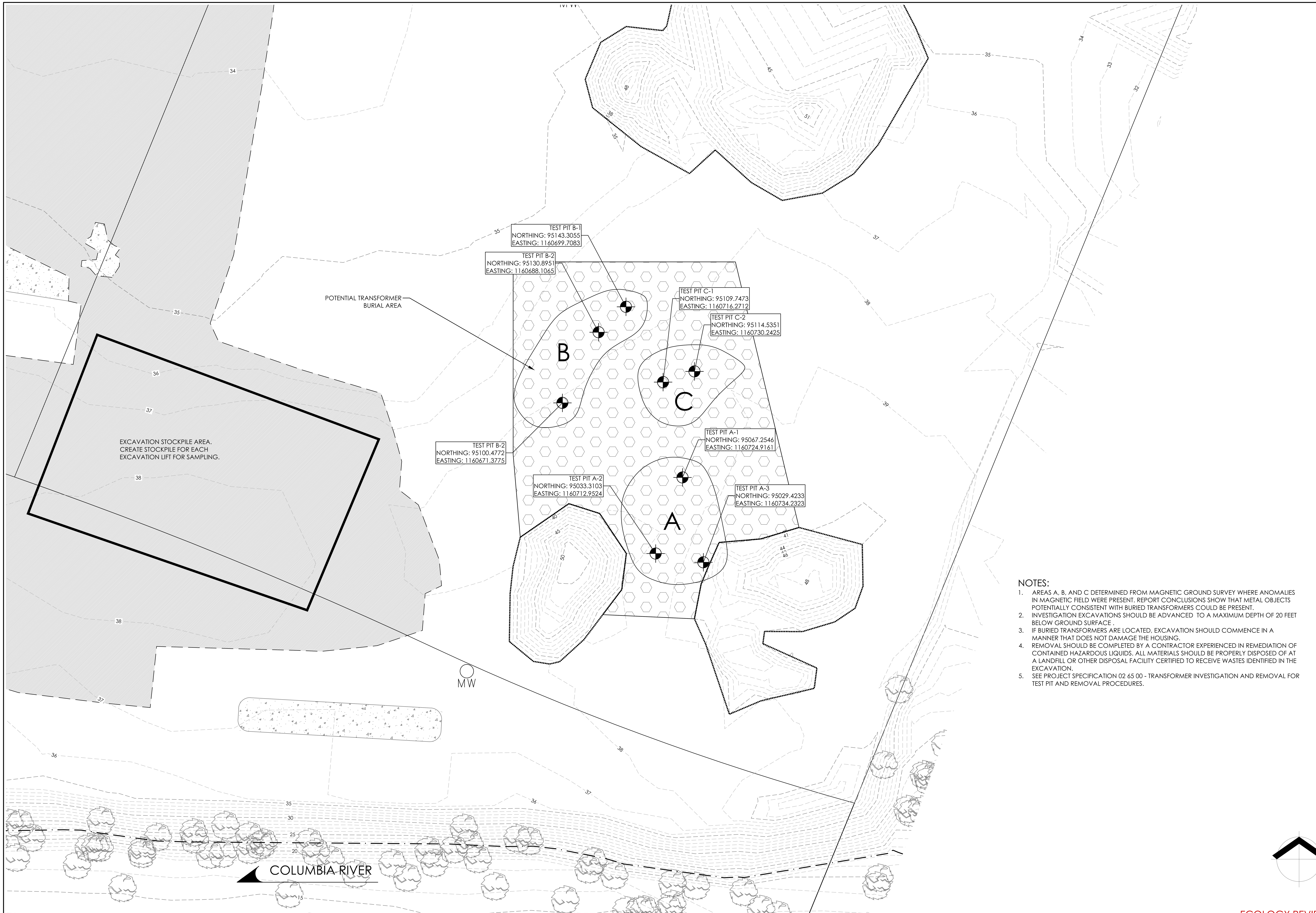
SCALE

SHEET TITLE
SECTIONS

SHEET
C6



NOTES:

1. AREAS A, B, AND C DETERMINED FROM MAGNETIC GROUND SURVEY WHERE ANOMALIES IN MAGNETIC FIELD WERE PRESENT. REPORT CONCLUSIONS SHOW THAT METAL OBJECTS POTENTIALLY CONSISTENT WITH BURIED TRANSFORMERS COULD BE PRESENT.
2. INVESTIGATION EXCAVATIONS SHOULD BE ADVANCED TO A MAXIMUM DEPTH OF 20 FEET BELOW GROUND SURFACE .
3. IF BURIED TRANSFORMERS ARE LOCATED, EXCAVATION SHOULD COMMENCE IN A MANNER THAT DOES NOT DAMAGE THE HOUSING.
4. REMOVAL SHOULD BE COMPLETED BY A CONTRACTOR EXPERIENCED IN REMEDIATION OF CONTAINED HAZARDOUS LIQUIDS. ALL MATERIALS SHOULD BE PROPERLY DISPOSED OF AT A LANDFILL OR OTHER DISPOSAL FACILITY CERTIFIED TO RECEIVE WASTES IDENTIFIED IN THE EXCAVATION.
5. SEE PROJECT SPECIFICATION 02 65 00 - TRANSFORMER INVESTIGATION AND REMOVAL FOR TEST PIT AND REMOVAL PROCEDURES.

ECOLOGY REVIEW

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PORT OF CAMAS-WASHOUGAL

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PORT OF CAMAS/WASHOUGAL

WASHOUGAL, WASHINGTON

ISSUE	DATE	DESCRIPTION
####	####	####

PROJECT: 0229.04.08

DESIGNED: J. FAUST

DRAWN: J. FAUST

CHECKED: A. HUGHES

SCALE

0 20' 40'

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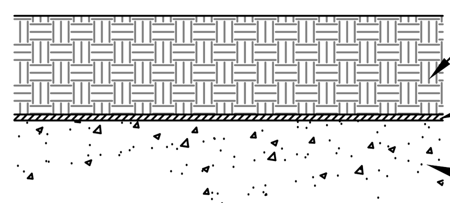
SHEET TITLE

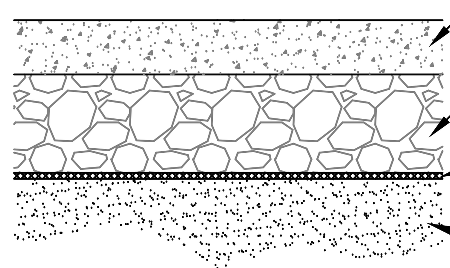
TRANSFORMER REMOVAL PLAN

SHEET

C7

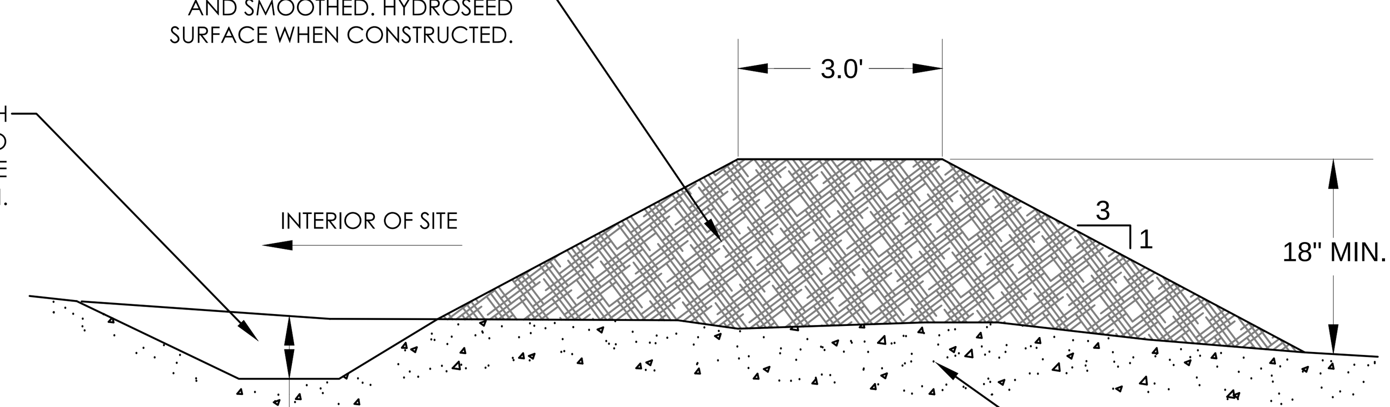


1 C4 TYPICAL SOIL CAP SECTION
NTS

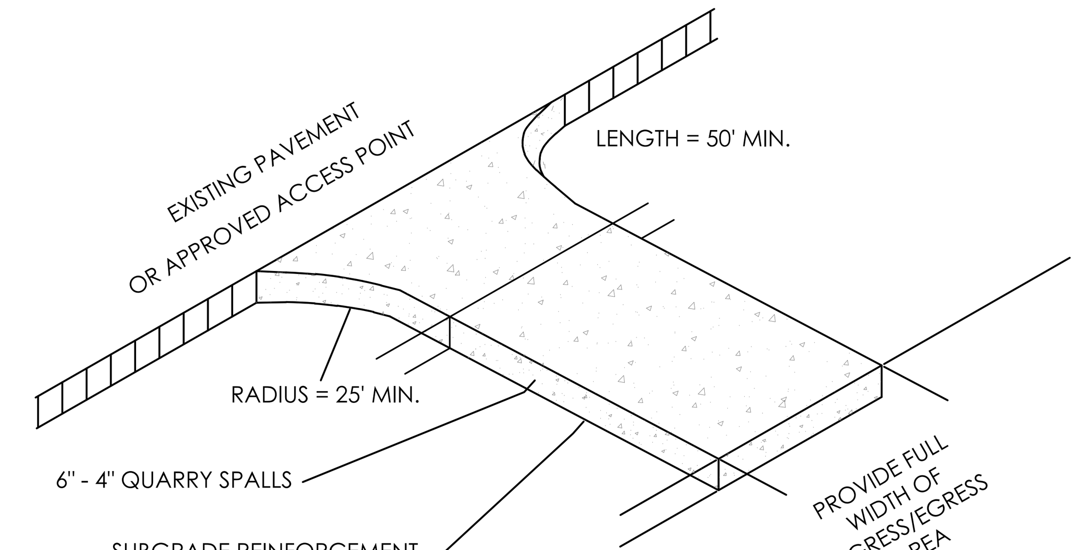


NOTES:
1. POND DEWATERING TO BE COMPLETED BEFORE BASE PREPARATION.
2. BALLAST TO BE TAMPED AND COMPACTED UNTIL FIRM, UNYIELDING SURFACE IS ACHIEVED. ADDITIONAL BALLAST MAY BE REQUIRED TO ACHIEVE WORKING SURFACE AND DESIRED FIRMNESS.

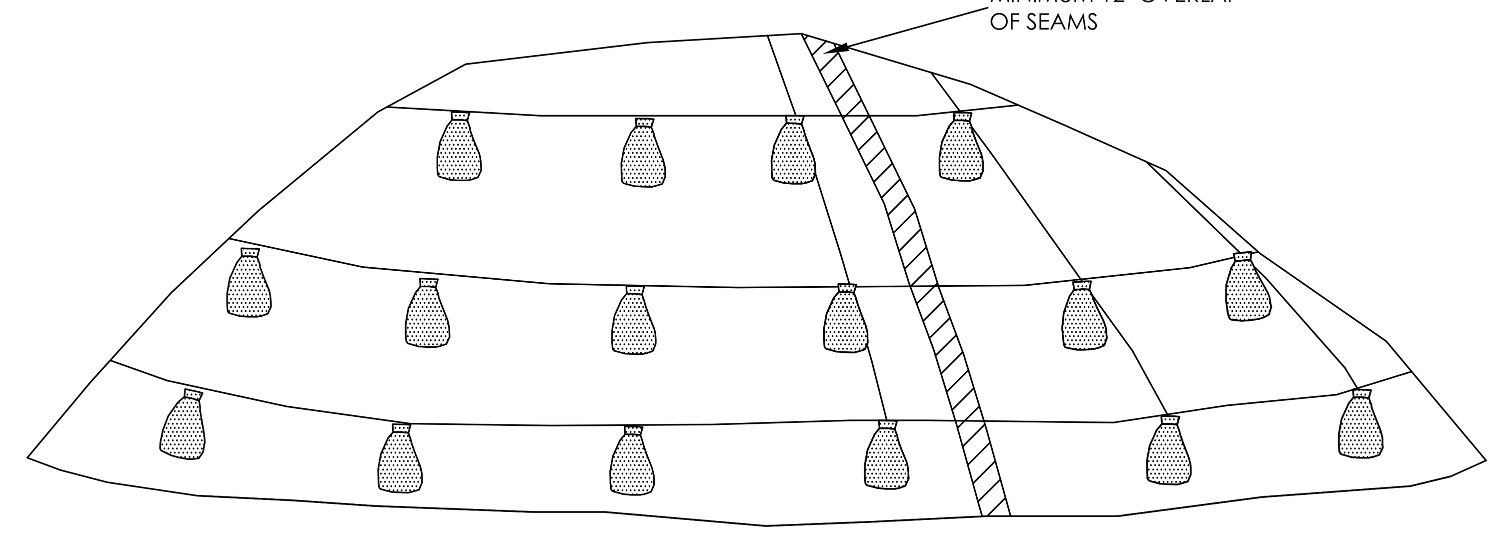
2 C4 POND BASE PREPARATION
NTS



3 C5 SEDIMENT TRAP
NTS

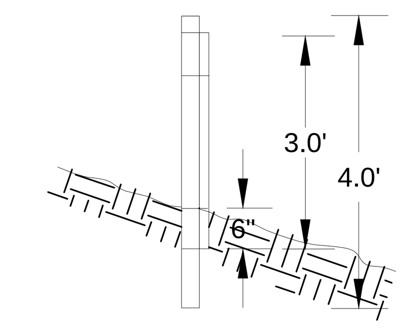


EC1 C3 STABILIZED CONSTRUCTION ENTRANCE DETAIL
NTS

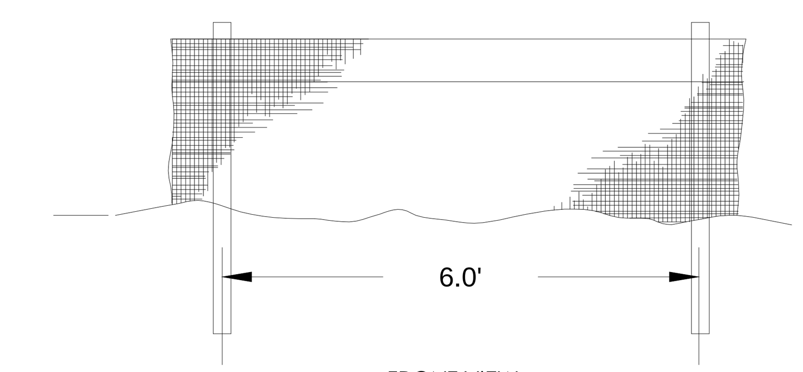


1. MINIMUM 12" COVER OVERLAP AT ALL SEAMS.
2. STOCKPILE COVER SHALL BE MAINTAINED TIGHTLY IN PLACE BY USING SAND BAGS OR TIRES ON ROPES WITH A MAXIMUM OF 10' GRID SPACING IN ALL DIRECTIONS.
3. STOCKPILE COVERING SHALL BE BLACK PLASTIC WITH U.V. PROTECTION.

EC2 C3 STOCKPILE COVER DETAIL
NTS

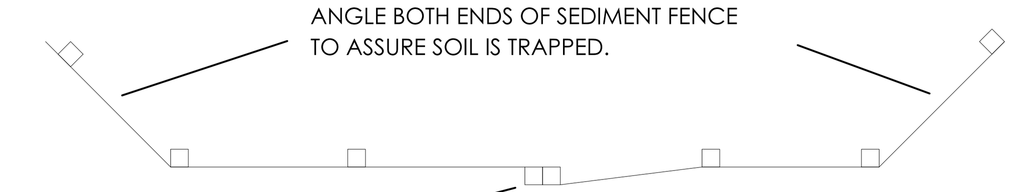


SIDE VIEW



FRONT VIEW

ANGLE BOTH ENDS OF SEDIMENT FENCE TO ASSURE SOIL IS TRAPPED.



INTERLOCKED 2" x 2" POSTS

TOP VIEW

NOTES:
1. BURY BOTTOM OF FILTER FABRIC 6" MIN. VERTICALLY BELOW GRADE.
2. 2" x 2" FIR, PINE, OR STEEL FENCE POSTS.
3. STITCHED LOOPS TO BE INSTALLED ON UPHILL SIDE OF SLOPE.
4. COMPACT NATIVE FILL IN ALL AREAS OF FILTER FABRIC TRENCH.
5. SEDIMENT FENCING SHALL BE INSTALLED ON CONTOUR.

EC3 C3 SEDIMENT FENCE DETAIL
NTS

PLOTTED ON: 2014-07-02 2:46 PM
PLOTTED BY: Lia Ovelar FILENAME: G:\00_MFA Civil 3D\00_PROJECTS\0229.04 Port of Camas-Washougal\SWPPP\SITE.dwg

PERMIT REVIEW

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PORT OF CAMAS-WASHOUGAL

FORMER HAMBLETON BROS. LOG YARD REMEDIAL ACTION
PORT OF CAMAS/WASHOUGAL
WASHOUGAL, WASHINGTON

ISSUE	DATE	DESCRIPTION
	07/01/14	ISSUED FOR PERMIT

PROJECT: 0229.04.08
DESIGNED: J. FAUST
DRAWN: J. FAUST
CHECKED: A. HUGHES
SCALE
DRAWING NOT TO SCALE
SHEET TITLE
DETAILS
SHEET
C8

APPENDIX A
CULTURAL RESOURCE RECONNAISSANCE

CULTURAL RESOURCE RECONNAISSANCE

FOR THE PORT OF CAMAS-WASHOUGAL'S

WATERFRONT BROWNFIELD INTEGRATED PLAN

CLARK COUNTY, WASHINGTON

Prepared for
Maul Foster & Alongi, Inc.
Vancouver, Washington
and
Port of Camas-Washougal,
Washougal, Washington

December 20, 2011

REPORT NO. 2789

Archaeological Investigations Northwest, Inc.

2632 SE 162nd Ave. • Portland, OR • 97236 Phone 503 761-6605 • Fax 503 761-6620

CULTURAL RESOURCE RECONNAISSANCE
FOR THE PORT OF CAMAS-WASHOUGAL'S
WATERFRONT BROWNFIELD INTEGRATED PLAN
CLARK COUNTY, WASHINGTON

PROJECT:	Port of Camas-Washougal's Waterfront Brownfield Integrated Plan
TYPE:	Cultural Resource Reconnaissance
LOCATION:	Section 12, Township 1 North, Range 3 East; Section 7, Township 1 North, Range 4 East, Willamette Meridian
USGS QUAD:	*Camas, Wash.-Oreg.*, 7.5-minute, 1993 *Washougal, Wash.-Oreg.*, 7.5-minute, 1994
CITY:	Washougal
COUNTY:	Clark
PROJECT AREA:	Approximately 25 acres
FINDINGS:	Archaeological Resources: • No archaeological resources have been identified within the project area. However, pre-contact and historic-period archaeological resources are common along the Columbia River shoreline in the vicinity of the project. • AINW recommends an archaeological survey, including subsurface testing, prior to development to determine if archaeological resources are present beneath the fill material that covers much of the project area. Historic Resources: • The Hambleton Lumber Company was recorded by AINW in 2007. The resource was determined to be not eligible for listing in the National Register of Historic Places.
PREPARERS:	Nicholas Smits, M.A., R.P.A., Michele L. Punke, Ph.D., R.P.A., and Jo Reese, M.A., R.P.A.

INTRODUCTION

On behalf of Maul Foster & Alongi, Inc. (MFA), and the Port of Camas-Washougal, Archaeological Investigations Northwest, Inc. (AINW), has conducted a cultural resource reconnaissance study for the Port of Camas-Washougal's Waterfront Brownfield Integrated Plan in Washougal, Clark County, Washington (Figure 1). The project area includes five tax lots formerly occupied by the Hambleton Lumber Company (now closed) in Section 12 of Township 1 North, Range 3 East, and Section 7 of Township 1 North, Range 4 East, Willamette Meridian. Together, the five lots encompass approximately 25 acres of land located south of State Route (SR) 14 along the Columbia River on the east side of South 2nd Street.

The purpose of the cultural resource reconnaissance study was to determine whether archaeological or historic resources are present within the Port of Camas-Washougal's Waterfront Brownfield Integrated Plan project area or are likely to be present. The study also provides recommendations pertaining to local, state, and perhaps federal laws and regulations pertaining to cultural resources that would need to be addressed if the parcel is developed.

As part of the reconnaissance study, AINW conducted background research to determine which portions of the project area have been previously surveyed and whether any cultural resources have been recorded within the project area and vicinity. AINW reviewed the Washington Information System for Architectural and Archaeological Records Data (WISAARD), an online database maintained by the Washington Department of Archaeology and Historic Preservation (DAHP). In addition, historical maps, published secondary sources, and materials on file at AINW were reviewed to assess the potential for pre-contact and historic-period archaeological and historical resources and to document changes in the Columbia River shoreline within the project area since the 1850s.

In addition to the background research, AINW performed a field reconnaissance of the project area to assess current conditions and determine the potential for subsurface archaeological deposits. AINW Senior Geoarchaeologist Michele L. Punke, Ph.D., R.P.A., visited the project area and inspected backhoe excavations that were conducted for the purpose of environmental and geotechnical studies. The backhoe excavations indicate that as much as 4.6 meters (m) (15 feet [ft]) of dredge fill material covers native soil within the project area.

No archaeological resources were identified within the project boundary as a result of AINW's reconnaissance-level study. However, pre-contact and historic-period archaeological resources are common along the Columbia River in the vicinity of the project. AINW recommends that prior to development an archaeological survey, including exploratory backhoe excavations, be conducted to determine if intact archaeological resources are present beneath the fill deposits that cover much of the project. This report summarizes the results of AINW's background research and field visit and it provides specific recommendations for future archaeological work. Two buildings remain on the parcel from the Hambleton Lumber Company; the others have been previously removed.

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

According to the DAHP's WISAARD online database and from reviewing materials on file at AINW, at least 21 previous cultural resource investigations have been conducted within a 0.4-kilometer (km) (0.25-mile [mi]) radius of the current project (Browman 1965a, 1965b; Buchanan and Reese 2008; Daugherty et al. 1976; Duncan 1978a, 1978b; Freed 2004; Gall 2007; Historical Research Associates, Inc. [HRA] 1992; Kiers and Trautman 2009; King 1991; King et al. 1992, 1994; McDaniel 2005; Mills and Fagan 2001; Reese 1999; Reese and Ogle 2008; Shapson 1966; Smits 2007; Smits et al. 2008; Wilson et al. 2006). One of these previous investigations, an archaeological survey for a gravel loading facility immediately east of South 2nd Street (Reese 1999), was within the current project area. The gravel loading facility project area was about two acres in size, and the archaeological fieldwork consisted of a ground surface inspection. No cultural materials were identified during the survey; however, based on the potential for deeply buried archaeological deposits, it was recommended that the development of the area be restricted to no deeper than 0.5 m (1.6 ft) below the ground surface.

Due to the sensitive nature of specific site location data, a summary about sites in the vicinity and a map showing their locations are presented in an Appendix to this report. That section can be removed prior to public disclosure.

No archaeological resources have been recorded within the current project area. Ten archaeological resources have been recorded within approximately 0.4 km (0.25 mi) of the project (Appendix, Figure A1). An eleventh resource, site 45CL699, is located approximately 0.6 km (0.4 mi) to the east of the current project. As described in the Appendix, most of these resources are located on or very near the first terrace or the shoreline of the Columbia River and suggest that the former Hambleton Lumber Company land may contain archaeological sites below a layer of fill.

Numerous pre-contact (Native American) archaeological sites are found in this vicinity, as several nearby streams join and flow into the Columbia River. Sites along Lacamas Creek are common within 0.4 km (0.25 mi) of its confluence with the Washougal River. The Washougal River, in turn, flows into the Columbia River less than 0.8 km (0.5 mi) from the current project location. Several sites have been found along the Washougal River, one within 0.4 km (0.25 mi) of the project. On the shoreline of the Columbia River near the project in the cities of Camas and Washougal, several sites dot the shoreline, including a possible village site, 45CL204. Historic-period sites also have been recorded in the nearby area. These appear to be related to former historic-period farms or houses.

HISTORICAL CONTEXT

AINW reviewed General Land Office (GLO) maps, aerial photographs, and other historical maps and published secondary sources to determine if historic-period structures or features were formerly present within the project area. The maps and aerial photographs were also used to determine the extent to which the Columbia River shoreline has changed over the years, particularly after construction of the Bonneville Dam in 1938 and due to fill materials being added to portions of the shoreline and first terrace. A geotechnical study conducted for the project estimated the former position of the original riverbank crest along the Columbia River shoreline at the location of the project area (Duquette and Albright 2011:Figure 2). This estimated original riverbank crest along the Columbia River shoreline is shown on Figure 2.

GLO maps from 1856 show one building within the project area (GLO 1856a, 1856b). The building was located in the SE ¼ of Section 12 of Township 1 North, Range 3 East, along the former shoreline of the Columbia River in the south-central portion of the current project area. The building was occupied by John Parker and his wife, Elizabeth Ann Lady (Harshman 1989:534). Elizabeth was the daughter of Joseph Lady, for whom Lady Island is named. John Parker was the son of David Clark Parker who, in 1851, obtained a permit to operate a ferry between Lady Island and his property, Parker's Landing, just west of the project area. Parker's Landing eventually grew into the small community of Parkersville, platted in the 1850s (Harshman 1989:534; Morris and Welch 1976:3).

Although David Clark Parker died (and was buried on his Donation Land Claim [DLC]) in 1858, GLO maps from 1863 show the western portion of the project area still within his DLC (No. 48) and the eastern portion of the project area within the Richard Ough DLC (No. 53) (GLO 1863a, 1863b). After Parker's death, Lewis Van Vleet accepted part of Parkersville as payment for his services as administrator of Parker's estate (Morris and Welch 1976:3). Van Vleet had settled on Fern Prairie in 1853 and continued to live there after acquiring land from Parker. An 1888 "Map of Clarke County" (Habersham 1888) shows the Parker DLC subdivided among three new owners, one of which was Van Vleet. By this time, the towns of Camas and Washougal were flourishing while Parkersville was relatively deserted. No structures are shown within the project area on the 1863 GLO maps.

The Columbia River shoreline within the project area apparently changed little between the 1850s and 1930s. Maps produced between 1856 and 1929 show that the shoreline within the project area was in roughly the same location. Following construction of the Bonneville Dam in 1938, however, bank erosion became a major problem on the Columbia River below Washougal, and bank protection measures were proposed by the U.S. Army Corps of Engineers (USACE) (1951:2622-2623). Maps produced in the 1940s show that the shoreline within the project area had eroded slightly, and that the Port had constructed Terminal No. 1 at the former location of Parker's Landing. Steel dolphins and pilings also had been driven into the river bottom near the shoreline to protect the river bank immediately downstream from the terminal and provide for docks and moorings.

The Parkersville area was predominantly residential until the 1930s or 1940s, when the Port constructed Terminal No. 1 just west of the current project area. By the 1960s, the Port had expanded their terminal operations on the Columbia River shoreline. On the east side of the terminal, the Hambleton Lumber Company also modified the shoreline by excavating a slip and placing large quantities of fill on the riverbank, extending the land about 61 m (200 ft) south into the river. Over time, the lumber company has added materials such as fine-grained sediment, crushed rock, wood, and debris to the surface of the non-shoreline portion of the project parcel to bring it to a level grade. In 1970, fill was placed immediately south of the Parker's Landing Historical Park during construction of the boat ramp and access area and the shoreline was extended south into the river about 15 m (50 ft). By 1974, the river's shoreline resembled the modern shoreline. AINW recorded the Hambleton Lumber Company property as an historic resource in 2007; it was subsequently determined to be not eligible for listing in the National Register of Historic Places (NRHP) (Smits et al. 2008).

FIELD INVESTIGATIONS

On September 6 and 7, 2011, Dr. Punke conducted a reconnaissance survey of the project area and monitored the excavation of seven geotechnical test pits (TP-5 through TP-11) and two surface soil samples (SS# 20-1 and SS# 20-2) (Figure 2). Most of the project area has been filled and graded flat and then paved or covered in gravel (Photos 1 and 2), except for the vegetated land at the southern edge of the project area along the Columbia River (Photo 3). This waterfront area was not surveyed due to poor access. Two buildings remain on the parcel: a corrugated metal shed and a shop or storage building (Figure 2; Photo 4); all other buildings that formerly stood on the parcel were removed previously.

The test pits and surface soil sample locations were determined by MFA scientists. The test pits, which were excavated with a backhoe and measured approximately 0.9 m (3.0 ft) wide, ranged between 1.5 and 5.3 m (5.0 and 17.5 ft) deep (Table 1; Photo 6). The surface soil samples were also excavated with a backhoe and measured approximately 0.9 m (3.0 ft) wide and 0.9 m (3.0 ft) deep (Table 1; Photo 7). In addition to the seven test pits that were monitored by Dr. Punke, MFA excavated four test pits (TP-1 through TP-4) and other surface soil samples (not shown on Figure 2) (Duquette and Albright 2011).

Depths to natural sediment were highly variable across the project area (Table 1). Fill materials composed of gravelly and fine-grained sediments and modern trash were found in most of the test pits and within both of the surface soil samples. These fill materials were thickest along the southern edge of the project area, nearest to the river. In test pits TP-10 (center of project area) and TP-11 (northwest corner of project area), fill materials were composed of mixed gravels, sands, and silts and were less thick than in the southern portion of the project area.

TABLE 1

GEOTECHNICAL EXCAVATION RESULTS

TEST PIT/ SOIL SAMPLE	DEPTH OF EXCAVATION (ft)	DEPTH TO NATURAL SEDIMENT (ft)
TP-1*	8.0	4.5**
TP-2*	9.0	7.0**
TP-3*	17.5	4.5**
TP-4*	8.5	5.0**
TP-5	17.0	13.5
TP-6	16.0	15.0
TP-7	9.0	8.0
TP-8	9.0	8.0
TP-9	8.0	5.5
TP-10	7.0	5.0
TP-11	5.0	3.0
SS# 20-1	3.0	No natural sediment encountered
SS# 20-2	3.0	No natural sediment encountered

* Test pit was not monitored by an archaeologist. Depth information from MFA scientist.
** Estimates of depth to natural sediment likely represent depth to dredge fill sands.

Although natural sediments were reported by the MFA scientist at relatively shallow depths in test pits TP-1 through TP-4 (southwest corner of project area), given the elevated landform upon which they were excavated and earlier studies that suggest the landform was composed of fill (Reese 1999), the sands encountered at the shallow depths were likely dredge fill sands placed at the location in order to build up the land (Photo 8). The upper edge of the Columbia River shoreline was estimated as part of the geotechnical study and is shown as the former crest of riverbank on Figure 2 (Duquette and Albright 2011). In the western third of the parcel, as shown on Figure 2, fill has added land into the Columbia River. In the eastern two-thirds of the project parcel, though there is fill on the former crest of the riverbank, the crest is in approximately its historical position.

No archaeological deposits, features, or artifacts were discovered during the reconnaissance survey or in any of the excavated geotechnical test pits or surface soil samples. Fill materials were encountered in every test pit and surface scrape within the project area that was archaeological monitored. Natural, undisturbed sediments are present beneath the fill materials.

SUMMARY AND RECOMMENDATIONS

AINW has conducted a cultural resource reconnaissance study for the Port of Camas-Washougal's Waterfront Brownfield Integrated Plan project to aid in planning future development. The project area was, until recently, occupied by the Hambleton Lumber Company, which operated in this location between about 1960 and 2010. Two buildings remain standing on the project parcel. AINW recorded the Hambleton Lumber Company as an historic resource in 2007 and it was subsequently determined to be not eligible for listing in the NRHP.

Background research indicates that one previous archaeological survey was conducted within the project area; no archaeological resources have been previously recorded within the project area. The majority of the project area is covered in pavement or gravel. Archaeological monitoring of geotechnical excavations revealed that deep deposits of fill are present throughout much of the project area. No archaeological resources were identified during either the reconnaissance survey or the monitoring of geotechnical excavations.

Numerous pre-contact and historic-period archaeological resources have been identified along the Columbia River shoreline near the project and are very common in the vicinity of the project area. Although no archaeological resources were identified during AINW's reconnaissance study, the project area has a high potential for containing archaeological resources. Fill materials cover most of the project area; these fill deposits may be capping underlying archaeological deposits.

AINW recommends that prior to development, an archaeological pedestrian survey be performed in all portions of the project area that have not been previously surveyed and are not covered in pavement. If any impacts are proposed for areas not covered in fill, for example, along the shoreline and on the outer margins of the parcel, excavation of shovel tests and augers may be an appropriate level of effort to determine whether a resource is present. As part of the survey-level work, AINW recommends additional backhoe excavations to expose the area under the fill and to determine if intact archaeological deposits are present beneath the fill deposits within the project area, if development of that area may reach below the fill into native soils. Information regarding the depth of the overlying fill materials from the geotechnical work can be used to help guide the exploratory backhoe excavations. If fill materials are removed and natural sediments are exposed, samples of the natural sediment should be tested for archaeological materials by screening the sediment for artifacts.

REFERENCES

Browman, David L.
1965a Site Form for 45CL16. On file, Department of Archaeology and Historic Preservation, Olympia, Washington.
1965b Site Form for 45CL17. On file, Department of Archaeology and Historic Preservation, Olympia, Washington.

Bryant, Peter, and Andrew Hudson
2006 *Archaeological Predetermination Report for 814 'A' Street, Washougal.* Archaeological Services of Clark County Report No. 06179. Submitted to Clark County Community Development, Vancouver, Washington.

Buchanan, Kelsey W., and Jo Reese
2008 *Archaeological Predetermination Report for Property North of 165 C Street, Washougal, Washington.* Archaeological Investigations Northwest, Inc. Report No. 2086. Prepared for Killian Pacific, Vancouver, Washington.

Daugherty, Richard D., Dale R. Croes, and Eric Blinman
1976 *Port of Camas-Washougal Test Operation for Archaeological Remains.* National Heritage, Inc.

Duncan, Mary Ann
1978a Site form for site 45CL204H. On file, Department of Archaeology and Historic Preservation, Olympia, Washington.
1978b Site form for site 45CL16. On file, Department of Archaeology and Historic Preservation, Olympia, Washington.
1978c Site form for site 45CL17. On file, Department of Archaeology and Historic Preservation, Olympia, Washington.

Duquette, Jeff, and Stuart Albright
2011 *Preliminary Geotechnical Assessment, Hambleton Lumber Site, Washougal, Washington.* Ash Creek Associates, Inc. Report No. 1845-00. Prepared for Maul Foster & Alongi, Inc., Vancouver, Washington.

Freed, Robert A.
2004 *Archaeological Predetermination Report for 3039 East 1st Avenue in Camas, WA.* Prepared for Railing Investments, Vancouver, Washington.

Gall, Alexander
2007 *Archaeological Predetermination Report for One Stop Mini-Storage, 271 SE Lechner Street, Camas, Washington.* Archaeological Services of Clark County Report No. 07380. Prepared to Kitterman LLC, Camas, Washington.

General Land Office (GLO)
1856a *Plat of Township No. 1 North, Range No. 3 East, Willamette Meridian.* Microfiche on file, U. S. Bureau of Land Management, Oregon State Office, Portland, Oregon.
1856b *Plat of Township No. 1 North, Range No. 4 East, Willamette Meridian.* Microfiche on file, U. S. Bureau of Land Management, Oregon State Office, Portland, Oregon.
1863a *Plat of Township No. 1 North, Range No. 3 East, Willamette Meridian.* Microfiche on file, U. S. Bureau of Land Management, Oregon State Office, Portland, Oregon.
1863b *Plat of Township No. 1 North, Range No. 4 East, Willamette Meridian.* Microfiche on file, U. S. Bureau of Land Management, Oregon State Office, Portland, Oregon.

Habersham, R. A.
1888 *Map of Clarke County, Washington Territory.* On file, Archaeological Investigations Northwest, Inc., Portland, Oregon.

Harshman, Rose Marie (compiler)
1989 *Clark County Pioneers: A Centennial Salute.* Clark County Genealogical Society, Vancouver, Washington.

Historical Research Associates, Inc. (HRA)
1992 *Northwest Pipeline Corporation System Expansion Project Preliminary Treatment Field Report 45CL204H.* Historical Research Associates, Inc., Seattle, Washington. Prepared for Northwest Pipeline Corporation.

Kiers, Roger, and Pam Trautman
2009 *Addendum Cultural Resources Survey, SR 14 Camas-Washougal Add Lanes and Build Interchange Project, Clark County, Washington*. Washington State Department of Transportation, Olympia, Washington.

King, Jeffrey Scott
1991 Site Form for 45CL410. On file, Department of Archaeology and Historic Preservation, Olympia.
1992 *December 1992 Letter Report on Construction Monitoring for the Northwest Pipeline Corporation System Expansion Project, Washington State.* Prepared for Northwest Pipeline Corporation, Salt Lake City, Utah.

King, Jeffrey Scott, Lisa Mighetto, James C. Woodman, and Gail Thompson
1992 *Cultural Resources Inventory and Archaeological Testing for the Northwest Pipeline Corporation System Expansion Project, Washington.* Historical Research Associates, Inc., Seattle, Washington. Prepared for Northwest Pipeline Corporation, Salt Lake City, Utah.
1994 *Results of Cultural Resources Inventory and Archaeological Testing for the Northwest Pipeline Corporation System Expansion Project, Washington.* Historical Research Associates, Inc., Seattle, Washington. Prepared for Northwest Pipeline Corporation, Salt Lake City, Utah.

McDaniel, Sarah
2005 *Cultural Resources Survey Report for the Port of Camas/Washougal Proposed Boat Launching Facility Clark County, Washington*. URS Corporation, Portland, Oregon. Submitted to the Port of Camas/Washougal, Washougal, Washington.

Mills, Bonnie J., and John L. Fagan
2001 *An Archaeological Survey of the Proposed Van Vleet Brick Plaza at Parker's Landing Historical Park.* Archaeological Investigations Northwest, Inc. Letter Report No. 619. Submitted to Parkersville Heritage foundation, Camas, Washington.

Morris, Maxine, and Jeanne M. Welch
1976 National Register of Historic Places Registration Forms for Parkersville Site (45CL204). On file, Department of Archaeology and Historic Preservation, Olympia, Washington.

Reese, Jo
1999 *Gravel Loading Facility, Washington.* Archaeological Investigations Northwest, Inc. Letter Report No. 287. Submitted to Coyote Springs Sand & Gravel, Portland, Oregon.

Reese, Jo, and Todd Ogle
2008 *Archaeological Study for Well #14 and the Anderson Property, City of Camas, Washington.* Archaeological Investigations Northwest, Inc. Report No. 1750. Prepared for Otak, Inc., Vancouver, Washington, and City of Camas, Washington.

Roulette, Bill R.
2006a *Summary of a Limited Archaeological Survey of Your Property Located at 814 South 'A' Street in Washougal, Clark County, Washington.* Applied Archaeological Research Report No. 600. Submitted to Robert Lovelace, Washougal, Washington.
2006b Site Addendum Form for 45CL699. On file, Department of Archaeology and Historic Preservation, Olympia, Washington.

Shapson, Dennis B.
1966 *University of Washington, Washington State Department of Highways, Archaeological Site Survey Report.* On file, Department of Archaeology and Historic Preservation, Olympia, Washington.

Smits, Nicholas J.
2007 *Archaeological Predetermination Report for 141 S. A. Street, Washougal, Washington.* Archaeological Investigations Northwest, Inc. Report No. 2042.

Smits, Nicholas J., Judith A. Chapman, Elizabeth J. O'Brien, and Jo Reese
2008 *Cultural Resource Study for the SR 14 Camas-Washougal Add Lanes and Build Interchange, Clark County, Washington.* Archaeological Investigation Northwest, Inc. Report No. 2033. Prepared for Skillings Connolly, Inc, Olympia, Washington, and Washington Department of Transportation Southwest Region, Vancouver, Washington.

United States Army Corps of Engineers (USACE)
1951 *Columbia River and Tributaries, Northwestern United States. Volume VI.* U.S. Government Printing Office, Washington, D.C.

Welch, Jeanne M.
1975 Site Form for 45CL204H. On file, Department of Archaeology and Historic Preservation, Olympia.

Wilson, Meredith, Nicholas Smits, Jason Allen, and Jo Reese
2006 *Cultural Resource Overview for the Proposed Riverwalk Development, Washougal, Clark County.* Archaeological Investigations Northwest, Inc. Report No. 1808. Prepared for Riverwalk, LLC, Washougal, Washington.

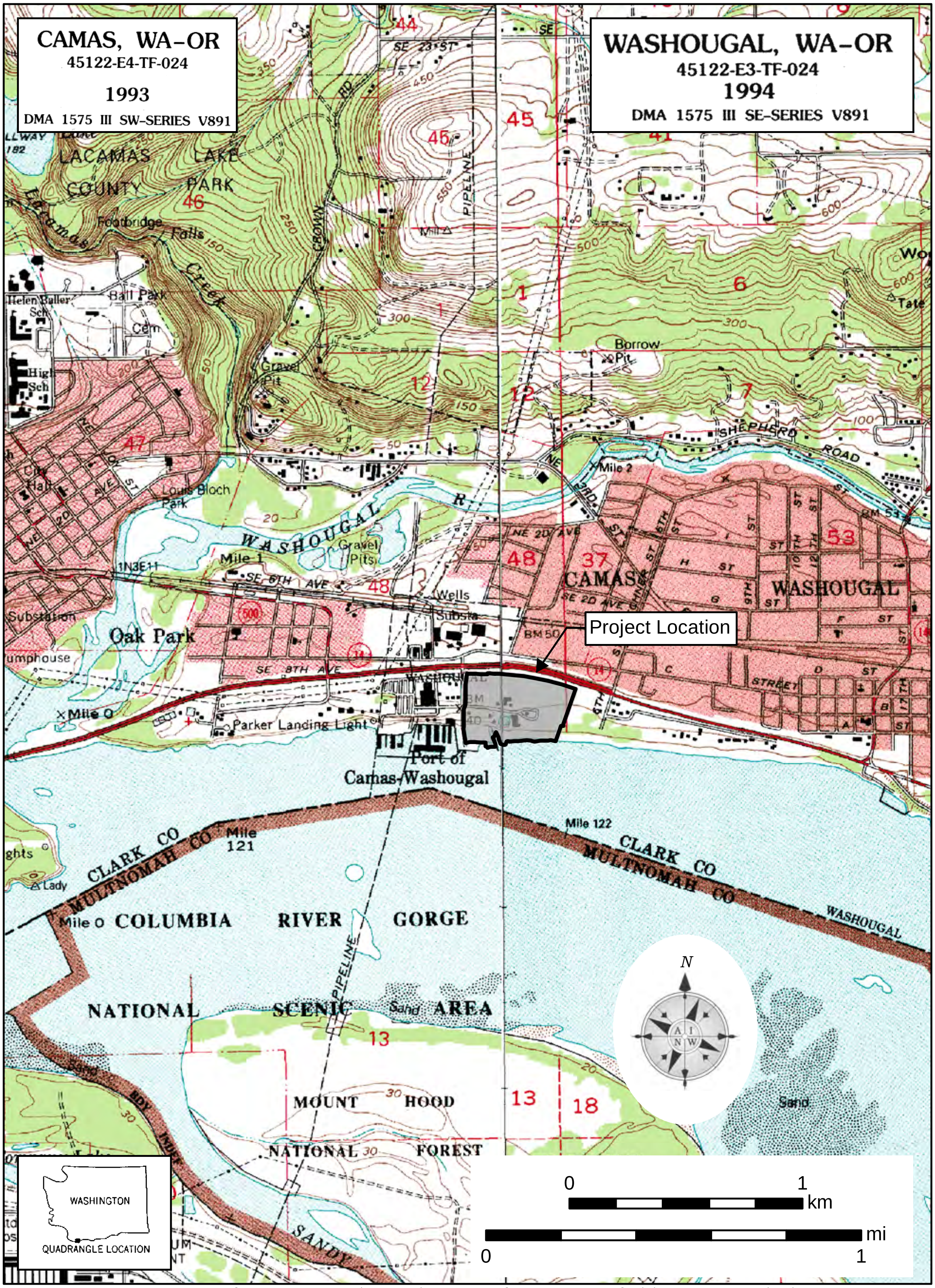

Figure 1. Port of Camas-Washougal's Waterfront Brownfield Intergrated Plan project location.

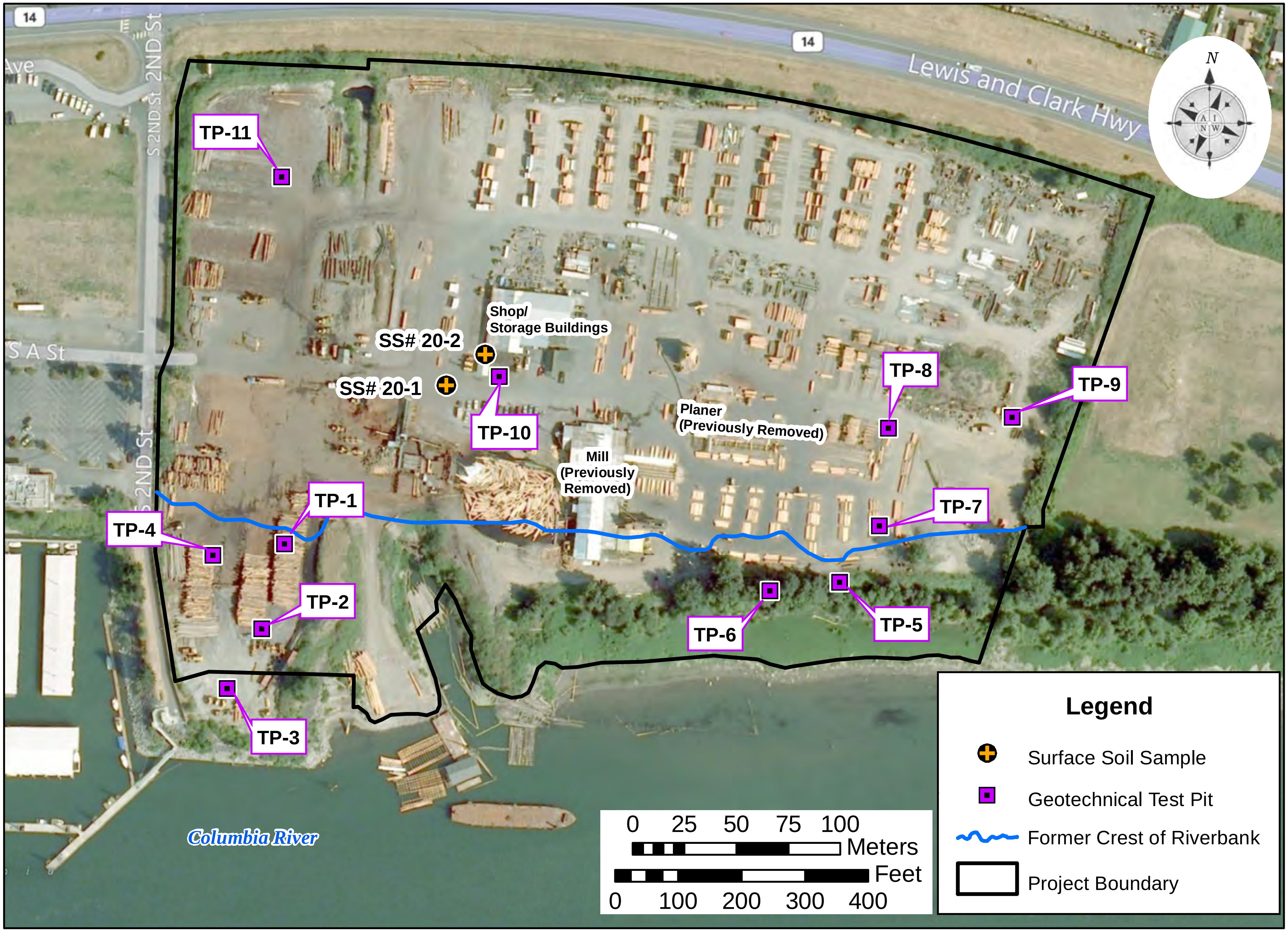

Figure 2. Locations of geotechnical test pits and surface soil samples inspected for this report. The former crest of the riverbank was estimated through a scaled comparison of historical maps (Duquette and Albright 2011:Figure 2).

Photo 1. Excavation of test pit TP-8 within the Port of Camas-Washougal's Waterfront Brownfield Integrated Plan project area. The view is towards the southwest.

Photo 2. Excavation of test pit TP-10. The Columbia River is in the background to the left. The view is towards the south-southwest.

Photo 3. Southern edge of the project area along the Columbia River. The view is towards the east-northeast.

Photo 4. Corrugated metal building within project area. The view is towards the northeast.


Photo 5. Shop or storage building within the project area. The view is towards the northeast.


Photo 6. Test pit TP-6 at the end of excavation at a depth of 4.9 m (16.0 ft). The view is towards the north.


Photo 7. Excavation of surface soil sample SS# 20-1 at end of excavation at a depth of 0.9 m (3.0 ft). The view is towards the west.


Photo 8. Elevated land in southwestern corner of project area that was built probably using dredge sands. TP-1 through TP-4 were excavated into this landform. The view is towards the west-northwest.

APPENDIX

ARCHAEOLOGICAL SITES IN THE VICINITY OF THE PORT OF CAMAS-WASHOUGAL'S WATERFRONT BROWNFIELD INTEGRATED PLAN PROJECT AREA

By
Nicholas Smits, M.A., R.P.A.
Michele L. Punke, Ph.D., R.P.A.
Jo Reese, M.A., R.P.A.

November 9, 2011

CONTAINS PRIVILEGED INFORMATION - DO NOT RELEASE

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ARCHAEOLOGICAL SITES IN THE VICINITY OF THE PORT OF CAMAS-WASHOUGAL'S WATERFRONT BROWNFIELD INTEGRATED PLAN PROJECT AREA (FIGURE A1)

The following is a summary about archaeological sites that are near the project area. Their locations are indicated on Figure A1. This information is sensitive and should not be disclosed to the public.

In 1965, an archaeological survey for construction of SR 14 was conducted under the University of Washington State Department of Highways' Archaeological Survey program (Shapson 1966). As a result of the investigation, two archaeological sites, 45CL16 and 45CL17, were recorded (Browman 1965a, 1965b; Shapson 1966). Site **45CL16**, found during construction of SR 14 at the intersection of SR 14 and South 7th Street in Washougal, consisted of a fire hearth, fire-cracked rock (FCR), and a scatter of lithic flakes (Browman 1965a; Duncan 1978b). During a surface inspection of the site in 1978, only one lithic flake and one fleck of charcoal were noted (Duncan 1978b). The recorded site location is beneath the existing SR 14 road prism, approximately 230 m (770 ft) to the east of the current project area. This site has not been formally evaluated for its NRHP eligibility.

Site **45CL17** was recorded on the Columbia River shoreline, east of 45CL16 (Browman 1965b; Shapson 1966). Although the boundaries of 45CL17 have not been defined, it reportedly measured about 120 m (394 ft) wide and 10 to 30 m (33 to 98 ft) long. The estimated location for site 45CL17, based on differing lines of evidence, is shown on Figure A1; it may be as close as 0.5 km (0.3 mi) to the east of the current project area. A thick midden deposit, measuring at least 1 m (3.3 ft) deep, was noted at the site along with cobble choppers, ground stone tools, FCR, and debitage. At the time it was recorded, the site had already been looted, resulting in the destruction of a possible cremation pit (Browman 1965b). During a later site visit, Duncan observed cultural deposits to a depth of 2 m (6.6 ft) below the ground surface in previously-excavated looters' pits (Duncan 1978c). The site has not been evaluated for NRHP eligibility.

Another site, 45CL699, has been found in the broad area where site 45CL17 may have been originally observed. Site **45CL699** is located approximately 0.6 km (0.4 mi) east of the current project area. The site was identified in 2006 during a predetermination study (Bryant and Hudson 2006) and was later tested during a survey-level investigation (Roulette 2006a). At the time it was identified, 45CL699 consisted of a scatter of lithic artifacts (including a projectile point, a net weight fragment, a possible cobble tool, and lithic debitage) observed on the ground surface. One shovel test was later excavated within the site in the location of a proposed piling for a dock that was planned to be constructed on the Columbia River shoreline (Roulette 2006a). About 270 pieces of lithic debitage were observed in the shovel test, most of which were found in a disturbed context in the upper 42 cm (17 in) of the site. About 70 of the flakes were found in the shovel test between 42 and 80 cm (17 and 31 in) below the surface in undisturbed sediments (Roulette 2006a, 2006b). The site has not been assessed for NRHP eligibility.

During an archaeological survey conducted in 2005 (McDaniel 2005), three isolated pre-contact artifacts (**45CL670**, **45CL671**, and **45CL672**) were recorded along the Columbia River shoreline to the east of the current project area. Two other isolated pre-contact artifacts were identified but not recorded, as they were located outside of the project's boundaries, to the east of the location of the recorded isolates (McDaniel 2005:12). The isolate found near the southeast corner of the current project area, 45CL670, was a water-worn cryptocrystalline silicate (CCS) biface. Isolates 45CL671 and 45CL672 consisted of CCS flakes.

The Parkersville site (**45CL204** [formerly 45CL115 and 45CL204H]) is located approximately 230 m (750 ft) west of the current project area between SE Union and South 2nd Streets. It was originally identified in 1969 when three residences were constructed immediately west of Parker's Landing Historical Park (Morris and Welch 1976). Artifacts found during construction of these residences included stone mortars, pestles, hammerstones, net weights, and a stone effigy. Subsequently, the area where these materials were found was not included in the archaeological site boundaries when the site was officially recorded in 1975 (Welch 1975). If these materials are taken into account, site 45CL204 extends an additional 210 m (689 ft) to the west of the site boundary shown on Figure A1.

In 1976, site 45CL204 was listed in the NRHP based on its archaeological deposits, which contain pre-contact artifacts as well as historic-period materials associated with Euroamerican occupation of the site in the nineteenth and twentieth centuries (Morris and Welch 1976). Archaeological testing was conducted at the site in the early 1990s for a natural gas pipeline expansion project (HRA 1992). During monitoring of the pipeline construction at the site, pre-contact archaeological deposits were found at the southern end of the park beneath 3.5 m (11.5 ft) of dredge fill. The deposits were found approximately 30 m (100 ft) south of Parker's Landing Historical Park, near the river's edge at an elevation of about 6 m (20 ft). The overlying dredge fill was mechanically removed from the area and eight 1x1-m (3.3x3.3-ft) units were excavated below the fill, resulting in the recovery of approximately 800 artifacts, including pre-contact lithic debris and tools, as well as historic-period artifacts (HRA 1992).

As part of a cultural resource survey conducted a few years ago for the construction of additional lanes and an interchange along SR 14, three additional archaeological sites were identified and recorded near the current project area (Smits et al. 2008). Archaeological site **45CL771**, located approximately 260 m (850 ft) west of the current project area, consisted of non-diagnostic historic-period artifacts and a single CCS flake. The artifacts were found in disturbed sediments that were recently deposited as fill. Site **45CL772**, located approximately 30 m (100 ft) east of the project area, consisted of historic-period artifacts associated with a recently demolished house. Archaeological site **45CL774** was found along the SR 14 right-of-way approximately 53 m (175 ft) to the north of the current project area. Like 45CL772, this site also appeared to be associated with the demolition of historic-period structures. The site included architectural and domestic artifacts (such as glassware, dish, and storage vessel fragments) dating to the historic and modern periods and were found in a disturbed context (Smits et al. 2008:29-30). All three sites were determined to be not eligible for listing in the NRHP.

Site **45CL410** was recorded in 1991 and is located approximately 0.4 km (0.25 mi) northwest of the current project area on a terrace above the Washougal River (King 1991; King et al. 1992, 1994). When discovered, the site consisted of both pre-contact and historic-period artifacts, including lithic flakes and tools, possible hearth features, glass, ceramics, and machine-cut square nails. A portion of the site was evaluated and determined to be not eligible for listing in the NRHP. Since its discovery, portions of the site have been impacted by modern development and the site boundary has been refined (Smits et al. 2008). Other isolates (not shown on Figure A1) have been found a short distance east of this site.

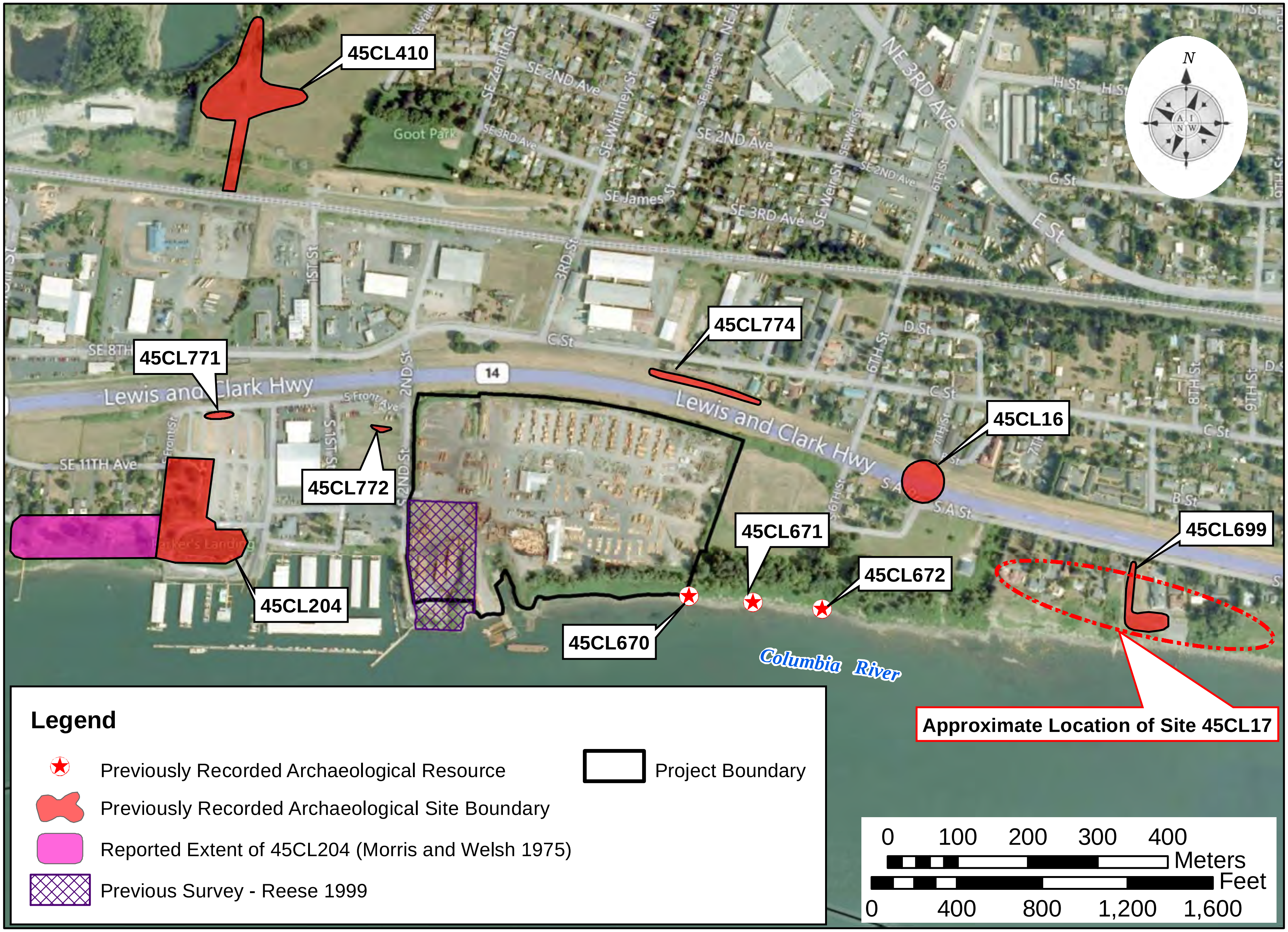

Figure A1. Previously recorded archaeological resources in the vicinity of the Port of Camas-Washougal's Waterfront Brownfield Intergrated Plan parcel.

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APPENDIX B
WETLAND STUDY

ECOLOGICAL LAND SERVICES, INC.

November 21, 2011

Dave Ripp, Executive Director
Port of Camas-Washougal
24 South A Street
Washougal, WA 98671
Phone - (360) 835-2196 ext. 101

Re: Wetland reconnaissance for the Hambleton lumber mill site and Port of Camas-Washougal (POCW) 6th Street site located in Washougal, Washington.

Dear Mr. Ripp:

This letter is to provide documentation of the findings observed during the wetland reconnaissance completed by Ecological Land Services Inc. (ELS) at the Hambleton lumber mill and POCW 6th Street sites located in the City of Washougal, Clark County Washington.

Summary of Site Visit

The site reconnaissance occurred on November 3, 2011. The Hambleton site was previously used as a lumber mill and portions of the site contain the remains of structures associated with the past lumber mill. The site is mostly flat, but topography varies as the site has been altered by past milling and landfill activities. The 6th Street site consisted of mostly field grasses to the north and a band of cottonwood trees to the south.

Methods

The ELS biologist researched the Clark County GIS database for mapped wetland and hydric soils before walking the site. Field site visits for both the Hambleton property and the 6th Street site were performed, and observations of vegetation, soils, and evidence of hydrology were documented.

Due to gravel fill, a test plot was not dug at the Hambleton site. One test plot was taken at the 6th Street site just adjacent to 6th Street.

Findings

According to the Clark County GIS database there are no hydric soils mapped within the Hambleton or 6th Street sites. Two wetland areas within the Hambleton site were mapped by the GIS database; one of which is mapped near the center of the Hambleton site, but based on field observations the center of the site had no evidence of persistent wetland hydrology. Vegetation was sparse and consisted of upland vegetation dominated by oxeye daisy, English plantain, and dandelion. A test plot could not be dug due to a thick layer of gravel /fill material in this area. A second wetland was mapped in the southwestern portion of the site. This is a manmade pond created from uplands for the lumber mill use.

The Clark County GIS mapped one wetland within the 6th Street site. A test plot was dug and data was recorded. ELS found 10YR 3/3 upland soils, no evidence of wetland hydrology, and upland vegetation within the test plot.

Conclusions
Based on research of mapped wetlands and hydric soils, field observations/documentation, and review of historical aerials, it is our professional opinion that no wetlands exist within the Hambleton or 6th Street sites. Based on our site visits it is also our professional opinion that the onsite manmade pond located on the Hambleton site was directly related to the previous mill operations and is therefore non-jurisdictional. However, the ultimate determination of jurisdiction lies with the U.S. Army Corps of Engineers.

Limitations
The conclusions listed above are based on standard scientific methodology and best professional judgment. In our opinion, the conclusions should agree with local, state, and federal regulatory agencies; however, this should be considered a preliminary jurisdictional determination and should be used at your own risk until it has been reviewed and approved in writing by the appropriate regulatory agencies.

If you have any questions or need additional information please contact me at (360) 560-3008 or via email at michele@eco-land.com

Sincerely,

Michele McGraw
Biologist

Attachments
Figure 1 – Vicinity Map
Figure 2 – Aerial Site Map
Figure 3- Clark County GIS Maps

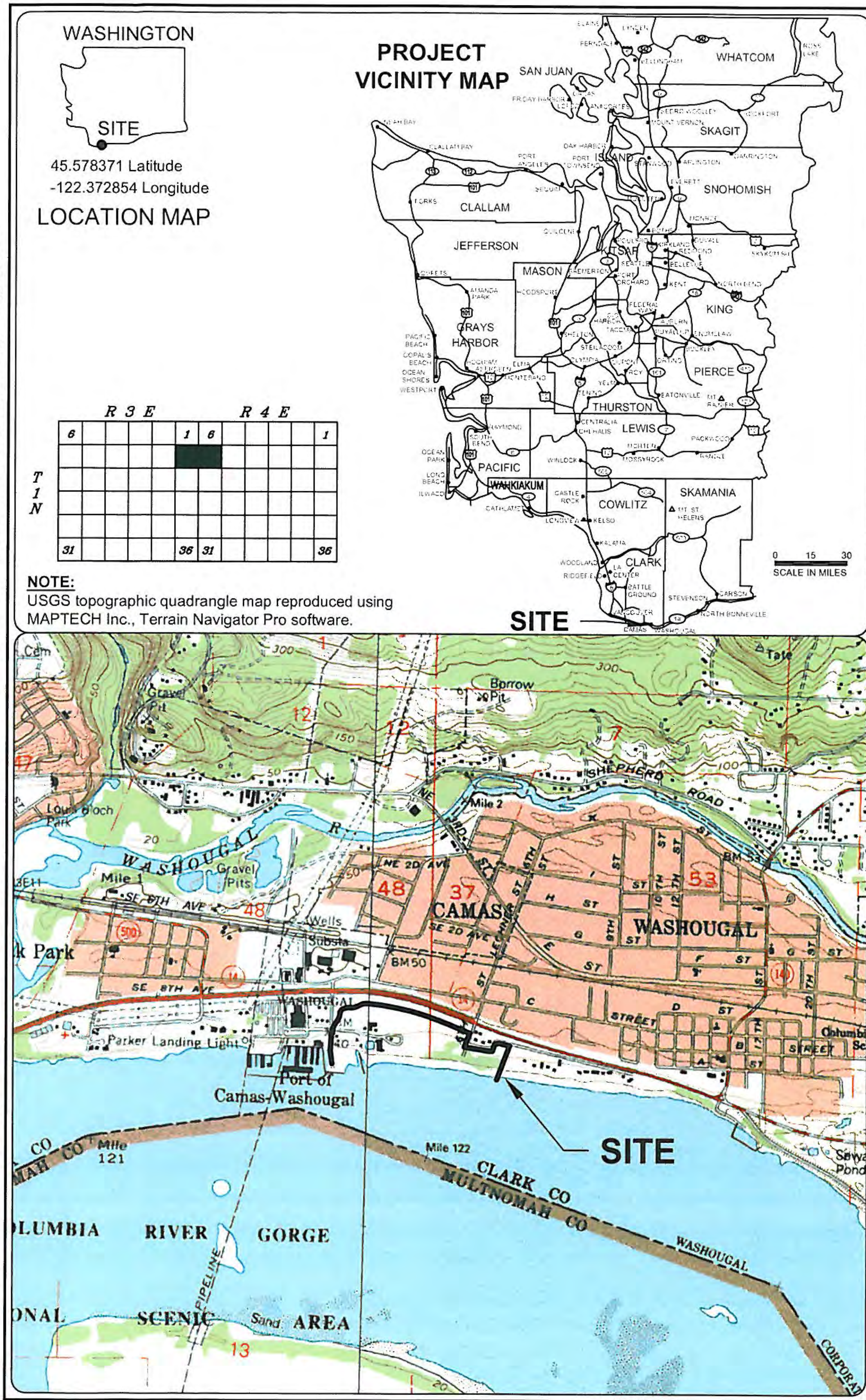

Figure 1
VICINITY MAP
Hambleton Mill Critical Areas Reconnaissance
Maul Foster & Alongi, Inc.
Clark County, Washington
Section 12, T1N, R3E, & Section 7, T1N, R4E, W.M.

DATE: 11/28/11
DWN: JKJ
REQ. BY: MLM
PRJ. MGR: MLM
CHK:
PROJECT NO: 421.06

ECOLOGICAL LAND SERVICES, INC.
1157 3rd Ave., Suite 220
Longview, WA 98632
Phone: (360) 578-1371 Fax: (360) 414-9305

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1" = 2000'

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NOTE(S):
1. Site survey by KC Development. 2011 aerial photo provided by Google Earth™.

Figure 2
SITE MAP
Hambleton Mill Critical Areas Reconnaissance
Maul Foster & Alongi, Inc.
Clark County, Washington
Section 12, T1N, R3E, & Section 7, T1N, R4E, W.M.

DATE: 11/28/11
DWN: JKJ
REQ. BY: MLM
PRJ. MGR: MLM
CHK:
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ECOLOGICAL LAND SERVICES, INC.
1157 3rd Ave., Suite 220
Longview, WA 98632
Phone: (360) 578-1371 Fax: (360) 414-9305

11/28/2011 8:45 AM S:\Clark-WA\Washougal\421-Maul Foster & Alongi, Inc\421.06-Hambleton Mill Critical Areas Reconnaissance\421.06-Figures\421.06_DL.dwg Jennifer

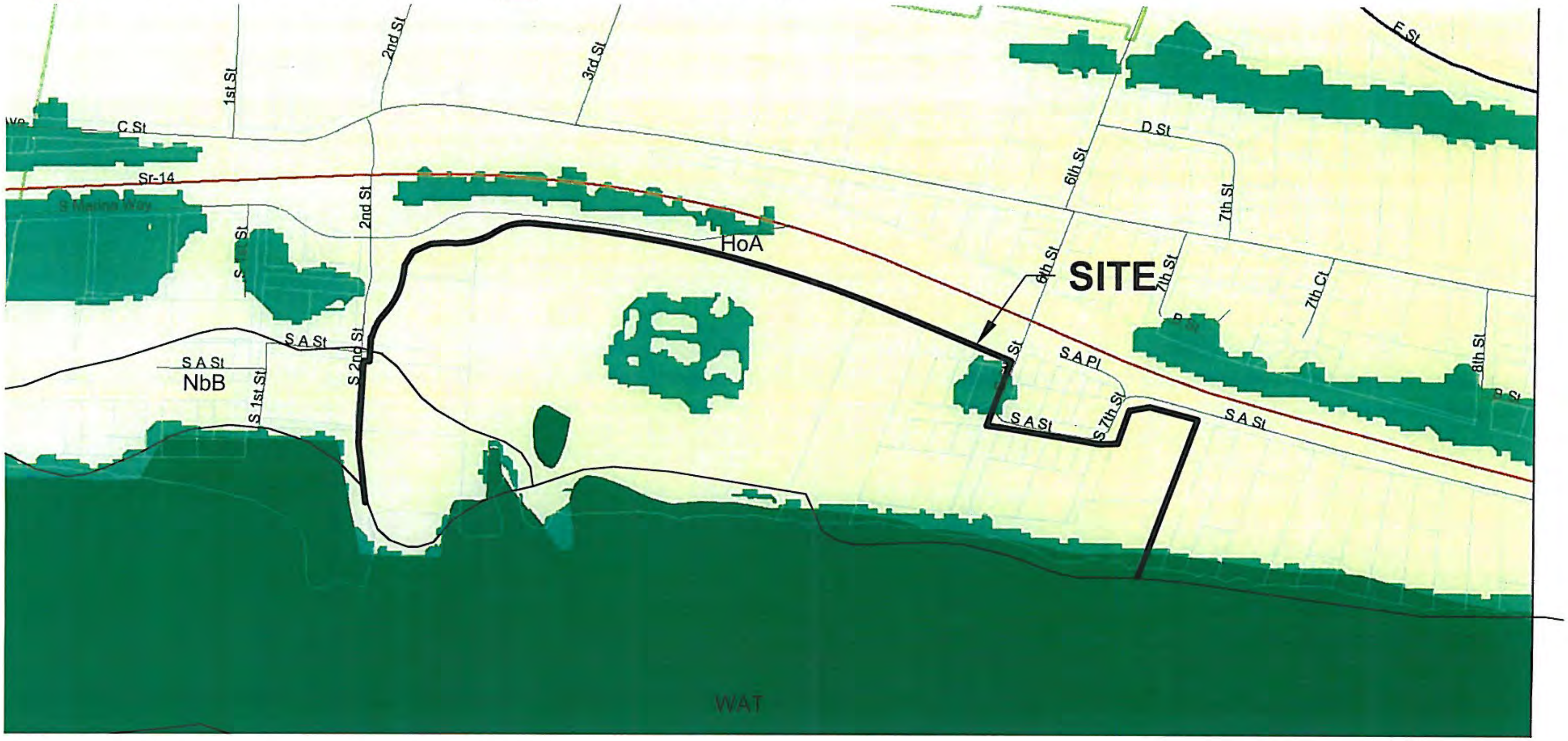
Clark County Soils and Wetlands Inventory

LEGEND:

Clark County Wetland Inventory

National Wetlands Inventory

HoA	Hillsboro silt loam, 0 to 3 percent slopes. Not hydric.
NbB	Newberg silt loam, 3 to 8 percent slopes. Not hydric.
WAT	Water



NOTE: Map provided on-line by Clark County, Washington at web address: *http://gis.clark.wa.gov/imf/imf.jsp?site=zoning*

N W E S

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SCALE IN FEET
1" = 500'

ECOLOGICAL LAND SERVICES, INC.
1157 3rd Ave., Suite 220
Longview, WA 98632
Phone: (360) 578-1371 Fax: (360) 414-9305

DATE: 11/28/11
DWN: JKJ
REQ. BY: MLM
PRJ. MGR: MLM
CHK:
PROJECT NO: 421.06

Figure 3
CLARK COUNTY WETLANDS AND SOILS
Hambleton Mill Critical Areas Reconnaissance
Maul Foster & Alongi, Inc.
Clark County, Washington
Section 12, T1N, R3E, & Section 7, T1N, R4E, W.M.

APPENDIX C
GEOPHYSICAL SITE INVESTIGATION

Zonge International, Inc.
Parkside Business Center, Bldg. 1-B
3866 SW Nimbus Avenue
Beaverton, OR 97008
phone: 503.992.6723

July 25, 2013
Ref: 13105

David Ripp
Port of Camas-Washougal
24 South "A" Street
Washougal, WA 98671

Re: Geophysical Site Investigation
335 South A Street
Washougal, Washington

Dear Mr. Ripp;

Zonge International, Inc. (Zonge) presents this report summarizing the findings of a geophysical site investigation conducted at the former lumber mill property, 335 South A Street, Washougal, Washington (Figure 1). The objective of the survey was to locate a group of electrical transformers reportedly buried at depths up to 20 feet.

A gridded magnetometer survey was utilized for the geophysical investigation. Results of this survey are summarized in Figure 2, *Geophysical Interpretation Summary*, and discussed in the section, *Results and Interpretation*.

The site was formerly a lumber mill (Figure 1). Buildings and surface materials have recently been removed. The area of reported burial is to the east of a large asphalt covered area where there is currently a 10-foot high dirt pile. Thick vegetation (scotch broom & blackberries) on the pile limited the data acquisition to a few cleared, or partially cleared, paths. A similar dirt pile is 50 feet to the east. The geophysical survey was extended up to 100 feet to the north through a cleared, gravel covered area. The survey was limited on the south by thick vegetation.

Survey Methodology

The magnetic method was selected as it responds strongly to massive steel (ferrous) objects and will provide the desired depth-of-exploration of 20-30 feet for large, transformer sized objects.

Magnetic Data Acquisition

The magnetic (MAG) survey was performed with a Geometrics G858G cesium magnetometer/ gradiometer. This instrument was run in the “continuous” sampling mode, recording the magnetic field at 0.1 second intervals (approximately 0.5 feet). MAG data were collected at a nominal line spacing of 10 feet.

GPS Location Control

Location data were acquired simultaneously with the MAG data using a Trimble AG132 Differential Global Positioning System (DGPS). This system provides visual feedback to the operator to assure that he is "on line" and that the survey area is covered uniformly. This system is a real time differential GPS system using a Coast Guard beacon for the differential correction. The GPS system has sub-meter accuracy; hence positions are generally accurate to ±1-3 feet.

Data Processing

MAG data were analyzed, gridded, and contoured using the Geosoft OasisMontaj software package. Data were gridded and interpreted for anomalies that may indicate the presence of collections of large buried metallic objects, e.g. transformers. Gridding was done using a kriging algorithm and a 0.5 meter grid spacing.

Color contour plots of MAG data are included as Appendix A. We have included plots of the total magnetic field, the magnetic analytic signal, and the vertical magnetic gradient. The total magnetic field is the raw recorded magnetic field from the top sensor. The magnetic analytic signal is computed from the total magnetic field. A high in the analytic signal occurs directly over the magnetic source and is a measure of the magnetic gradient. The vertical gradient is measured by taking the difference in the magnetic field as measured by two sensors spaced 0.5 meters apart, one above the other. Anomalies in the total magnetic field and the vertical gradient will have both high and low values associated with them.

Results and Interpretation

A summary of magnetic anomalies considered to be significant is shown on Figure 2, *Geophysical Interpretation Summary*. We have interpreted an area north and northwest of the large mounded earth piles as an area of buried debris. The magnetic signature in this area is somewhat chaotic, indicative of a collection of magnetic debris of varying sizes. The frequency of the response would indicate burial of 5 feet or greater for most of the debris although the strong magnetic gradient would indicate some shallower debris.

Anomalies A, B, and C are indicative of more concentrated objects or larger singular objects within the debris. This interpretation is based on the stronger anomalies which appear irregular in character.

Any one of Anomalies A, B, or C could be indicative of a collection of large electrical transformers or other materials with similar mass of steel.

Closure

Geophysical surveys performed as part of this project may or may not successfully detect or delineate any or all subsurface objects or features present. Locations, depths, and the scale of buried objects or subsurface features mapped as a result of this survey are a result of geophysical interpretation only, and should be considered as confirmed, actual, or accurate only where recovered by excavation or drilling.

Geophysical methods and field procedures described above are applicable to these particular project objectives, and that these methods have been successfully applied by Zonge in investigations of similar size and nature. However, sometimes field or subsurface conditions are different from those anticipated and the resultant data may not achieve the desired objectives. Zonge warrants that our services were performed within the limits prescribed by the client, with the usual thoroughness and competence of the geophysical profession.

Thank you for the opportunity to work with you on this project. Please feel free to call if you have questions or require additional information.

Yours truly,

Zonge International, Inc.

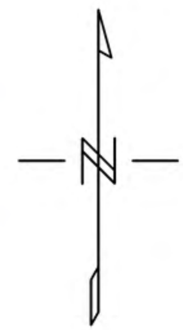
Rowland B. French, L.G.
Program Geophysicist

c.c. Alan Hughes, Maul Foster & Alongi

Attachments: Figures 1 – 2
Appendix A - Geophysical Data Plots

FIE: Zonge Port C-W rpt01.docx
PROJECT: 13105

ZONGE PROJECT: 13105 FILE: Washougal Site wasp.map DATE: JULY 2013 REVISION: A-24-JULY-13



AREAL PHOTO FROM GOOGLE EARTH
IMAGEARY DATE 8/15/2012
USED WITH PERMISSION

Scale 1:3600

250 0 250

US survey foot

NAD83 / Washington South (ftUS)

FIGURE 1

Prepared By:

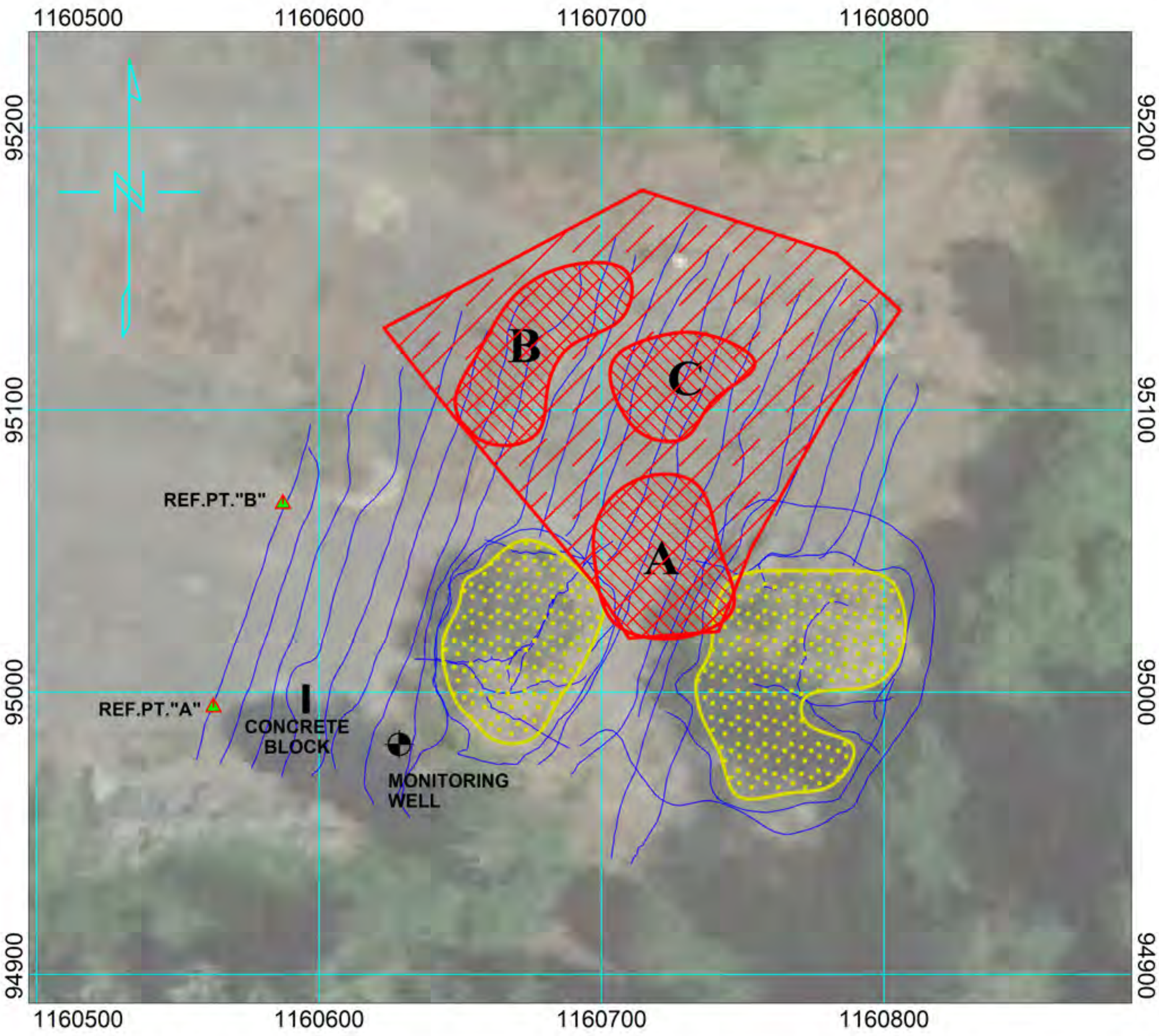
Zonge
TRUSTED GEOPHYSICS.

Prepared For:

PORT OF CAMAS-WASHOUGAL

SITE LOCATION MAP

Geophysical Site Investigation
3355 South A Street
Washougal, Washington



LEGEND

MAGNETIC DATA PATH

A STRONG MAGNETIC ANOMALY (DISCUSSED IN TEXT)

AREA OF BURIED DEBRIS

DIRT PILE

FIGURE 2

Scale 1:720

25 0 25 50

US survey foot

NAD83 / Washington South (ftUS)

Prepared By: Zonge TRUSTED GEOPHYSICS

Prepared For: PORT OF CAMAS-WASHOUGAL

GEOPHYSICAL INTERPRETATION SUMMARY

Geophysical Site Investigation
3355 South A Street
Washougal, Washington

REVISION: A-25-JULY-13
DATE: JULY 2013
FILE: DetailA_Interp.map
ZONGE PROJECT: 13105

Geophysical Site Investigation

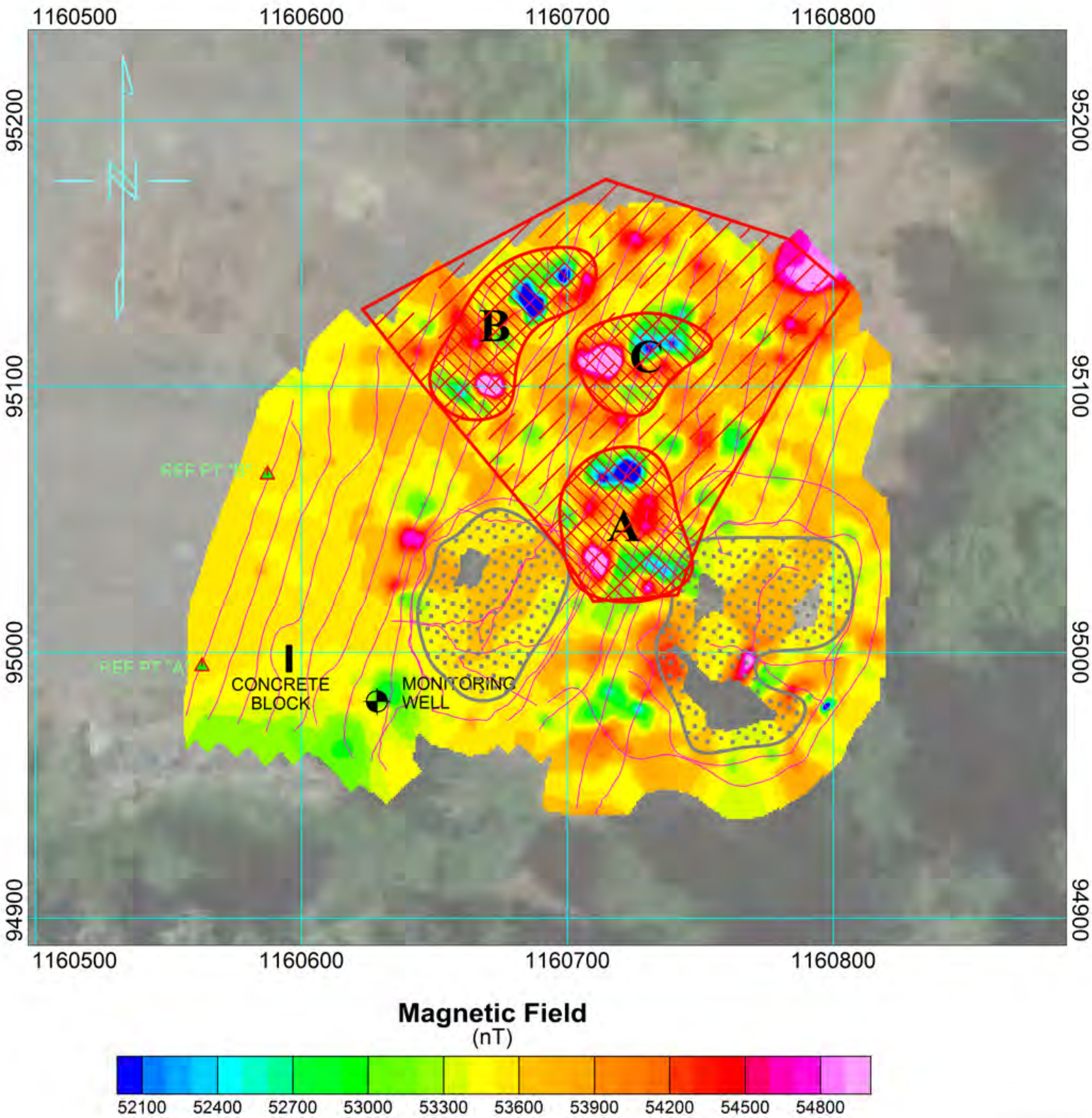
335 South A Street

Washougal, Washington

APPENDIX A

Geophysical Data Plots

LIST OF FIGURES



FOR LEGEND SEE FIGURE 2

FIGURE A1

Scale 1:720

25 0 25 50

US survey foot

NAD83 / Washington South (ftUS)

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TRUSTED GEOPHYSICS.

Prepared For:

PORT OF CAMAS-WASHOUGAL

TOTAL MAGNETIC FIELD DATA PLOT

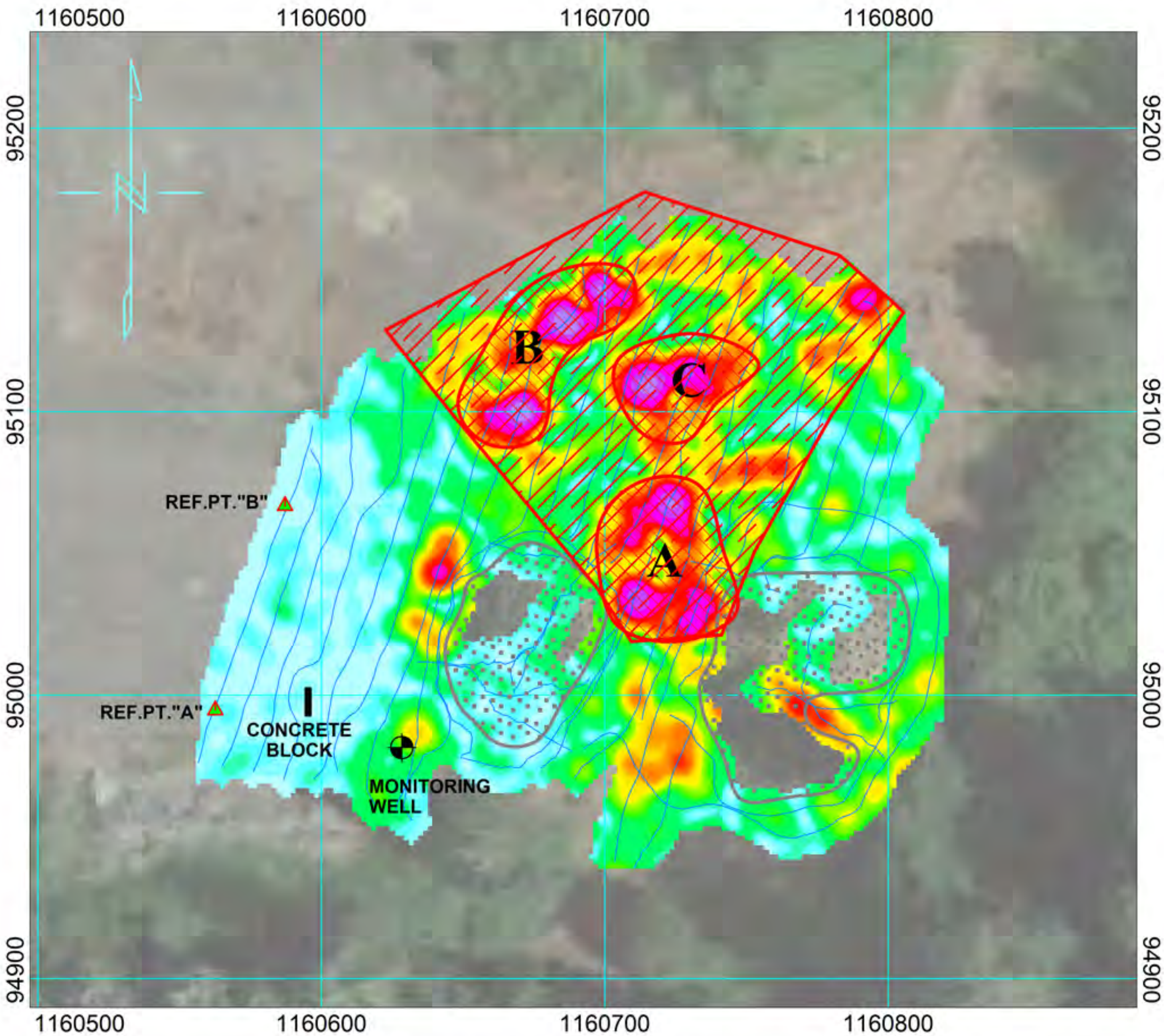
Geophysical Site Investigation
3355 South A Street
Washougal, Washington

REVISION: A-25-JULY-13

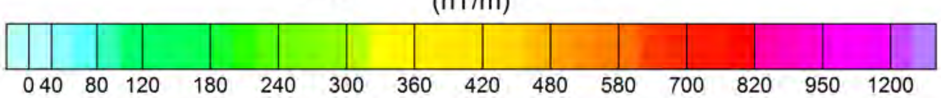
DATE: JULY 2013

FILE: DetailA_Ansig.map

ZONGE PROJECT: 13105



Magnetic Analytic Signal
(nT/m)



FOR LEGEND SEE FIGURE 2

FIGURE A2

Scale 1:720

25 0 25 50

US survey foot

NAD83 / Washington South (ftUS)

MAGNETIC ANALYTIC SIGNAL DATA PLOT

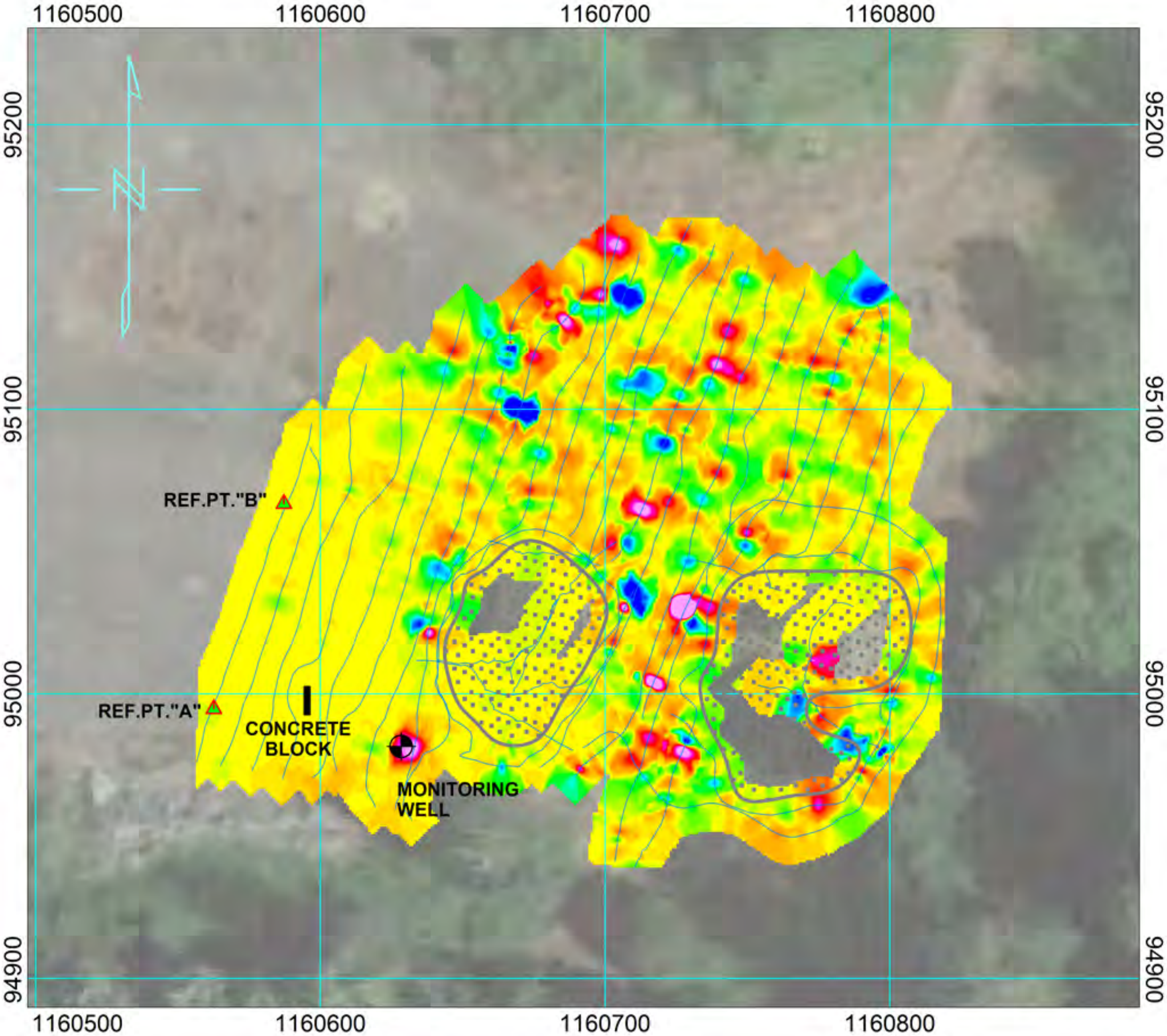
Geophysical Site Investigation
3355 South A Street
Washougal, Washington

Prepared By:

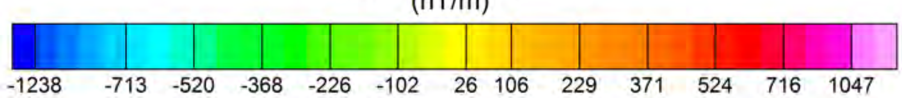
Zonge
TRUSTED GEOPHYSICS.

Prepared For:

PORT OF CAMAS-WASHOUGAL



Magnetic Gradient
(nT/m)



FOR LEGEND SEE FIGURE 2

FIGURE A3

Scale 1:720

25 0 25 50

US survey foot

NAD83 / Washington South (ftUS)

VERTICAL MAGNETIC GRADIENT DATA PLOT

Geophysical Site Investigation
3355 South A Street
Washougal, Washington

Prepared By:

Zonge
TRUSTED GEOPHYSICS

Prepared For:

PORT OF CAMAS-WASHOUGAL

REVISION: A-22-JULY-13

DATE: JULY 2013

FILE: DetailA_VGrad.map

ZONGE PROJECT: 13105

APPENDIX D

GEOTECHNICAL EVALUATION

APEX

Geotechnical Evaluation Hambleton Lumber Pedestrian Improvements Washougal, Washington

Prepared for:
The Port of Camas-Washougal

April 15, 2014
2117-00

APEX

Geotechnical Evaluation
Hambleton Lumber Pedestrian Improvements
Washougal, Washington

Prepared for:
The Port of Camas-Washougal

April 15, 2014
2117-00

Adam Reese, L.E.G.
Senior Project Geologist

4/15/14

Stuart Albright, P.E.
Principal Engineer

Table of Contents

Figures

Appendix

1.0 Introduction and Limitations

This report presents Apex Companies, LLC's (Apex's) geologic and geotechnical engineering evaluation and recommendations for the proposed pedestrian and parking improvements within the Hambleton Lumber site in Washougal, Washington. The property is currently being studied for redevelopment potential. Prior to overall redevelopment, the Port of Camas Washougal is proposing to construct a series of public improvements including a pathway at the crest of the slope above the Columbia River, a small parking lot on the southwest corner of the property, and a restroom building adjacent to the parking lot. In addition, the site remediation will involve the filling of the former mill pond near the middle of the site.

The purpose of our work was to provide a geotechnical engineering evaluation for the proposed public improvements and the filling of the pond. Apex's Scope of Work was detailed in our proposal. The work was performed for the exclusive use of the Port of Camas-Washougal and their clients and agents for specific geotechnically related application to this project. This work was conducted in accordance with generally accepted professional practices in the same or similar localities related to the nature of the work accomplished, at the time the services were performed. No other warranty, express or implied, is made.

Our scope of work included a site reconnaissance, review of past subsurface information, and completion of a project-specific exploration program including drilled borings.

2.0 Site Description and Project Understanding

Site Description. The Hambleton Lumber site is located in Washougal in the area generally bound on the north by SR-14, on the south by the Columbia River, on the west by S 2nd Avenue, and on the east by parcels owned by the Port of Camas Washougal. The site location and boundaries are indicated on Figures 1and 2, respectively.

Site History. The site housed a lumber mill from the 1950s until 2010. In the 1937 aerial photograph, the property appears to be in agricultural and residential usage. The 1947 USGS map shows the Port of Camas Washougal Terminal Number 1 offshore along the western end of the site, but it appears that the majority of the site is still in residential/agricultural usage. However, by 1954, the USGS map shows the constructed slip and primary mill building.

The most significant site changes associated with development of the lumber mill have been modifications to the shoreline. This has included the placement of large quantities of fill along the waterfront, the excavation of a slip, and the excavation of a mill pond.

A comparison of historical maps indicates that for the majority of the site, the shoreline was extended towards the Columbia River by 50 to 100 feet. The location of the original slope crest as scaled from maps and photographs is shown on Figure 2. The westernmost parcel appears to have been extended some 200 feet and was ultimately filled to the previous harbor line associated with the Terminal Number 1 structure. That area is also elevated above surrounding grades and appears to have served as a log deck. The area is likely covered by multiple feet of wood debris.

The shoreline was not only extended but oversteepened as well. A review of topography from the Clark County GIS site indicates that for the adjacent, underdeveloped parcels, the natural river bank is generally in the range of 4H:1V (14 degrees from horizontal). The riverbank at the Hambleton site is currently at a gradient of approximately 1H:1V (45 degrees). This slope is generally not stable and past aerial photographs show evidence of erosion and sliding on this slope. The face of the slope is currently fairly heavily vegetated.

With the exception of the shoreline area, it does not appear that the remainder of the site was extensively re-graded during the development of the mill. Although other sites in the area have received significant quantities of dredge fills, it does not appear that was the case with the Hambleton site.

Project Understanding. The proposed improvements include a pedestrian pathway, a small parking lot, and a restroom building. The trail is currently envisioned as following the crest of the river bank, quite near the edge. We understand that retaining walls may be necessary in areas where the trail encroaches on the slope face. The parking lot is proposed to be constructed on the peninsula feature located in the southwest corner of the site. This peninsula previously served as a log deck for the mill. The restroom structure will be developed adjacent to the parking lot.

3.0 Geologic Setting

Based upon a review of available geologic literature and a review of previous work in the area, the most prevalent materials in the area are surface fills, recent alluvium (silts and sands, and gravels) and the Troutdale Formation (gravels, cobbles, sands, and intermittent boulders).

The project site is located within the Portland Basin, which was formed by a series of geologic events that included: Cascade mountains building from a series of large fissures in the earth that emitted the Columbia River Basalt; torrential erosion of the Cascade Range generating alluvial deposits now identified as the Troutdale Formation; a second episode of volcanism resulting in a series of Boring Lava volcanic eruption centers; vast deposits of wind-blown silt (loess) termed the Portland Hills Silt, derived from denuded glacial plains to the east; a series of cataclysmic glacial floods generated in Montana and Idaho (Missoula Flood Deposits) that scoured the lowland loess, alluvial plains, and volcanic cones; and more recent stream and river erosion and sedimentation that has shaped the lowlands as they appear today. The controlling geologic units within the site vicinity are primarily recent (Quaternary; Holocene, Pleistocene) alluvium and lacustrine gravel and boulder deposits associated with the Missoula Floods (Quaternary; Pleistocene). Following is a description of these deposits and geologic events.

Alluvium. Office review of the geologic studies for the project vicinity indicates surficial soil deposits in the area consist of unconsolidated recent alluvium derived from river and stream deposits at the ground surface. Based upon the project site location near the mouth of Lacamas Creek and Washougal River, some of the materials in the site vicinity are likely to be reworked deltaic sediments of the Troutdale Formation, Skamania Volcanics, and remnants of the Missoula Flood Deposits. The alluvium encountered beneath the project site consists primarily of silts.

Missoula Flood Deposits. The areas of the Portland Basin below about Elevation 350 are overlain by a series of Pleistocene-aged (ending about 14,000 years ago) catastrophic flood gravels deposited throughout the area (from Camas and Vancouver to Lake Oswego and Wilsonville) during the great Missoula (or Spokane) floods. In the vicinity of the site, at the mouth of the Columbia Gorge and the south end of the Lacamas Lake constriction, the flood deposits consist of large cobbles and boulders near the source areas of maximum velocity. On the project site, these lacustrine gravels are overlain with up to 10 feet of recent alluvial silts.

Groundwater. Previous work in the area by environmental consultants indicates that the groundwater table is typically encountered at a depth of 15 to 25 feet below current ground surface elevations. Shallow, perched water is anticipated throughout the site during prolonged wet weather.

3.1 Seismicity and Earthquake Sources

The seismicity of the Washougal area, and hence the potential for ground shaking, is controlled by three separate fault mechanisms. These include the Cascadia Subduction Zone (CSZ), the mid-depth intraplate zone, and the relatively shallow crustal zone. Descriptions of these potential earthquake sources are presented below.

The CSZ is located offshore and extends from Northern California to British Columbia. Within this zone, the oceanic Juan De Fuca Plate is being subducted beneath the continental North American Plate to the east. The interface between these two plates is located at a depth of approximately 15 to 20 kilometers (km). The seismicity of the CSZ is subject to several uncertainties, including the maximum earthquake magnitude and the recurrence intervals associated with various magnitude earthquakes. Anecdotal evidence of previous CSZ earthquakes has been observed within coastal marshes along the Washington coast. Sequences of interlayered peat and sands have been interpreted to be the result of large subduction zone earthquakes occurring at intervals on the order of 300 to 500 years, with the most recent event taking place approximately 300 years ago. A recent study by Geomatrix (1995) suggests that the maximum earthquake associated with the CSZ is moment magnitude (Mw) 8 to 9. This is based on an empirical expression relating moment magnitude to the area of fault rupture derived from earthquakes that have occurred within subduction zones in other parts of the world. An Mw 9 earthquake would involve a rupture of the entire CSZ. As discussed by Geomatrix (1995), this has not occurred in other subduction zones that have exhibited much higher levels of historical seismicity than the CSZ, and is considered unlikely. For the purpose of this study, an earthquake of Mw 8.5 was assumed to occur within the CSZ.

The intraplate zone encompasses the portion of the subducting Juan De Fuca Plate located at a depth of approximately 30 to 50 km below western Washington and western Oregon. Very low levels of seismicity have been observed within the intraplate zone in Oregon and southwestern Washington. However, much higher levels of seismicity within this zone have been recorded elsewhere in Washington and in California. Several reasons for this seismic quiescence were suggested in the Geomatrix (1995) study and include changes in the direction of subduction between Oregon, Washington, and British Columbia as well as the effects of volcanic activity along the Cascade Range. Historical activity associated with the intraplate zone includes the 1949 Olympia magnitude 7.1 and the 1965 Puget Sound magnitude 6.5 earthquakes. Based on the data presented within the Geomatrix (1995) report, an earthquake of magnitude 7.25 has been chosen to represent the seismic potential of the intraplate zone.

The third source of seismicity that can result in ground shaking within the area is near-surface crustal earthquakes occurring within the North American Plate. The historical seismicity of crustal earthquakes in western Oregon and Washington is higher than the seismicity associated with the CSZ and the intraplate zone. The 1993 Scotts Mills (magnitude 5.6) and Klamath Falls (magnitude 6.0) earthquakes were crustal earthquakes.

4.0 Subsurface Conditions

We have reviewed a series of past and current field explorations completed on the site for environmental assessment purposes. This review includes well logs available from the State of Washington as well as test pits, borings, and geoprobes completed by Evren Northwest in 2006 and 2007, geoprobes completed by Maul Foster & Alongi in 2011, and geotechnical borings for the development of the Port's office building on a parcel to the west of the subject property. In 2011, Apex staff observed a series of shallow test pits completed by Maul Foster & Alongi. The maximum depth penetrated by past explorations was approximately 45 feet below the existing ground surface.

The project specific field explorations for this project were conducted on January 20, 2014. The explorations consisted of a surficial reconnaissance and the drilling of six solid-stem augured borings in the vicinity of the restroom, parking lot, and trail alignments. Borings were completed to depths of ranging from approximately 6.5 to 31.5 feet below the ground surface (bgs). The boring locations are shown on the Site Plan (Figure 2). Boring logs are included in Appendix A. The subsurface conditions encountered on site are described below.

Topsoil. The majority of the site has been in industrial use and, as such, is not vegetated. Small areas of topsoil may be encountered during site preparation. This material should be stripped during initial site work. Topsoil strippings should not be reemployed as structural fill, but can potentially be re-used in landscaping areas.

Fill. With the exception of the shoreline and mill pond, previous subsurface explorations have not encountered evidence of large-scale mass grading. However, the site's use as a lumber processing facility has led to continual grading of the site surface. Historically, lumber mill sites were paved with gravel. Through use, the gravel gets covered with wood, random soil, and debris. Periodically, more gravel is placed to keep the site passable to equipment. The result of this action is a surface formation that contains a mixture of soil, crushed rock, organics, and debris. This material has been encountered to varying degrees across the site. Such fills are generally not suitable for the support of buildings and pavements and the degradation of organics can have a significant detrimental impact on both long-term settlement and methane production.

Deeper, less organic fill is present along the south property boundary, adjacent to the Columbia River. As previously discussed, this fill represents a deep fill placed in the river over time, extending the site southward.

Native Silts and Sands. The near-surface native soils underlying surface fills generally consist of interlayered silts and sands with some clays. This soil unit was observed to range from 2 to 12 feet in thickness. In general, no strength measurements of the formation have been collected but from our experience in the area, we anticipate that the soils are medium-stiff to stiff in consistency.

This soil unit can be reemployed as structural fill during the dry season if it has been moisture conditioned and adequately compacted. During the wet season, this soil unit will not be suitable for use as fill. In addition, use of a gravel working pad over these soils will be required during the wet season in order to allow wheeled construction traffic to traverse the site, and to avoid pumping, rutting, and softening structural or pavement subgrade areas.

Dense to Very Dense Gravels, Cobbles, and Boulders. The primary native soil unit underlying the project site consists of a dense to very dense, dry grading to damp with depth, brown, gravel with cobbles and some silt. Intermittent boulders are typical within this soil unit.

This soil unit can be reemployed as structural fill during the dry season if it has been moisture conditioned and adequately compacted. However, oversized rock, cobbles, and boulders will require segregation. Material larger than about 6 inches in diameter should not be reutilized as structural fill or backfill. This soil unit will function adequately as load bearing strata for moderately loaded structures established over conventional spread footings.

Trenching and excavations within this soil unit may require oversizing of the excavations or trench alignments as a result of caving and sloughing or when the removal of large boulders becomes necessary in order to match design lines and grade. Greater amounts of backfilling will be required as a result of trenches and excavations extending laterally beyond line and grade due to caving and sloughing. Earthwork and utility contractors should include allowances for construction challenges associated with trenches and excavations advanced into gravel/cobble soils with occasional boulders or nested boulders.

Groundwater. The static groundwater table was not observed in the majority of the explorations reviewed. We completed water depth measurements of the six monitoring wells present on site on February 3, 2014. The depths to water below surface grades ranged from 27 to 35 feet. In our opinion, these levels are within a few feet of typical wintertime levels. Shallow, perched water is anticipated throughout the site during prolonged wet weather.

5.0 Conclusions and Recommendations

In general, the site is appropriate for industrial or commercial redevelopment. The presence of loose, organic surface fill throughout the site will have the most significant impact on the future development. The remediation of these fills will require careful site grading.

5.1 Slope Stability and Shoreline Issues

As previously noted, the outer 50 to 100 feet of the site is underlain by a deep fill placed over the shoreline slope. This has resulted in oversteepened slopes subject to river processes. For structures, we recommend a significant setback from the slope crest.

The Washougal Critical Areas code requires a minimum 50-foot buffer from steep slopes. Such a buffer would result in a gradient that is flatter than 2H:1V from the toe of the existing shoreline slope. However, we understand that this buffer is frequently modified and that development within the buffer is not uncommon in Washougal. Ultimately, encroachments on the buffer should be evaluated on a case-by-case basis. However, for planning purposes, a setback of 25 feet from the crest of the slope for structures would provide reasonable setback.

Pedestrian walkways are frequently located within structural setbacks, near the crests of slopes. While enhanced risks associated with this type of development are not unusual, it does result in periodic trail closures associated with minor and major slope failures. The trails along the Columbia in Clark County have had numerous partial closures in the past decade. The only way to preclude the possibility of closures on the stretch of trail proposed for this site would be to implement the setbacks described above (25 feet from the crest). Should some risk of slope impacts be acceptable, an encroachment within the 25 feet would make sense. Under those circumstances, we would recommend that the trail be located a minimum of 10 feet back from the slope crest.

Development Slopes. We recommend that finished cut and fill slopes not exceed gradients of 2H:1V. Cut and fill slopes should be protected immediately from erosion following completion of grading. Erosion protection should consist of placement of jute mesh and seeding with erosion resistant vegetation or other engineer-approved erosion control methods. Newly finished cut and fill slopes that exceed 15 feet in height should be assessed on a case-by-case basis for global stability.

5.2 Pathway and Parking Preparation

The entire site has previously been regraded. Surface fills will likely be encountered in all areas proposed for development of pathways and parking. For most of the pathway and parking areas, the upper foot of soil present is quite organic and debris laden. This material is not suitable for the support of pathways or pavements and should be stripped during site preparation. After removing the disturbed, organic surface material, the exposed subgrade should be evaluated. Overly soft or organic soils should be removed.

Even with the approach to site preparation proposed above, the site will be susceptible to long-term settlement associated with the presence of deep fills. The impact of those settlements can be mitigated by using a relatively deep rock section under the pathways and pavements. The base should consist of at least 12 inches of compacted gravel to provide uniform bearing and to spread out minor differential settlements. Asphalt concrete surfacing would be the most insensitive to settlements. We anticipate that the pathway will be concrete (consistent with other sections). In that case, it would be advantageous to tie the concrete panels together with wire mesh case in the panels.

Pathway Pavements. For concrete pavements, the pathway section should be a minimum of five inches in thickness. As noted above, this use of wire reinforcement would assist in mitigating settlement impacts. For asphalt cement concrete, the use of 3 inches of surfacing is appropriate for this project.

Parking and Driveway Pavements. The access driveway will be on a relatively flat gradient and designed to serve the parking area. We anticipate that the only trucks accessing this site would be associated with maintenance and garbage service. Therefore, once construction has been completed, the likely traffic will generally consist of automobiles and the occasional service truck. For the driveway and parking lot, we recommend a pavement section that consists of 2.5 inches of asphalt-concrete over 12 inches of crushed rock base (note that the base thickness is recommended to mitigate settlement impacts).

5.3 Foundation Support

Much of the site was previously used for the storage of logs and wood debris as well as various stages of log processing. The organic content of the surface fills is sufficiently high as to preclude placing foundations on those fills. Further, the organic content would also likely prevent the placement of those soils elsewhere on site as structural fill. In general, removal and recompaction of the upper surface of the fills (likely 5 feet or more) would be necessary to provide support for settlement sensitive structures. After removal and/or recompaction of the shallow surface fills, conventional spread footings could be employed for building support. Alternatively, deep foundations such as piles or piers could be used.

Restroom Building. In the vicinity of the restroom building, we encountered fills to the depth of our exploration (21.5 feet). This is consistent with the site location being riverward of the original river bank. At depth, the fills are generally uncompacted and contain inclusions of wood debris. Ideally, structures such as the restroom facility would be founded on native soils or compacted structural fills, but that would not be feasible here due to the extensive depth of random fill.

The shallow fills (upper five feet) encountered at or near the restroom site were generally dense in consistency. This likely relates to compaction associated with operation of the mill (loader operations, stacks of logs, etc.). In our opinion, a lightweight structure such as a restroom building can be founded on shallow spread footings with minimal risk from deeper settlements. The shallowest one foot of soil encountered was quite organic and will require stripping. Further, overexcavation of organics and/or debris should be anticipated at the time of subgrade preparation.

We recommend use of an allowable soil bearing capacity of 2 kips per square foot (Ksf) for foundation sizing. Total settlement of foundations designed under the above conditions should be less than about 1 inch and differential settlements between individual footing elements is not expected to exceed approximately 1/2 inch. This estimate does not include a provision for broad, deep settlements associated with the deeper fills. In our opinion, such settlements would occur over a broad area and would generally not be directly observed at the restroom structure. The recommended soil bearing pressure may be increased by 1/3 for short-term loading such as wind or seismic.

For sliding resistance, the silts underlying spread footings can be assumed to have an ultimate coefficient of friction of 0.40. Passive soil pressure can be developed along the sides of footings if granular backfill is used around footings and the backfill is compacted to at least 95 percent of the material's maximum dry density as determined by ASTM D 1557. An equivalent passive fluid weight of 250 pounds per cubic foot (pcf) can be used for resistance against sliding.

5.4 Retaining Wall Design

The following guidelines for non-restrained walls assume that the associated recommendations regarding drainage, compaction, and other issues will be implemented. We anticipate that mechanically stabilized earth (MSE) walls are the most viable for this site.

MSE Walls. MSE retaining wall backfills should consist of clean, granular soils (i.e., sand, gravels, crushed rock). MSE walls require high-quality backfill for durability, good drainage, constructability, and good soil reinforcement interaction. These characteristics can be obtained from well-graded granular materials. MSE systems depend on friction between the reinforcing elements and the soil. In such cases, a material with high friction characteristics is specified and required. Some systems rely on passive pressure on reinforcing elements and, in those cases, the quality of backfill is still critical. These performance requirements generally eliminate predominately fine-grained soils—particularly soils with high clay content.

Recommended soil strength parameters for use in the reinforced retaining wall design are summarized in the following table. Soil cohesion should be assumed as zero.

Table 1: MSE Backfill, Soil Strength Design Recommendations

Backfill Type	Design Friction Angle (Φ)	Moist Soil Unit Weight (γ)	Active Lateral Earth Pressure Coefficient[2]	At-Rest Lateral Earth Pressure Coefficient[3]
Imported Clean Sand[1]	34 degrees	120 pcf	0.28	0.44
Imported Crushed Rock	40 degrees	135 pcf	0.22	0.36

Table 2: MSE Backfill, Active and At-Rest Earth Pressure Coefficients for Sloping Backfill

Backfill Type	Active Earth Pressure Coefficient 3:1 Back Slope	At-Rest Earth Pressure Coefficient 3:1 Back Slope	Active Earth Pressure Coefficient 2:1 Back Slope	At-Rest Earth Pressure Coefficient 2:1 Back Slope
Imported Clean Sand[1]	0.33	0.49	0.41	0.57
Imported Crushed Rock	0.24	0.38	0.28	0.42

Notes:

1. Imported Clean Sand: The sand should contain less than 9 percent or 10 percent fines by weight passing a standard No. 200 sieve.
2. Coulomb Active Lateral Earth Pressure with wall friction. The value assumes level backfill.
3. At-Rest Earth Pressure, $K_o = 1-\sin(\Phi)$. The value assumes level backfill.

MSE Wall Design. MSE wall design can be based upon the following soil parameters.

Table 3: MSE Wall Soil Design Parameters

Parameter	Symbol	Units	Value
In-place Soils at Foundation Grade			
Foundation Soil Friction Angle	φ	Degrees	28
Foundation Soil Unit Weight	γ	pcf	120
Base Sliding Coefficient (Ultimate)	d	--	0.34
Allowable Bearing Capacity for footing embedded a minimum of 3 feet	q_{all}	Ksf	2
Passive Lateral Earth Pressure Coefficient	kp	--	2.77

Notes:

1. Ksf = Kips per square foot. Pcf – pounds per cubic foot.
2. Allowable Bearing Capacity based upon a Factor of Safety of two.

Seismic Lateral Earth Pressure. Lateral earth pressure acting on a retaining wall should be increased to account for seismic loadings. These pressures may be approximated by an evenly distributed pressure which is applied over the entire back of the wall. Using a design acceleration coefficient of 0.12 (this is equal to 1/2 of the horizontal PGA) and a wall height "H" of up to 6 feet, we recommend that the seismic loadings be based on the surcharge pressures given in the following table.

Table 4: Seismic Surcharge Design Pressure Recommendations

Design Condition	Seismic Pressure Surcharge (psf)
Active Earth Pressure	6H
At-Rest Earth Pressure	16H

These pressures represent our best estimate of actual pressures that may develop and do not contain a factor of safety. These pressures assume retaining wall backfill material is well drained.

MSE Wall Foundation Embedment. To reduce long-term MSE wall stability issues associated with sloughing of existing slopes, we recommend that the foundation of the MSE walls be embedded a minimum of 3 feet below finished grades along the front face of the wall. Over-excavation of soft subgrade soils below wall footings should be anticipated. Over-excavations of up to 3 feet in depth may be necessary in areas. Over-excavation areas should be backfilled with compacted crushed rock.

Total and Differential Settlement Estimate. For MSE backfill heights of 6 feet or less in which foundations are embedded a minimum of 3 feet below all surrounding grades, our estimated total settlement is less than 1 inch. Differential settlement over either a 50-foot section or 100-foot section of MSE wall is estimated to be less than 0.5 inch.

Suitable Fill Materials. Backfill selection should be based on the ability of the material to drain and the drainage design developed for MSE walls. In addition, weather conditions will also affect the ability to place and properly compact fill materials utilized in MSE wall construction. Additionally, for MSE walls and reinforced slopes, the susceptibility of the backfill reinforcement to damage due to placement and compaction of backfill on the soil reinforcement shall be taken into account with regard to backfill selection.

5.5 Site Grading Recommendations

Topsoil Stripping. Topsoil is generally not present on site. However, the near-surface fills are typically quite organic and are essentially topsoil-like in nature. Where encountered, topsoil and highly organic fills should be stripped from all building and pavement areas. This soil should not be reused as structural fill but can be reused in low lying landscape berms.

Wet Weather Grading. We recommend that site work be conducted during summer months (late June through early October). If wet weather grading is to be conducted, it should be anticipated that grading and site work costs will increase significantly. All fills placed during wet weather should consist of clean gravel or clean crushed rock. Clean granular wet weather fill (gravel or crushed rock) should contain less than 5 to 7 percent fines by weight. If wet weather grading and site work is conducted, a granular work pad should be constructed over the site. This should consist of 18 inches of clean gravel or clean crushed rock, or 12 inches of clean gravel or clean crushed rock placed over a geotextile filter fabric.

Compaction Recommendations. Structural fills should be installed on a subgrade that has been prepared in accordance with the above recommendations. Fills should be installed in horizontal lifts not exceeding 8 inches in thickness (loose - prior to compaction), and should be compacted to at least 92 percent of the maximum dry density for fine-grained native soils. The maximum dry densities should be determined in accordance with ASTM D 1557 (Modified Proctor Test). The compaction criteria may be reduced to 85 percent in non-structural landscape or planter areas. Fills placed over ground that slopes in excess of 3H:1V should be keyed and benched into firm soils beneath all topsoil and tree or brush roots.

Structural Fills During Summer Grading. During dry weather, structural fills may consist of virtually any well-graded soil that is free of debris, organic matter, and high percentages of clay or clay lumps, and that can be compacted to the preceding specifications. However, if excess moisture causes the fill to pump or weave, those areas should be dried and re-compacted, or removed and backfilled with compacted granular fill. In order to achieve adequate compaction during wet weather, or if proper moisture content cannot be achieved by drying, we recommend that fills consist of well-graded granular soils (sand or sand and gravel) that do not contain more than five percent material by weight passing the No. 200 sieve. In addition, it is usually desirable to limit this material to a maximum 6 inches in diameter for ease of compaction and future installation of utilities.

The majority of shallow material on the east and west margins of the site (areas not previously paved or covered in gravel) is quite organic in nature. These soils would not be suitable for use as structural fill. Shallow soils excavated from the previously paved, central portion of the site may be suitable for use although pockets of organic rich soil have been encountered throughout the site. In general, soils containing more than 5 percent organics by weight should not be placed as structural fills during site grading.

5.6 Pond Reclamation

It is our understanding that the former mill pond will be dredged and subsequently filled. Although it would be desirable to dewater the pond prior to filling, it is likely that at least some water will remain. Further, the remaining subgrade soils are likely to be highly disturbed. In order to place structural fills, it will be necessary to establish a firm base against which to compact subsequent lifts of fill. This would typically be accomplished through the placement of an initial lift of open graded, large particle crushed rock. We would recommend the use of Permeable Ballast, specified in Section 9-03.9(2) of the WSDOT Standard Specifications. As an alternative, crushed concrete generated from site demolition could be used for this purpose. In order to be effectively placed, the concrete should be broken up to approximately 8 inch segments or smaller. The amount of fines in the crushed concrete should be limited to the extent practical.

An initial lift of two to three feet of Permeable Ballast or crushed concrete should be placed prior to any compactive effort being applied. Once this first deep lift is in place, the surface should be tamped or compacted. If the surface is relatively firm and unyielding, the ballast/concrete should be compacted until it stops deflecting. If the surface deflects excessively, another foot of ballast/concrete should be added and tamped. This process would continue until a firm subgrade is achieved. Placement of a geogrid prior to installing the first lift of Ballast/concrete would likely reduce the thickness of ballast needed to achieve a firm subgrade.

After the final lift of ballast/concrete is placed, it should be capped with a minimum of six inches of crushed surfacing base course to fill the exposed voids and act as a filter layer. Alternately, a non-woven geotextile could be used. The remainder of the pond would then be filled with structural fill placed in lifts, in accordance with the grading recommendations of this report.

5.7 Excavations

Subsurface conditions encountered during the site investigation indicate that precautions in utility excavations will be required due to the potential for caving/sloughing. Any excavations deeper than 4 feet should be sloped or shored in accordance with OSHA regulations. Normally, shoring systems (for excavations less than 20 feet in depth) are contractor-designed and -installed items. Our past experience in the area as well as review of previous subsurface explorations indicates that boulders are present throughout the gravel formation underlying the site. We anticipate that difficult excavation conditions will be encountered throughout the property.

5.8 Erosion Control

We recommend that finished cut and fill slopes be protected immediately following grading with vegetation, gravel, or other approved erosion control methods. Water should not be allowed to flow over slope faces or drop from outfalls, but should be collected and routed to stormwater disposal systems. Riprap, gabion baskets, or similar erosion control methods may be necessary at stormwater outfalls or to reduce water velocity in ditches. Silt fences should be established and maintained throughout the construction period. Silt fence barriers should be established down slope from all construction areas to protect natural drainage channels from erosion and/or siltation. In order to decrease erosion potential, care should be taken to maintain native vegetation and organic soil cover in as much of the site as possible.

5.9 Infiltration Testing

Encased Falling Head infiltration testing was conducted within three borings drilled within the project boundaries. The soils at and below test depth were allowed to saturate for at least one hour. After the saturation period, a falling head test was conducted within the PVC pipe. For each of a series of three tests, the decrease in head within the casing was timed for a period of one hour. The accuracy of our measuring device was 1/16-inch and drop in head was measured periodically over the course of the test. The infiltration test results for the final one-hour test for each location in which water drops from approximately 6 inches above the test depth to the test depth are indicated in the following table.

Table 5: Infiltration Test Results

Location of Test	Depth of Test	Infiltration Rate (inches per hour)
B-1	5 feet	0.36
B-2	5 feet	2.7
B-5	5 feet	1.4

6.0 Recommendations for Additional Services

Prior to construction, we recommend that Apex be retained to review the final design plans and specifications. This review will allow us to evaluate whether any change in concept may affect the validity of our recommendations, and whether our recommendations have been correctly interpreted. In order to correlate preliminary soil data with the actual soil conditions encountered during construction, and to assess construction conformance to our report, we recommend that we be retained for construction observation of the following:

- Site preparation activities including stripping, key and bench construction, and fill placement and compaction;
- Footing excavations to verify suitability of bearing soils;
- Subgrades benepath pavements; and
- Other geotechnical considerations which may arise during the course of construction.

7.0 Closing

This report presented Apex's geotechnical engineering evaluation and recommendations for the proposed project. Subject to the recommendations provided within this report, construction of the proposed project is feasible from a geotechnical standpoint. We trust that this report meets your needs. If you have any questions, or if we can be of further assistance, please call. We look forward to working with you in the future.

Note: Base map prepared from USGS 7.5-minute quadrangles of Camas and Washougal, WA, dated 2013 as provided by USGS.gov.

0 2,000 4,000

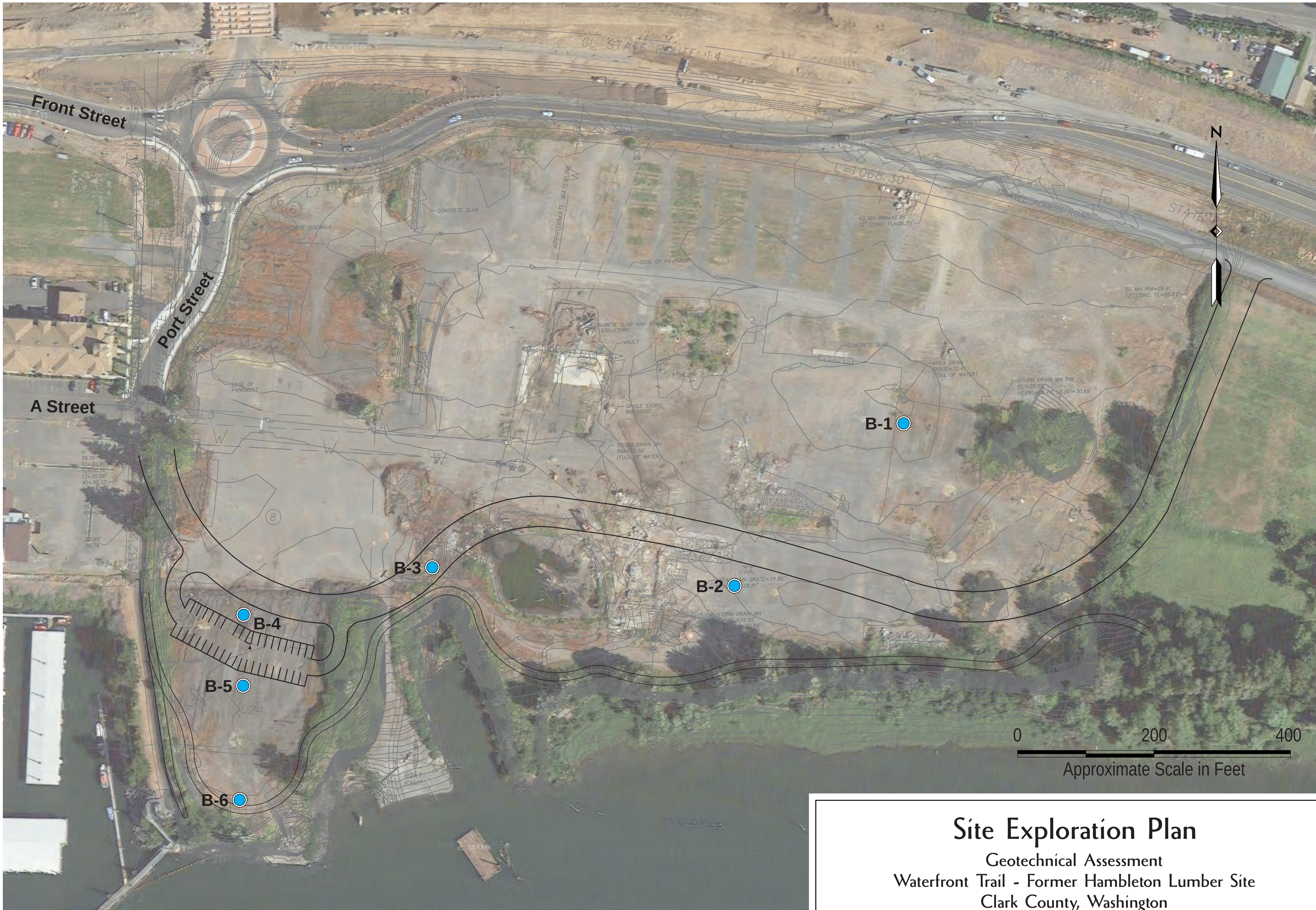
Approximate Scale in Feet

N

Site Location Map

Geotechnical Assessment
Waterfront Trail - Former Hambleton Lumber Site
Clark County, Washington

APEX Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	2117-00	Figure
	January 2014		1



Site Exploration Plan

Geotechnical Assessment
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Clark County, Washington

Legend:

B-1 Boring Location

NOTE: Base map prepared from 2014 - Google Imagery. Aerial dated August 15, 2012.

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Project Number	2117-00	Figure
January 2014		2

Appendix A

Subsurface Exploration Logs

Sample Descriptions

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, and grain size, and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
MAJOR CONSTITUENT with additional remarks; color, moisture, minor constituents, density/consistency.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits and Geoprobe® explorations is estimated based on visual observation and is presented parenthetically on test pit and Geoprobe® exploration logs.

SAND and GRAVEL Density	Standard Penetration Resistance in Blows/Foot
Very loose	0 - 4
Loose	4 - 10
Medium dense	10 - 30
Dense	30 - 50
Very dense	>50

SILT or CLAY Density	Standard Penetration Resistance in Blows/Foot
Very soft	0 - 2
Soft	2 - 4
Medium stiff	4 - 8
Stiff	8 - 15
Very Stiff	15 - 30
Hard	>30

Moisture

Dry	Little perceptible moisture.
Sl. Moist	Some perceptible moisture, probably below optimum.
Moist	Probably near optimum moisture content.
Wet	Much perceptible moisture, probably above optimum.

Minor Constituents

Minor Constituents	Estimated Percentage
Not identified in description	0 - 5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

Sampling Symbols

BORING AND PUSH-PROBE SYMBOLS

- ☒ Split Spoon
- ◪ Sonic
- ◩ Tube (Shelby, Push-Probe)
- ▥ Cuttings
- ◫ Core Run
- * No Sample Recovery
- SSA Solid Stem Auger
- HSA Hollow Stem Auger
- MR Mud Rotary

TEST PIT SOIL SAMPLES

- ☒ Grab
- ◪ Bag
- ◩ Shelby Tube

Key to Exploration Logs

Geotechnical Assessment
Waterfront Trail - Former Hambleton Lumber Site
Clark County, Washington

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Project Number	2117-00	Figure
January 2014		Key

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Geotechnical Assessment
Waterfront Trail - Former Hambleton Lumber Site
Clark County, Washington

Boring Number:	**B-1**
Project Number:	**2117-00**
Logged By:	A. Reese
Date:	January 20, 2014
Site Conditions:	Windy, 30ºF
Drilling Contractor:	Western States Soil Cons.
Drilling Equipment:	CME-75, Truck-Mounted
Sampler Type:	SPT, Split Spoon
Depth to Water (ATD):	--
Surface Elevation:	--

Depth, feet	Sample ID	Sample	Lithologic Description	▲ Standard Penetration Resistance (Blows per Foot) 10 20 30 40
0–2			Gravel and asphalt fragments (Fill).	
2–5		☒	SILT with angular gravel and wood debris (Old Fill); brown/pale brown/dark brown, slightly moist, soft.	▲
5–6.5		☒	SILT; brown, slightly moist, trace fine sand, medium stiff.	▲
			Bottom of Boring at 6.5' BGS. Infiltration Test Conducted at 5.0' BGS.	

Depth scale: 5, 10, 15, 20, 25, 30, 35

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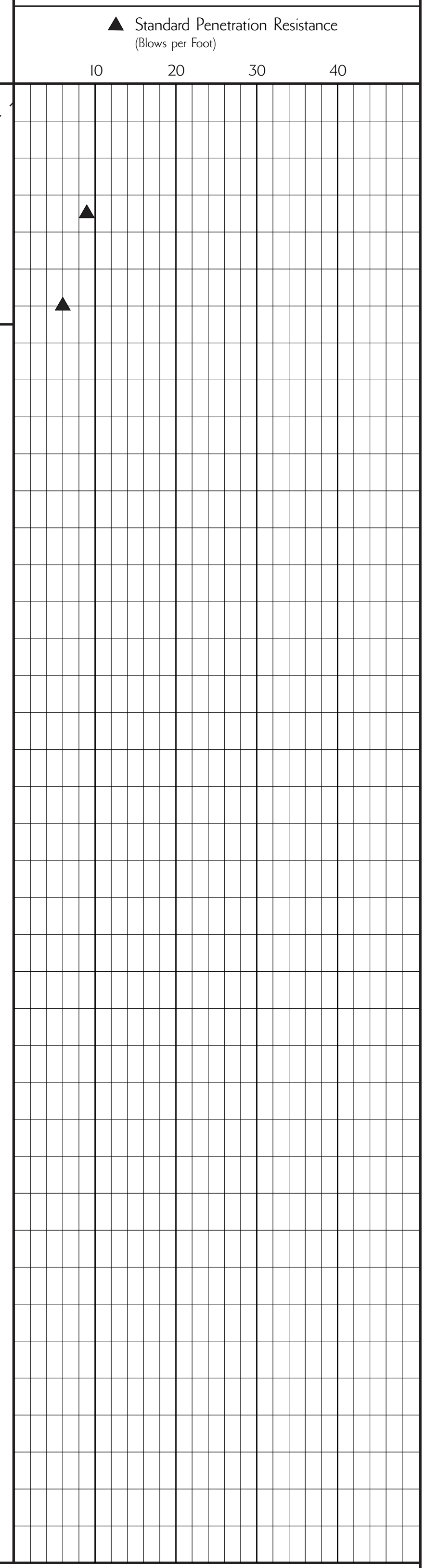
Geotechnical Assessment
Waterfront Trail - Former Hambleton Lumber Site
Clark County, Washington

Boring Number:	**B-2**
Project Number:	**2117-00**
Logged By:	A. Reese
Date:	January 20, 2014
Site Conditions:	Windy, 30ºF
Drilling Contractor:	Western States Soil Cons.
Drilling Equipment:	CME-75, Truck-Mounted
Sampler Type:	SPT, Split Spoon
Depth to Water (ATD):	--
Surface Elevation:	--

Depth, feet	Sample ID	Sample	Lithologic Description
0			Asphalt over asphalt concrete (3") over base rock (3").
			Silty fine SAND; brown, slightly moist, loose to medium dense.
5			
			Bottom of Boring at 6.5' BGS. Infiltration Test Conducted at 5.0' BGS.
10			
15			
20			
25			
30			
35			



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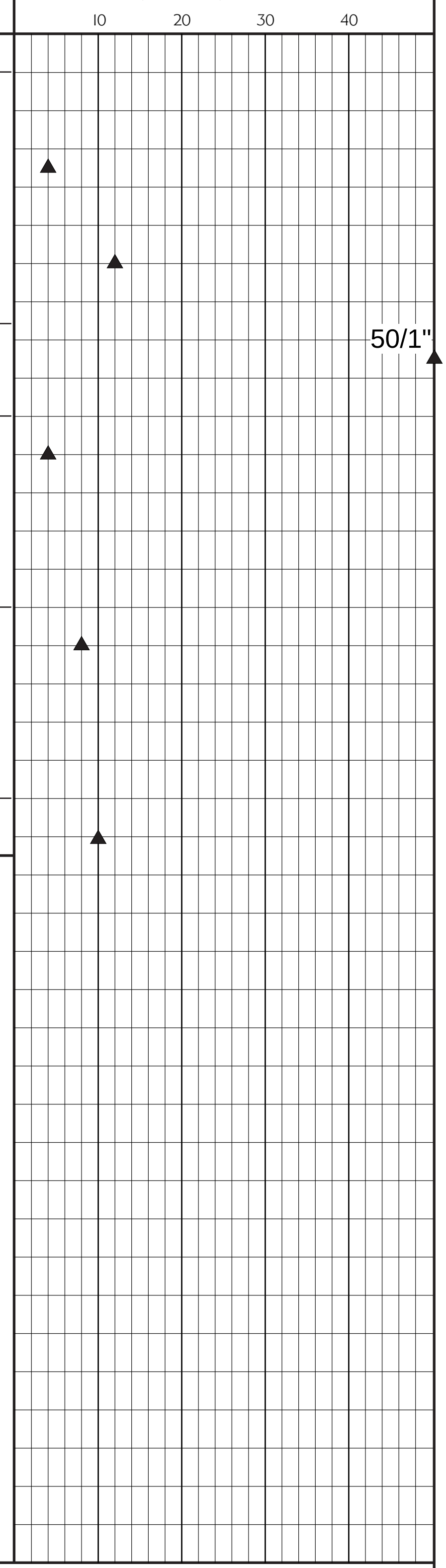
Geotechnical Assessment
Waterfront Trail - Former Hambleton Lumber Site
Clark County, Washington

Boring Number: **B-2**
Project Number: **2117-00**
Logged By: A. Reese
Date: January 20, 2014
Site Conditions: Windy, 30ºF
Drilling Contractor: Western States Soil Cons.
Drilling Equipment: CME-75, Truck-Mounted
Sampler Type: SPT, Split Spoon
Depth to Water (ATD): --
Surface Elevation: --

Depth, feet	Sample ID	Sample	Lithologic Description
0			Gravel/wood debris (Fill).
1			Organic/decomposing wood (Fill); very dark brown, moist, soft.
5		☒	Gravel (Fill) lens from 5 to 6'. Perched groundwater at ~5.5'.
			No Recovery.
			Concrete debris (Fill).
10		☒	Concrete, wood, and gravel debris (Fill) in an organic soil matrix.
15		☒	SILT; gray, slightly moist, medium stiff.
20		☒	Fine SAND; light gray, slightly moist, slightly silty, medium dense.
21.5			Bottom of Boring at 21.5' BGS. No Groundwater Encountered.

▲ Standard Penetration Resistance (Blows per Foot)



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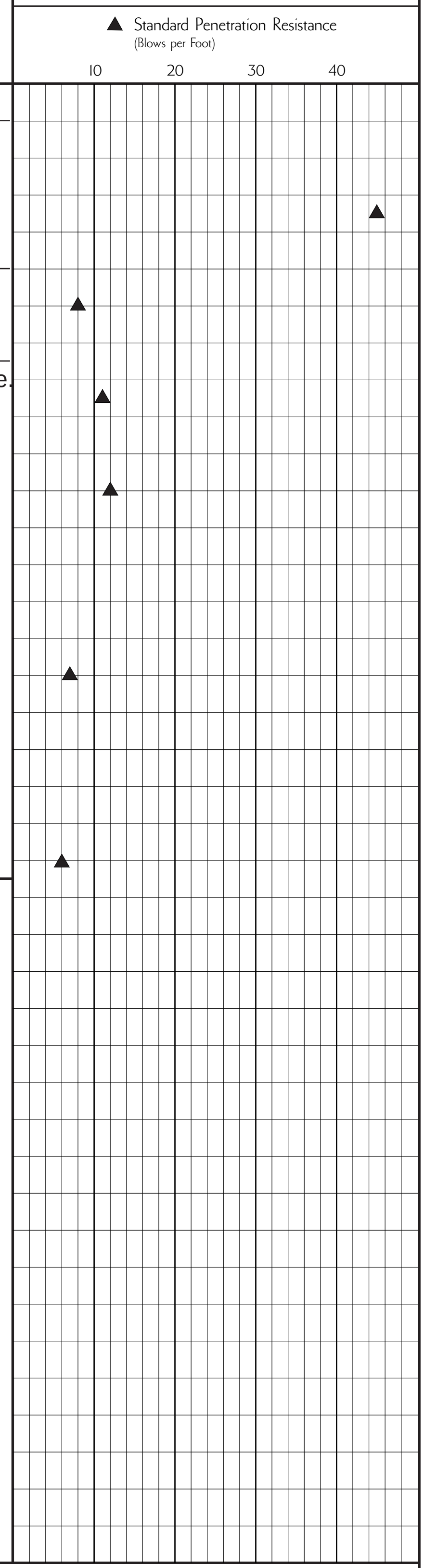
Geotechnical Assessment
Waterfront Trail - Former Hambleton Lumber Site
Clark County, Washington

Boring Number: **B-4**

Project Number: **2117-00**
Logged By: A. Reese
Date: January 20, 2014
Site Conditions: Windy, 30ºF
Drilling Contractor: Western States Soil Cons.
Drilling Equipment: CME-75, Truck-Mounted
Sampler Type: SPT, Split Spoon
Depth to Water (ATD): --
Surface Elevation: --

Depth, feet	Sample ID	Sample	Lithologic Description
0			Gravel/wood debris (Fill).
1			GRAVEL (Fill) in a silt matrix: dark gray, slightly moist, very dense.
5			SILT (Fill) with some wood debris; dark brown, slightly moist, medium stiff.
7.5			Fine to medium SAND; light yellowish-brown, slightly moist, medium dense.
20			Some wood debris.
21.5			Bottom of Boring at 21.5' BGS. No Groundwater Encountered.



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Geotechnical Assessment
Waterfront Trail - Former Hambleton Lumber Site
Clark County, Washington

Boring Number:	B-5
Project Number:	2117-00
Logged By:	A. Reese
Date:	January 20, 2014
Site Conditions:	Windy, 30ºF
Drilling Contractor:	Western States Soil Cons.
Drilling Equipment:	CME-75, Truck-Mounted
Sampler Type:	SPT, Split Spoon
Depth to Water (ATD):	--
Surface Elevation:	--

Depth, feet	Sample ID	Sample	Lithologic Description	Standard Penetration Resistance (Blows per Foot)
0–2			Gravel and wood/bark/chips (Fill).	
2–5.5		X	SILT (Fill); brown/pale brown/dark brown, slightly moist, consolidated, stiff. Obstruction at 3.5'.	50/5"
5.5–6		X	Angular gravel/cobble (Fill); gray, dry, very dense.	
			Auger Refusal at 6.0' BGS. Infiltration Test Conducted at 5.0' BGS.	

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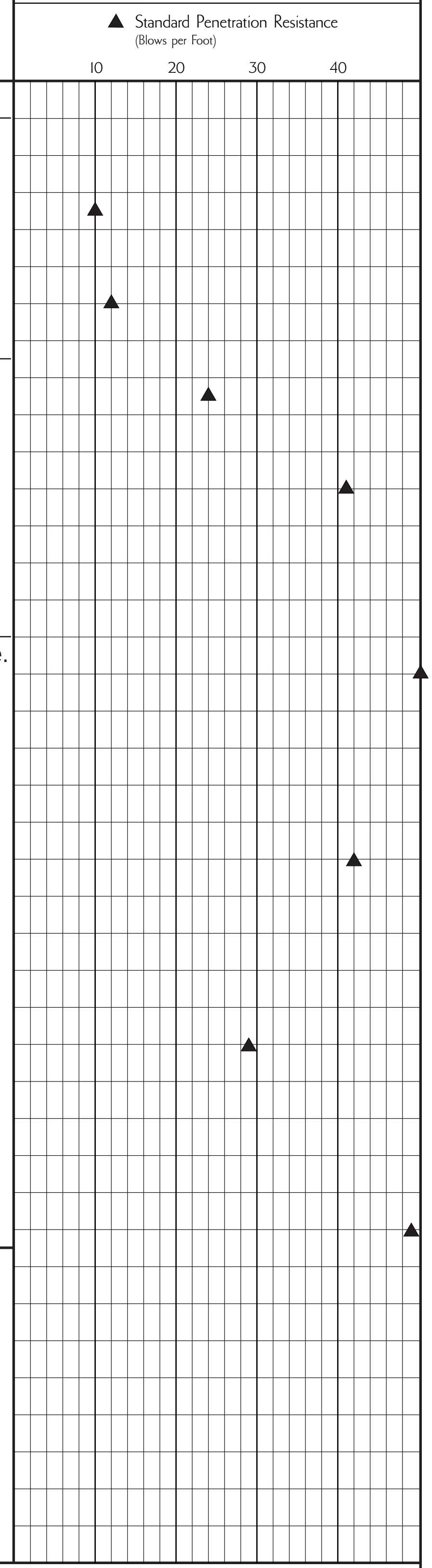
Geotechnical Assessment
Waterfront Trail - Former Hambleton Lumber Site
Clark County, Washington

Boring Number:	B-6
Project Number:	2117-00
Logged By:	A. Reese
Date:	January 20, 2014
Site Conditions:	Windy, 30ºF
Drilling Contractor:	Western States Soil Cons.
Drilling Equipment:	CME-75, Truck-Mounted
Sampler Type:	SPT, Split Spoon
Depth to Water (ATD):	--
Surface Elevation:	--

Depth, feet	Sample ID	Sample	Lithologic Description
			Wood/bark/lumber fragments (Fill) with rounded gravel in a sandy matrix.
			Medium-granied SAND (Fill) with silty inclusions and gravel; light yellowish-brown, slightly moist, medium dense.
5			No silt inclusions.
			Sandy GRAVEL; light yellowish-brown, slightly moist, dense.
10			
15			SAND with gravel and cobbles; light yellowish-brown, slightly moist, dense.
			Obstruction at 16.25'.
20			
25			No gravel.
30			Becomes gray, wet and very dense.
			Bottom of Boring at 31.5' BGS. No Groundwater Encountered.
35			



APPENDIX E
UNANTICIPATED DISCOVERY PLAN

Hambleton Brothers Log Yard
Inadvertent Discovery Plan for the Proposed Site Remediation

1. Introduction

The former Hambleton Brothers Log Yard consists of a portion of a lumber mill that operated from 1948 to 2010 in Washougal, Washington. The Hambleton Brothers Log Yard location is in Sections 12 and 13, Township 1 North, Range 3 East, and Section 7, Township 1 North, Range 4 West, Willamette Meridian (Figure 1). Operation of the facility led to deposits of hazardous substances (i.e., petroleum hydrocarbons, metals [lead and mercury], polychlorinated biphenyls, volatile organic compounds, and/or carcinogenic polycyclic aromatic hydrocarbons). These deposits are limited to a stockpile located in the southeast corner of the former log yard, shallow surface soils in the former aggregate recycling area, surface soils adjacent to the former log pond, and sediments in the former log pond. In addition, buried electrical transformers may be located on the southeast corner of the former log yard at depths up to 20 feet below ground surface. The presence and extent of contamination related to the transformers are unknown and will be identified during construction. An area on the adjacent land parcel has a small area of stained soil that will be removed and consolidated in the pond (Figure 2).

The Port of Camas-Washougal (Port) acquired the property in 2011 and has proposed improving the site as a mixed-use commercial development. To address requirements of the Model Toxics Control Act, the Washington Department of Ecology (Ecology) and the Port signed Agreed Order No. DE 9935. Under terms of this Order, the planned remedial action would include:

1. sampling and characterizing liquids and sediment from the log pond and then draining, hauling, and disposing of the liquid as appropriate;
2. a base of structural material (crushed concrete and compacted gravel) would then be installed in the base of the pond to provide a firm support for fill placement;
3. impacted materials would be consolidated in the former log pond , including a stockpile (500 cubic yards) and soil from the adjacent Killian property (100 cubic yards);
4. other impacted, and/or clean, materials from site grading and excavation would be consolidated in the pond as capacity allows in order to achieve the design subgrade elevation;
5. and the filled log pond, the mill area, and the aggregate recycling area will be capped with a minimum of 2 feet of clean soil. The soil cap will be underlain by a geotextile demarcation layer.

Additional cleanup action may be required in the former aggregate recycling area in the southeast corner of the former log yard, which could potentially contain buried electrical transformers. These areas will be investigated during construction and addressed.

The proposed cleanup actions involve coordination with Ecology. The Washington Department of Archaeology and Historic Preservation (DAHP) has the lead responsibility for ensuring compliance with State laws that protect archaeological resources and Indian graves in Washington (RCW 25-48, 27.44, 27-53, and 68.60). There is no federal agency involvement in this project.

1.1. Previous Archaeology

Two previous archaeological surveys have included all or portions of the former log yard (Reese 1999; Smits et al. 2011). No evidence of archaeological resources was identified in these surveys but the absence of native soil exposures and the relatively high frequency of archaeological sites in the vicinity suggested that buried archaeological resources could be present. Archaeological monitoring of test pits excavated in 2011 determined that at least three feet and as much as 15 feet of fill is present across the former log yard location (Smits et al. 2011:4-5). One archaeological resource—a lithic biface fragment (45CL670)—was recorded along the Columbia River shoreline immediately southeast of the southeastern log yard corner in 2005 (McDaniel 2005).

1.2. Discovery

Upon discovery of a suspected archaeological object or other evidence of an archaeological resource, further ground-disturbing activity at the location of the find will immediately cease. The Port will promptly arrange for a qualified archaeologist to examine and make a preliminary assessment of the discovery. Should the archaeologist determine that a possible intact archaeological resource has been encountered, he or she may direct the cessation of all ground-disturbing activity in the vicinity of the discovery. The archaeologist will promptly notify the DAHP of the find. The archaeologist will work with the Port's contractor to determine when and where work can continue. The monitoring archaeologist will consult and coordinate with the DAHP regarding the possible significance of any finds.

In the event that likely or confirmed human remains are encountered, the individual encountering the possible remains will immediately notify the Port. Pursuant to RCW 27.44.055 and 68.60.055, the Port shall immediately notify the Clark County Medical Examiner and the Clark County Sheriff's Department. All activity must cease that may cause further disturbance to those remains and the area of the find must be secured and protected from further disturbance and exposure to rain, wind, etc. The remains should not be touched, moved, or further disturbed.

The County Medical Examiner will assume jurisdiction over the human skeletal remains and make a determination of whether those remains are forensic or non-forensic. If the County Coroner determines the remains are non-forensic, then they will report that finding to the DAHP, who will then take jurisdiction over those remains and report them to the appropriate cemeteries and affected Tribes. The State Physical Anthropologist will make a determination of whether the remains are Indian or non-Indian and report that finding to the affected parties including the appropriate Tribes and the Port. The DAHP will then handle all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains.

The decision regarding the potential significance of any archaeological objects or deposits will be based on the consultation with the DAHP and the Tribes, who will make the final determination of significance. In general, artifacts or deposits indicative of casual loss or discard will be considered and recorded as isolated finds. Artifacts or deposits that reflect or appear to reflect patterned behavior and are or appear to be in situ, as well as any archaeological features, will be considered potentially significant and will require further consultation with the DAHP and the Tribes. The archaeologist examining the find will document all finds in his or her fieldnotes, including determining the provenience of the find as precisely as possible.

2. Confidentiality

The Port shall make its best efforts, in accordance with state law, to ensure that its personnel and contractors keep the discovery of any found or suspected human remains, other cultural items, and potential historic properties confidential. Contractors and agency personnel are prohibited from contacting the media or any third party or otherwise sharing information regarding the discovery with any member of the public, and to immediately notify the Port and direct any inquiry from the media or public. Prior to any release, the Port, the appropriate Tribes, and the DAHP shall concur on the amount of information, if any, to be released to the public, any third party, and the media and the procedures for such a release, to the extent permitted by law.

3. References

McDaniel, Sarah

2005 *Cultural Resources Survey Report for the Port of Camas/Washougal Proposed Boat Launching Facility Clark County, Washington*. URS Corporation, Portland, Oregon.Submitted to the Port of Camas/Washougal, Washougal, Washington.

Reese, Jo

1999 *Gravel Loading Facility, Washington.* Archaeological Investigations Northwest, Inc. Letter Report No. 287. Submitted to Coyote Springs Sand & Gravel, Portland, Oregon.

Smits, Nicholas, Michele L. Punke, and Jo Reese

2011 *Cultural Resource Reconnaissance For The Port Of Camas-Washougal's Waterfront Brownfield Integrated Plan Clark County, Washington*. Archaeological Investigations Northwest, Inc. Letter Report No. 287. Submitted to Maul Foster & Alongi, Inc., Vancouver, Washington and Port of Camas-Washougal, Washougal, Washington.

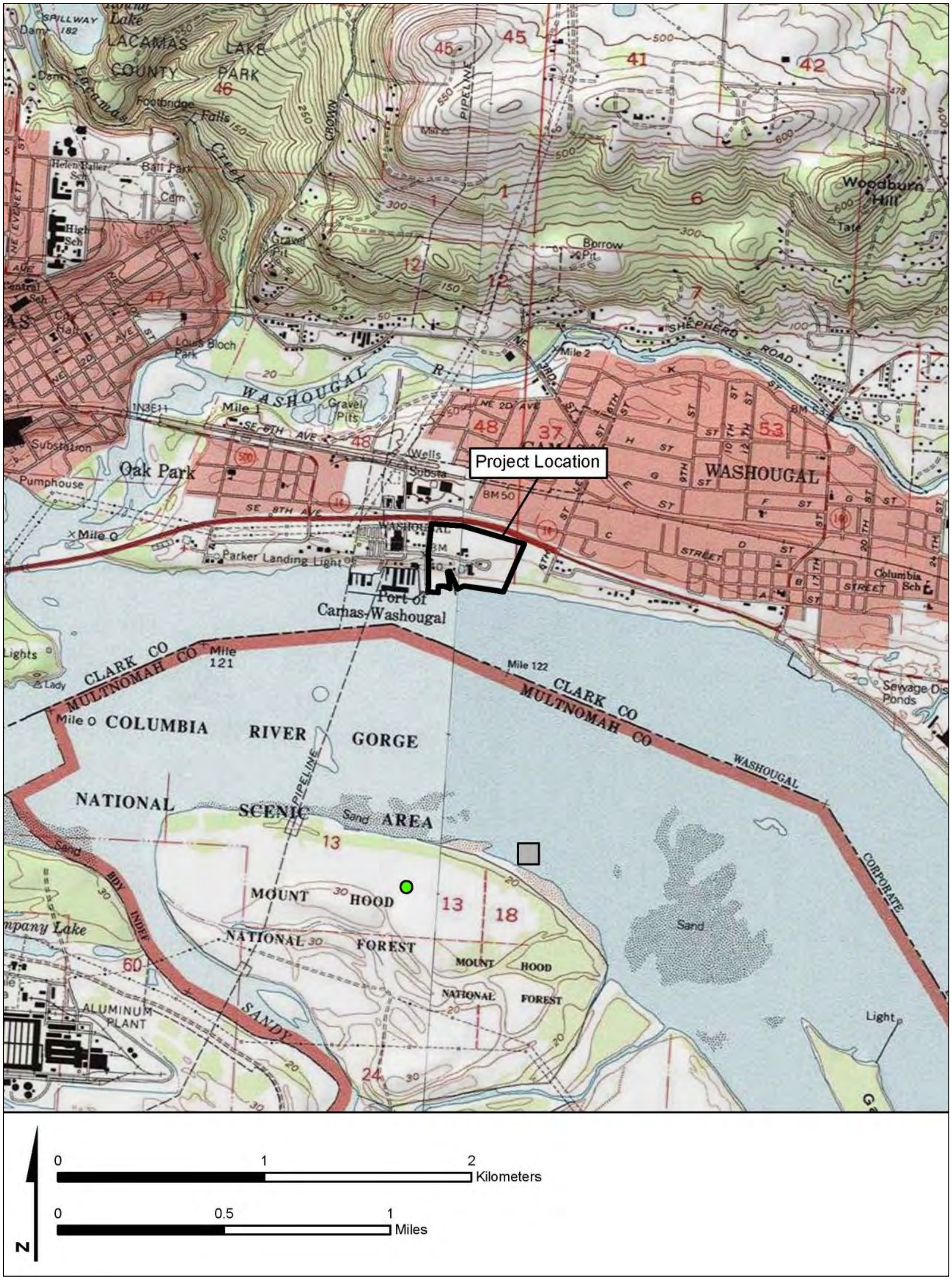


Figure 1. Location of the Hambleton Brothers Log Yard.

Figure 2. Site configuration.

Attachment A

Contact Information for Inadvertent Discovery Plan

Name	Affiliation	Phone
David Ripp	Port of Camas-Washougal	360 835-2196
Jacob Faust, PE	MFA	971 544-2139
Rob Whitlam Guy Tasa	State Archaeologist State Physical Anthropologist DAHP	360 586-3080 360 586-3534
	Clark County Sheriff's Dept	360 397-2211
Dennis J. Wickham, M.D.	Clark County Medical Examiner	360 397-8405
Kate Valdez Johnson Meninick	Tribal Historic Preservation Officer Cultural Resources Program Manager Yakama Nation	509 985-7596 509 685-7203
Dave Burlingame Nathan Reynolds	Cultural Resources Director Ethnoecologist Cowlitz Tribe	360 577-6962 360 577-8140
Briece Edwards	Archaeologist Grand Ronde Tribe	503 879-2084
Ray Gardner	Tribal Council Chair Chinook Indian Nation	360 875-6670

APPENDIX F
STORMWATER CALCULATIONS

Soil Map—Clark County, Washington

Map Scale: 1:2,580 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 35, 70, 140, 210

Feet: 0, 100, 200, 400, 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clark County, Washington
Survey Area Data: Version 10, Dec 9, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 8, 2010—Sep 4, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Clark County, Washington (WA011)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
HoA	Hillsboro silt loam, 0 to 3 percent slopes	10.2	73.7%
NbB	Newberg silt loam, 3 to 8 percent slopes	3.4	24.9%
W	Water	0.2	1.3%
Totals for Area of Interest		**13.8**	**100.0%**

Summary for Subcatchment 1S: Basin B

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.47 cfs @ 7.99 hrs, Volume= 0.190 af, Depth= 1.04"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-26.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2YR-24HR Rainfall=2.80"

	Area (ac)	CN	Description
*	2.180	79	
	2.180	79	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: Basin B