# LINNTON MILL RESTORATION SITE

# RESTORATION PLAN

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ENVIRONMENTAL CONSULTANTS

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# ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| 404 Mitigation Credits | Credits used to offset impacts to aquatic habitat resulting from Portland Harbor remediation actions, as well as from non-cleanup projects in the Service Area |
| ACM | Active Channel Margin |
| Applicant | Linnton Water Credits, LLC |
| BP/ARCO | British Petroleum/Atlantic Richfield Company |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| DSAYs | Discounted Service Acre Years |
| DSL | Oregon Department of State Lands |
| EPA | United States Environmental Protection Agency |
| HEA | Habitat Equivalency Analysis |
| IMCS | Interim Management and Contingency Security |
| LWC | Linnton Water Credits, LLC |
| NOAA | National Oceanic and Atmospheric Administration |
| NPV | Net Present Value |
| NRD | Natural Resource Damage |
| NRDA Credits | Credits used to meet NRDA liability for releases of contaminants into Portland Harbor |
| NRDA | Natural Resources Damages Assessment |
| ODEQ | Oregon Department of Environmental Quality |
| OHW | Ordinary High Water |
| OLW | Ordinary Low Water |
| Performance Period | Period after project construction during which physical and biological monitoring will track the Site's progress relative to performance standards; proposed as a 10-year period |
| Project | Linnton Mill Restoration Site Project |
| RCD | RestorCap Development, LLC |
| RM | River Mile |
| PRP | Potentially Responsible Party |
| Section 10/Section 404 | Section 10 of the Rivers and Harbors Act; Section 404 of the Clean Water Act |
| Service Area | Corresponds to the Portland Harbor Superfund Broader Focus Area |
| Study Area | Study area for the Portland Harbor Superfund Site, lower 11.5 mile of the Willamette River |
| Trustee Council | Portland Harbor Natural Resource Trustee Council |
| USFWS | United States Fish and Wildlife Service |

# 1 INTRODUCTION

Linnton Water Credits, LLC (LWC) plans to construct the Linnton Mill Restoration Site (Restoration Site) as a habitat restoration action in the lower Willamette River/Portland Harbor. The purpose of the Restoration Site is to generate habitat credits in the form of Discounted Service Acre Years (DSAYs) and offer them in two forms: as NRDA Credits to offset Natural Resource Damage (NRD) liabilities, and as 404 Mitigation Credits to offset unavoidable impacts to aquatic habitat within the federal Section 10/Section 404 permit program and the State of Oregon Removal/Fill program. Both types of credits are intended to directly facilitate the cleanup of the Portland Harbor Superfund Site. 404 Mitigation Credits will also be available to offset impacts from non-cleanup-related aquatic projects.

The Restoration Site Project (the Project) involves transforming an existing industrial parcel along the Willamette River into a habitat site that includes new Off-Channel habitat, enhanced Shallow Water and Active Channel Margin (ACM) habitats, and new/restored Riparian and Upland forested habitat. The Site is located on the west bank of the Willamette River between approximately River Miles (RM) 4.7 and 5.0 (Figure 1).

This Project has been developed in coordination with the Portland Harbor Natural Resource Trustee Council[1] (Trustee Council). The purpose of this Linnton Mill Site Restoration Plan (Linnton Restoration Plan) is as follows:

1. To illustrate the process of Project development, present all project-related elements, and to describe the framework for its long-term implementation. These items are discussed in more detail in Sections 2 (Project), 3 (Timelines and Schedules), and 4 (Design Process), and includes Exhibits A-H.

2. To discuss the concurrent development of the Project as a Mitigation Bank. This is discussed in more detail in Section 5 (Credit Banking), and includes Exhibit I.

3. To provide the technical/administrative, financial and legal components of the Project. This is described in more detail in Section 6 (Implementation). Supporting documents are provided in Appendices 1 through 17 (to differentiate from the Exhibits discussed above).

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[1] The Trustee Council consists of the State of Oregon, the U.S. Department of Commerce through the National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of the Interior, the Confederated Tribes of the Grand Ronde Community of Oregon, the Confederated Tribes of Siletz Indians, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe.

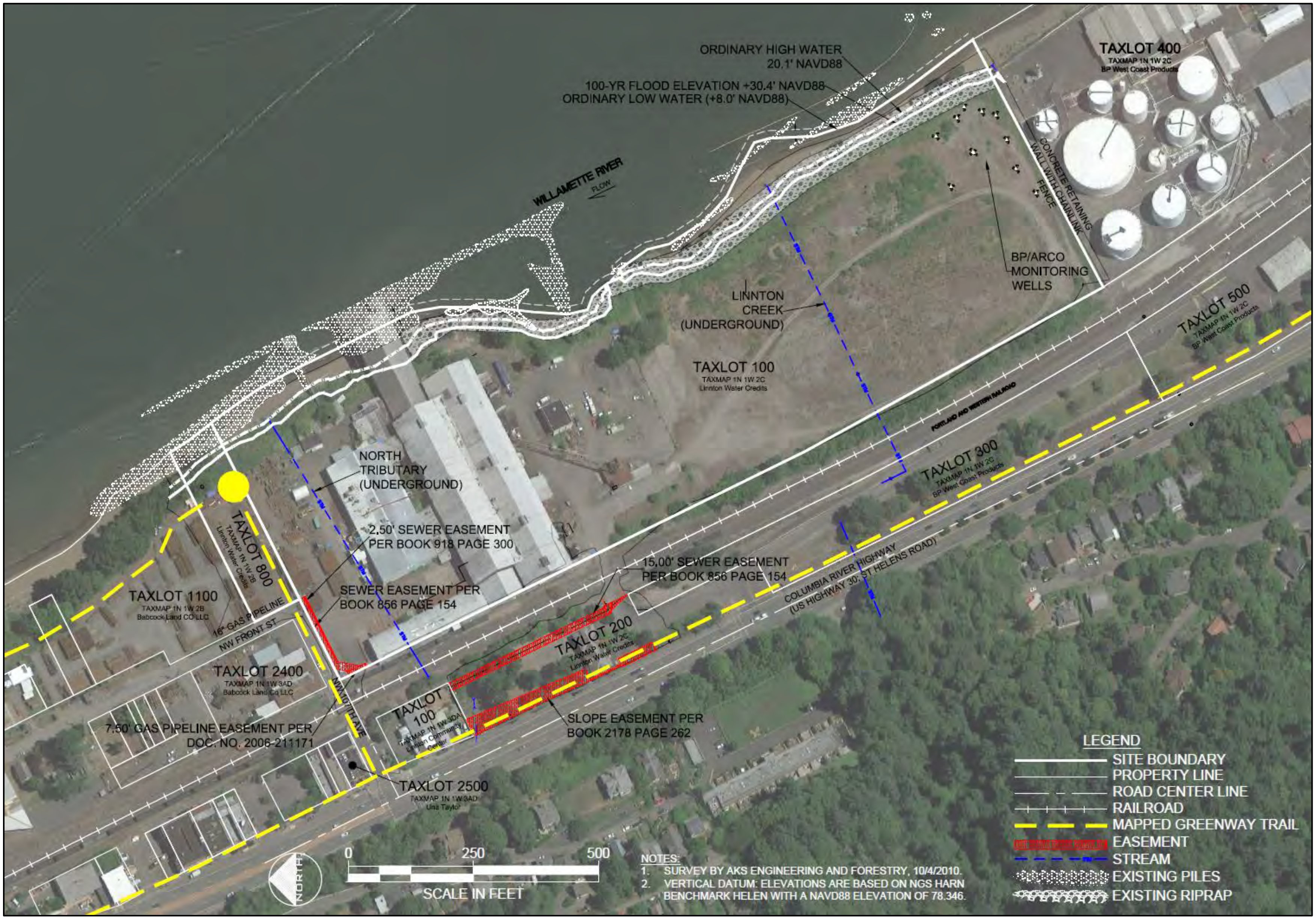

**Figure 1. Linnton Mill Site adjacent ownership and easements**

## 1.1 SITE BACKGROUND

The Linnton Mill property is a highly developed industrial property that encompasses approximately 27.83 acres over approximately 1,800 linear feet of the western bank of the Lower Willamette River, at approximately RM5. The property has been in industrial use since the late 1800s (CH2M Hill 2007). The entire property was developed and operated as a sawmill from 1894 to 1947, when it was destroyed by fire. The northern part of the property was then used as a plywood mill from 1951 to 2001, with the southern portion of the property used for stockpiling/dewatering of Columbia River sand from 1997 until recent years (CH2M Hill 2007). Based on historic aerial photos, stockpiling/dewatering operations ended within the past five years. Currently, the site includes extensive piles and pile stubs, overwater structures, shoreline armoring, a sheet pile wall, small isolated patches of riparian vegetation, and highly developed and industrial upland. The Site is located within the Portland Harbor Superfund Site.

## 1.2 SITE LOCATION

The proposed Site is located at 10504 NW St. Helens Rd, Portland, Oregon, on the Willamette River (Exhibit B, Attachment 1, Sheet 1). The property is within the Lower Willamette watershed, 4th field HUC 17090012, between RM 4.7 and 5.0. The geographic coordinates of the center of the site are 45.59747° N. latitude, -122.78245° W. longitude; Township 1N, Range 1W, Section 2C. The Bank would encompass the entirety of two parcels: Tax Lots 100 and 800 (Sheets 2 and 3). The Linnton Mill Site is a highly developed waterfront industrial property that encompasses approximately 27.83 acres over approximately 1,800 linear feet of the western bank of the lower Willamette River (Exhibit B, Attachment 1, Sheet 4). The site is located in the City of Portland's Heavy Industrial Zone within the Portland Harbor.

## 1.3 SITE OWNER/SPONSOR

| **Owner/Sponsor** | **Consultant** |
|---|---|
| Linnton Water Credits; Rob Marinai | Grette Associates; Glenn Grette |
| 337 17th Street, Suite 200 | 151 South Worthen St. Suite 101 |
| Oakland, CA 94612 | Wenatchee, WA 98801 |
| (510) 326-7131 \| robm@restorcap.net | (509) 663-6300 \| glenng@gretteassociates.com |

LWC is the Project owner. LWC is a wholly-owned subsidiary of RestorCap Development, LLC (RCD). RestorCap, LLC is a Member of RCD and has been engaged by RCD pursuant to an operating and management agreement to implement the Project.

# 2 PROJECT

## 2.1 PROJECT GOALS AND OBJECTIVES

The goals and objectives of the Linnton Mill Restoration Site are as follows.

- **Goal 1: Restore 26.67 acres of industrial land by removing existing abandoned infrastructure.**

  - Objective 1a: Remove existing docks and all piles in the ACM and Shallow Water habitat zones.
  - Objective 1b: Remove all buildings on site.
  - Objective 1c: Remove concrete and asphalt, with the exception of the concrete foundation under the buildings.

- **Goal 2: Restore 26.67 acres of industrial land into a complex of fully functioning habitats to benefit fish and wildlife species in Portland Harbor.**
  - Objective 2a: Through grading and excavation, create 5.48 acres of new aquatic habitat, including 4.34 acres of off-channel habitat and 1.14 acres of new ACM habitat.
  - Objective 2b: Conduct habitat restoration on 1.76 acres of active channel margin habitat to the Willamette River through re-grading, riprap removal, and revegetation.
  - Objective 2c: Improve the quality of 4.93 acres of shallow water habitat through piling removal and improvements to adjacent ACM habitat.
  - Objective 2d: Through grading and excavation, create 9.60acres of fully-functioning forested riparian habitat and 4.90 acres of fully-functioning forested upland habitat.
  - Objective 2e: Remove approximately 700 piles and pile stubs, inclusing many creosote-treated piles, within 0.77 acres of aquatic habitat.
  - Objective 2f: Plant and manage appropriate native vegetation throughout the different habitat types to facilitate the establishment of vegetative cover and minimize non-native plant establishment.
  - Objective 2g: Install 3 to 4 structural habitat features per acre of ACM, Off-Channel, Riparian and Upland habitat to provide complexity for fish and wildlife.

- **Goal 3: Ensure the long-term success of the restored habitat through monitoring, maintenance and stewardship.**
  - Objective 3a: Conduct select pre-construction baseline lamprey and wildlife monitoring.
  - Objective 3b: Implement a site-specific performance plan with performance standards to track the development of the site.
  - Objective 3c: Minimize colonization of the site by noxious species, as defined in the performance standards.
  - Objective 3d: Maintain fish access to the Off-Channel habitat.
  - Objective 3e: Identify and rectify obstacles to habitat development or use, as defined in the performance standards.
  - Objective 3f: After the Performance Period, implement a long-term stewardship program.

- **Goal 4: Support human enjoyment of the site.**
  - Objective 4a: Construct a view platform and path, which connects to the City of Portland Greenway Trail that is mapped as passing by the site.
  - Objective 4b: Discourage human use of the habitat site through fences and signage.

- Objective 4c. Place educational signage on site that informs the public about the habitat site, as well as the history of the site as a lumber and plywood mill.

## 2.2 PROJECT DESCRIPTION

The Project would excavate an industrial site (the Linnton Mill Site) adjacent to the Willamette River to create off-channel habitat, improve shoreline habitat, remove in-water structures, improve existing culverted on-site streams, and enhance riparian and upland habitat (see Figures 2a and 2b, Exhibit A – 100% Design Plans, and Exhibit B – Site-Specific Performance Plan, Attachment 1, Sheets 1-12). The Project would create and restore the types of habitat that have been most affected by development, and are most critical to fish and wildlife species using the lower Willamette River: new Off-Channel habitat, enhanced Shallow Water and ACM habitats, and new/restored Riparian and Upland forested habitat[2]. The majority of the work would occur in areas that are currently uplands, above the ordinary high water (OHW) and the 100-year flood elevation.

This will be accomplished through clearing/grubbing existing vegetation, removing existing overwater structures and piles, excavating upland soils to form the off-channel habitat, placing the excavated soils on the fringes of the Site, removing shoreline armoring and anthropogenic material, re-grading the shoreline, then replanting the disturbed soils with native vegetation. Some key elements of the Project are listed below:

- 5.48 acres of new aquatic habitat, 4.34 acres of which will be new off-channel habitat within the Off-Channel Zone;
- 4.93 acres of restored shallow water habitat within the Shallow Water Zone, including removal of approximately 0.36 acres of overwater coverage and associated piles;
- 1.76 acres of restored ACM habitat, including removal of 0.49 acres/1,050 linear feet of shoreline armoring within the ACM, and 1.14 acres of new ACM habitat;
- 9.60 acres of restored riparian habitat and 4.90 acres of restored upland habitat, including conversion of invasive vegetation, buildings, and concrete pads to native forested habitat;
- Removal of approximately 700 piles and pile stubs within approximately 0.77 acre of aquatic habitat, including many creosote-treated piles.
- Disconnection of on-site stormwater discharge pipes from the North Tributary in the downstream portion of the site and replacing the failing culvert/outfall

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[2] Habitat types as defined by the Portland Harbor NRD Trustee Council's Habitat Equivalency Analysis (HEA) table of values.

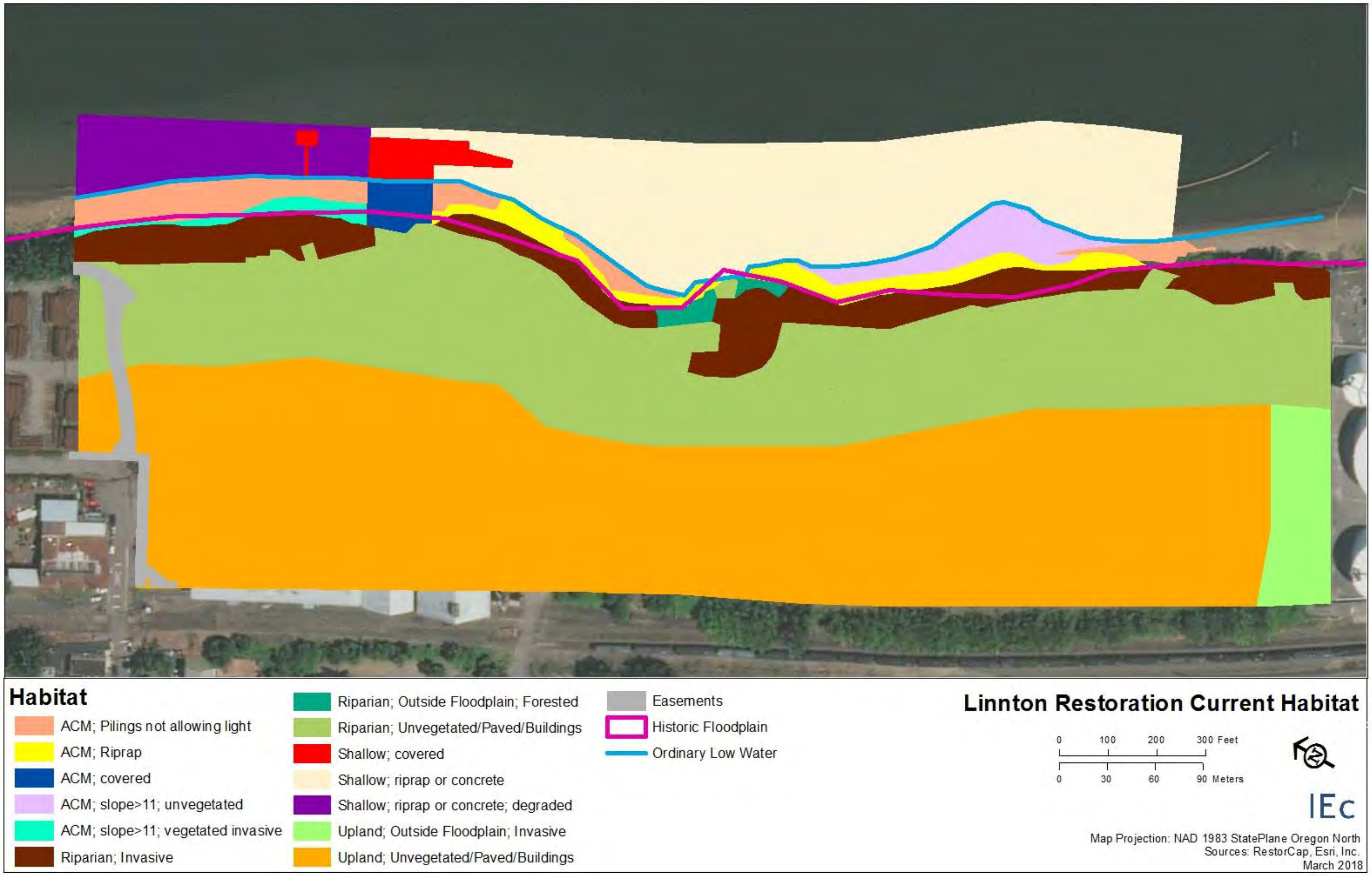

Figure 2a. Linnton Mill Site Habitat Current Conditions

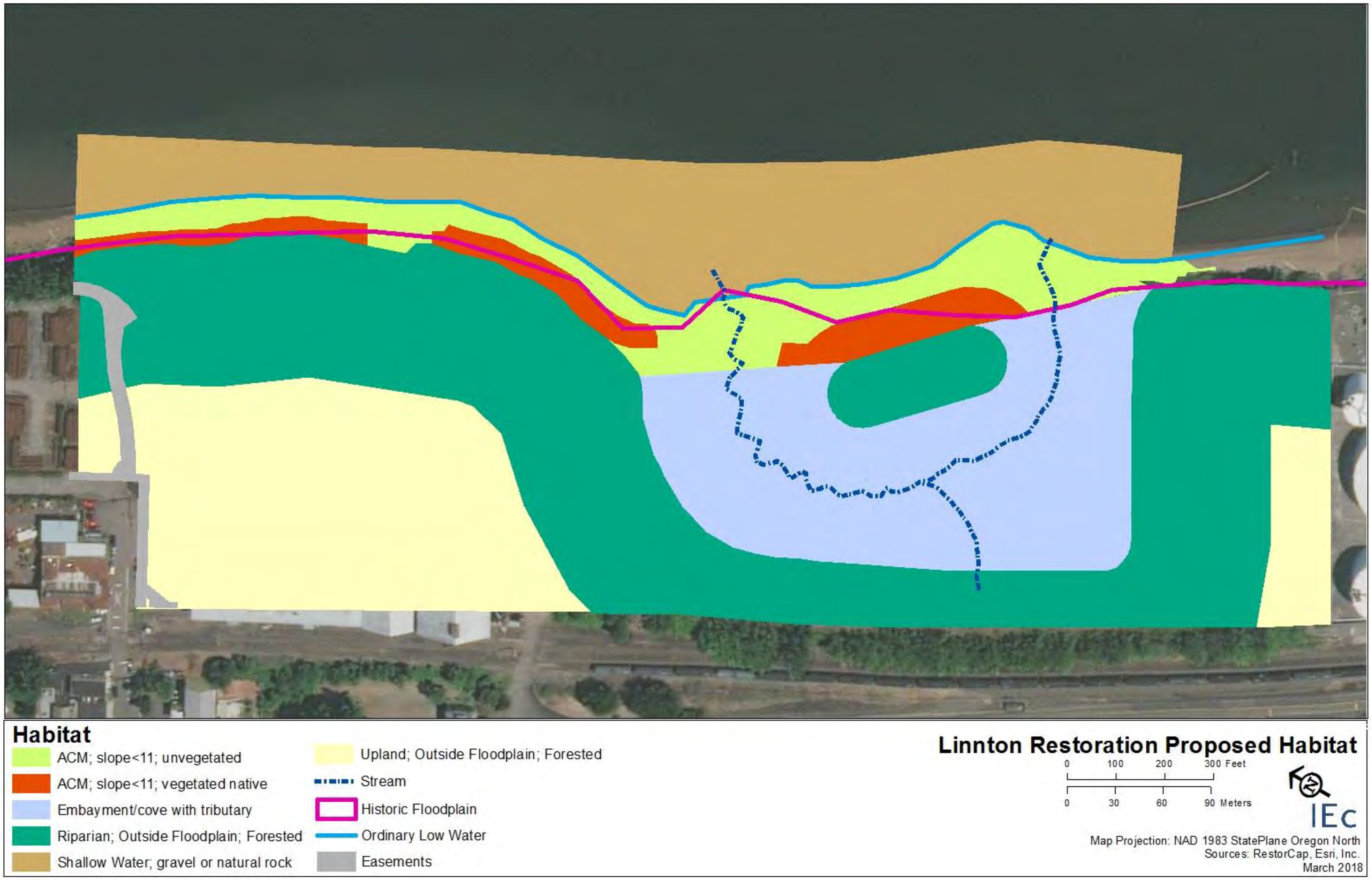

**Figure 2b. Linnton Mill Site Habitat Restored Conditions**

- In terms of Cowardin Classification habitats, the action will generate 7.76 acres of new/restored Riverine habitat, and 4.40 acres of new/restored Palustrine habitat.

**Table 1. Acres of each Habitat Type, Pre- and Post-Project.**

| Habitat Type | Pre-Project acres | Post-Project acres |
|---|---|---|
| Upland | 11.45 | 4.90 |
| Riparian | 8.80 | 9.60 |
| ACM | 1.76 | 2.90 |
| Shallow Water | 4.93 | 4.93 |
| Off-Channel | 0 | 4.34 |
| Total | 26.94 | 26.67* |

*Total of 26.94 acres, minus 0.27 acre of easements that will not be counted toward the total.

Complete project designs and specifications are attached as Exhibit A. Permit drawings, a more detailed project description, and detailed pre- and post-project figures are included in Exhibit B.

The Project represents a unique and important opportunity to provide diverse nearshore and off-channel habitat, well-developed riparian forested habitat, and surrounding forested upland. The Project will meet the Trustee Council's restoration goals by generating the valuable, river-associated habitats that were once common to the lower Willamette River. Further, the project meets the need for DSAYs from within the lower 11.6 miles of the river (Study Area for the Portland Harbor Superfund Site). This represents a unique opportunity, as property within the Study Area that is both available for habitat site development and of a large enough size to generate significant habitat while remaining economically viable is exceedingly rare. For these reasons, the Trustee Council has identified the Linnton Mill Site as unique and historically important.

## 2.3 MONITORING

### 2.3.1 Pre-Construction Baseline Monitoring

Pre-construction baseline monitoring was conducted in 2014-2015. Monitoring included a baseline calculation of shoreline habitat, sampling of bird assemblages, bald eagle monitoring, and mink surveys. Pre-construction baseline monitoring for lamprey was conducted by United States Fish and Wildlife Service (USFWS) in Fall 2017. A diverse assemblage of birds was observed associated with the site, but only eight species were observed using the buildings and other manmade structures. This assemblage was typical of highly developed, low habitat quality waterfront area. Bald eagles used the site for perching and occasional foraging, but not nesting. No mink or mink sign was observed during pre-construction monitoring. The Pre-Construction Baseline Monitoring Plan is provided as Attachment 2 to Exhibit B. The site-specific Lamprey Monitoring Plan is provided as Attachment 1 to Appendix 11.

### 2.3.2 Performance Period

The Project includes a Performance Period in which monitoring will be used to compare the site against interim performance standards to gauge the trajectory of the site toward the final success criteria. Monitoring will include physical, hydrologic, and biological sampling to ensure the Site is developing along the intended trajectory. This is described in detail in the Site Specific Performance Plan (Grette Associates; Exhibit B). The schedule as described in that document is repeated in Table 2. Note that lamprey monitoring (baseline and years 1-20) will be conducted by USFWS according to the “Evaluation of Portland Harbor Superfund Area Restoration: Larval Pacific Lamprey Linnton Restoration Site,” and associated “Evaluation of Portland Harbor Superfund Area Restoration: Linnton Mill Restoration Site Lamprey Monitoring Plan – Addendum 1 Sediment Sampling and Analysis Plan, March 2, 2017” (see Section 6.2.5, and Appendix 11).

**Table 2. Monitoring schedule summary**

| | | | Monitoring Year | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Monitoring Parameter** | **Performance Standard?** | **Baseline** | **As-Built/Yr 0 (2018)** | **Yr 1 (2019)** | **Yr 2 (2020)** | **Yr 3 (2021)** | **Yr 4 (2022)** | **Yr 5 (2023)** | **Yr 6 (2024** | **Yr 7 (2025)** | **Yr 8 (2026)** | **Yr 9 (2027)** | **Yr 10 (2028)** | **Yr 15 (2033)** | **Yr 20 (2038)** |
| Habitat complexity elements presence /retention | **Yes** | | X | X | | X | | X | | X | | | X | | |
| Area/elevation of habitats | **Yes** | | X | X | | X | | X[2] | | X | | | X | | |
| Fish passage/ accessibility | **Yes** | | X | X | X | X | X | X | X | X | X | X | X | | |
| Lateral extent of flooding | **Yes** | | | X | | X | | | | X | | | X | | |
| Water level | **Yes** | | | X | | X | | | | X | | | X | | |
| Vegetation | **Yes** | | X | X | X | X | X | X | | X | | | X | | |
| Acreage of mink and eagle shoreline habitat restoration | No | X | X | | | | | | | | | | X | | |
| Water temperature | No | | | X | X | X | X | X | X | X | X | X | X | | |
| Dissolved oxygen | No | | | X | X | X | X | X | X | X | X | X | X | | |
| Fish presence | No | | | X | | X | | X | | X | | | X | | |
| Bird | No | X | | X | | X | | X | | | | | X | | |
| Bald eagle | No | X | | | | X | | X | | X | | | X | | |
| Mink | No | X | | | | X | | X | | X | | | X | | |
| Photo points | No | X | X | X | X | X | X | X | X | X | X | X | X | | |
| Lamprey | No | | X | X | X | X | X | X | | | | | X | X | X |

[1] This schedule assumes As-Built/Year 0 is 2018, and Year 1 is 2019; if the construction schedule changes, years should be adjusted accordingly.

[2] Includes full topographic survey.

### 2.3.3 Long-Term Stewardship Period

Long-term stewardship begins 10 years after project implementation or when the final performance standards have been met. Long-term stewardship will include site maintenance and monitoring, community outreach, enforcement of illicit uses, and record-keeping. Long-term stewardship is described in detail the Site Specific Performance Plan (Grette Associates; Exhibit B) and in the Long-Term Stewardship Budget Narrative (Appendix 12). The schedule as described in that document is repeated in Table 3 (year information added). Note that lamprey monitoring will be conducted by USFWS in Years 15 and 20 according to their site-specific plan (see Section 6.2.5 and Appendix 11).

**Table 3. Long-term stewardship documentation and reporting**

| Product | Purpose | Frequency | Years |
|---|---|---|---|
| Initial Site Assessment | Describe baseline condition site when long-term stewardship begins. | One time. | Year 11 |
| Long-term Stewardship Plan | Outlines roles and responsibilities for entities involved with long-term stewardship at the site. Provides methodology and actions to maintain ecological values and benefits during the lifetime of the project. | Once at the beginning and then update periodically as needed. | Year 11 and forward |
| Maintenance Plan | Describes each year's activities based on priority actions. | Annual | Year 11 and forward |
| Monitoring Report | Provides current condition information and management and maintenance recommendation for the following year. | Annual | Year 11 and forward |
| Fiscal Report | Document interest accrual, spending, and overall standing of long-term stewardship fund. | Annual | Year 11 and forward |
| Notification of Enforcement Issue | Notify the Trustee Council or its designee of enforcement issue and whether assistance is needed to resolve the problem. | As needed | Year 11 and forward. |

# 3 TIMELINES AND SCHEDULES

## 3.1 PRE-CONSTRUCTION AND CONSTRUCTION

A timeline of Project activities from baseline monitoring through as-built submittals is shown in Table 4. The Project construction schedule from the Site Specific Performance Plan (Exhibit B) is repeated in Table 5. Year 1 of the Performance Period will be the first calendar year after plants are installed. The current schedule assumes construction (Year 0) occurs in 2017/2018, with planting occurring in the fall-spring 2017/2018 or fall of 2018 depending on progress, and 2019 being Year 1.

**Table 4. Anticipated project timeline: baseline monitoring through as-built survey**

| Year | 2014 | 2015 | | | | 2016 | | | | 2017[1] | | | | 2018 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Quarter** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** | **1** | **2** | **3** | **4** |
| **Baseline monitoring** [2] | | | | | | | | | | | | | | | | | |
| Shoreline habitat | X[3] | | | | | | | | | | | | | | | | |
| Bird Assemblage | | | X | | | | | | | | | | | | | | |
| Bald Eagles | ← | ─ | ─ | → | | | | | | | | | | | | | |
| Mink | | | ← | → | | | | | | | | | | | | | |
| **Baseline monitoring submittal** | | | | | | X | | | | | | | | | | | |
| **Wetland reconnaissance** | | X | | | X | | | | | | | | | | | | |
| **Wetland submittal** | | | | | | X | | | | | | | | | | | |
| **Wetland concurrence** | | | | | | | X | | X | | | | | | | | |
| **Permit submittal** | | | | | | X | | | | | | | | | | | |
| **Permit review** | | | | | | ← | ─ | ─ | ─ | ─ | ─ | → | | | | | |
| **Permits issued** | | | | | | | | | | | | X | | | | | |
| **Construction (anticipated)** | | | | | | | | | | | | | | | | | |
| In-water demolition | | | | | | | | | | | | ← | → | | | ← | → |
| Upland demolition | | | | | | | | | | | | ← | ─ | → | | | |
| Upland excavation | | | | | | | | | | | | | ← | ─ | → | | |
| In-water excavation | | | | | | | | | | | | | | | | | |
| Place habitat structures | | | | | | | | | | | | | | X | | | X |
| Planting | | | | | | | | | | | | | | | | | X |
| Breach habitat site | | | | | | | | | | | | | | | | X | |
| **As-built survey (anticipated)** | | | | | | | | | | | | | | | ← | → | |
| **As-built submittal (anticipated)** | | | | | | | | | | | | | | | | | X |

[1] This schedule assumes Construction/As-Built is 2017-2018, and the As-Built Report due date will be April 1, 2019.

[2] Lamprey monitoring will be conducted by USFWS according to their site-specific plan (see Section 6.2.5).

[3] Site habitat surveys included fieldwork in 2013.

**Table 5. Anticipated construction schedule (Year 0)**

| Activity | 2017 | | | | 2018 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| Upland building demolition | | ← | — | → | | | | | | | | | | | | |
| Overwater building demolition | ↔ | | | | | | | | | | | | | | | |
| Excavation/grading (landward of OHW) | | | ← | — | — | — | — | — | — | → | | | | | | |
| Upland outfall replacement | | | | | | | | | ← | → | | | | | | |
| Habitat structure placement (off-channel habitat) | | | | | | | | | ← | — | — | → | | | | |
| Habitat structure placement (landward of OHW) | | | | | | | | | ← | — | — | → | | | | |
| Excavation/grading (waterward of OHW) | | | | | | | | | | | ← | — | → | | | |
| Pile removal (in-water) | | | | | | | | | | | ← | — | — | → | | |
| Outfall shoreline contouring | | | | | | | | | | | ← | — | — | → | | |
| Breaching off-channel habitat | | | | | | | | | | | | | ← | → | | |
| Planting (off-channel habitat) | | | | | | | | | | | | | | ← | — | → |
| Planting (waterward of OHW) | | | | | | | | | | | | | | ← | — | → |
| Planting (landward of OHW) | | | | | | | | | | | | | | ← | — | → |

# 4 DESIGN PROCESS

The Site's design reflects several factors that have been taken into consideration, including the presence of the Site in the Portland Harbor Superfund Site, historic land uses, surrounding land uses, existing Site conditions, river level trends, and the effort to maximize habitat quality. A Basis of Design report is included as Exhibit C. The influence of these factors into the design process is discussed below.

## 4.1 BASELINE CONDITIONS

### 4.1.1 Site Contamination History

The Site's location in the industrial waterfront of Portland Harbor and adjacency to the Portland Harbor Superfund Site has factored prominently into the design of the Project. The Site's history includes land uses—both on and adjacent—that could adversely affect the ecological integrity of the subsequent habitat. Based on the factors described below, a design that minimized risk of exposure of new contamination was favored. The Site design incorporates the results of environmental investigations and resolutions regarding potential contamination, as discussed below.

#### *4.1.1.1 Portland Harbor Superfund Site/Consent Decree*

As mentioned above, the Site is adjacent to the Portland Harbor Superfund Site. The purchase of the property by LWC from Linnton Plywood Association was conditioned on the settlement of the seller's liabilities for response costs and Natural Resource Damages (NRD) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This settlement was formalized in an Amended Consent Decree (USEPA 2015) and included cash payments to resolve Linnton Plywood Association's alleged liability. Thus, at this time, LWC as the owner does not face potential liability as a Potentially Responsible Party (PRP) at the Portland Harbor Superfund Site.

#### *4.1.1.2 Upland Environmental Assessments*

The Oregon Department of Environmental Quality (ODEQ) issued a Source Control Decision for the Project site in 2004 which determined that the upland portion of the site was not a current or ongoing source of contamination threatening the Willamette River, and that no additional source control measures were needed to protect the river (ODEQ 2004; CH2M HILL 2002). An Environmental Assessment was prepared in 2007 to compile existing data, historical accounts of the use of the Project site, and additional data in support of an ODEQ "No Further Action" determination (CH2M Hill 2007). ODEQ issued a determination in 2009 (ODEQ 2009) stating that no further action was required to address environmental contamination at the Project site while also acknowledging that some limited contamination may remain on the site, but that it may be left in place because it does not present unacceptable risks.

For this reason, a design that minimizes risk of exposure of unknown contamination was pursued. This consisted of focusing excavation in the southern portion of the Site and avoiding excavation near the buildings to the extent possible. Additionally, a design that leaves the concrete foundations of the buildings in place to be covered by on-site soil placement (Section 4.2.2) was favored to further minimize unanticipated contamination exposure.

#### *4.1.1.3 BP/ARCO Petroleum Hydrocarbon Plume*

The ODEQ No Further Action determination also acknowledges a petroleum hydrocarbon plume in the southeast corner of the Project site that originates at the neighboring BP/ARCO facility. BP/ARCO has conducted groundwater modeling and monitoring, which concluded that there was potential for a limited area of migration at the southern boundary of the Linnton Mill property (URS 2013). An Interim Remedial Action Work Plan was developed to eliminate this potential through a groundwater pump and treat system (URS 2014), implemented in 2015. The effectiveness of these measures will be evaluated in a pending Source Control Evaluation. Until such evaluation is completed, Site design avoids excavation in the extreme southern portion of the Property.

### 4.1.2 Geotechnical

The results of geotechnical investigations of the on-site soil also influenced the design. A complete Geotechnical Engineering Report for the Project site was completed to support the design and construction of the Project (Appendix C of Exhibit C, Basis of Design Report). This report included results from new soil borings as well as historic borings by others. Based on those samples, the subsurface soil profile consists largely of several feet of fill, primarily dredged sand. These results supported the feasibility of large-scale excavation for the off-channel habitat and indicated a relatively low probability of undetected contaminants or cultural artifacts.

### 4.1.3 Wetland Reconnaissance

The Site was investigated for the presence of jurisdictional wetlands or waters of the U.S. that may affect Site design. Wetland reconnaissance was conducted at the Project site in 2015 (Grette Associates; Exhibit D). Based on that reconnaissance, no jurisdictional wetlands are present on site. Both the Oregon Department of State Lands (DSL) and the U.S. Army Corps of Engineers (the Corps) concurred with these findings (included with Exhibit D).

### 4.1.4 Willamette Greenway/Public Access

The City of Portland Greenway Code map indicates a future Greenway Trail overlook in the northern extent of the Site. In response, a public access trail was incorporated into the design, which includes interpretive signage, an overlook, and benches. This overlook could be connected to the Willamette Greenway easement if the Greenway Trail is developed past the Linnton Site in the future. The public location of the Site and the presence of the Greenway Trail promoted the need to restrict access to the habitat area with a fence.

### 4.1.5 Title Policy/Report

The September 2, 2015 Owner's Title Insurance Policy issued by the Chicago Title Insurance Company for 10504 NW St. Helens Road, Portland, Oregon (Policy 472512502586JL (Exhibit E) indicated several easements and other encumbrances on the Site that could potentially impact habitat function and quality. **Error! Reference source not found.** provides a discussion of each such encumbrance.

Figure 1 provides a location of the only encumbrances that are expected to remain associated with the Site as of the time of construction. These—two sewer easements and one gas pipeline easement—are located along the periphery of the far northwestern corner of the Site. Consideration in the design was made to such easements; the only planned construction activities for these areas are removal of overlying asphalt/concrete and plantings. These easements will not be included in the credit-generating calculated area of the Site. An existing mineral right easement is being extinguished. LWC has executed and submitted payment for an agreement with BNSF whereby BNSF releases its mineral rights to LWC. While this has been agreed to in principle by BNSF, LWC has not yet received a signed quitclaim deed. This is discussed further in Exhibit E.

## 4.2 HABITAT SITE DESIGN

LWC has designed the Site to maximize habitat function and quality while maintaining financial viability. The factors that influenced the final design of the habitat site are described below.

### 4.2.1 Cut/Fill

Aside from constraints related to potential contamination, the primary factor in the habitat design process has been managing of costs. Prior to LWC's ownership, the Linnton Mill site was investigated as a potential habitat mitigation site by other entities but was deemed cost-prohibitive due to the excessive volume of soil disposal required to create aquatic habitat. To overcome these cost constraints, LWC will place all excavated material onsite and incorporate it as a habitat feature. To this end, the Site's layout has been designed to balance excavation volume with on-site soil placement. This necessitated limiting habitat creation to allow sufficient space for soil placement in a manner that ensures that the soil placement mound would be stable.

### 4.2.2 Geotechnical

A geotechnical memorandum was prepared to determine stable design slopes for the soil placement mound as well as the off-channel habitat (Geotechnics; Exhibit F). This memo, based on geotechnical modeling, indicates that design slopes of 3H:1V for upland slopes and 8H:1V for slopes below OHW would be stable. This memo also investigated the geotechnical feasibility of leaving the building foundations in place and placing the excavated soil on top of these foundations, and whether groundwater drains would be necessary to preserve stability. The memo concluded that the proposed fill atop the concrete foundation would be stable as designed, and groundwater drains would not be necessary.

### 4.2.3 Habitat Function

LWC has also designed the Site to provide high quality habitat of the types identified by the Trustee Council as important to aquatic species in Portland Harbor. Rather than merely maximizing habitat quantity, LWC focused also on providing aquatic habitat that benefits target species. Site design focused on creating habitat that maximized the value of the habitat by incorporating features such as an offshore island that creates protected off-channel habitat, existing freshwater inputs to provide cold water refugia, and forested riparian habitat of sufficient width to provide full riparian function. The aquatic habitat design would support subyearling and yearling juvenile Chinook salmon that rear in this portion of the lower Willamette River. Additionally, Site features such as forested riparian and upland habitat and diverse topographic features were designed with the intent of serving a range of wildlife species such as mink, eagle, and native birds.

### 4.2.4 Hydrology

The elevations of the off-channel habitat portion of the Site were determined by hydrologic modeling. Site hydrology has been integral to Project design, as described in the Basis of Design document (included as part of the Basis of Design document, Waterways Consulting; Exhibit C). Site hydrology is dominated by the Willamette River, with potential for contributing hydrology from two tributary watersheds. An inundation analysis was prepared to assess frequency of inundation at key elevations which were subsequently used to define and design habitat types for the completed Project. Based on that analysis, the off-channel portion of the Site was designed with its lowest portion at approximately +5 ft NAVD88 to provide inundation throughout the year, and the flow-through channel elevation at +10 ft NAVD88 to receive river flow-through during spring months.

### 4.2.5 Stormwater Analysis/Surface Water Input

As discussed above, a creek (Linnton Creek) is currently piped under the Linnton Site and enters the Willamette River through an outfall. One of the key features of the off-channel habitat is the potential to provide off-channel cold water refugia for juvenile salmonids. To achieve this, Linnton Creek has been incorporated into the design as a cold water input to the off-channel habitat.

A stormwater analysis was conducted to assess the suitability of the Linnton Creek drainage for surface water input into the Project off-channel habitat area (EES Environmental Consulting; Exhibit G). Linnton Creek receives tributary hydrology and stormwater from upstream sources. Results indicated that both chemical constituents and general chemistry parameters were suitable/at levels consistent with expectations for natural stormwater conditions in the area. A second, unnamed tributary (referenced in application material as “North Tributary”) passes under the northern portion of the Site. Culvert investigations revealed substantial damage. This tributary receives stormwater inputs from the Linnton Mill buildings. North Tributary will not be incorporated into the Restoration Site, but the stormwater inputs will be removed and the damaged culvert will be decommissioned in place and replaced by a new culvert.

### 4.2.6 Groundwater Input

Several subsurface investigations at the site (Farallon 2016) and at the BP property (AECOM 2017) to the south during the summer months have identified groundwater elevations ranging from elevation 20 to 30 feet (NAVD 88) at the west side of the project area where the Linnton Creek culvert will daylight. The off-channel habitat has been designed at an elevation that will facilitate daylighting of groundwater as an additional cold water input. Based on the seasonality of the aforementioned observations, groundwater inputs are likely to persist year round.

### 4.2.7 Soil Sampling

Although ODEQ issued a “No Further Action” determination for this Site (Section 4.1.1.2), as part of a Consent Judgment, LWC agreed to perform additional remedial activities to ensure that the constructed Site is protective of public health, safety, and welfare, as well as the environment. A sampling plan was developed and conducted to analyze the soil surface to be exposed by Project excavation (“leave surface”) (Farallon Consulting; Exhibit H). Based on those results, five areas of leave surface would exceed the screening levels of the Portland Harbor Preliminary Remediation Goals: these areas will be over-excavated and capped with clean fill to meet design elevations. An Environmental Media Management Plan is in development, which will include additional post-construction sampling of a portion of the off-channel habitat, and provide direction in the management, handling, and disposal of contaminated or potentially contaminated soils at the site, including those identified for capping.

### 4.2.8 Planting Plan

The Site’s planting plan was designed to include local native species that would thrive in the habitats to be created at the Site. A local native plant expert was consulted to compose an appropriate planting plan, with species chosen from the Portland Harbor Trustee Council Preferred Plant List and the City of Portland Native Plant List. This planting plan is included in Sheets L1-L3 of the 100% Plans and Specifications (Waterways Consulting; Exhibit A).

# 5 CREDIT BANKING

## 5.1 CREDIT CURRENCY

The Site will generate Credits in the form of DSAYs, which are calculated by the Lower Willamette River Habitat Equivalency Analysis (HEA) model developed for the Lower Willamette River by the Natural Resource Trustee Council. Based on a review of the Project design, the Trustee Council calculated that the Site would generate 510.8 DSAYs. This calculation is presented in Exhibit I. This calculation is subject to change based on year of habitat construction, Trustee Council review of as-builts, project performance and other criteria.

## 5.2 DUAL PURPOSE BANK

### 5.2.1 NRD Restoration Bank

The Project will offer DSAY credits for two separate bank programs. The primary purpose of the Project is to provide DSAYs for clients looking to meet their NRD liability for releases of contaminants into Portland Harbor (NRDA Credits). NRDA Credits may be offered by potentially responsible parties (PRPs) to provide ecological credits that may be proposed as part of a natural resource damages settlement, subject to: 1) approval by all appropriate officials, including the members of the Trustee Council; 2) public review and comment; and 3) court approval. All 510.8 DSAY credits offered at the Site are eligible as NRDA Credits.

### 5.2.2 Aquatic Mitigation Bank

The secondary purpose is to provide DSAY credits in a Mitigation Bank to offset impacts to aquatic habitat resulting from Portland Harbor remediation actions, as well as from non-cleanup projects in the Service Area pursuant to the federal Section 10/404 and state Removal/Fill permit requirements (404 Mitigation Credits). The Site is being approved through traditional mitigation banking processes. It is anticipated that 324.4 of the 510.8 DSAYs available at the Site may be approved as 404 Mitigation Credits.[3] This subset (324.4 DSAYs) will be available as "dual-purpose" credits, available as either NRDA Credits or 404 Mitigation Credits.

### 5.2.3 Need for a Dual-Purpose Bank

This dual-purpose nature of the bank is intended to facilitate the Portland Harbor clean-up and habitat restoration to the extent possible. It is anticipated that PRPs will need NRDA Credits to offset NRD liabilities, as well as 404 Mitigation Credits to offset unavoidable impacts to aquatic habitat from remediation activities such as dredging or bank stabilization. Currently, there are no banks that offer credits for both needs. Thus, without the availability of 404 Mitigation Credits, an PRP will be able to offset NRDA liabilities, but will find it difficult to identify suitable habitat mitigation credits to offset impacts resulting from remediation activities.

The Linnton Mill Restoration Site intends to overcome this hurdle. Once approved, the Site will offer PRPs the ability to purchase NRDA Credits to offset NRD liabilities, or 404 Mitigation Credits to offset unavoidable aquatic impacts from remediation activities. The 404 Mitigation Credits would also apply to general in-water projects that incur mitigation needs under the Corps' Section 10/404 and DSL's Removal/Fill permit programs.

## 5.3 CREDIT ACCOUNTING

The two bank purposes entail separate but parallel approval processes. The processes are related because they draw their credits from the same habitat restoration action. As mentioned above, all of the DSAYs generated by the Site will be available as NRDA Credits with up to 324.4 of those available as 404 Mitigation Credits.

To avoid double-counting—either within each bank program, or between bank programs—a single ledger will be used to document the credit sales for the two processes.

Of the 510.8 credits generated at the Site and approved by the Natural Resource Trustee Council, only 324.4 of those credits are proposed to be eligible as 404 Mitigation Credits[4]. Since these credits would be eligible for both programs, they are described as "Dual-Purpose" credits.[5] The remaining 186.4 credits would be "Single-Purpose" credits, eligible only for NRD restoration.

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[3] Preliminary estimate; the final total would be approved in the final approved Mitigation Banking Agreement (in preparation).

[4] Credits that would not be eligible as 404 Mitigation Credits include credits derived from areas above OHW or from credit multiplier factors assigned by the Natural Resource Trustee Council.

The 404 Mitigation Credit subset would be further divided into 188.0 404 Mitigation (Riverine) Credits and 136.4 404 Mitigation (Palustrine) Credits.

For clarity, the ledger will track a single overall credit total (510.8) of "Available Credits". At the time of purchase, credits will be identified as one of three credit types: NRDA Credits, 404 Mitigation (Palustrine) Credits, or 404 Mitigation (Riverine) Credits. All Available Credits are initially eligible as NRDA Credits. However, only 188.0 of the Available Credits would be eligible as 404 Mitigation (Riverine) Credits, and 136.4 as 404 Mitigation (Palustrine) Credits[6]. The ledger would track purchased credits of all three types.

**Table 6. Maximum DSAY Credits available.**

| Available Credits | Subset eligible as 404 Mitigation (Riverine) Credits | Subset eligible as 404 Mitigation (Palustrine) Credits |
|---|---|---|
| 510.8 | 188.0 | 136.4 |

Credits eligible as 404 Mitigation Credits should be considered a subset of the total Available Credits. 404 Mitigation Credits could also be thought of as "dual-purpose" credits—eligible as either NRDA Credits or 404 Mitigation Credits. Being a subset of the total available credits, the total 404 Mitigation Credits (Riverine plus Palustrine) available could never equal or exceed the total Available Credits.

The LWCr shall provide the Trustee Council or its designee(s), as well as the Mitigation Bank Interagency Review Team (IRT) co-chairs (the Corps and DSL), with a copy of each credit transaction within 30 days of the transaction. The LWC shall also provide the Trustee Council or its designee(s), and the IRT co-chairs, a copy of the ledger, as of December 31 of the previous year, by February 15 of each year until all credits have been awarded and sold or otherwise transferred, or until the LWC has informed the Trustee Council or its designee(s) that it has terminated credit sales.This ledger will be held in an approved online banking system such as RIBITS. With each transaction, the ledger will be updated and a notification sent to the Trustee Council and IRT co-chairs, along with a transaction letter detailing the credit sale.

## 5.4 SERVICE AREA

The Service Area for the NRDA Restoration Bank corresponds to the Portland Harbor Natural Resource Damage Assessment Area, which consists of the waters, including the shoreline, intertidal areas, and bottom sediments, of the Willamette River located in the City of Portland, Multnomah County, Oregon. The Portland Harbor Natural Resource Damage Assessment Area encompasses the Willamette River, including Swan Island Lagoon, from approximately River Mile 12.3 to approximately River Mile 0.8 near the confluence with the Columbia River, as well as the upper 1.2 miles of Multnomah Channel. The Service Area for the Aquatic Mitigation Bank (404 Mitigation Credits) shall be as determined in the final approved Mitigation Banking Instrument.

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[6] The final total of Available Credits eligible as 404 Mitigation Credits will be determined by the Interagency Review Team (IRT) through their review of the Linnton Mill Mitigation Banking Instrument (currently under review).

# 6 IMPLEMENTATION

## 6.1 TECHNICAL/ADMINISTRATIVE COMPONENTS

### 6.1.1 Credit Release Schedule

The Credit Release Schedule (Appendix 1) describes the proposed DSAY release schedule for the Project. The actual number of DSAYs shall be determined by the Trustee Council based upon verification that the project was constructed as designed, the results of the contamination review following implementation of the during-construction sediment sampling event, attainment of the final Performance Standards, and other considerations. The Site Specific Performance Plan (Exhibit B) details the monitoring plan for the Performance Period following Project construction. Monitoring during this period includes Implementation Monitoring (as-built surveys, Year 0) and Effectiveness Monitoring to track site progress through interim Performance Standards, including Performance Standards to determine if the site successfully provides the habitat as proposed (Years 1-10). See Section 2.3.2 for a summary of tasks and schedule for Implementation and Effectiveness Monitoring.

### 6.1.2 Credit Sales Agreement

Credit sales agreements will likely vary depending upon the credit purchaser, timing of purchase, and number of credits to be purchased. However, for illustrative purposes a pro forma credit sales agreement is included as Appendix 4.

### 6.1.3 Conservation Easement Instruments

There are two conservation easement/deed restriction instruments associated with the Project.

*Oregon Department of State Lands:* Since the DSL claims ownership of waters below Ordinary Low Water (OLW), that portion of the Project extending below OLW must be subject to a conservation easement or similar restriction with the DSL.

The portion of the Project extending below OLW will be subject to a DSL lease until replaced by a conservation easement. Appendix 5 provides the DSL lease. The lease will be for a term of 10 years, but according to its terms must be replaced by a DSL conservation easement by the eighth year.

*Upland Deed Restriction:* The upland portion (that portion of the Project above OLW and owned by LWC) will be subject to a deed restriction until replaced by a conservation easement deed as described below. The proposed deed restriction language is included in Appendix 6.

### 6.1.4 Permanent Easement Holder Information and Long-term Stewardship

Prior to the end of the Performance Period, the upland project will be permanently protected with a conservation easement (Appendix 7), which will replace the deed restriction. The Easement Holder shall be an organization qualified under ORS 271.715(3) to hold a conservation easement. Such Easement Holder shall also be approved by the Trustee Council and the IRT co-chairs prior to the close of the Performance Period, or before Performance Standards are met, whichever occurs first.

Following approval of the permanent Easement Holder, a conservation easement deed running with the land will be recorded to ensure protection of the Project in perpetuity. Such easement will be subject to the prior approval of the Trustee Council and IRT co-chairs.

In addition, LWC will submit the Long-Term Stewardship Plan to the Trustee Council for approval prior to the close of the Performance Period, or before Performance Standards are met, whichever occurs first. As described in the Long-Term Stewardship Funding Plan (Appendix 12), the Long-Term Stewardship Plan will be prepared by the Steward using funds from the Stewardship Fund provided by the Sponsor.

Consistent with the Portland Harbor NRDA Monitoring and Stewardship Framework, the Long-Term Steward will conduct several tasks, including the following:

- Program Management, including timely communications with the Trustee Council and IRT co-chairs and fiscal management of the long-term stewardship fund;
- Initial Site Assessment, to establish and document current site conditions and identify any immediate maintenance needs;
- Site-Specific Long-Term Stewardship Plan, which the Long-Term Steward will develop and submit to the Trustee Council and IRT co-chairs for approval;
- Site Visits, to be conducted on a regular basis in perpetuity;
- Annual Maintenance Plan, as warranted;
- Maintenance and Adaptive Management for the site, as needed;
- Ongoing Effectiveness Monitoring and Reporting;
- Community Relations;
- Enforcement of trespasses, illegal dumping or other improper/illegal activities at the site; and
- Documentation and Reporting.

It is LWC's intent to transfer its fee interest in the Project to a conservation oriented group or an entity that will manage it consistent with the goals and objectives of the restoration. Transfer would occur at some point following Project implementation; exact timing to be determined. This will be done in coordination with the Long-Term Stewardship process and in consultation with the Trustee Council and IRT co-chairs.

## 6.2 FINANCIAL COMPONENTS

### 6.2.1 Construction Performance Bond

The Construction Performance Bond will ensure that the habitat project will be completed as proposed. This bond will be issued prior to initiation of construction. Upon (i) completion of construction activities in accordance with this Linnton Restoration Plan, as demonstrated by (a) submission of as-built drawings and planting documentation to the Trustee Council; and (b) recognition/acceptance of such as-built drawings and planting documentation by the Trustee

Council and IRT or its designee(s) and (ii) funding of the Adaptive Management Set-Aside Escrow Account (Appendix 3) the bond shall be released.

LWC has received and selected three responsive bids from third-party construction firms for the construction of the habitat project—including seeding and planting costs—as set forth in the 100% Design Specification (Exhibit A). Summaries of these bids are included in Appendix 8.

Based upon an average of the three bids, a 15% contingency, and the costs for the Adaptive Management Set Aside, the total proposed cost for the construction bond is $6,287,116.98 (Table 7).

Within 90 days following the completion of the construction of the Restoration Project, or as the parties otherwise agree, LWC will submit the as-built report for the constructed Restoration Project to the Trustee Council. The as-built report will include an as-built topographic survey and tabular elevation data along transects, final as-built planting details, maps indicating the locations of transects, monitoring equipment, and photo points, discussion about any deviations from the permitted design, and discussions of any other challenges encountered during construction.

The Trustee Council will review the as-built drawings and the constructed Restoration Project to confirm that it was completed in substantial conformity with the 100% Design Specifications. Within 90 days of receiving the as-built drawings from LWC, or as the parties otherwise agree, the Trustee Council will determine whether the Restoration Project was constructed in substantial conformity with the 100% Design Specifications and, if not, provide to LWC a report in writing detailing the specific deviations from the 100% Design Specifications it discovered in its review.

If LWC fails to construct the Project in substantial conformity with the 100% Design Specifications, via the approval of the as-built report (including planting documentation), the Trustee Council or their designee(s) could access the security to construct the Project as planned. Further, if LWC fails to provide the escrow funding for the Adaptive Management Set-Aside within 60 days following the Trustee Council approval of the as-built report (including planting documentation), the Trustee Council or its designee(s) could access the security to perform any necessary adaptive management activities.

Within 60 days following the later to occur of (i) the determination by the Trustee Council that the Restoration Project is in substantial conformity with the 100% Design Specifications and (ii) the Adaptive Management Escrow Account being funded in the amount of $593,851.22, the Trustee Council will provide written notice to the surety under the Construction Performance Bond (with a copy of such notice to LWC) authorizing the surety to terminate the Construction Performance Bond.

A copy of the Construction Performance Bond is included in Appendix 2.

**Table 7. Construction bond cost summary**

| | |
|---|---|
| Average of Three Bids | $4,950,665.88 |
| 15% Contingency | $742,599.88 |
| Adaptive Management Set-Aside | $593,851.22 |
| **Total for Construction Performance Bond** | **$6,287,116.98** |

### 6.2.2 Funding for Ecological Monitoring

The Linnton Project Interim Management and Contingency Security (IMCS) is being established to provide security for anticipated monitoring, initial management, and maintenance activities at the Project site, as well as lamprey monitoring activities during the Performance Period.

LWC proposes the establishment of the IMCS bond in the amount of $993,024.00 (Table 8; Appendix 9). This amount was determined by estimating the costs for activities expected within the first 10 years after completion of the restoration construction, plus a 15% contingency (Appendix 10). In addition, the IMCS includes the budget for lamprey monitoring for years 1-10, 15, and 20 (Appendix 11).

The IMCS will be furnished as a performance bond. If LWC fails to conduct the necessary and agreed upon management or monitoring activities within the Performance Period, the Trustee Council or its designee(s) could access the security to implement the activities as shown in the Site Specific Performance Plan and Lamprey Monitoring Plan in order to complete the establishment of the Project, the monitoring of the project, and generally leave the Project site in a state where it can be effectively managed with the Long-Term Stewardship Fund once the Project moves from the Performance Period into the long-term stewardship period. The IMCS will be funded prior to the first credit release by establishing a performance bond for the full amount of $993,024.00. Upon meeting Year 5 performance standards, the IMCS bond amount will be reduced by half.

Within 90 days, or as agreed to by the parties, of receiving the final monitoring report from LWC in connection with completion of all performance monitoring required for such Performance Period, the Trustee Council will inform LWC in writing whether, in the Trustee Council's reasonable opinion, all necessary and agreed upon management or monitoring activities within the Performance Period have been conducted by LWC in accordance with the Linnton Restoration Plan. Upon meeting the Year 10 performance standards or when LWC and the Trustee Council agree that the Performance Period is complete, the remaining IMCS bond amount will be released. If the Trustee Council determines that such activities have not been performed in accordance with the Linnton Restoration Plan, it will provide to LWC written documentation detailing the specific deficiencies in the Ecological Maintenance and Monitoring.

A copy of the final IMCS performance bond is included as Appendix 9.

**Table 8. IMCS bond cost summary**

| | |
|---|---|
| Grette Associates Cost Estimate | $571,110.00 |
| 15% Contingency | $85,666.00 |
| Lamprey Monitoring Years 1-10 | $240,929.00 |
| Lamprey Monitoring Years 15 and 20 | $95,319.00 |
| **Total for IMCS Bond** | **$993,024.00** |

### 6.2.3 Funding for Long-Term Stewardship

LWC will establish a Long-Term Stewardship Fund by Year 8 of the Performance Period. Such fund will be used to set up a mechanism for the permanent Long-Term Steward to receive funding for the tasks summarized in Section 4.1.6 and further detailed in the Portland Harbor NRDA Monitoring and Stewardship Framework.

Grette Associates developed a cost estimate of $28,936.88 per year for the Long-Term Stewardship budget in accordance with the Portland Harbor Natural Resource Trustee Council Long-Term Stewardship Funding Standards (Appendix 12). To calculate the stewardship funding the following assumptions were made. The annual cost estimate (above) includes a 10% contingency for all tasks and a 25% administrative cost. Assuming a 4% per annum drawdown rate for the Long-Term Stewardship Fund, a total of $723,422.00 must be deposited there by the end of Year 8 to yield the $28,936.88 per year necessary (starting in Year 11) to fully fund the annual Long-Term Stewardship budget in perpetuity. LWC will ensure it has $723,422 on deposit by the end of Year 8.

Funds collected will be in the form of a long-term stewardship fund. It is LWC's intent that the funds will be directed to the Department of Interior Natural Resource Damage Assessment and Restoration Fund (DOI NRDAR Fund) following the procedures outlined in the Department of the Interior Natural Resource Damage Assessment and Restoration Fund Assessment and Settlement Deposit Remittance Procedures. The Long-Term Stewardship Funding Agreement,which must be approved by the Trustee Council prior to implementation, will include provisions for the potential transfer of oversight of the long-term stewardship fund to the Long-Term Steward.

### 6.2.4 Funding for Adaptive Management

Prior to and as a condition of the first credit release, LWC will execute a performance bond to fully secure funding for Adaptive Management Set-Aside. Adaptive Management Set-Aside funds will be used to support adaptive management actions, as necessary, jointly identified by LWC the Trustee Council, and the IRT Co-Chairs during the Performance Period. Any funds that remain unused at the end of the Performance Period will be released to LWC.

The amount required to fund the Adaptive Management Set-Aside is 25% of the habitat-related construction costs. These construction costs will not include one-time demolition, removal or other non-habitat related costs such as piling removals, construction material removal, and off-site disposal costs. LWC asked Waterways Consulting, Inc. to provide additional detail regarding which portions of the construction cost estimate represent one-time expenditures, versus portions which should be included within the Adaptive Management Set-Aside cost calculation

(Appendix 13). In addition to line items excluded from this calculation because they represent one-time costs (e.g., General Demolition, Piling Demolition, Clearing and Grubbing), certain line items have been prorated. In particular, 41% of the line item for Unclassified Excavation (representing the upper four feet of excavation placement) has been allocated toward the Adaptive Management Set-Aside calculation, as that percentage represents the amount of excavation (134,875 cubic yards) considered as being used for habitat creation (i.e. subject to potential need for Adaptive Management), as opposed to the volume merely being stored in the upland.

As detailed in the cost estimate (Appendix 13) such costs combined average $2,375,404.88 based upon the third-party cost estimates received. 25% of this figure totals $593,851.22, which is the proposed amount of the Adaptive Management Set-Aside.

LWC's obligation to fund the Adaptive Management Set-Aside will initially be secured by the Construction Performance Bond, as detailed in 6.2.1. As discussed therein, the Construction Performance Bond will not be released until an Adaptive Management Set-Aside Escrow account is established and fully funded. Full funding of the Adaptive Management Set-Aside escrow account is required before the second credit release. An example Adaptive Management Set-Aside Escrow Agreement, to which LWC, NOAA (or other entity identified by and on behalf of the Trustee Council), DSL (or other entity identified by and on the behalf of the IRT) and the escrow agent will be signatories, is attached as Appendix 3.

### 6.2.5 Funding for Lamprey Monitoring

The budget set forth in Table 9 below reflects the anticipated costs associated with the 20 year lamprey monitoring plan for the Linnton site, based upon the Linnton Restoration Project Site Final Budget for Lamprey Monitoring Efforts – Linnton Mill Restoration Site (see Appendix 11). These costs reflect expenses related to site sampling, to be conducted by the USFWS, and analysis of sediment samples, to be analyzed by a third-party laboratory selected by the Trustee Council, as documented in the site-specific lamprey monitoring plan, Evaluation of Portland Harbor Superfund Area Restoration: Larval Pacific Lamprey Linnton Restoration Site, and associated Evaluation of Portland Harbor Superfund Area Restoration: Linnton Mill Restoration Site Lamprey Monitoring Plan – Addendum 1 Sediment Sampling and Analysis Plan, March 2, 2017 (attached to Appendix 11).

In years 1-10, in advance of each monitoring event, payment will be remitted to the USFWS and a designated Trustee, respectively, in portions as directed by the Trustee Council, unless otherwise directed by the Trustee Council. For the years 15 and 20 monitoring events, payment will be provided to a designated Trustee prior to the final release of credits. As described in the notes following the budget estimate, the cost estimates provided in this budget reflect the best estimates of the costs of lamprey monitoring over the life of the plan (20 years). While the budget does account for inflation in estimating costs beyond Year 0, it is not possible to predict with certainty whether and to what extent certain costs may change over time. As such, the specific amount of funds required in any given year may differ from what is presented herein, as directed by the Trustee Council or its representative.

The Trustee Council will provide cost documentation annually. Actual costs will be compared to estimated costs at the end of each monitoring year and any excess funds will be applied to subsequent monitoring years. Payments due for subsequent monitoring events will not be withheld or delayed if cost documentation has not been received. Any excess funds will be credited to the next payment due.

Funding for Years 1-10, and Years 15 and 20, of the lamprey monitoring will secured by the IMCS Performance Bond (Appendix 9), until such time as such funding is paid to the Trustee Council (or its designee); but in no case shall payment of Lamprey Monitoring funding for Years 1-10 extend beyond the Performance Period.

**Table 9. Lamprey monitoring summary**

| | |
|---|---|
| Pre-implementation (applicant-funded prior to monitoring event) | $27,495.00 |
| Years 1 – 10 Performance Period (applicant-funded prior to monitoring event, secured by IMCS) | $240,929.00 |
| Year 15 (applicant-funded prior to end of Performance Period, secured by IMCS) | $44,144.00 |
| Year 20 (applicant-funded prior to end of Performance Period, secured by IMCS) | $51,175.00 |
| **Total for Lamprey Monitoring** | **$363,743.00** |

### 6.2.6 Funding for Trustee Monitoring Oversight

The initial Trustee Council oversight budget dated May 13, 2016, totaling $233,560.72, has been agreed to by the Parties and is attached as Appendix 15.

LWC will make payments for Trustee Council oversight on an annual basis prior to the beginning of each calendar year to cover the total Trustee Council oversight costs for the following calendar year. Payment will be made by check furnished to the DOI NRDAR Fund following the procedures outlined in the Department of the Interior Natural Resource Damage Assessment and Restoration Fund Assessment and Settlement Deposit Remittance Procedures.

The Trustee Council will provide cost documentation annually for the previous calendar year's oversight expenditures by July 1 of each year. Actual costs will be compared to estimated costs at the end of each year and any excess funds will be applied to subsequent years. Payments due for subsequent years will not be withheld or delayed if cost documentation has not been received.

The Trustee Council reserves the right to disperse Trustee Council oversight funding to individual Trustees in amounts different from those estimated in the budget in Appendix 15, not to exceed the total Trustee Council oversight budget in any year.

## 6.3 MEMORANDUM OF AGREEMENT

### 6.3.1 Original Memorandum of Agreement

RCD and the Trustee Council are parties to that certain Memorandum of Agreement between the Natural Resource Trustees and RestorCap for Providing Technical Assistance Related to Habitat Restoration Projects toward Future Settlement of Natural Resource Damage Claims at the Portland Harbor CERCLA Site dated May 16, 2013 (the “Original MOA”), wherein they agreed to use their collaborative efforts to identify, design and assess the value of one or more habitat restoration projects in or near the Portland Harbor Superfund Site. The Original Memorandum set forth a process to develop a forecast settlement credits value, revise the forecasted value after contruction, and develop a final settlement credit value for a habitat restoration project. This Original Memorandum is attached as Appendix 16.

### 6.3.2 Memorandum of Agreement Addendum

The attached MOA Addendum (Appendix 17) includes LWC, as a wholly-owned subsidiary of RCD, as the “Restoration Implementer” for the Project. It also provides for recognition of this Restoration Plan and sets forth the requirements for LWCto implement the Project in accordance with this Restoration Plan.

# 7 REFERENCES

CH2MHILL. 2007. Linnton Plywood Association Environmental Assessment. Prepared for Linnton Plywood Association. August 2007. URL: http://www.deq.state.or.us/Webdocs/Controls/Output/PdfHandler.ashx?p=d3e5f7c7-6394-475c-8a07-67e04a3d7597.pdf&s=LPA_Environmental_Assessment_August2007.pdf

ODEQ. 2004. Source Control Decision for the Linnton Plywood Association Facility/Columbia Sand & Gravel Facility at 10504 NW St. Helens Road, Portland OR ECSI Nos. 2351 & 23723. Available on the World Wide Web at URL: http://www.deq.state.or.us/Webdocs/Controls/Output/PdfHandler.ashx?p=88abb95a-5fc9-46ef-97d2-a6fadefbe14c.pdf&s=Source%20Control%20Decision%20-%20LPA%20-%205-7-2004.pdf

ODEQ. 2009. No Further Action Determination. Prepared for Linnton Plywood Association. July 10, 2009. Available on the World Wide Web at URL: http://www.deq.state.or.us/Webdocs/Controls/Output/PdfHandler.ashx?p=1b06d60d-d576-4342-b766-e3ca0aa9bd9a.pdf&s=Linnton%20Plywood%20Signed%20NFA%207-10-09.pdf

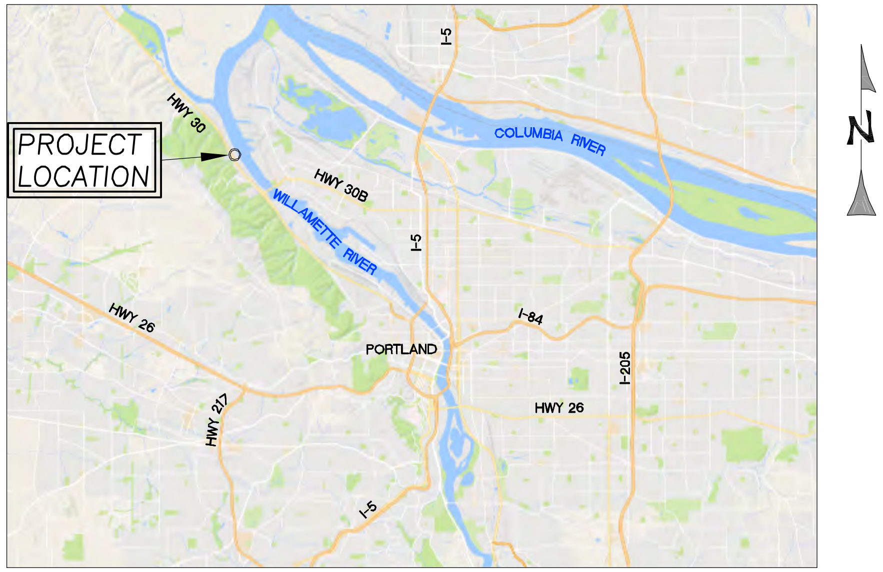
URS Corporation. 2013. Letter Regarding 2013 Annual Groundwater Modeling Report, BP Bulk Terminal 22T, 9930 NW St. Helens Road, Portland, Oregon. From Clifford J. Pearson and Scott Kranz. To Tom Gainer, Oregon Department of Environmental Quality. August 19, 2013.

URS Corporation. 2014. Interim Remedial Measure Work Plan - BP Bulk Terminal 22T. Prepared for Atlantic Richfield Company. July 2014.

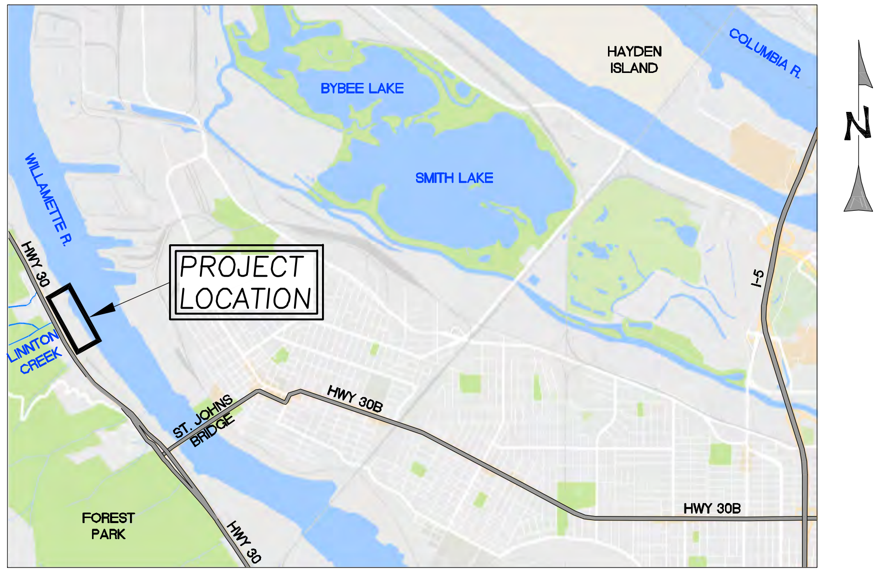
U.S. Environmental Protection Agency. (USEPA). 2015. Amended Consent Decree: United States of America (Plaintiff) v. Linnton Plywood Association (Defendant). Case 3:14-cv-01772-MO. Filed 06/24/2015. Available online. URL: https://www3.epa.gov/region10/pdf/ph/uplands/linnton_settlement_agreement_06242015.pdf

# Exhibit A. 100% Plans and Specifications (Waterways Consulting)

# LINNTON MITIGATION SITE
# PHASE 2 - HABITAT RESTORATION
## 100% DESIGN SUBMITTAL



### REGIONAL MAP
N.T.S. (GOOGLE)

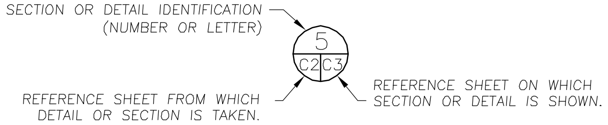


### VICINITY MAP
N.T.S. (GOOGLE)

## SHEET INDEX

| | |
|---|---|
| C1 | COVER SHEET |
| C2 | POST PHASE 1 DEMOLITION CONDITIONS |
| C3 | DEMOLITION PLAN NORTH |
| C4 | DEMOLITION PLAN SOUTH |
| C5 | GRADING PLAN NORTH |
| C6 | GRADING PLAN SOUTH |
| C7 | NORTH CULVERT REALIGNMENT PLAN AND PROFILE |
| C8 | LINNTON CREEK PLAN AND PROFILE |
| C9 | SECTIONS |
| C10 | DETAILS |
| C11 | HABITAT FEATURE PLACEMENT PLAN |
| C12 | HABITAT FEATURE DETAILS |
| C13 | PATHWAY PLAN AND SECTIONS |
| EC1 | ESCP COVER SHEET |
| EC2 | EXISTING CONDITIONS AND FLOW PATTERNS |
| EC3 | DEMOLITION EROSION CONTROL PLAN |
| EC4 | CONSTRUCTION ACCESS PHASING AND DEWATERING PLAN |
| EC5 | SEEDING AND PERMANENT EROSION CONTROL PLAN |
| EC6 | EROSION CONTROL DETAILS |
| P1 | PLANTING PLAN |
| P2 | PLANTING LIST |

## SECTION AND DETAIL CONVENTION



## PROJECT DESCRIPTION

THESE DRAWINGS PROVIDE 100% DESIGN LEVEL DETAILS FOR PHASE 2 OF THE LINNTON MITIGATION SITE PROJECT. THIS PHASE INCLUDES THE CREATION OF OFF CHANNEL HABITAT ALONG THE WEST BANK OF THE WILLAMETTE RIVER. WORK SHALL CONSIST OF MASS EXCAVATION AND STOCKPILING OF SOILS ON-SITE TO CREATE SHALLOW WATER, WETLAND, AND UPLAND HABITAT FEATURES.

## GENERAL NOTES

1. TOPOGRAPHIC MAPPING WAS PERFORMED BY:
   AKS ENGINEERING & FORESTRY, LLC
   13910 SW GALBREATH DR., SUITE 100
   SHERWOOD, OR 97140
   503.925.8799
   SURVEYS COMPLETED SEPTEMBER - OCTOBER 2010 AND APRIL 25TH - MAY 16TH 2013

   ADDITIONAL TOPOGRAPHIC MAPPING WAS PERFORMED BY:
   WATERWAYS CONSULTING, INC.
   1020 SW TAYLOR ST., SUITE 380
   PORTLAND, OR 97205
   503.227.5979
   SURVEY COMPLETED AUGUST 12, 2016
2. ELEVATION DATUM: ELEVATIONS ARE BASED ON NGS HARN BENCHMARK RD4218 "HELEN" WITH A NAVD 88 ELEVATION OF 79.346 FT. TO CONVERT TO NGVD 29 SUBTRACT 3.475 (APPROX.) TO CONVERT TO THE COLUMBIA RIVER DATUM SUBTRACT 5.32 (APPROX.)
3. BASIS OF BEARINGS: BASIS OF BEARINGS IS PER MULTNOMAH COUNTY SURVEY NUMBER 37607, MULTNOMAH COUNTY SURVEYOR'S OFFICE.
4. AERIAL PHOTO SOURCE:
   ENVIRONMENTAL DATA RESOURCES, INC.
   ACQUIRED: 2012
5. CONTOUR INTERVAL IS ONE FOOT. ELEVATIONS AND DISTANCES SHOWN ARE IN DECIMAL FEET.
6. ORDINARY HIGH WATER IS AT A NAVD 88 ELEVATION OF 20.1 FT. PER ARMY CORPS OF ENGINEERS 2004 REPORT.
7. THE 100 YEAR FLOOD EVENT WATER SURFACE IS AT A NAVD 88 ELEVATION OF 30.4 FT.
8. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES ARE NOT SHOWN HEREON.
9. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE CURRENT EDITION OF THE OREGON DEPARTMENT OF TRANSPORTATION (ODOT) STANDARD SPECIFICATIONS (HEREAFTER REFERRED TO AS "STANDARD SPECIFICATIONS").

## ABBREVIATIONS

| | |
|---|---|
| AC | ASPHALT CONCRETE |
| AVG. | AVERAGE |
| BMP | BEST MANAGEMENT PRACTICES |
| CC | CONCRETE |
| CLSM | CONTROLLED LOW STRENGTH MATERIAL |
| CMP | CORRUGATED METAL PIPE |
| CY | CUBIC YARDS |
| DIA. | DIAMETER |
| E | EXISTING |
| E.G. | EXISTING GROUND |
| ELEV. | ELEVATION |
| ESM | ENGINEERED STREAMBED MATERIAL |
| F.G. | FINISHED GRADE |
| FT | FEET |
| I.E. | INVERT ELEVATION |
| LWD | LARGE WOODY DEBRIS |
| N | NEW |
| N.I.C. | NOT IN CONTRACT |
| N.T.S. | NOT TO SCALE |
| O.C. | ON CENTER |
| OSD | OREGON STANDARD DRAWING |
| O.C. | RELATIVE COMPACTION |
| RCP | REINFORCED CONCRETE PIPE |
| RSP | ROCK SLOPE PROTECTION |
| SPK | SPIKE |
| SQ.FT. | SQUARE FOOT |
| T | TREE |
| T.B.D. | TO BE DETERMINED |
| TYP | TYPICAL |
| UNK | UNKNOWN |
| WSE | WATER SURFACE ELEVATION |
| YR | YEAR |

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
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| | | | |
| | | | |
| | | | |

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77870PE
OREGON
JANUARY 3, 2011
JAKE DYLAN HOFELD
EXPIRES: 6/30/2019

JAKE D. HOFELD
3/20/18
DATE

PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS, LLC

COVER SHEET

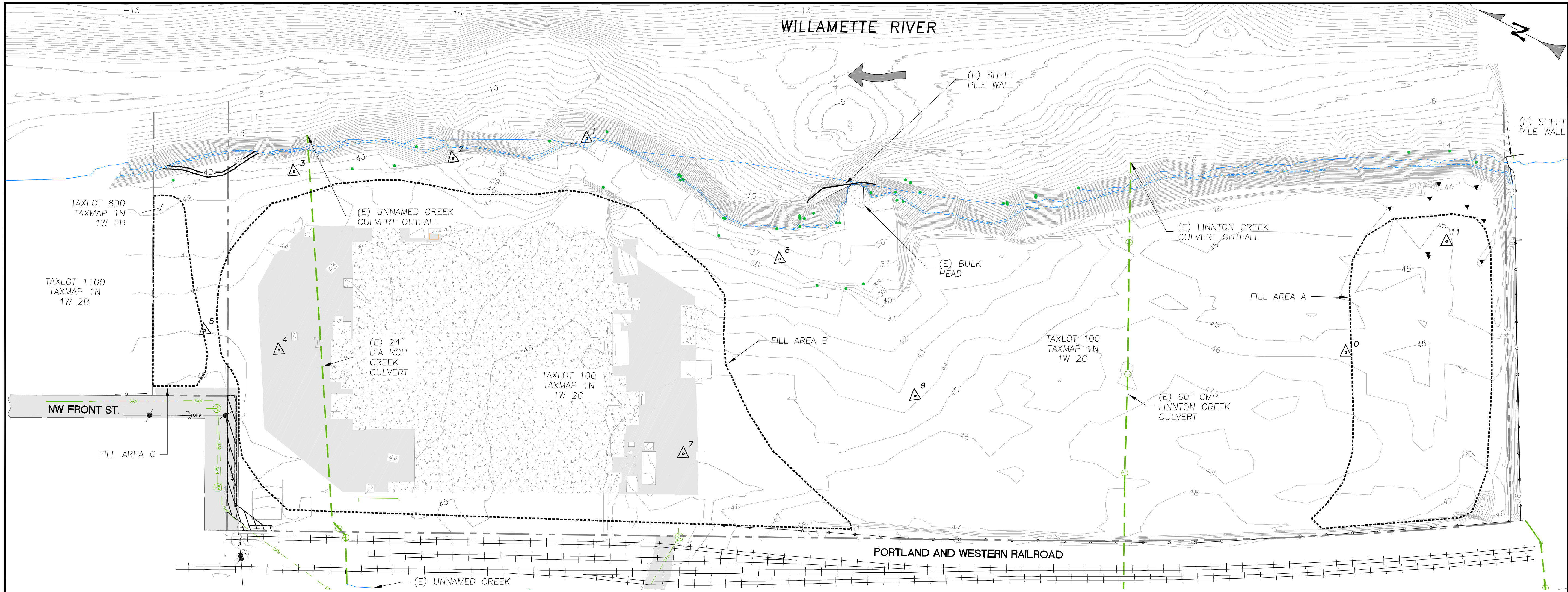
LINNTON MITIGATION SITE
PHASE II - HABITAT
RESTORATION
100% DESIGN SUBMITTAL

DESIGNED BY: J.H.
DRAWN BY: A.L./D.H.
CHECKED BY: J.H.
DATE: 03/20/18
JOB NO.: 13-044

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C1

1
OF
21



## POST PHASE 1 SITE CONDITIONS

SCALE: 1" = 70'

## LEGEND

| | |
|---|---|
| —85— —86— | (E) 1' CONTOURS |
| ┼┼┼┼ | (E) RAILROAD |
| — — — | (E) CULVERT |
| — — SAN — | (E) SANITARY SEWER PIPE |
| — — OHW — | (E) OVERHEAD ELECTRICAL WIRE |
| — - — | PARCEL BOUNDARY |
| —— | (E) FEMA FLOODWAY (APPROXIMATE) |
| - - - - | (E) 100-YEAR FEMA WSE |
| - - - - | (E) CITY OF PORTLAND 1996 WSE (APPROXIMATE) |
| —o—o— | (E) FENCE LINE |
| ▬ | (E) AC PAVEMENT |
| ▨ | (E) CONCRETE PAD |
| ▨ | (E) EASEMENT |
| ⊖ | (E) STORM SEWER MANHOLE |
| ⊙ | (E) SANITARY SEWER MANHOLE |
| ▭ | (E) CATCH BASIN |
| ● | (E) UTILITY POLE |
| → | (E) UTILITY POLE GUY WIRE |
| ▲ | (E) MONITORING WELL |
| ● | (E) TREE |
| △ 2 | SURVEY CONTROL POINTS |

NOTES:

1. REFER TO SHEET EC2 FOR PLAN VIEW OF EROSION CONTROL ELEMENTS CURRENTLY INSTALLED ON-SITE.
2. ALL EXCAVATED MATERIALS (INCLUDING IMPACTED SOILS AS SHOWN ON SHEET C6) SHALL BE PERMANENTLY PLACED AT ONE OF THE THREE FILL AREAS SHOWN ON THIS SHEET CONFORMING TO THE GRADES SHOWN ON THE OTHER SHEETS IN THIS SET.

## CONTROL POINTS

| POINT | NORTHING | EASTING | ELEV. | DESC. |
|---|---|---|---|---|
| 1 | 712582.18 | 7618024.86 | 30.99 | 60 D NAIL |
| 2 | 712729.53 | 7617921.52 | 39.13 | MAG NAIL |
| 3 | 712909.84 | 7617808.26 | 40.78 | 60 D NAIL |
| 4 | 712921.39 | 7617587.72 | 43.55 | MAG NAIL |
| 5 | 712920.02 | 7617567.28 | 44.91 | MAG NAIL |
| 7 | 712278.04 | 7617707.62 | 45.29 | MAG NAIL |
| 8 | 712279.30 | 7617995.83 | 37.10 | MAG NAIL |
| 9 | 712032.40 | 7617918.60 | 43.64 | MAG NAIL |
| 10 | 711548.23 | 7618228.46 | 45.32 | 1/2" RPC |
| 11 | 711494.62 | 7618420.60 | 44.14 | 1/2" RPC |

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
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REGISTERED PROFESSIONAL ENGINEER
77870PE
OREGON
JANUARY 3, 2011
JAKE DYLAN HOFELD
EXPIRES: 6/30/2019

JAKE D. HOFELD

3/20/18
DATE

PREPARED AT THE REQUEST OF:

LINNTON WATER CREDITS, LLC

POST PHASE 1
SITE
CONDITIONS

LINNTON MITIGATION SITE
PHASE II - HABITAT
RESTORATION
100% DESIGN SUBMITTAL

DESIGNED BY: J.H.
DRAWN BY: A.L./D.H.
CHECKED BY: J.H.
DATE: 03/20/18
JOB NO.: 13-044

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C2

2 OF 21

## LEGEND

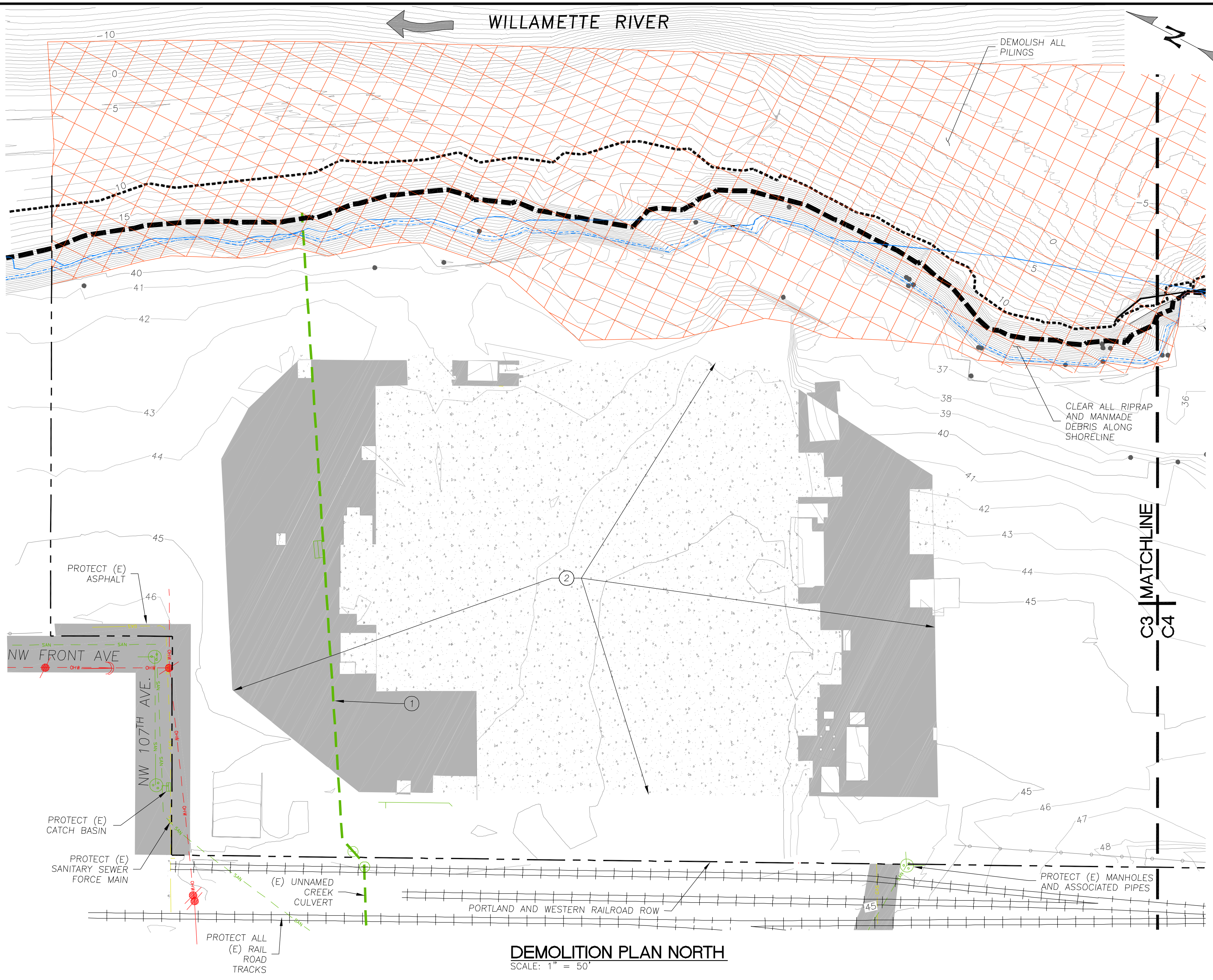
| | |
|---|---|
| 85 86 | (E) 1' CONTOURS |
| OHW | (E) OVERHEAD WIRE ELECTRIC |
| SAN | (E) SANITARY SEWER LINE (APPROX.) |
| | (E) ORDINARY HIGH WATER (ELEV. 20.1') |
| | (E) ORDINARY LOW WATER (ELEV. 11.0') |
| | (E) FEMA FLOODWAY (APPROXIMATE) |
| | (E) 100-YEAR FEMA WSE |
| | (ELEV. (E) CITY OF PORTLAND 1996 WSE 34.5') |
| GAS | (E) GAS LINE |
| | (E) RAILROAD |
| | (E) CULVERT |
| | PROJECT BOUNDARY |
| | (E) FENCE LINE |
| | (E) AC PAVEMENT |
| | (E) CONCRETE PAD (NOT ALL SHOWN) |
| ▨ | LIMITS OF PILING DEMOLITION AND MANMADE DEBRIS CLEARING |
| | GUY ANCHOR |
| ● | (E) POWER POLE |
| | (E) SANITARY SEWER MANHOLE |
| ⊖ | (E) STORM SEWER MANHOLE |
| ▯ | (E) CATCH BASIN |
| ▲ | (E) MONITORING WELL |
| ● | (E) TREE |

NOTES:

1. INSTALL ALL EROSION AND SEDIMENT CONTROL BMP's PER SHEET EC3 PRIOR TO STARTING ANY WORK. TURBIDITY CURTAIN SHALL BE INSTALLED PRIOR TO ANY PILING DEMOLITION.
2. SALVAGE RIP RAP AND WOODY DEBRIS FROM RIVER SHORELINE FOR USE IN HABITAT FEATURES.

KEY NOTES: ⓧ

1. SEE SHEET C7 REGARDING ABANDONING (E) 24" DIA. CULVERT.
2. AC PAVEMENT AND CONCRETE SHOWN TO REMAIN IN PLACE AND BE COVERED WITH EXCAVATED MATERIALS.



## DEMOLITION PLAN NORTH

SCALE: 1" = 50'

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
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| | | | |
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JAKE DYLAN HOFELD
EXPIRES: 6/30/2019

JAKE D. HOFELD

3/20/18
DATE

PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS, LLC

DEMOLITION PLAN NORTH

LINNTON MITIGATION SITE
PHASE II - HABITAT RESTORATION
100% DESIGN SUBMITTAL

DESIGNED BY: J.H.
DRAWN BY: A.L./D.H.
CHECKED BY: J.H.
DATE: 03/20/18
JOB NO.: 13-044

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C3

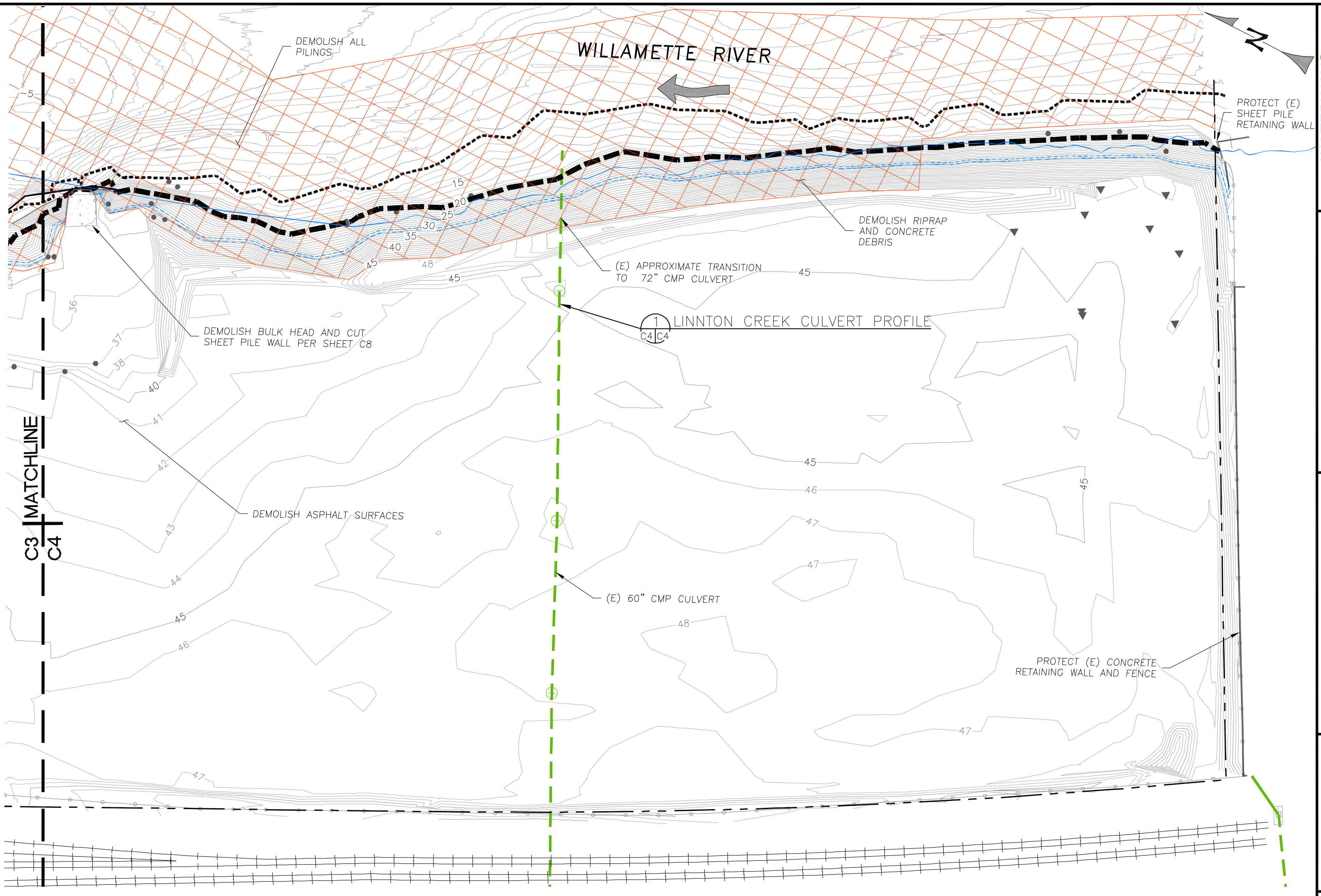
3 OF 21

## LEGEND

| | |
|---|---|
| 85 86 | (E) 1' CONTOURS |
| ▬ ▬ ▬ | (E) ORDINARY HIGH WATER (ELEV. 20.1') |
| ┈┈┈ | (E) ORDINARY LOW WATER (ELEV. 11.0') |
| ─── | (E) FEMA FLOODWAY (APPROXIMATE) |
| - - - | (E) 100-YEAR FEMA WSE |
| - - - | (E) CITY OF PORTLAND 1996 WSE (APPROXIMATE) |
| ┼┼┼ | (E) RAILROAD |
| ▬ ▬ ▬ | (E) CULVERT |
| ─ - ─ | PROJECT BOUNDARY |
| ─○─ | (E) FENCE LINE |
| ▨ | (E) CONCRETE PAD (NOT ALL SHOWN) |
| ▨ | LIMITS OF PILING DEMOLITION AND MANMADE DEBRIS CLEARING |
| ⊖ | (E) STORM SEWER MANHOLE |
| ⊟ | (E) CATCH BASIN |
| ▲ | (E) MONITORING WELL |
| ● | (E) TREE |

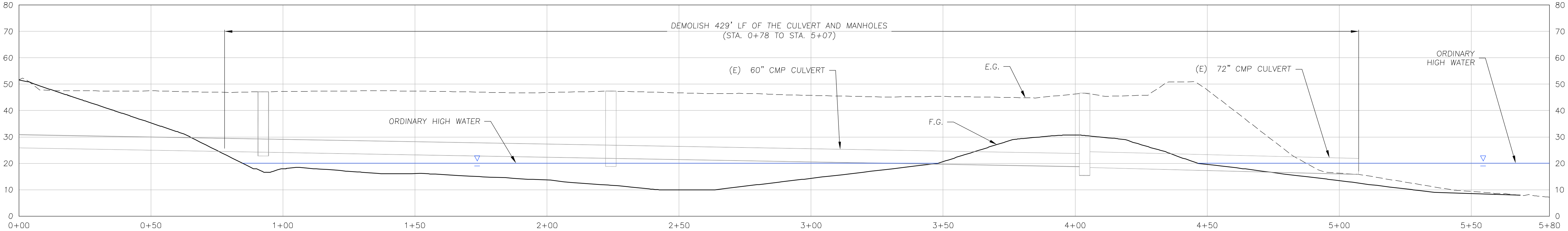
NOTES:

1. MONITORING WELLS TO BE DECOMMISSIONED BY OTHERS (NIC).
2. CLEAR ALL CONCRETE DEBRIS FROM WILLAMETTE RIVER SHORELINE WITHIN PROJECT BOUNDARY.
3. DEMOLISH ALL MANMADE FEATURES WITHIN PROJECT AREA INCLUDING, BUT NOT LIMITED TO CONCRETE SLABS/WALLS, ASPHALT, PILINGS, MECHANICAL EQUIPMENT, UTILITY POLES, AND FENCES, UNLESS INDICATED OTHERWISE ON DRAWINGS.
4. (E) 60" CMP CULVERT SHALL BE CUT SUCH THAT THE CULVERT DAYLIGHTS 2' PAST THE EDGE OF FINISHED GRADE. DEMOLISH ALL PORTIONS OF THE CULVERT AND ASSOCIATED MANHOLES TO THE EAST OF THIS LOCATION.



## DEMOLITION PLAN SOUTH

SCALE: 1" = 50'



## LINNTON CREEK CULVERT PROFILE

1 C4 C4

SCALE: 1" = 20'

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
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JAKE D. HOFELD
REGISTERED PROFESSIONAL ENGINEER
77870PE
OREGON
JANUARY 3, 2011
JAKE DYLAN HOFELD
EXPIRES: 6/30/2019
3/20/18
DATE

PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS, LLC

DEMOLITION PLAN SOUTH

LINNTON MITIGATION SITE
PHASE II - HABITAT RESTORATION
100% DESIGN SUBMITTAL

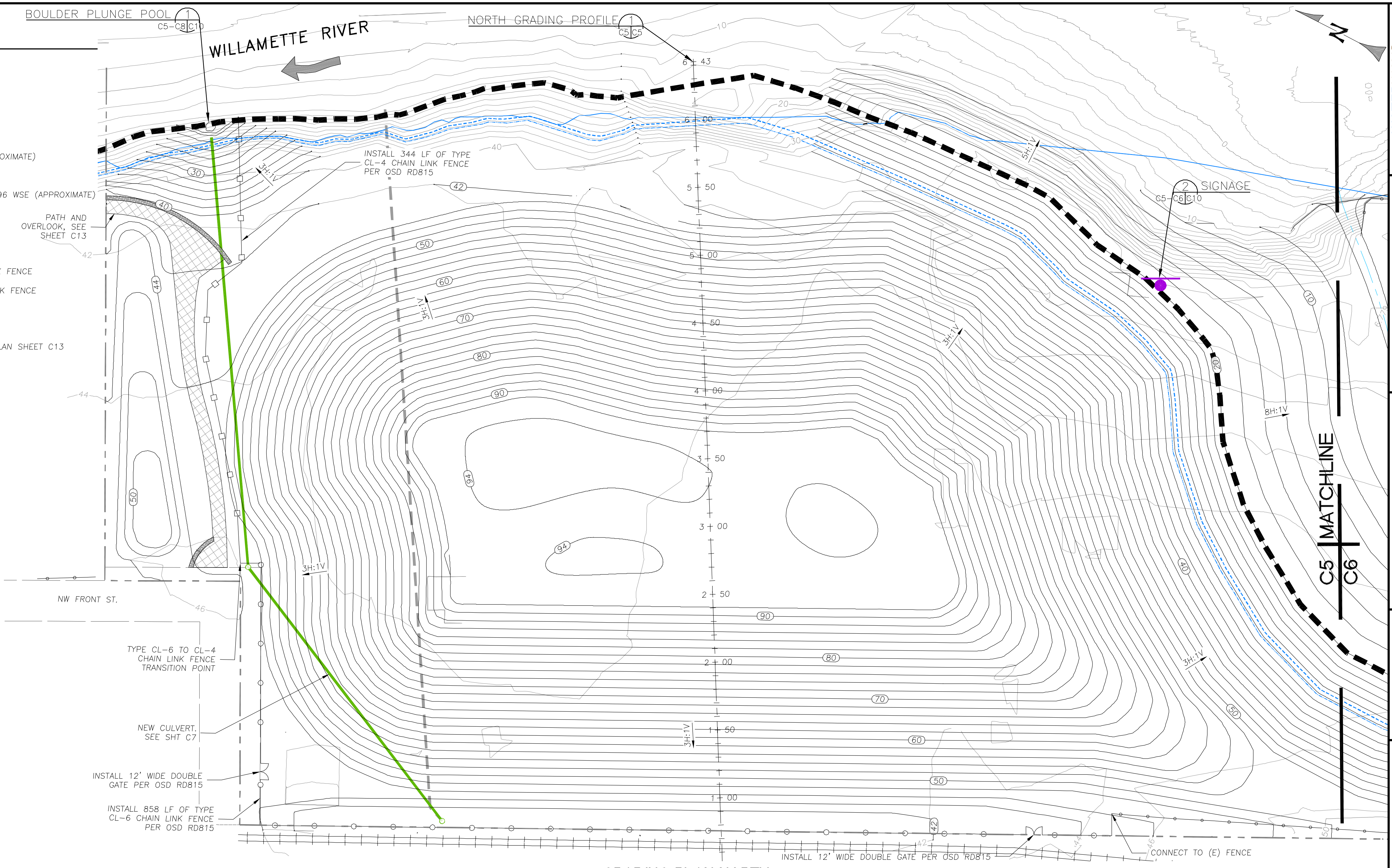
DESIGNED BY: J.H.
DRAWN BY: A.L./D.H.
CHECKED BY: J.H.
DATE: 03/20/18
JOB NO.: 13-044

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C4

## LEGEND

| | |
|---|---|
| 80 82 | (E) 2' CONTOURS |
| 100 102 | (N) 2' CONTOURS |
| ┼┼┼┼ | (E) RAILROAD |
| — - — | PROJECT BOUNDARY |
| ▬ ▬ ▬ | (N) ORDINARY HIGH WATER |
| —— | (E) FEMA FLOODWAY (APPROXIMATE) |
| - - - | (N) 100-YEAR FEMA WSE |
| - - - | (N) CITY OF PORTLAND 1996 WSE (APPROXIMATE) |
| 🟩 | (N) HDPE PIPE |
| ○ | (N) MANHOLE |
| —— | (E) FENCE |
| —○— | (N) TYPE CL-6 CHAIN LINK FENCE |
| —□— | (E) TYPE CL-4 CHAIN LINK FENCE |
| ● | (N) SIGNAGE |
| ▨ | (N) PATH, SEE PATHWAY PLAN SHEET C13 |



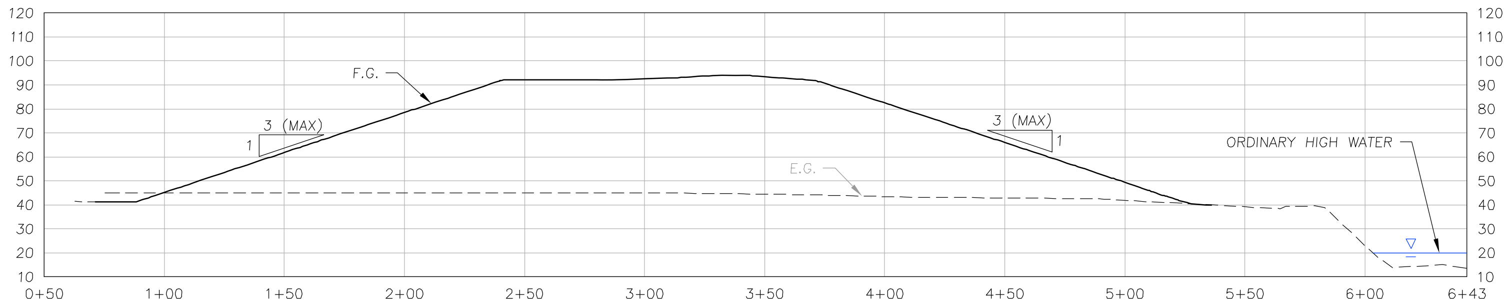
## GRADING PLAN NORTH
SCALE: 1" = 40'

## GRADING SUMMARY

EXCAVATION CUT VOLUME = 328,491 CY
IMPACTED SOIL OVER-EXCAVATION VOLUME = 926 CY

THE ABOVE QUANTITIES ARE APPROXIMATE IN-PLACE VOLUMES CALCULATED AS THE DIFFERENCE BETWEEN EXISTING GROUND AND THE PROPOSED FINISH GRADE, PREPARED FOR PERMITTING PURPOSES ONLY. EXISTING GROUND IS DEFINED BY THE TOPOGRAPHIC CONTOURS AND/OR SPOT ELEVATIONS ON THE PLAN. PROPOSED FINISH GRADE IS DEFINED AS THE DESIGN SURFACE ELEVATION OF WORK TO BE CONSTRUCTED. THE QUANTITIES HAVE NOT BEEN FACTORED TO INCLUDE ALLOWANCES FOR BULKING, CLEARING AND GRUBBING, SUBSIDENCE, SHRINKAGE, OVER EXCAVATION, AND RE-COMPACTION, UNDERGROUND UTILITY AND SUBSTRUCTURE SPOILS AND CONSTRUCTION METHODS.

THE CONTRACTOR SHALL PERFORM AN INDEPENDENT EARTHWORK ESTIMATE FOR THE PURPOSE OF PREPARING BID PRICES FOR EARTHWORK. THE BID PRICE SHALL INCLUDE COSTS FOR ANY NECESSARY IMPORT AND PLACEMENT OF EARTH MATERIALS OR THE EXPORT AND PROPER DISPOSAL OF EXCESS OR UNSUITABLE EARTH MATERIALS.



## NORTH GRADING PROFILE
SCALE: 1" = 40'

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
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LINNTON MITIGATION SITE
PHASE II - HABITAT
RESTORATION
100% DESIGN SUBMITTAL

GRADING PLAN
NORTH

PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS,
LLC

JAKE D. HOFELD
77870PE
OREGON
JANUARY 3, 2017
EXPIRES: 6/30/2019
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BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

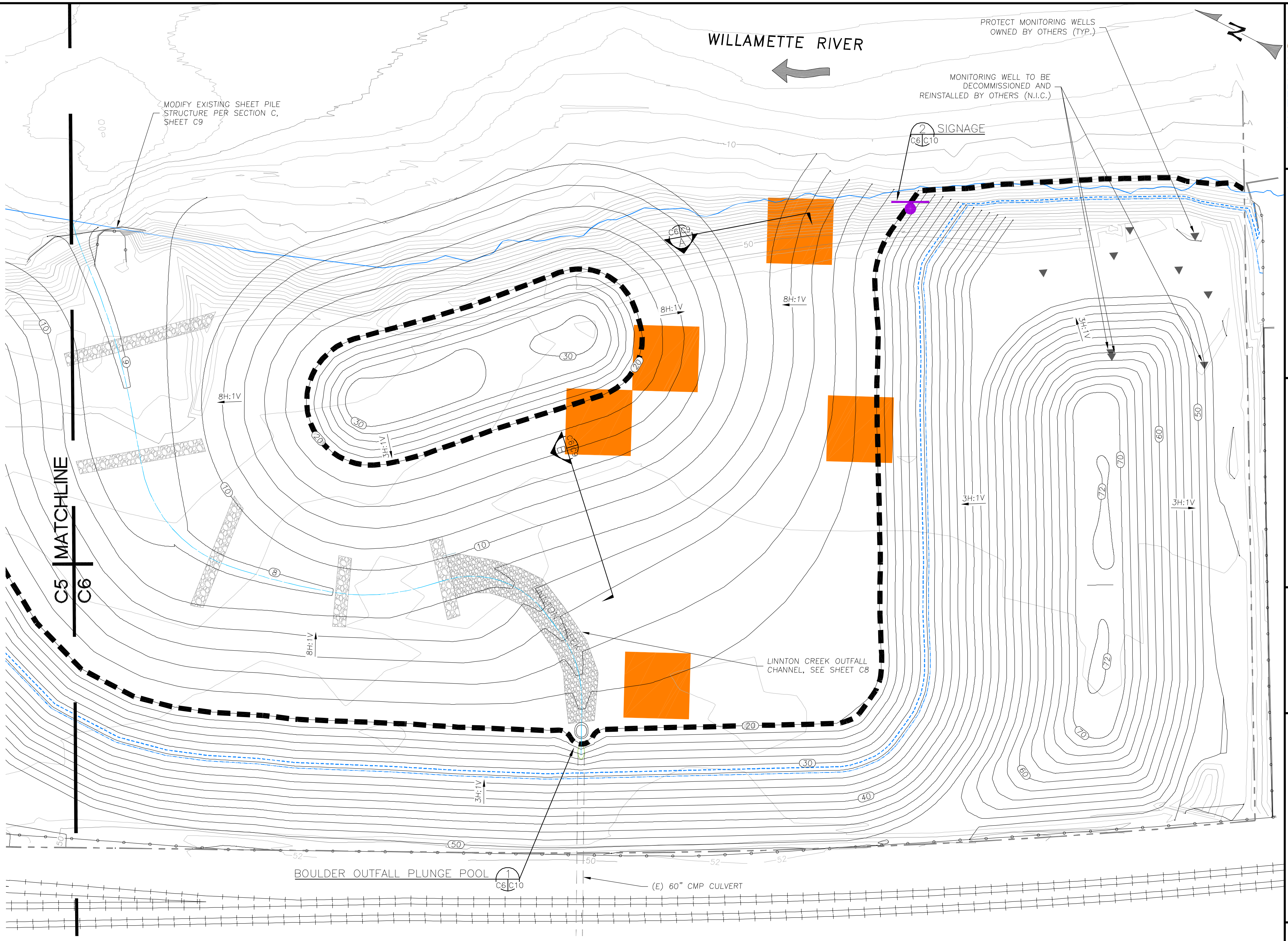
C5

## LEGEND

| | |
|---|---|
| 80 82 | (E) 2' CONTOURS |
| 100 102 | (N) 2' CONTOURS |
| ┼┼┼┼ | (E) RAILROAD |
| — — – | PROJECT BOUNDARY |
| ▬ ▬ ▬ | (N) ORDINARY HIGH WATER (20.1') |
| —— | (E) FEMA FLOODWAY (APPROXIMATE) |
| - - - - | (N) 100–YEAR FEMA WSE |
| -·-·- | (N) CITY OF PORTLAND 1996 WSE (APPROXIMATE) |
| — · — | (N) FLOW LINE |
| ▨ | (N) ENGINEERED STREAMBED MATERIAL |
| 🟧 | IMPACTED SOILS |
| ▲ | MONITORING WELL |
| ● | (N) SIGNAGE |

NOTES:

1. AREAS OF IMPACTED SOIL SHALL BE EXCAVATED A MINIMUM OF 2' BELOW FINISHED GRADE AND BACKFILLED WITH ENGINEERED FILL. ALL IMPACTED SOIL EXCAVATED FROM THE LOCATIONS SHOWN IN THE DRAWINGS SHALL BE PLACED IN FILL AREAS ABOVE OHW AT THE DIRECTION OF THE ENGINEER.



GRADING PLAN SOUTH
SCALE: 1" = 40'

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JAKE D. HOFELD
3/20/18
DATE

REGISTERED PROFESSIONAL ENGINEER
77870PE
OREGON
JANUARY 3, 2011
JAKE DYLAN HOFELD
EXPIRES: 6/30/2019

PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS, LLC

GRADING PLAN SOUTH

LINNTON MITIGATION SITE
PHASE II - HABITAT RESTORATION
100% DESIGN SUBMITTAL

DESIGNED BY: J.H.
DRAWN BY: A.L./D.H.
CHECKED BY: J.H.
DATE: 03/20/18
JOB NO.: 13-044

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C6

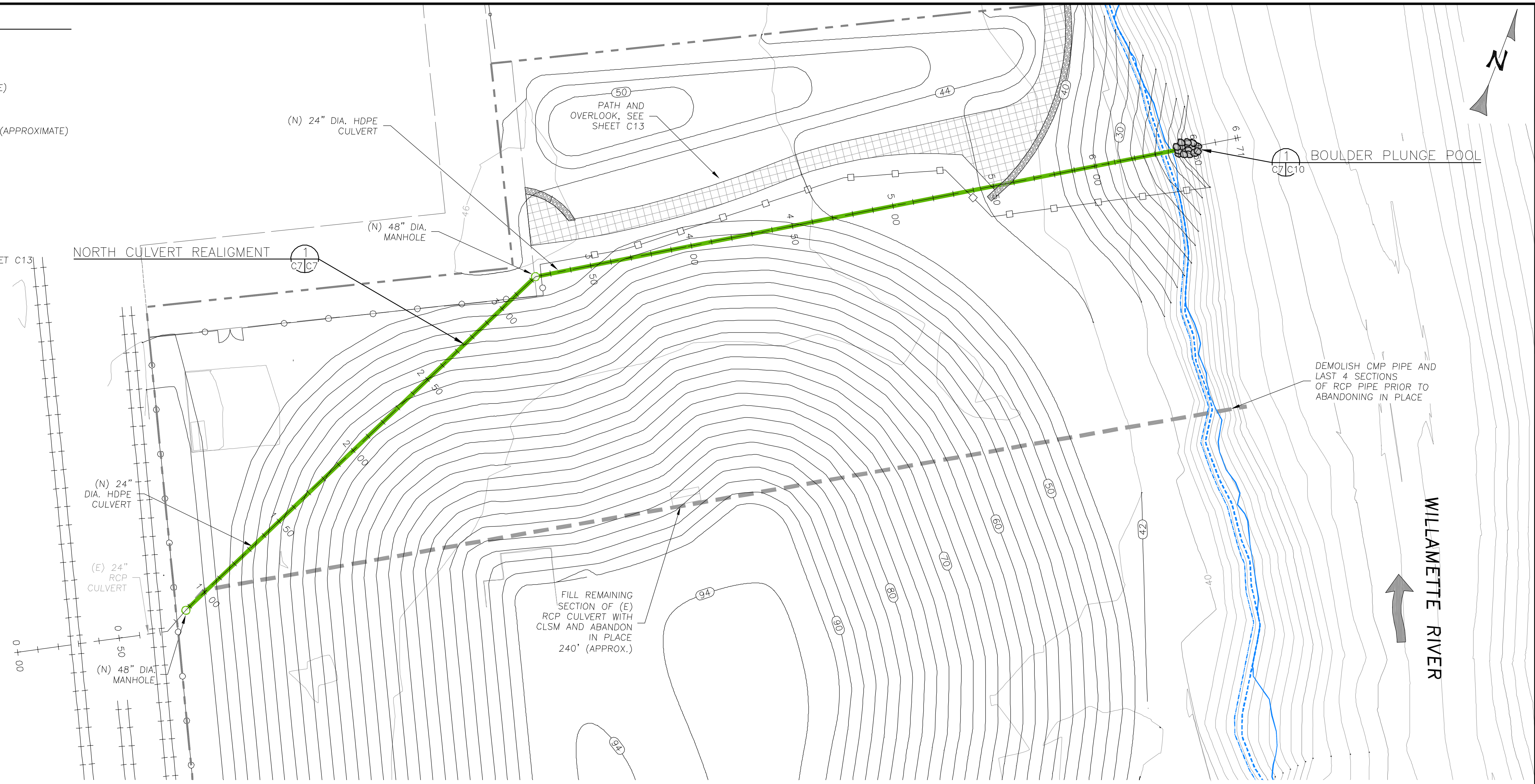
6 OF 21

## LEGEND

| | |
|---|---|
| 80 82 | (E) 2' CONTOURS |
| 100 102 | (N) 2' CONTOURS |
| ━ | (E) FEMA FLOODWAY (APPROXIMATE) |
| - - - | (N) 100-YEAR FEMA WSE |
| - - - | (N) CITY OF PORTLAND 1996 WSE (APPROXIMATE) |
| ┼┼┼┼ | (E) RAILROAD |
| — - — | PROJECT BOUNDARY |
| ━ | (E) CULVERT |
| 🟩 | (N) HDPE PIPE |
| ○ | (N) MANHOLE |
| ▨ | (N) PATH, SEE PATHWAY PLAN SHEET C13 |

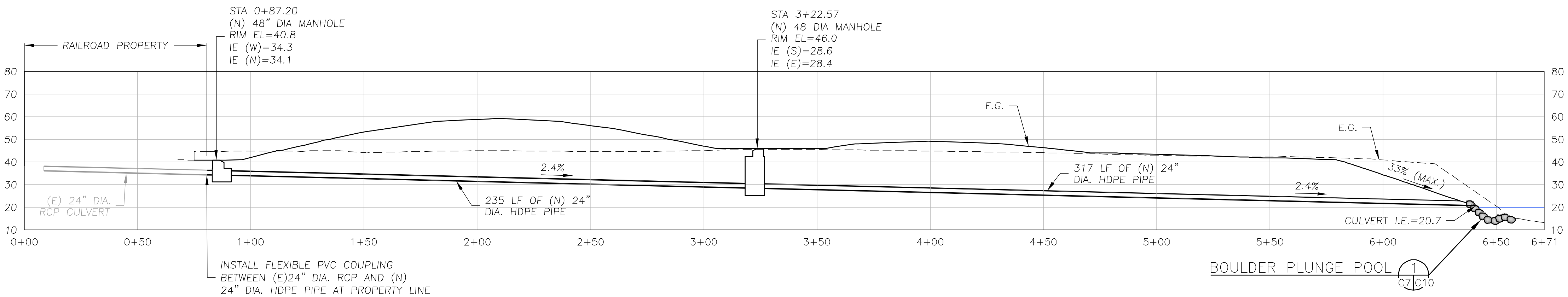
NOTES:

1. INSTALL MANHOLES PER OSD RD 335.
2. INSTALL HDPE PIPE PER OSD RD 300.



## NORTH CULVERT REALIGNMENT PLAN

SCALE: 1" = 30'



## NORTH CULVERT REALIGNMENT PROFILE

SCALE: 1" = 30'

1 C7 C7

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JAKE DYLAN HOFELD
EXPIRES: 6/30/2019

JAKE D. HOFELD

3/20/18
DATE

PREPARED AT THE REQUEST OF:

LINNTON WATER CREDITS, LLC

NORTH CULVERT REALIGNMENT PLAN AND PROFILE

LINNTON MITIGATION SITE
PHASE II - HABITAT RESTORATION
100% DESIGN SUBMITTAL

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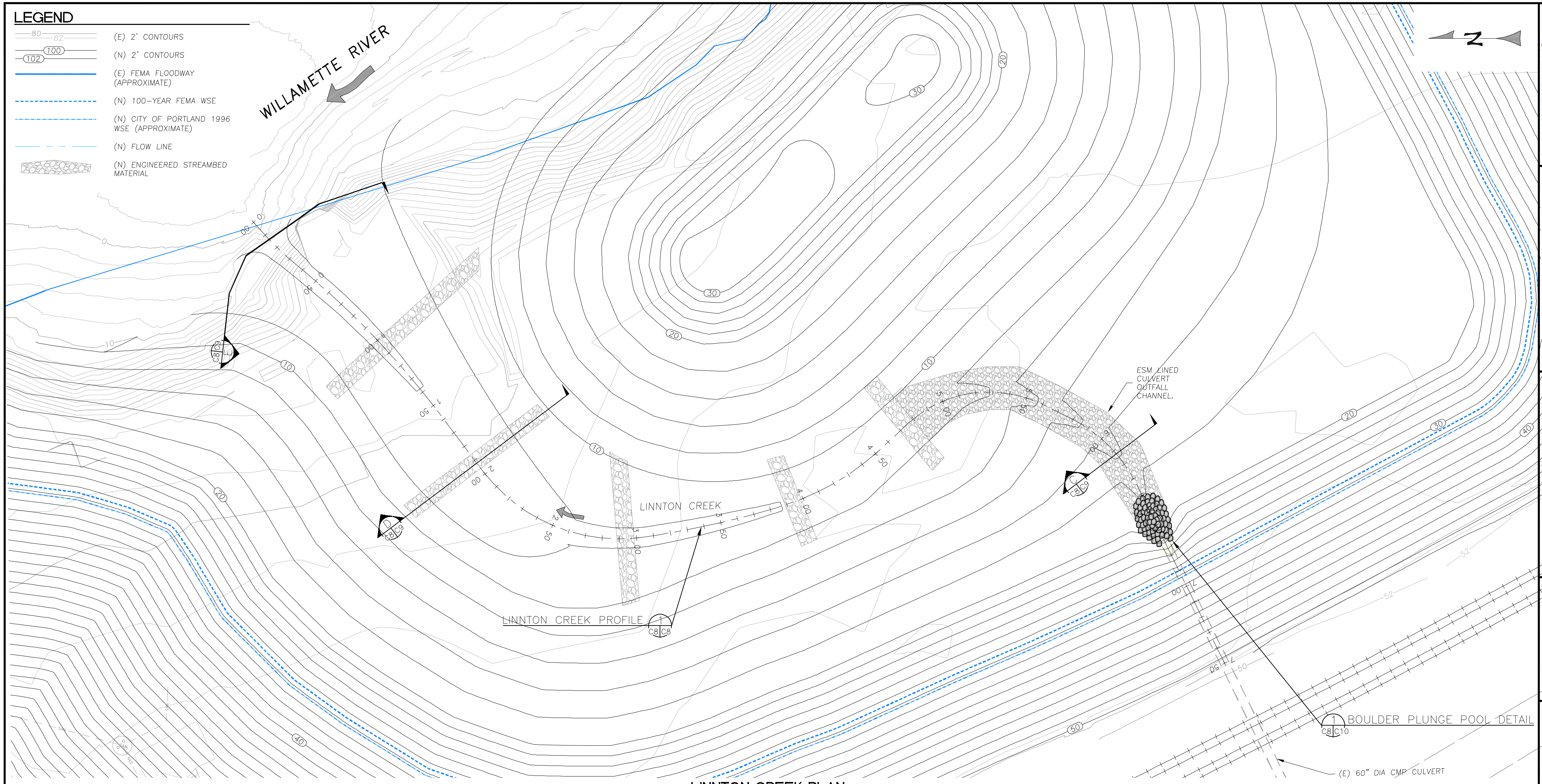
0 1"

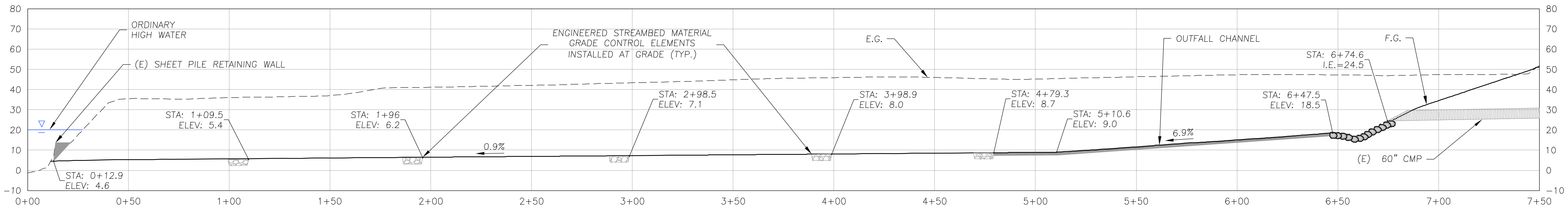
C7

7 OF 21



## LINNTON CREEK PLAN

SCALE: 1" = 30'



## LINNTON CREEK PROFILE

SCALE: 1" = 30'

1 C8 C8

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LINNTON MITIGATION SITE
PHASE II - HABITAT
RESTORATION
100% DESIGN SUBMITTAL

DESIGNED BY: J.H.
DRAWN BY: A.L./D.H.
CHECKED BY: J.H.
DATE: 03/20/18
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0 1"

LINNTON CREEK
PLAN AND
PROFILE

PREPARED AT THE REQUEST OF:

LINNTON WATER CREDITS, LLC

JAKE D. HOFELD
REGISTERED PROFESSIONAL ENGINEER
77870PE
OREGON
JANUARY 3, 2017
JAKE DYLAN HOFELD
EXPIRES: 6/30/2019

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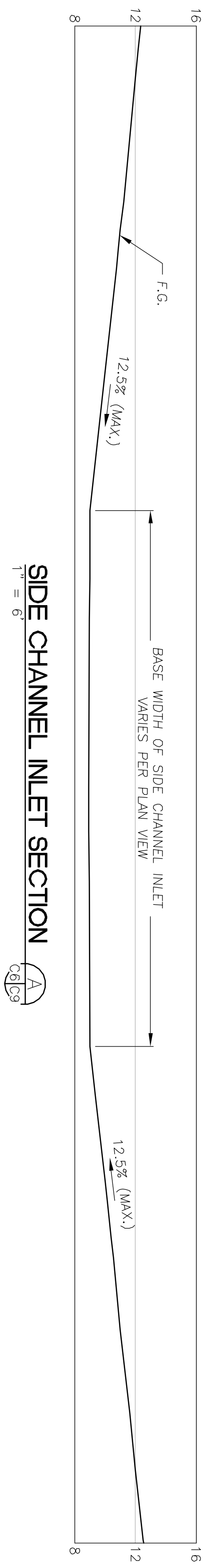
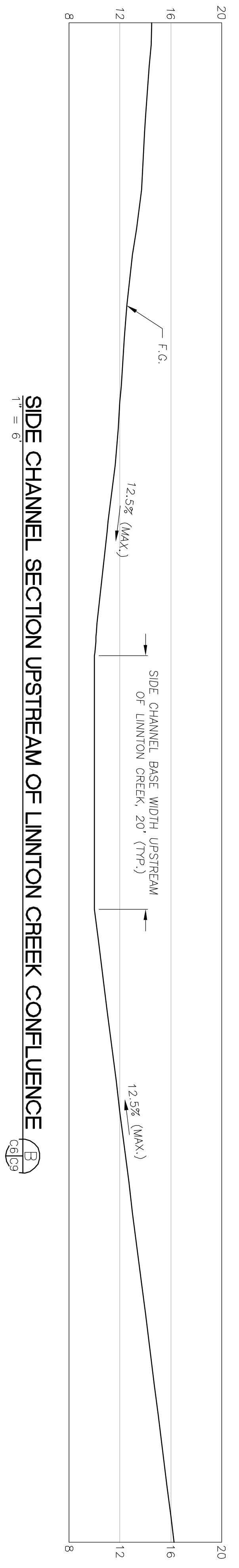
C8

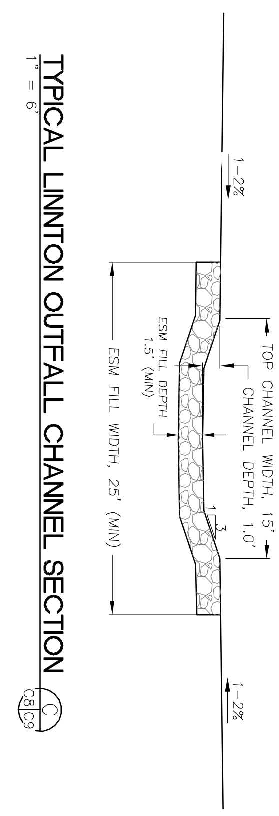
8
OF
21



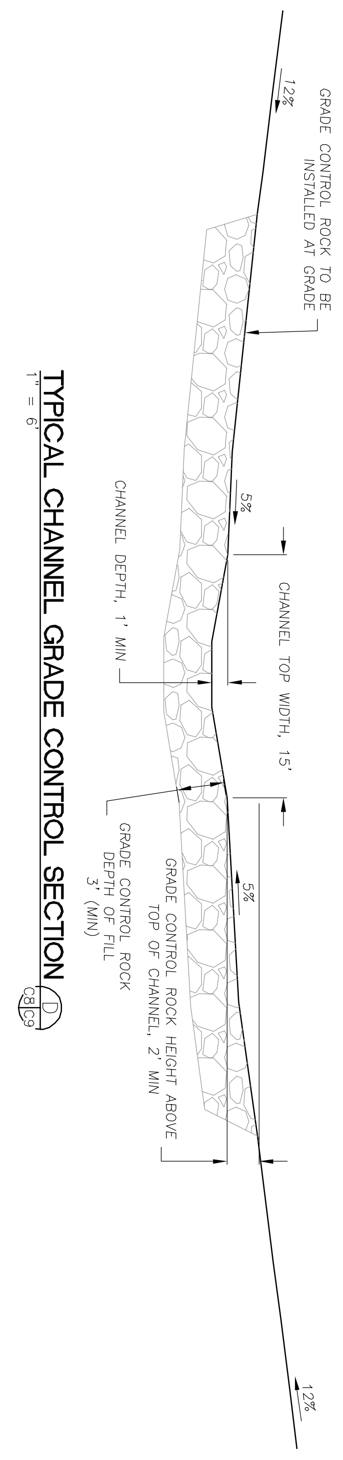
**SIDE CHANNEL INLET SECTION** A C6|C9
1" = 6'



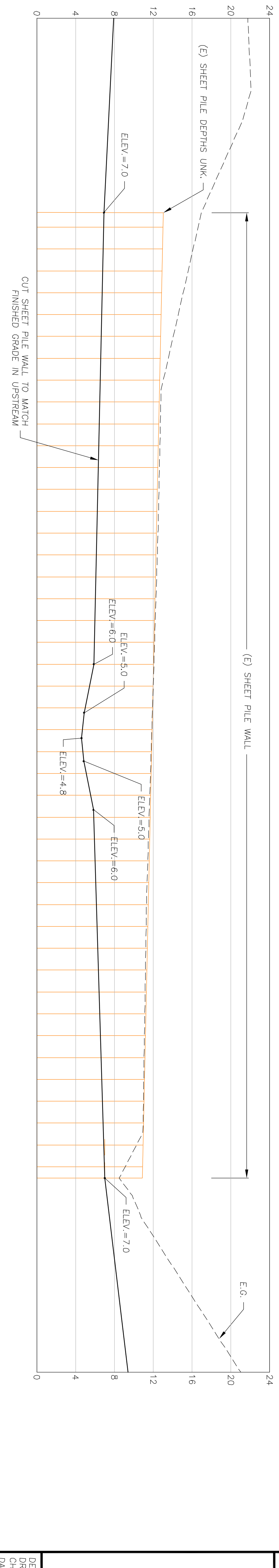
**SIDE CHANNEL SECTION UPSTREAM OF LINNTON CREEK CONFLUENCE** B C6|C9
1" = 6'



**TYPICAL LINNTON OUTFALL CHANNEL SECTION** C C8|C9
1" = 6'



**TYPICAL CHANNEL GRADE CONTROL SECTION** D C8|C9
1" = 6'



**SHEET PILE WALL MODIFICATIONS SECTION** E C8|C9
1" = 6'

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C9

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LINNTON MITIGATION SITE
PHASE II - HABITAT
RESTORATION
100% DESIGN SUBMITTAL

SECTIONS

PREPARED AT THE REQUEST OF:

LINNTON WATER CREDITS, LLC

Jake Hofeld
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REGISTERED PROFESSIONAL ENGINEER
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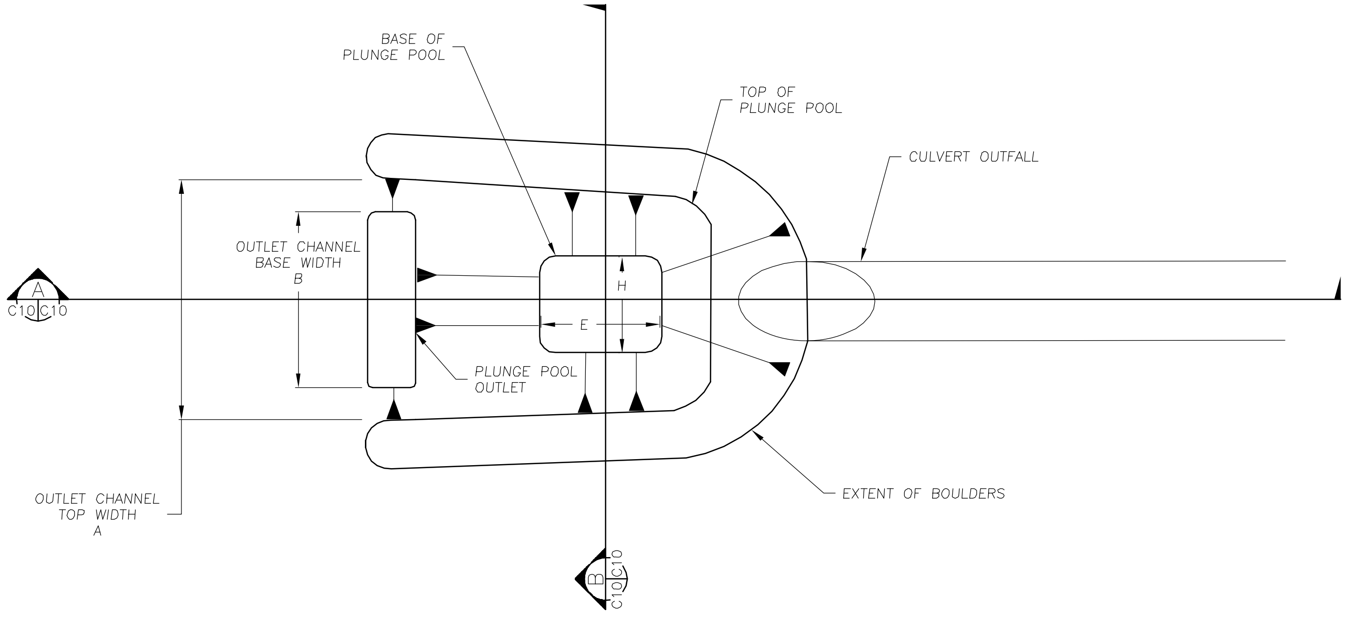
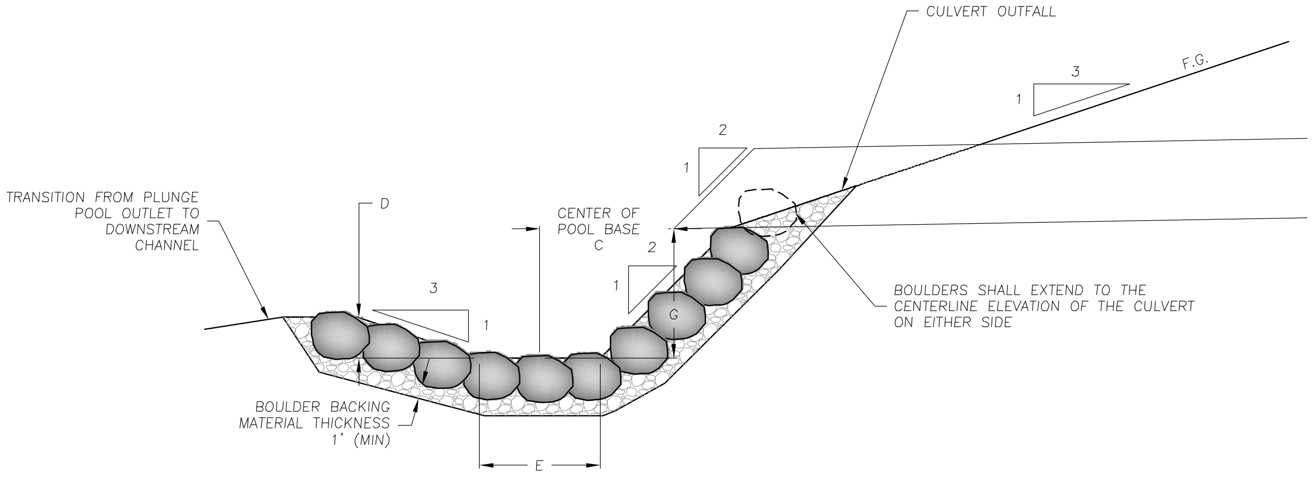
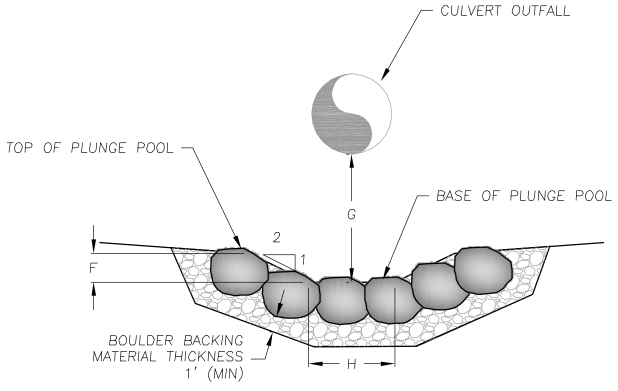


## PLAN VIEW
N.T.S.



## SECTION
N.T.S. A C10 C10

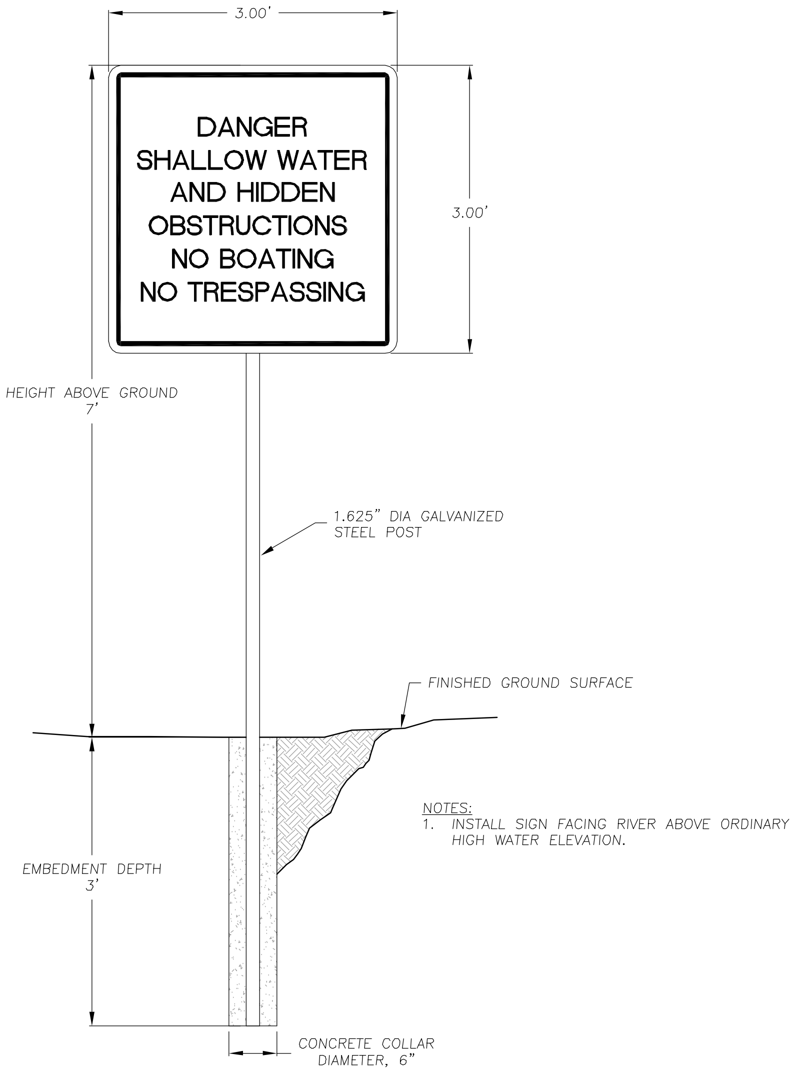


## SECTION
N.T.S. B C10 C10

|  | CULVERT OUTFALL DIMENSIONS, FT |  |
|---|---|---|
| VARIABLE | NORTH TRIBUTARY | LINNTON CREEK |
| A | 6 | 15 |
| B | 5.5 | 5.0 |
| C | 7.2 | 16.6 |
| D | 1.3 | 1.9 |
| E | 1.5 | 2.3 |
| F | 2.3 | 2.9 |
| G | 6 | 7.9 |
| H | 1.5 | 2.2 |

## PLUNGE POOL DIMENSIONS TABLE

## BOULDER PLUNGE POOL
N.T.S. 1 C7,C8 C10



NOTES:
1. INSTALL SIGN FACING RIVER ABOVE ORDINARY HIGH WATER ELEVATION.

## SIGNAGE
1" = 1' 2 C5,C6 C10

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JANUARY 3, 2017
JAKE DYLAN HOFELD
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3/20/18
DATE

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LINNTON WATER CREDITS, LLC

DETAILS

LINNTON MITIGATION SITE
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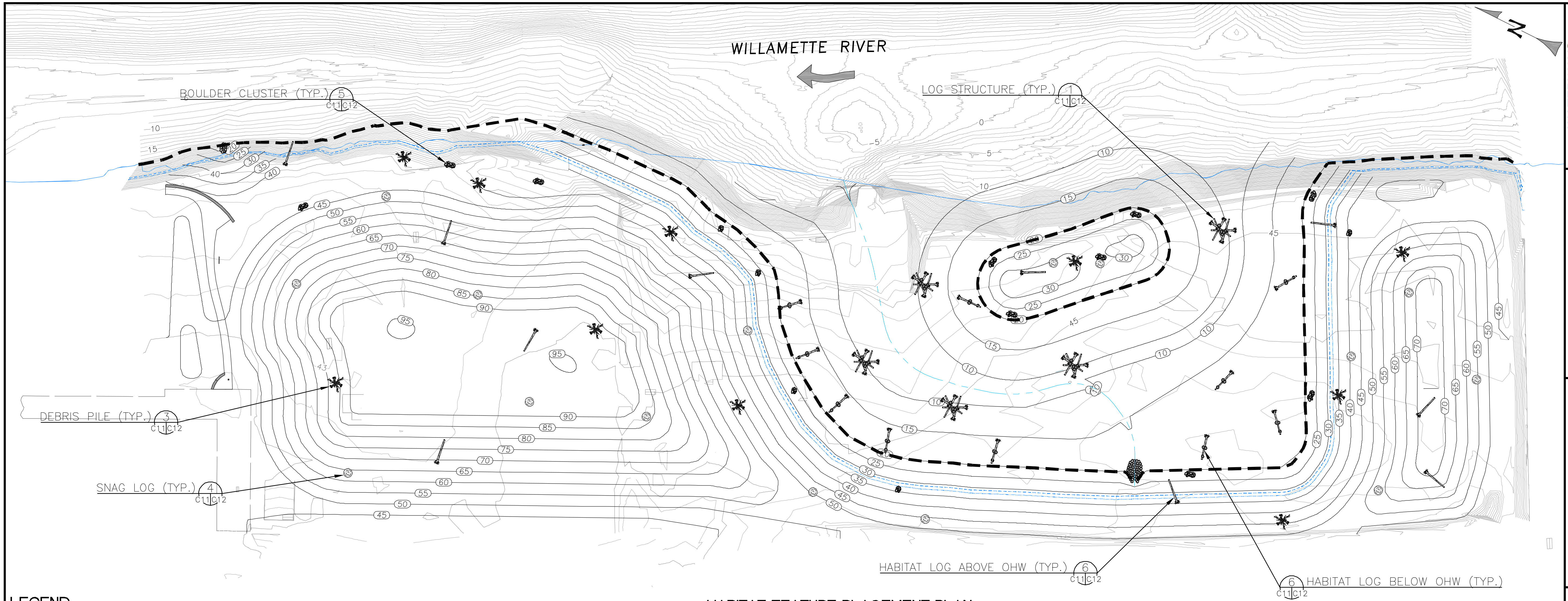
0 1"

C10
10 OF 21



## HABITAT FEATURE PLACEMENT PLAN

SCALE: 1" = 70'

## LEGEND

| | |
|---|---|
| 44 45 | (E) 1' CONTOURS |
| 100 | (N) 5' CONTOURS |
| | PROJECT BOUNDARY |
| | ORDINARY HIGH WATER (20.1') |
| | (E) FEMA FLOODWAY (APPROXIMATE) |
| | (N) 100-YEAR FEMA WSE |
| | (N) CITY OF PORTLAND 1996 WSE (APPROXIMATE) |
| | (N) HABITAT LOG BELOW OHW |
| | (N) HABITAT LOG ABOVE OHW |
| | (N) LOG STRUCTURE |
| | (N) SNAG LOG (N.T.S.) |
| | (N) BOULDER PILE |
| | (N) DEBRIS PILE |

## HABITAT FEATURE NOTES:

1. ALL HABITAT FEATURES INCLUDING LOGS, SNAGS, DEBRIS PILES, AND BOULDER CLUSTERS SHALL BE PLACED AT THE DIRECTION OF THE ENGINEER.

2. NO CABLES OR CHAINS SHALL BE USED IN THE CONSTRUCTION OF ANY HABITAT FEATURES SHOWN.

3. PLACEMENT LOCATIONS: LOG AND BOULDER LOCATIONS SHOWN ON DRAWINGS ARE APPROXIMATE. EXACT LOCATIONS SHALL BE AS DIRECTED BY THE ENGINEER IN THE FIELD. EXACT DIMENSIONS WILL VARY IN THE FIELD, DEPENDING ON WOOD SIZE, CONDITION, AND LOCAL SITE CONDITIONS.

4. LOGS: LOGS PLACED BELOW THE 100-YEAR WATER SURFACE ELEVATION OF 30.4' SHALL BE CEDAR, FIR, OR HEMLOCK, SOUND AND FREE OF SIGNIFICANT DECAY. NATIVE TREES, ROOTWADS, AND BRUSH SALVAGED DURING CLEARING AND GRUBBING OPERATIONS (INCLUDING ALDERS AND COTTONWOODS) SHALL BE USED FOR CONSTRUCTION OF DEBRIS PILES AND HABITAT LOGS ABOVE ORDINARY HIGH WATER. FOR GRAPHICAL CLARITY, MOST LOGS ARE SHOWN WITH BRANCHES OMITTED. HOWEVER, IT IS PREFERABLE THAT LOGS BE SUPPLIED WITH THE MAXIMUM NUMBER OF BRANCHES AND ROOTS INTACT TO ENHANCE PERFORMANCE OF THE HABITAT ELEMENTS.

5. BALLAST BOULDERS: BOULDERS WITHIN WILL BE SUB-ROUNDED TO SUB-ANGULAR WITH A MINIMUM WEIGHT OF 2.5 TONS (5,000 POUNDS).

6. MATERIAL QUANTITIES FOR HABITAT ELEMENTS BELOW ORDINARY HIGH WATER (15 ELEMENTS TOTAL):

6.1. MATERIALS IN EACH OF THE 5 LOG STRUCTURES SHALL MEET THE FOLLOWING CRITERIA:

| ITEM | DIAMETER* | LENGTH | # PER STRUCTURE | TOTAL (5 STRUCTURES) |
|---|---|---|---|---|
| LOGS W/ ROOTWADS | 18" – 30" | 30' – 40' | 4 | 20 |
| LOGS W/O ROOTWADS | 18" – 30" | 25' – 30' | 2 | 10 |
| PILING | 18" – 30" | 20' – 25' | 2 | 10 |
| BALLAST BOULDERS | – | – | 12 | 60 |
| PINNED LOG CONNECTIONS | – | – | 6 (MINIMUM) | 30 (MINIMUM) |

* MIN. 18 INCH DIAMETER AT ANY POINT ON LOG.

6.2. MATERIALS IN EACH OF THE 10 INDIVIDUAL HABITAT LOGS WITH BALLAST BOULDERS SHALL MEET THE FOLLOWING CRITERIA:

| ITEM | DIAMETER* | LENGTH | # PER STRUCTURE | TOTAL |
|---|---|---|---|---|
| LOGS W/ ROOTWADS | 18" – 30" | 30' – 40' | 1 | 10 |
| BALLAST BOULDERS | – | – | 3 | 30 (3 PER LOG) |

7. MATERIAL QUANTITIES FOR HABITAT ELEMENTS ABOVE ORDINARY HIGH WATER (50 ELEMENTS TOTAL):

| ITEM (QUANTITY) | DIAMETER* | LENGTH | # PER STRUCTURE | TOTAL |
|---|---|---|---|---|
| LOGS W/ ROOTWADS (10) | 18" – 30" | 30' – 40' | 1 | 10 |
| SNAG LOGS (15)* | 18" – 24" | 26' – 40' | 1 | 15 |
| BOULDER CLUSTERS (15) | ** | 8' – 15' | ** | 15 |
| DEBRIS PILES (10) | *** | *** | *** | 10 |

*A MINIMUM OF 3 SNAG LOGS SHALL BE 40' LONG. SNAG LOGS SHALL BE IN EARLY STAGES O DECAY WITH A MINIMUM OF 75% OF THE BARK ATTACHED TO THE TRUNK. ACCEPTABLE SPECIES INCLUDE DOUGLAS FIR, WESTERN RED CEDAR, BIG-LEAF MAPLE, OR BLACK COTTONWOOD.

**BOULDER CLUSTERS SHALL CONSIST OF COBBLES AND BOULDERS RANGING IN SIZE FROM 8" TO 36". ANGULAR ROCK IS ACCEPTABLE

***DEBRIS PILES SHALL CONSIST OF A MINIMUM OF 2 ROOTWADS COVERED LOOSELY WITH SLASH, BRANCHES, AND LOGS SALVAGED FROM THE PROJECT AREA DURING CLEARING AND GRUBBING OPERATIONS.

8. TOTAL # OF HABITAT ELEMENTS FOR THE SITE:

| ITEM | ACTIVE CHANNEL MARGIN (ACM) | OUTSIDE ACM | TOTAL |
|---|---|---|---|
| LOG STRUCTURES | 5 | – | 5 |
| HABITAT LOG W/ ROOTWADS | 10 | 10 | 20 |
| SNAG LOGS | – | 15 | 15 |
| BOULDER CLUSTERS | – | 15 | 15 |
| DEBRIS PILES | – | 10 | 10 |
| | | GRAND TOTAL = | 65 |

9. HABITAT ELEMENT COVERAGE DENSITIES:

| ZONES | ACRES | # OF HABITAT ELEMENTS | HABITAT ELEMENTS PER ACRE |
|---|---|---|---|
| ACM | 4.34 | 15 | 3.5 |
| OUTSIDE ACM | 14.33 | 50 | 3.5 |

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JAKE D. HOFELD
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OREGON
EXPIRES: 6/30/2019
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PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS, LLC

HABITAT FEATURE PLACEMENT PLAN

LINNTON MITIGATION SITE
PHASE II - HABITAT RESTORATION
100% DESIGN SUBMITTAL

DESIGNED BY: J.H.
DRAWN BY: A.L./D.H.
CHECKED BY: J.H.
DATE: 03/20/18
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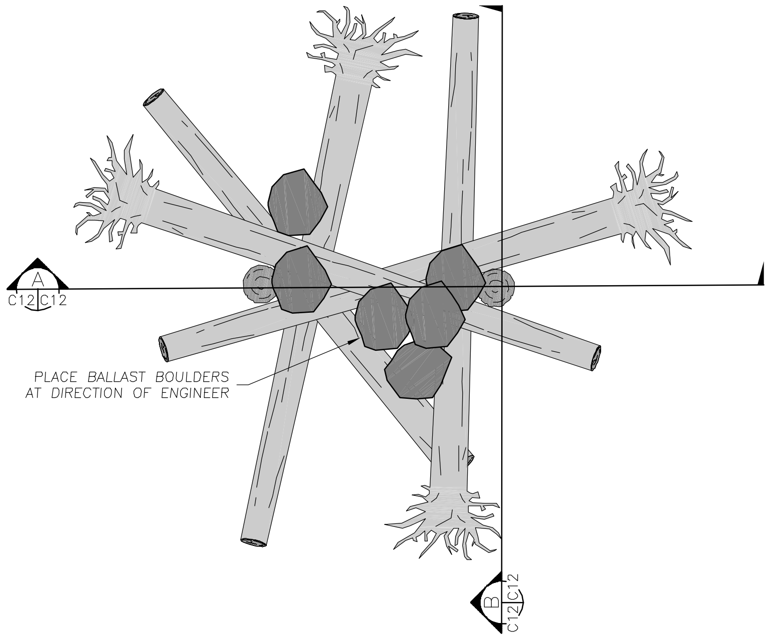
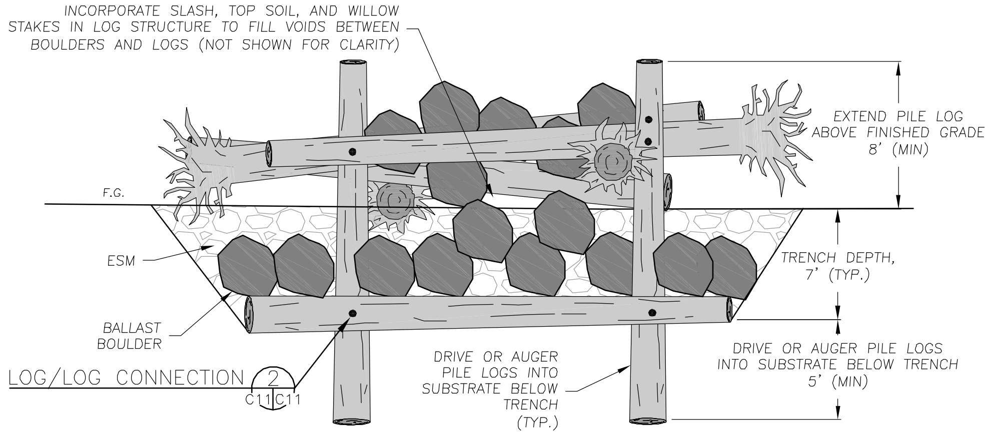
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C11

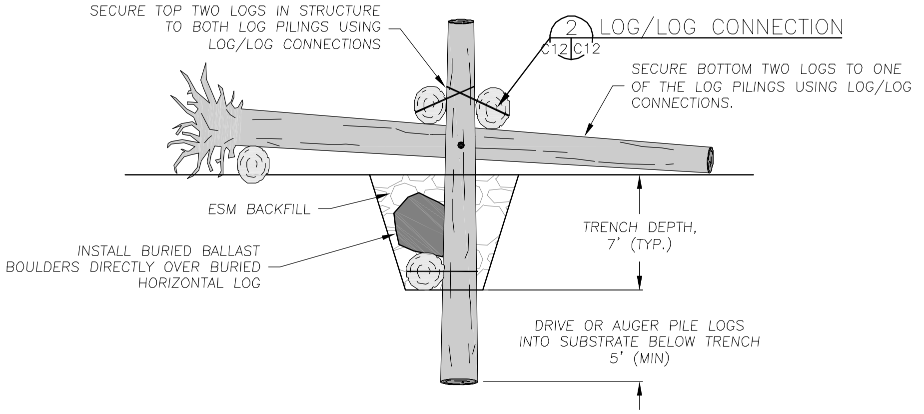
11 OF 21



## PLAN VIEW
SCALE: 1" = 6'

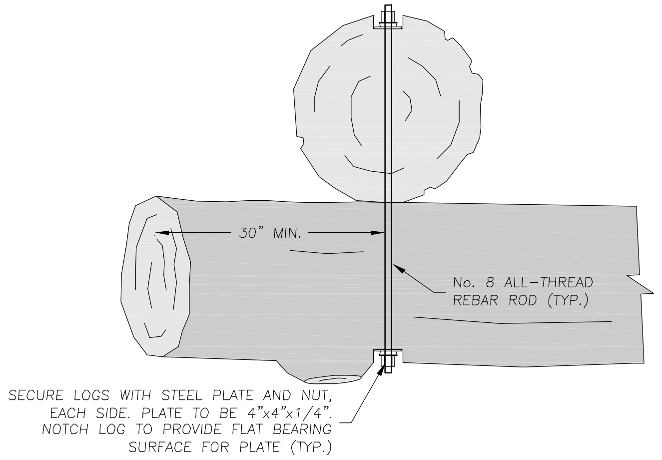


## SECTION A
SCALE: 1" = 6' C12 C12

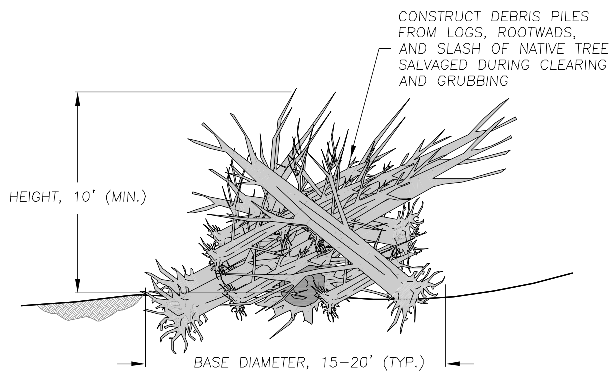


## SECTION B
SCALE: 1" = 6' C12 C12

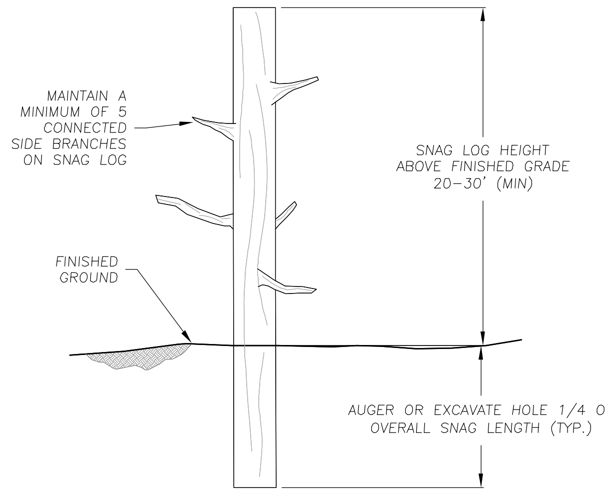
## LOG STRUCTURE 1
SCALE: 1" = 6' C11 C12



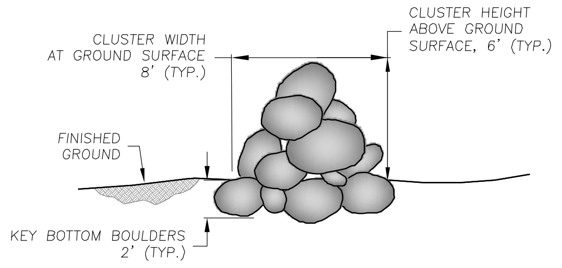
## LOG/LOG CONNECTION 2
SCALE: 1" = 1' C11 C12



## DEBRIS PILES 3
SCALE: 1" = 5' C11 C12



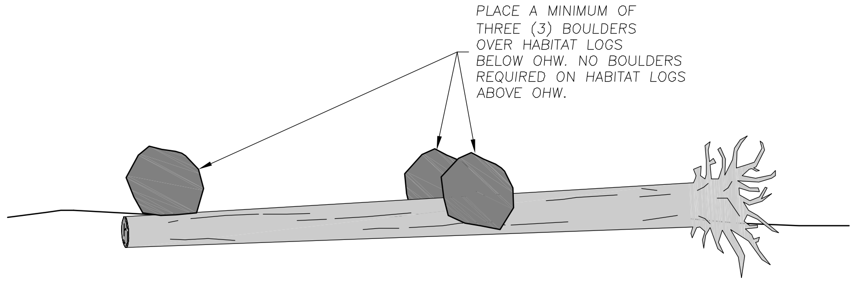
## SNAG LOG 4
SCALE: 1" = 5' C11 C12



## BOULDER CLUSTER 5
SCALE: 1" = 5' C11 C12

NOTES:

1. MINIMUM ROCK DIAMETER FOR BOULDER CLUSTER CONSTRUCTION IS 8".
2. ANGULAR BOULDERS ARE ACCEPTABLE FOR USE IN BOULDER CLUSTERS.
3. BOULDER CLUSTER LENGTHS VARY PER HABITAT PLACEMENT PLAN.
4. STACK BOULDERS IN A MANNER TO MAXIMIZE THE NUMBER OF 3" TO 6" DIAMETER VOID SPACES.



## HABITAT LOG 6
SCALE: 1" = 5' C11 C12

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3/20/18
DATE

REGISTERED PROFESSIONAL ENGINEER
77870PE
OREGON
JANUARY 3, 2011
JAKE DYLAN HOFELD
EXPIRES: 6/30/2019

PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS, LLC

HABITAT FEATURE DETAILS

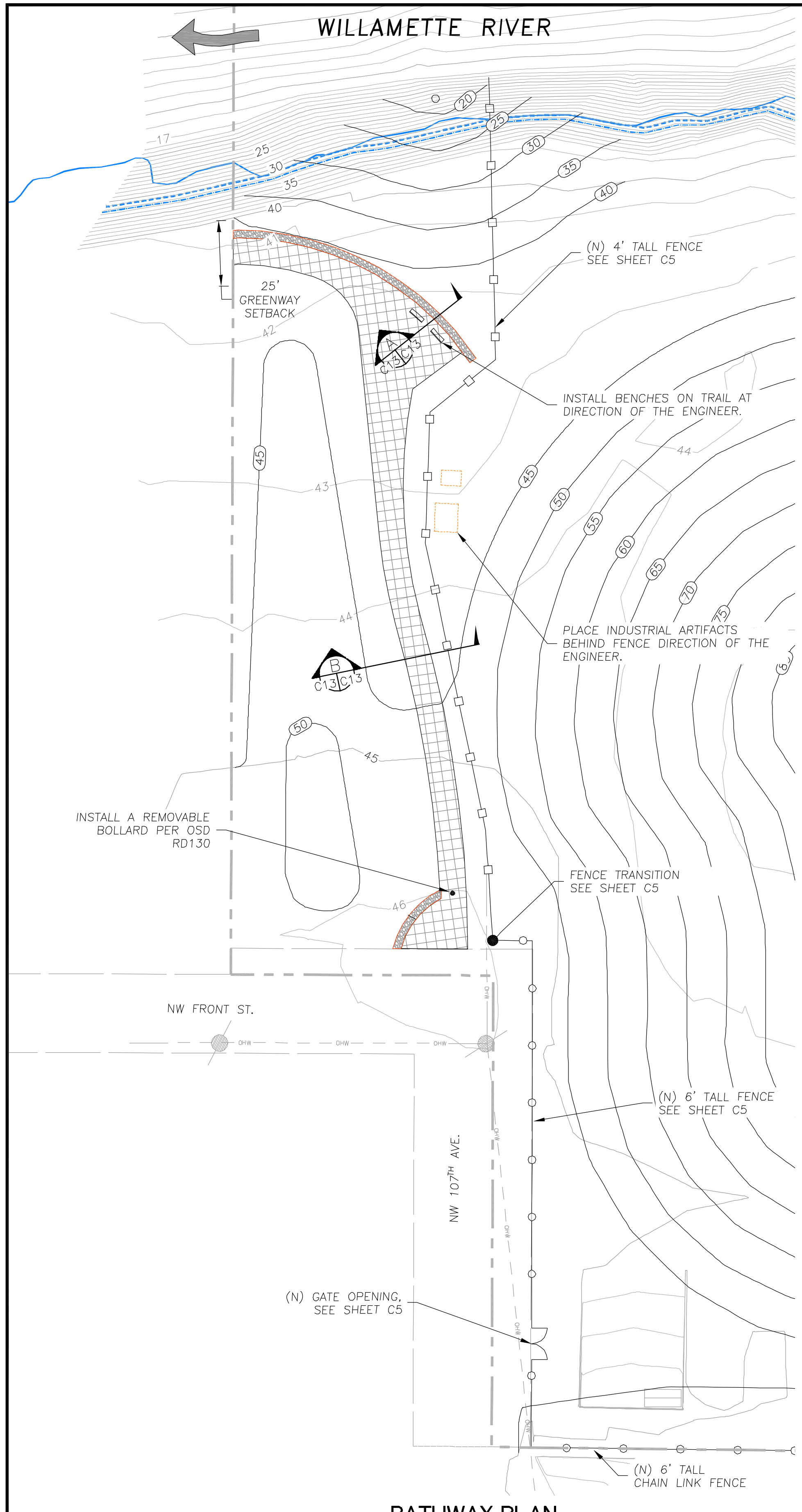
LINNTON MITIGATION SITE
PHASE II - HABITAT RESTORATION
100% DESIGN SUBMITTAL

DESIGNED BY: J.H.
DRAWN BY: A.L./D.H.
CHECKED BY: J.H.
DATE: 03/20/18
JOB NO.: 13-044

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C12

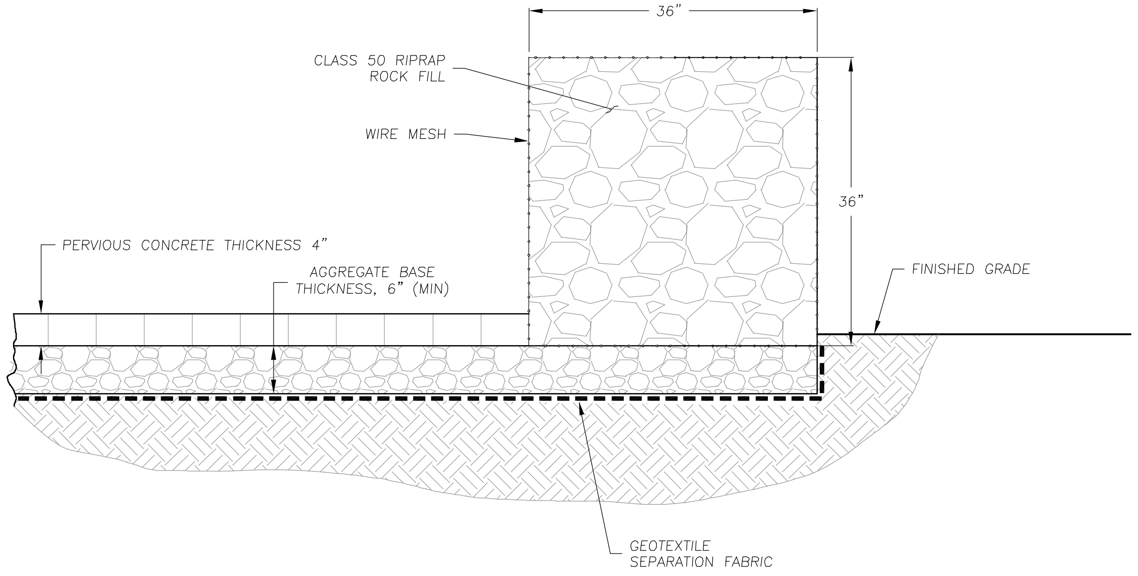
FINAL HDP - December 4, 2018



## PATHWAY PLAN
SCALE: 1" = 30'

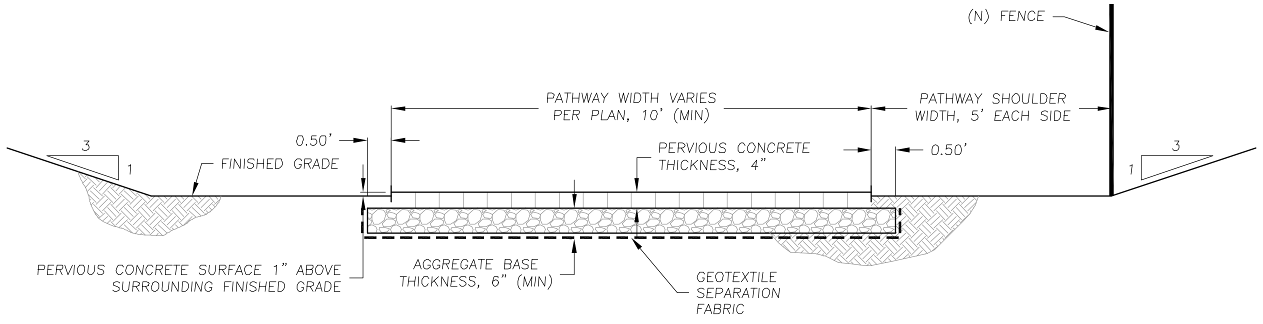
## LEGEND

| | |
|---|---|
| 44 45 | (E) 1' CONTOURS |
| 100 | PROPOSED 5' CONTOURS |
| — | (E) FEMA FLOODWAY (APPROXIMATE) |
| - - - | (N) 100-YEAR FEMA WSE |
| - - - | (N) 1996 FLOOD WSE (APPROXIMATE) |
| ┼┼┼ | (E) RAILROAD |
| — - — | PROJECT BOUNDARY |
| — | (E) ROADWAYS |
| □ | (N) 4' TALL CHAIN LINK FENCE |
| ○ | (N) 6' TALL CHAIN LINK FENCE |
| ▨ | (N) GABION WALL |
| ▦ | (N) PERVIOUS CONCRETE |
| ░ | (E) ASPHALT |



## TYPICAL GABION WALL SECTION
SCALE: 1" = 1'

A C13 C13



## TYPICAL PATHWAY SECTION
SCALE: 1" = 2'

B C13 C13

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
| △ | 3/20/18 | COP PERMIT REVISIONS | J.D.H. |

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Grette Associates LLC
ENVIRONMENTAL CONSULTANTS
151 South Worthen, Suite 101
Wenatchee, WA 98801
(509) 663-6300 | www.gretteassociates.com

REGISTERED PROFESSIONAL ENGINEER
77870PE
OREGON
JANUARY 3, 2017
JAKE DYLAN HOFELD
EXPIRES: 6/30/2019

JAKE D. HOFELD
3/20/18
DATE

PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS, LLC

PATHWAY PLAN AND SECTIONS

LINNTON MITIGATION SITE
PHASE II - HABITAT RESTORATION
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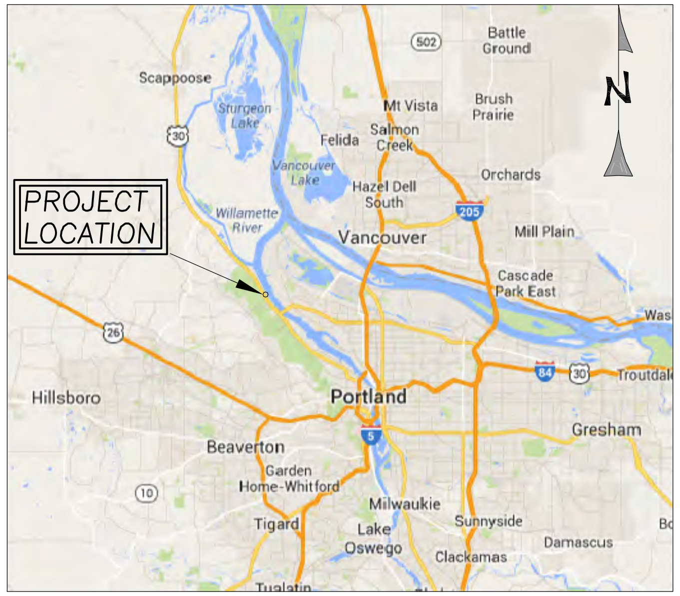
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C13

13 OF 21

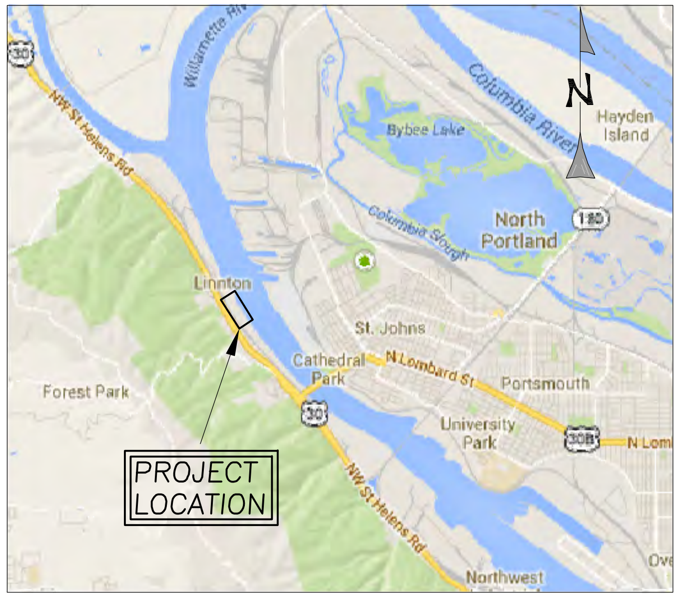
# LINNTON MITIGATION SITE - PHASE 2 HABITAT RESTORATION

## EROSION AND SEDIMENT CONTROL PLAN (ESCP)



## REGIONAL MAP

N.T.S. (GOOGLE)



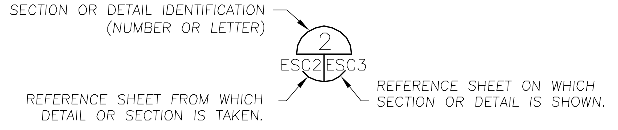
## VICINITY MAP

N.T.S. (GOOGLE)

## SHEET INDEX

| | |
|---|---|
| ESC1 | COVER SHEET |
| ESC2 | POST PHASE 1 DEMOLITION CONDITIONS |
| ESC3 | PHASE 2 DEMOLITION PLAN |
| ESC4 | GRADING AND DEWATERING PLAN |
| ESC5 | SEEDING AND PERMANENT EROSION CONTROL PLAN |
| ESC6 | DETAILS |

## SECTION AND DETAIL CONVENTION



## DEVELOPER

DEVELOPER/COMPANY: LINNTON WATER CREDITS, LLC
CONTACT: ROBERT MARINAI
337 17TH STREET, SUITE 200
OAKLAND, CALIFORNIA 94612
PHONE: 510-326-7131
FAX: 510-832-3414

## ENGINEERING FIRM

WATERWAYS CONSULTING, INC.
CONTACT: JAKE D. HOFELD, P.E.
1020 SW TAYLOR ST, SUITE 380
PORTLAND, OR 97205
PHONE: 503-227-5979
EMAIL: JAKEH@WATWAYS.COM

## PROJECT LOCATION:

10504 NW SAINT HELENS ROAD
PORTLAND, OR 97231
LATITUDE = 45.597377
LONGITUDE = -122.782595

## PROPERTY DESCRIPTION:

TAX LOTS: LOCATED IN THE SOUTHWEST 1/4 OF SECTION 2, TOWNSHIP 1 NORTH, RANGE 1 WEST (MULTNOMAH COUNTY TAX MAPS)
TAX LOT 100 = 21.15 ACRES
TAX LOT 800 = 0.91 ACRES

## NARRATIVE DESCRIPTIONS

*EXISTING SITE CONDITIONS*

*FORMER PLYWOOD MILL AT NORTHERN PORTION OF SITE AND GRAVEL YARD AT SOUTHERN END. UPLAND STRUCTURES DEMOLISHED TO CONCRETE FOUNDATIONS OR ASPHALT PAVEMENT.

*DEVELOPED CONDITIONS*

*RESTORED UPLAND AND OFF-CHANNEL HABITAT WITH A PUBLIC ACCESS TRAIL AT THE NORTH END OF THE PROJECT.

*NATURE OF CONSTRUCTION ACTIVITY AND ESTIMATED TIME TABLE*

* PHASE 2 HABITAT RESTORATION: MAY 2018 - DEC 2019

TOTAL DISTURBED AREA = 960934 SF (22.06 ACRES)

*SITE SOIL CLASSIFICATION:*

50A - URBAN LAND, 0 TO 3 PERCENT SLOPES

*RECEIVING WATER BODIES:*

NEAREST WATER BODY: WILLAMETTE RIVER

## PERMITTEE'S SITE INSPECTOR:

INSPECTOR: DEANNA HUTCHINSON, P.E., CESCL
COMPANY/AGENCY: WATERWAYS CONSULTING, INC.
PHONE: 503-227-5979
FAX: 888-819-6847
E-MAIL: DEANNA@WATWAYS.COM
DESCRIPTION OF EXPERIENCE: CESCL CERTIFIED WITH CONSTRUCTION AND EROSION CONTROL MEASURE INSPECTION FOR SEVERAL RESTORATION PROJECTS WITHIN OREGON.

## ATTENTION EXCAVATORS:

OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THESE RULES FROM THE CENTER BY CALLING 503-232-1987. IF YOU HAVE ANY QUESTIONS ABOUT THE RULES, YOU MAY CONTACT THE CENTER. YOU MUST NOTIFY THE CENTER AT LEAST TWO BUSINESS DAYS, BEFORE COMMENCING AN EXCAVATION. CALL 503-246-6699.

## STANDARD EROSION AND SEDIMENT CONTROL PLAN DRAWING NOTES:

1. ALL PERMIT REGISTRANTS MUST IMPLEMENT THE ESCP. FAILURE TO IMPLEMENT ANY OF THE CONTROL MEASURES OR PRACTICES DESCRIBED IN THE ESCP IS A VIOLATION OF THE PERMIT. (SCHEDULE A 8.A)
2. THE ESCP MEASURES SHOWN ON THIS PLAN ARE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, UPGRADE THESE MEASURES AS NEEDED TO COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL EROSION AND SEDIMENT CONTROL REGULATIONS. (SCHEDULE A.8.C.II.(1)(C))
3. SUBMISSION OF ALL ESCP REVISIONS IS NOT REQUIRED. SUBMITTAL OF THE ESCP REVISIONS IS ONLY UNDER SPECIFIC CONDITIONS. SUBMIT ALL NECESSARY REVISIONS TO DEQ OR AGENT. (SCHEDULE A.12.C.III)
4. PHASE CLEARING AND GRADING TO THE MAXIMUM EXTENT PRACTICAL TO PREVENT EXPOSED INACTIVE AREAS FROM BECOMING A SOURCE OF EROSION. (SCHEDULE A.8.C.II.(1)(D))
5. IDENTIFY, MARK, AND PROTECT (BY FENCING OFF OR OTHER MEANS) CRITICAL RIPARIAN AREAS AND VEGETATION INCLUDING IMPORTANT TREES AND ASSOCIATED ROOTING ZONES, AND VEGETATION AREAS TO BE PRESERVED. IDENTIFY VEGETATIVE BUFFER ZONES BETWEEN THE SITE AND SENSITIVE AREAS (E.G., WETLANDS), AND OTHER AREAS TO BE PRESERVED, ESPECIALLY IN PERIMETER AREAS. (SCHEDULE A.8.C.I.(1) & (2))
6. PRESERVE EXISTING VEGETATION WHEN PRACTICAL AND RE-VEGETATE OPEN AREAS. RE-VEGETATE OPEN AREAS WHEN PRACTICABLE BEFORE AND AFTER GRADING OR CONSTRUCTION. IDENTIFY THE TYPE OF VEGETATIVE SEED MIX USED. (SCHEDULE A.7.B.III(1) AND A.7.B.III(3))
7. EROSION AND SEDIMENT CONTROL MEASURES INCLUDING PERIMETER SEDIMENT CONTROL MUST BE IN PLACE BEFORE VEGETATION IS DISTURBED AND MUST REMAIN IN PLACE AND BE MAINTAINED, REPAIRED, AND PROMPTLY IMPLEMENTED FOLLOWING PROCEDURES ESTABLISHED FOR THE DURATION OF CONSTRUCTION, INCLUDING PROTECTION FOR ACTIVE STORM DRAIN INLETS AND CATCH BASINS AND APPROPRIATE NON-STORMWATER POLLUTION CONTROLS. (SCHEDULE A.7.D.I AND A.8.C)
8. ESTABLISH CONCRETE TRUCK AND OTHER CONCRETE EQUIPMENT WASHOUT AREAS BEFORE BEGINNING CONCRETE WORK. (SCHEDULE A.8.C.I.(6))
9. APPLY TEMPORARY AND/OR PERMANENT SOIL STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS AS GRADING PROGRESSES AND FOR ALL ROADWAYS INCLUDING GRAVEL ROADWAYS. (SCHEDULE A.8.C.II.(2))
10. ESTABLISH MATERIAL AND WASTE STORAGE AREAS, AND OTHER NON-STORMWATER CONTROLS. (SCHEDULE A.8.C.I.(7))
11. PREVENT TRACKING OF SEDIMENT ONTO PUBLIC OR PRIVATE ROADS USING BMPS SUCH AS: GRAVELED (OR PAVED) EXITS AND PARKING AREAS, GRAVEL ALL UNPAVED ROADS LOCATED ONSITE, OR USE AN EXIT TIRE WASH. THESE BMPS MUST BE IN PLACE PRIOR TO LAND-DISTURBING ACTIVITIES. (SCHEDULE A 7.D.II.(1) AND A.8.C.I(4))
12. WHEN TRUCKING SATURATED SOILS FROM THE SITE, EITHER USE WATER-TIGHT TRUCKS OR DRAIN LOADS ON SITE. (SCHEDULE A.7.D.II.(3))
13. USE BMPS TO PREVENT OR MINIMIZE STORMWATER EXPOSURE TO POLLUTANTS FROM SPILLS; VEHICLE AND EQUIPMENT FUELING, MAINTENANCE, AND STORAGE; OTHER CLEANING AND MAINTENANCE ACTIVITIES; AND WASTE HANDLING ACTIVITIES. THESE POLLUTANTS INCLUDE FUEL, HYDRAULIC FLUID, AND OTHER OILS FROM VEHICLES AND MACHINERY, AS WELL AS DEBRIS, LEFTOVER PAINTS, SOLVENTS, AND GLUES FROM CONSTRUCTION OPERATIONS. (SCHEDULE A.7.E.I.(2))
14. IMPLEMENT THE FOLLOWING BMPS WHEN APPLICABLE: WRITTEN SPILL PREVENTION AND RESPONSE PROCEDURES, EMPLOYEE TRAINING ON SPILL PREVENTION AND PROPER DISPOSAL PROCEDURES, SPILL KITS IN ALL VEHICLES, REGULAR MAINTENANCE SCHEDULE FOR VEHICLES AND MACHINERY, MATERIAL DELIVERY AND STORAGE CONTROLS, TRAINING AND SIGNAGE, AND COVERED STORAGE AREAS FOR WASTE AND SUPPLIES. (SCH A 7.E.III.)
15. USE WATER, SOIL-BINDING AGENT OR OTHER DUST CONTROL TECHNIQUE AS NEEDED TO AVOID WIND-BLOWN SOIL. (SCHEDULE A 7.B.II)
16. THE APPLICATION RATE OF FERTILIZERS USED TO REESTABLISH VEGETATION MUST FOLLOW MANUFACTURER'S RECOMMENDATIONS TO MINIMIZE NUTRIENT RELEASES TO SURFACE WATERS. EXERCISE CAUTION WHEN USING TIME-RELEASE FERTILIZERS WITHIN ANY WATERWAY RIPARIAN ZONE. (SCHEDULE A.9.B.III)
17. IF A STORMWATER TREATMENT SYSTEM (FOR EXAMPLE, ELECTRO-COAGULATION, FLOCCULATION, FILTRATION, ETC.) FOR SEDIMENT OR OTHER POLLUTANT REMOVAL IS EMPLOYED, SUBMIT AN OPERATION AND MAINTENANCE PLAN (INCLUDING SYSTEM SCHEMATIC, LOCATION OF SYSTEM, LOCATION OF INLET, LOCATION OF DISCHARGE, DISCHARGE DISPERSION DEVICE DESIGN, AND A SAMPLING PLAN AND FREQUENCY) BEFORE OPERATING THE TREATMENT SYSTEM. OBTAIN PLAN APPROVAL BEFORE OPERATING THE TREATMENT SYSTEM. OPERATE AND MAINTAIN THE TREATMENT SYSTEM ACCORDING TO MANUFACTURER'S SPECIFICATIONS. (SCHEDULE A.9.D)
18. TEMPORARILY STABILIZE SOILS AT THE END OF THE SHIFT BEFORE HOLIDAYS AND WEEKENDS, IF NEEDED. THE REGISTRANT IS RESPONSIBLE FOR ENSURING THAT SOILS ARE STABLE DURING RAIN EVENTS AT ALL TIMES OF THE YEAR. (SCHEDULE A 7.B)
19. AT THE END OF EACH WORKDAY SOIL STOCKPILES MUST BE STABILIZED OR COVERED, OR OTHER BMPS MUST BE IMPLEMENTED TO PREVENT DISCHARGES TO SURFACE WATERS OR CONVEYANCE SYSTEMS LEADING TO SURFACE WATERS. (SCHEDULE A 7.E.II.(2))
20. CONSTRUCTION ACTIVITIES MUST AVOID OR MINIMIZE EXCAVATION AND CREATION OF BARE GROUND DURING WET WEATHER. (SCHEDULE A.7.A.I)
21. SEDIMENT FENCE: REMOVE TRAPPED SEDIMENT BEFORE IT REACHES ONE THIRD OF THE ABOVE GROUND FENCE HEIGHT AND BEFORE FENCE REMOVAL. (SCHEDULE A.9.C.I)
22. OTHER SEDIMENT BARRIERS (SUCH AS BIOBAGS): REMOVE SEDIMENT BEFORE IT REACHES TWO INCHES DEPTH ABOVE GROUND HEIGHT. AND BEFORE BMP REMOVAL. (SCHEDULE A.9.C.II)
23. CATCH BASINS: CLEAN BEFORE RETENTION CAPACITY HAS BEEN REDUCED BY FIFTY PERCENT. SEDIMENT BASINS AND SEDIMENT TRAPS: REMOVE TRAPPED SEDIMENTS BEFORE DESIGN CAPACITY HAS BEEN REDUCED BY FIFTY PERCENT AND AT COMPLETION OF PROJECT. (SCHEDULE A.9.C.III & IV)
24. WITHIN 24 HOURS, SIGNIFICANT SEDIMENT THAT HAS LEFT THE CONSTRUCTION SITE, MUST BE REMEDIATED. INVESTIGATE THE CAUSE OF THE SEDIMENT RELEASE AND IMPLEMENT STEPS TO PREVENT A RECURRENCE OF THE DISCHARGE WITHIN THE SAME 24 HOURS. ANY IN-STREAM CLEAN UP OF SEDIMENT SHALL BE PERFORMED ACCORDING TO THE OREGON DIVISION OF STATE LANDS REQUIRED TIMEFRAME. (SCHEDULE A.9.B.I)
25. THE INTENTIONAL WASHING OF SEDIMENT INTO STORM SEWERS OR DRAINAGE WAYS MUST NOT OCCUR. VACUUMING OR DRY SWEEPING AND MATERIAL PICKUP MUST BE USED TO CLEANUP RELEASED SEDIMENTS. (SCHEDULE A.9.B.II)
26. THE ENTIRE SITE MUST BE TEMPORARILY STABILIZED USING VEGETATION OR A HEAVY MULCH LAYER, TEMPORARY SEEDING, OR OTHER METHOD SHOULD ALL CONSTRUCTION ACTIVITIES CEASE FOR 30 DAYS OR MORE. (SCHEDULE A.7.F.I)
27. PROVIDE TEMPORARY STABILIZATION FOR THAT PORTION OF THE SITE WHERE CONSTRUCTION ACTIVITIES CEASE FOR 14 DAYS OR MORE WITH A COVERING OF BLOWN STRAW AND A TACKIFIER, LOOSE STRAW, OR AN ADEQUATE COVERING OF COMPOST MULCH UNTIL WORK RESUMES ON THAT PORTION OF THE SITE. (SCHEDULE A.7.F.II)
28. PROVIDE PERMANENT EROSION CONTROL MEASURES ON ALL EXPOSED AREAS. DO NOT REMOVE TEMPORARY SEDIMENT CONTROL PRACTICES UNTIL PERMANENT VEGETATION OR OTHER COVER OF EXPOSED AREAS IS ESTABLISHED. HOWEVER, DO REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AS EXPOSED AREAS BECOME STABILIZED, UNLESS DOING SO CONFLICTS WITH LOCAL REQUIREMENTS. PROPERLY DISPOSE OF CONSTRUCTION MATERIALS AND WASTE, INCLUDING SEDIMENT RETAINED BY TEMPORARY BMPS. (SCHEDULE A.7.B.III(2) AND A.8.C.III)

## INSPECTION FREQUENCY:

| SITE CONDITION | MINIMUM FREQUENCY |
|---|---|
| 1. ACTIVE PERIOD | DAILY BETWEEN OCTOBER 1 AND APRIL 30 OR WHEN STORMWATER RUNOFF, INCLUDING RUNOFF FROM SNOWMELT, IS OCCURRING.<br>AT LEAST ONCE EVERY TWO (2) WEEKS REGARDLESS OF WHETHER STORMWATER RUNOFF IS OCCURRING BETWEEN MAY 1 AND SEPTEMBER 30. |
| 2. PRIOR TO THE SITE BECOMING INACTIVE OR IN ANTICIPATION OF SITE INACCESSIBILITY. | ONCE TO ENSURE THAT EROSION AND SEDIMENT CONTROL MEASURES ARE IN WORKING ORDER. ANY NECESSARY MAINTENANCE AND REPAIR MUST BE MADE PRIOR TO LEAVING THE SITE. |
| 3. INACTIVE PERIODS GREATER THAN FOURTEEN (14) CONSECUTIVE CALENDAR DAYS. | ONCE EVERY TWO (2) WEEKS OR WITHIN 24 HOURS FOLLOWING A STORM EVENT. |
| 4. PERIODS DURING WHICH THE SITE IS INACCESSIBLE DUE TO INCLEMENT WEATHER. | IF PRACTICAL, INSPECTIONS MUST OCCUR DAILY AT A RELEVANT AND ACCESSIBLE DISCHARGE POINT OR DOWNSTREAM LOCATION. |

* HOLD A PRE-CONSTRUCTION MEETING OF PROJECT CONSTRUCTION PERSONNEL THAT INCLUDES THE INSPECTOR TO DISCUSS EROSION AND SEDIMENT CONTROL MEASURES AND CONSTRUCTION LIMITS. (Schedule A.8.c.i.(3))

* ALL INSPECTIONS MUST BE MADE IN ACCORDANCE WITH DEQ 1200-C PERMIT REQUIREMENTS.

* INSPECTION LOGS MUST BE KEPT IN ACCORDANCE WITH DEQ'S 1200-C PERMIT REQUIREMENTS.

* RETAIN A COPY OF THE ESCP AND ALL REVISIONS ON SITE AND MAKE IT AVAILABLE ON REQUEST TO DEQ, AGENT, OR THE LOCAL MUNICIPALITY. DURING INACTIVE PERIODS OF GREATER THAN SEVEN (7) CONSECUTIVE CALENDAR DAYS, RETAIN THE ESCP AT THE CONSTRUCTION SITE OR AT ANOTHER LOCATION. (Schedule B.2.a)

## BMP MATRIX FOR DEMOLITION PHASE

| YEAR: | 2018 | | | | | | | | 2019 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BMPs | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| STORM DRAIN INLET PROTECTION | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| CONSTRUCTION ENTRANCE | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | |
| ORANGE FENCING (SENSITIVE AREAS) | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| PLASTIC SHEETING | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | | |
| SEDIMENT FENCING | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| TURBIDITY CURTAIN | | | X | X | X | X | | | | | | | | | | | | | | |
| CONCRETE TRUCK WASHOUT | | | X | X | X | X | | | | | | | | | | | | | | |
| STRAW WATTLES/FIBER ROLLS | | | | | | | | | | X | X | X | X | X | X | X | X | X | X | X |
| DEWATERING | | | | | | | | | | | | | | X | X | X | X | X | | |
| COMPOST BLANKETS | | | | | | | | | | | | X | X | X | X | X | X | X | X | X |
| HYDROSEEDING | | | | | | | | | | | | | | | | X | X | X | X | X |

## RATIONALE STATEMENT

A COMPREHENSIVE LIST OF AVAILABLE BEST MANAGEMENT PRACTICES (BMP) OPTIONS BASED ON DEQ's GUIDANCE MANUAL HAS BEEN REVIEWED TO COMPLETE THIS EROSION AND SEDIMENT CONTROL PLAN. SOME OF THE ABOVE LISTED BMP's WERE NOT CHOSEN BECAUSE THEY WERE DETERMINED TO NOT EFFECTIVELY MANAGE EROSION PREVENTION AND SEDIMENT CONTROL FOR THIS PROJECT BASED ON SPECIFIC SITE CONDITIONS, INCLUDING SOIL CONDITIONS TOPOGRAPHIC CONSTRAINTS, ACCESSIBILITY TO THE SITE, AND OTHER RELATED CONDITIONS, AS THE PROJECT PROGRESSES AND THERE IS A NEED TO REVISE THE ESC PLAN, AN ACTION PLAN WILL BE SUBMITTED.

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
| △1 | 3/20/18 | COP PERMIT REVISIONS | J.D.H. |
| | | | |
| | | | |
| | | | |

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77870PE
JAKE DYLAN HOFELD
EXPIRES: 6/30/2019

JAKE D. HOFELD
3/20/18
DATE

PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS, LLC

ESCP COVER SHEET

LINNTON MITIGATION SITE
PHASE 2 HABITAT RESTORATION
EROSION AND SEDIMENT CONTROL PLAN

DESIGNED BY: J.H.
DRAWN BY: D.H./J.H.
CHECKED BY: J.H.
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BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
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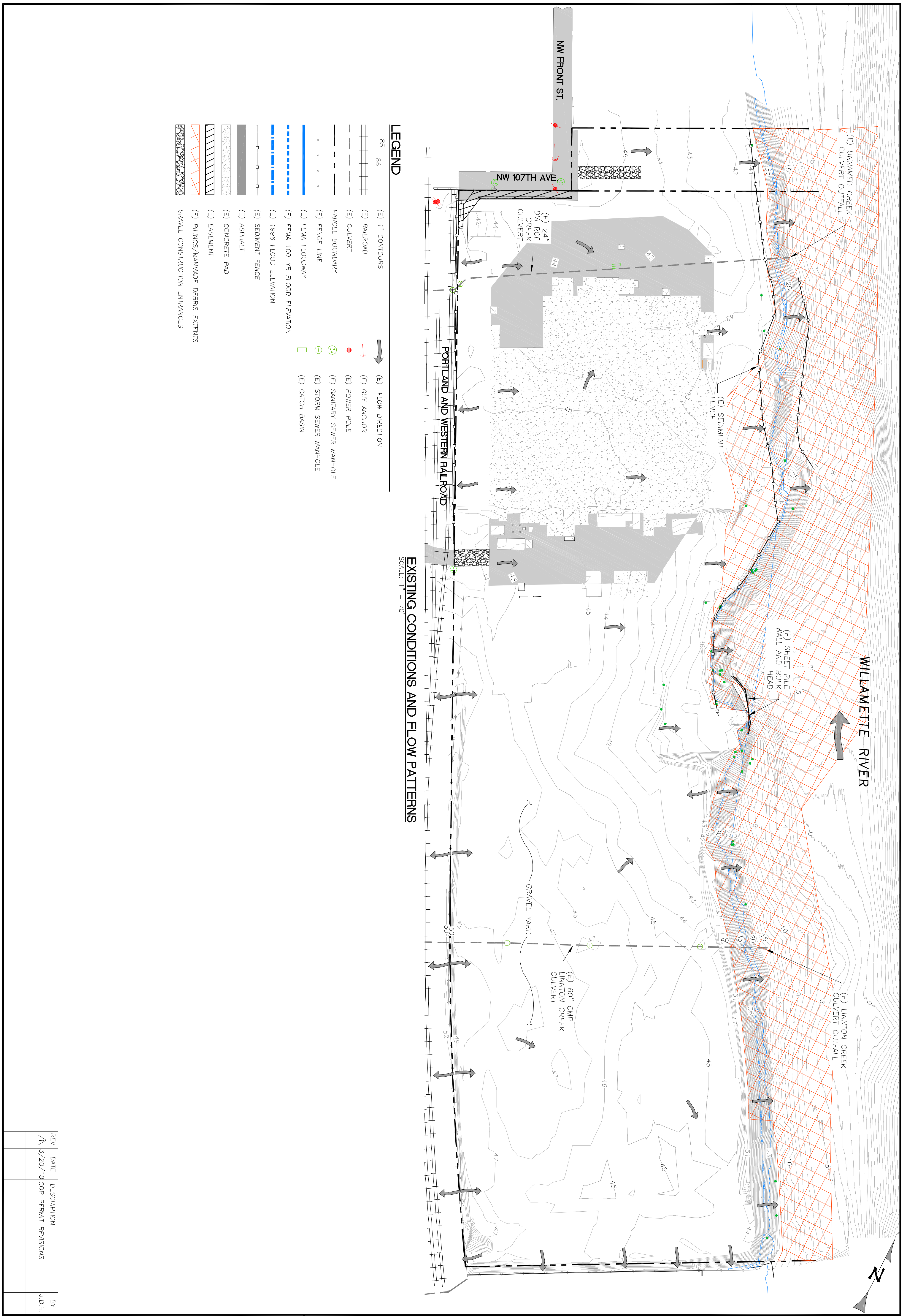
EC1

14 OF 21



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| △ | 3/20/18 | COP PERMIT REVISIONS | J.D.H. |

EC2

15 OF 21

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

DESIGNED BY: J.H.
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# LINNTON MITIGATION SITE PHASE 2 HABITAT RESTORATION EROSION AND SEDIMENT CONTROL PLAN

## EXISTING CONDITIONS AND FLOW PATTERNS

PREPARED AT THE REQUEST OF:

LINNTON WATER CREDITS, LLC

JAKE D. HOFELD
77870PE
OREGON
JANUARY 3, 2011
EXPIRES: 6/30/2019

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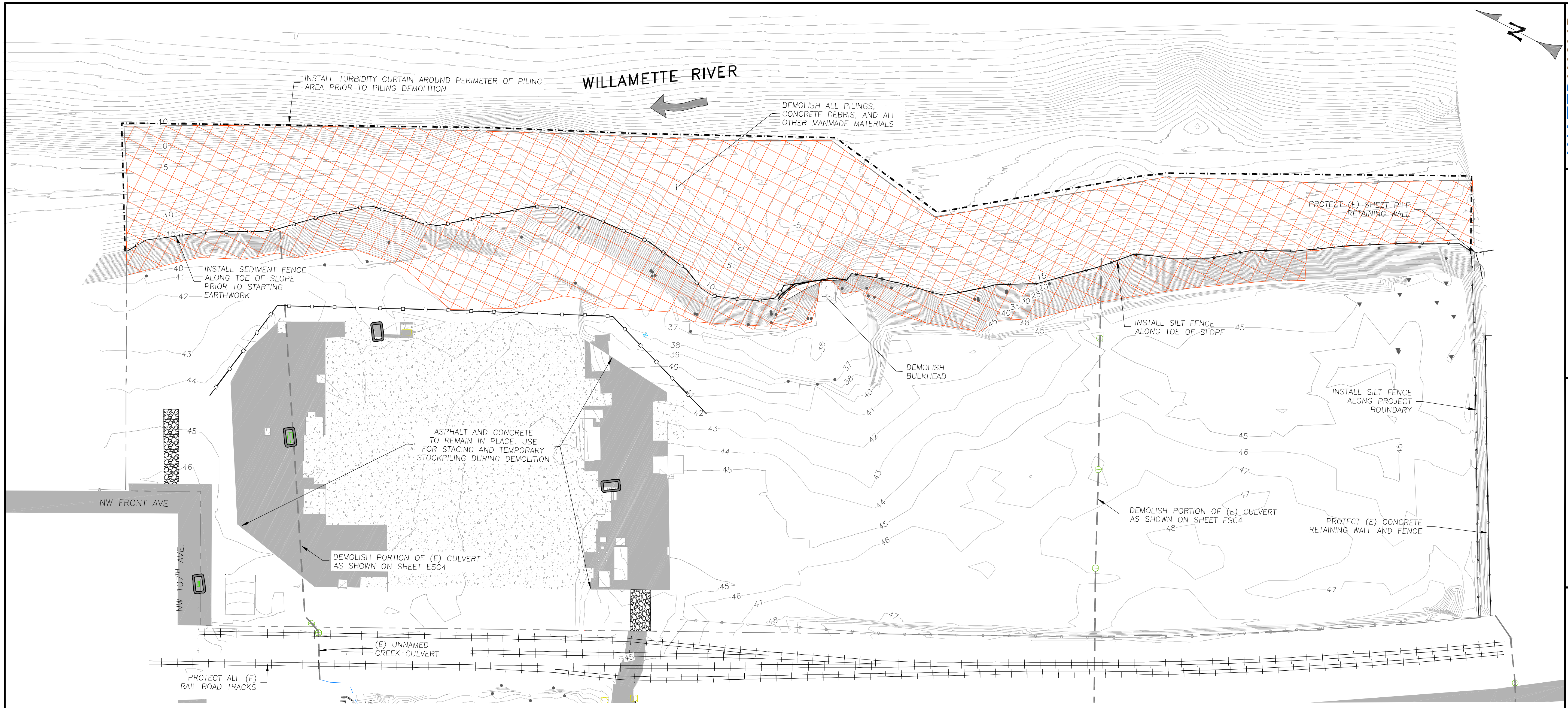

## DEMOLITION PLAN

SCALE: 1" = 70'

## LEGEND

- 85 86 (E) 1' CONTOURS
- (E) CULVERT
- PROJECT BOUNDARY
- (E) FENCE LINE
- TURBIDITY CURTAIN
- SEDIMENT FENCE
- (E) CONCRETE
- (E) ASPHALT
- GRAVEL CONSTRUCTION ENTRANCE
- TIMBER PILING DEMOLITION AREA
- (E) STORM SEWER MANHOLE
- (E) CATCH BASIN
- INLET PROTECTION

## NOTES:

1. REMOVE ALL CONCRETE DEBRIS AND OTHER MANMADE MATERIALS FROM WILLAMETTE RIVER SHORELINE WITHIN PROJECT BOUNDARY.
2. DEMOLISH ALL MANMADE ABOVE GRADE FEATURES WITHIN THE PROJECT BOUNDARY INCLUDING, BUT NOT LIMITED TO STRUCTURES, PIPES, CONCRETE WALLS/CURBS, TIMBER PILINGS, MECHANICAL/ELECTRICAL EQUIPMENT, UTILITY/LIGHT POLES, AND FENCES, UNLESS INDICATED OTHERWISE ON DRAWINGS.
3. ALL BELOW GRADE PIPES AND CONDUIT WITHIN THE PROJECT BOUNDARIES SHALL BE DEMOLISHED TO A MINIMUM OF 3' BELOW FINISHED GRADE. ALL REMAINING PIPES AND CONDUIT SHALL BE FILLED WITH CLSM OR SAND AND ABANDONED IN PLACE. COORDINATE WITH WATER, SEWER, GAS, AND ELECTRICAL UTILITIES TO SEVER SERVICE PRIOR TO DEMOLITION OF ON-SITE UTILITY INFRASTRUCTURE.
4. INSTALL INLET PROTECTION MEASURES AT LOCATIONS SHOWN IN THE DRAWINGS PER OREGON STANDARD DRAWING RD1015.
5. INSTALL SEDIMENT FENCE PER OREGON STANDARD DRAWING RD1040.
6. DUST MANAGEMENT INCLUDING COVERING BARE SOILS OR WATERING SHALL BE CONDUCTED DURING DRY PERIODS TO PREVENT MIGRATION OF DUST OFF SITE.
7. TEMPORARILY STOCKPILED MATERIALS:

   7.1. COVER ALL TEMPORARY STOCKPILED MATERIAL WITH PLASTIC SHEETING PER DETAIL 2, SHEET ESC6. ALL IMPACTED SOILS TEMPORARILY STOCKPILED SHALL BE PLACED OF PLASTIC SHEETING TO PREVENT IMPACTING UNDERLYING SURFACES PER THE APPROVED ENVIRONMENTAL MATERIALS MANAGEMENT PLAN.
   7.2. SURROUND ALL SIDES OF TEMPORARY STOCKPILES WITH SEDIMENT FENCE.
   7.3. ANY OFF-SITE HAULING OF TEMPORARILY STOCKPILED MATERIALS SHALL BE ALONG GRAVEL CONSTRUCTION ENTRANCES. COVER LOADS TO PREVENT LOSS OF MATERIAL DURING TRANSPORT.

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 3/20/18 | COP PERMIT REVISIONS | J.D.H. |
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JAKE D. HOFELD
3/20/18
DATE
77870PE
OREGON
JANUARY 3, 2011
JAKE DYLAN HOFELD
EXPIRES: 6/30/2019

PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS, LLC

DEMOLITION EROSION CONTROL PLAN

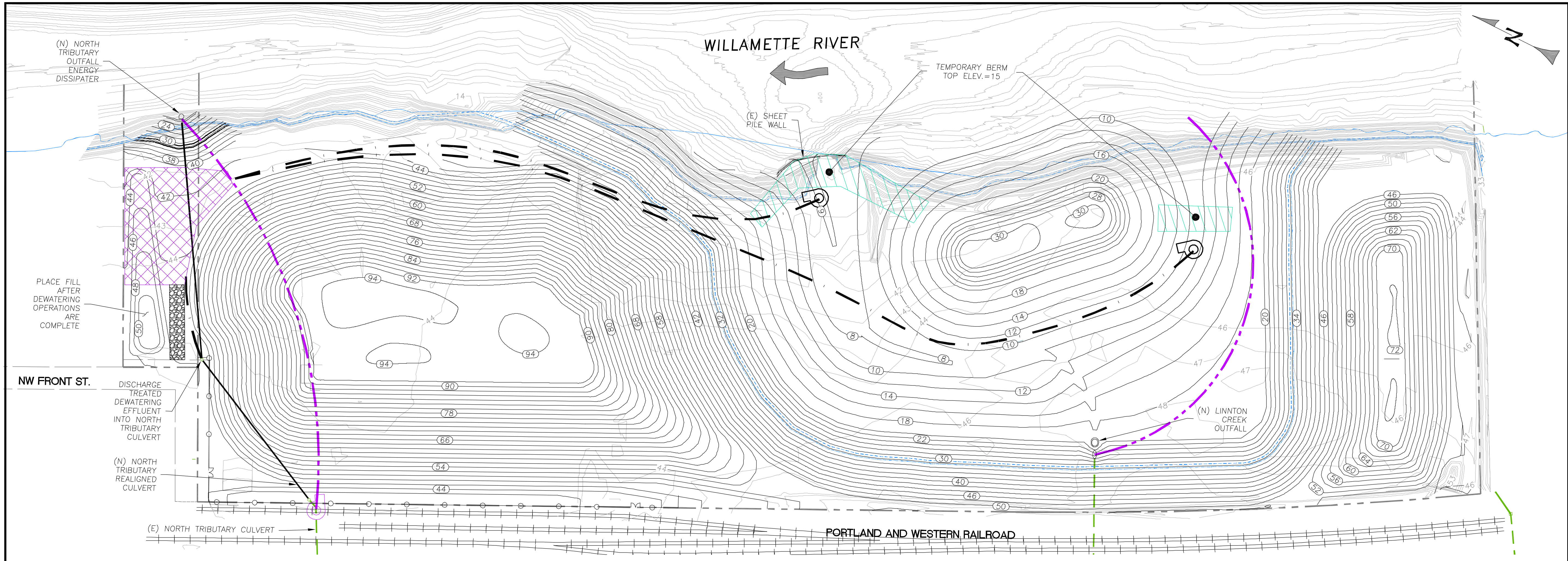
LINNTON MITIGATION SITE
PHASE 2 HABITAT
RESTORATION
EROSION AND SEDIMENT
CONTROL PLAN

DESIGNED BY: J.H.
DRAWN BY: D.H./J.H.
CHECKED BY: J.H.
DATE: 3/20/18
JOB NO.: 13-044

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

EC3

16 OF 21



## CONSTRUCTION DEWATERING, DIVERSION, AND PHASING PLAN

SCALE: 1" = 70'

## LEGEND

| | |
|---|---|
| 44 45 | (E) 1' CONTOURS |
| 68 70 | (N) 2' CONTOURS |
| ┼┼┼┼ | (E) RAILROAD |
| —— | (E) ROADWAY |
| – – – | (E) CULVERT |
| —— | (N) CULVERT |
| –·–·– | CREEK DIVERSION HOSE/PIPE |
| — · — | GROUNDWATER DEWATERING HOSE/PIPE |
| ▨ | TEMPORARY BERM |
| ▨ | DEWATERING EQUIPMENT STAGING AREA |
| ◎ | CREEK DEWATERING PUMP |
| ◎ | GROUNDWATER DEWATERING WELL/PUMP |
| ○ | (N) MANHOLE |

## GROUNDWATER DEWATERING NOTES

1. GROUNDWATER DEWATERING WELLS SHALL BE INSTALLED AT THE TWO LOCATIONS SHOWN ON THE PLAN THAT CORRESPOND TO LOW POINTS IN THE FINISHED GROUND SURFACE.
2. MAINTAIN POSITIVE DRAINAGE FROM EXCAVATION AREAS TO THE LOCATIONS OF THE WELLS.
3. BORED WELL HOLE DIAMETERS SHALL BE MAXIMIZED TO ALLOW FOR HIGH PERMEABILITY PACKING MATERIAL TO BE INSTALLED AROUND THE WELL CASING TO ACT AS A FILTER FOR SURFACE FLOWS THAT REACH THE WELL.
4. WELL PUMPS SHALL BE SIZED TO MAINTAIN A GROUNDWATER SURFACE OF 1' BELOW FINISHED GRADE.
5. MAINTAIN POSITIVE DRAINAGE TOWARDS WELLS DURING EXCAVATION.
6. REFER TO THE DEWATERING PLAN FOR TREATMENT REQUIREMENTS.

## CONSTRUCTION SEQUENCE NOTES

NOTE: EXCAVATION ALONG THE BANK OF THE WILLAMETTE RIVER BELOW ORDINARY HIGH WATER MUST OCCUR DURING IN-WATER WORK WINDOW JULY 15TH – OCTOBER 31ST)

1. INSTALL BMPs PER REQUIREMENTS OF DEQ 1200-C PERMIT.
2. CONSTRUCT THE NEW REALIGNED NORTH CULVERT AND OUTFALL ENERGY DISSIPATER. DIVERT NORTH TRIBUTARY FLOWS AROUND CONSTRUCTION AREA WHILE CONNECTING NEW CULVERT TO EXISTING CULVERT PIPE. ABANDON EXISTING NORTH TRIBUTARY CULVERT DOWNSTREAM OF NEW CULVERT TIE IN..
3. EXCAVATE AND STOCKPILE WHERE SHOWN ON SHEETS C5 AND C6 DOWN TO THE GROUNDWATER TABLE AT TIME OF CONSTRUCTION.
4. INSTALL GROUNDWATER DEWATERING WELLS AND TREATMENT EQUIPMENT AT DEWATERING EQUIPMENT STAGING AREA. DISCHARGE FROM THE TANKS SHALL BE DIRECTED TO THE MANHOLE UPSTREAM OF THE NORTH TRIBUTARY OUTFALL ENERGY DISSIPATER.
5. EXCAVATE DOWN TO THE ELEVATION OF THE LINNTON CREEK CULVERT AND DIVERT CREEK FLOW AROUND THE EXCAVATION AREA TO THE EXISTING LINNTON CREEK CULVERT OUTFALL. DEMOLISH THE PORTION OF LINNTON CREEK CULVERT DOWNSTREAM OF NEW OUTFALL LOCATION.
6. CONTINUE EXCAVATION TO FINISHED GRADE WHILE MAINTAINING BERMS WITH A CREST ELEV. OF 15 FEET AT THE INLETS TO THE RIVER.
7. INSTALL LINNTON CREEK OUTFALL CHANNEL, GRADE CONTROL STRUCTURES, AND ENGINEERED LOG STRUCTURES.
8. AMEND SOILS AT FINISHED GRADE SURFACE HYDROSEED.
9. EXCAVATE THE BERMS.
10. CUT THE SHEET PILE WALL AT THE CONFLUENCE OF THE NEW LINNTON CREEK CHANNEL AND WILLAMETTE RIVER.
11. COMPLETE REMAINING SEEDING.

| REV. | DATE | DESCRIPTION | BY |
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| △ | 3/20/18 | COP PERMIT REVISIONS | J.D.H. |
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JAKE DYLAN HOFELD
EXPIRES: 6/30/2019

JAKE D. HOFELD
3/20/18
DATE

PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS, LLC

CONSTRUCTION ACCESS PHASING AND DEWATERING PLAN

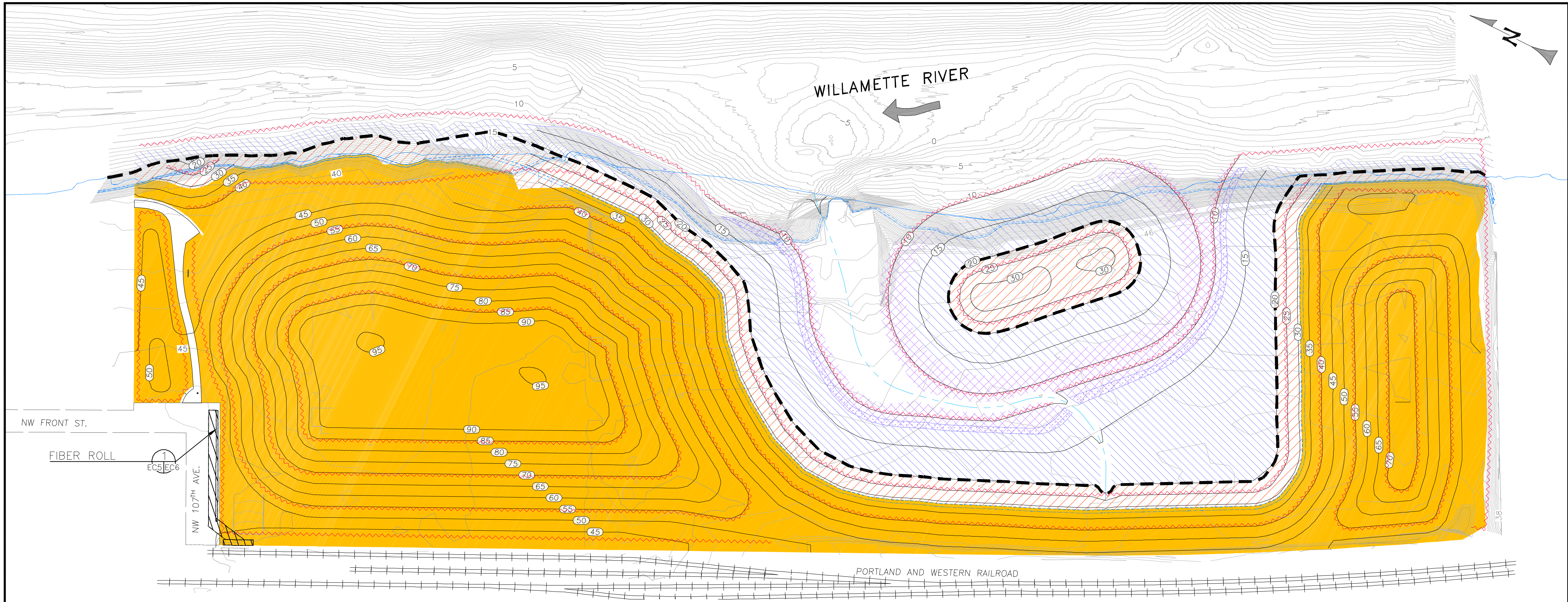
LINNTON MITIGATION SITE
PHASE 2 HABITAT
RESTORATION
EROSION AND SEDIMENT
CONTROL PLAN

DESIGNED BY: J.H.
DRAWN BY: D.H./J.H.
CHECKED BY: J.H.
DATE: 3/20/18
JOB NO.: 13-044

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

EC4

17 OF 21



## SEEDING AND PERMANENT EROSION CONTROL PLAN

SCALE: 1" = 70'

## LEGEND

| | |
|---|---|
| 44 45 | (E) 1' CONTOURS |
| (100) | PROPOSED 5' CONTOURS |
| ┼┼┼┼ | (E) RAILROAD |
| — - - — | PROJECT BOUNDARY |
| — | (E) ROADWAYS |
| - - - | (N) FLOW LINE |
| ﹏﹏ | FIBER ROLLS |
| — — — | ORDINARY HIGH WATER (20.1') |
| — | (E) FEMA FLOODWAY (APPROXIMATE) |
| ----- | (N) 100-YEAR FEMA WSE |
| — | (N) CITY OF PORTLAND 1996 WSE (APPROXIMATE) |

ZONE 1A SEEDING=1.3 ACRES – (+8.5' TO +12' ELEVATION)

| SYMBOL | BOTANICAL NAME | COMMON NAME | % MIX BY PLS (PURE LIVE SEED) |
|---|---|---|---|
| ▩ | AGROSTIS EXARATA | SPIKE BENTGRASS | 35% |
| | COREOPSIS TINCTORIA | COLUMBIA TICKSEED | 10% |
| | ELEOCHARIS OBTUSA | OBTUSE SPIKERUSH | 10% |
| | ELEOCHARIS PALUSTRIS | CREEPING SPIKERUSH | 20% |
| | LEERSIA ORYZOIDES | RICE CUT-GRASS | 20% |
| | SAGITTARIA LATIFOLIA | WAPATO | 5% |
| | | TOTALS | 100% |

ZONE 1B SEEDING=4.0 ACRES (+11' TO +20' ELEVATION)

| SYMBOL | BOTANICAL NAME | COMMON NAME | % MIX BY PLS (PURE LIVE SEED) |
|---|---|---|---|
| ▧ | AGROSTIS EXARATA | SPIKE BENTGRASS | 50% |
| | GLYCERIA ELATA | TALL MANNA-GRASS | 10% |
| | JUNCUS ACUMINATUS | TAPER-TIP RUSH | 2% |
| | DESCHAMPSIA ELONGATA | SLENDER HAIRGRASS | 10% |
| | LEERSIA ORYZOIDES | RICE CUT-GRASS | 20% |
| | SCIRPUS MICROCARPUS | SMALL-FRUIT BULRUSH | 8% |
| | | TOTALS | 100% |

ZONE 2 SEEDING=2.1 ACRES (+20' TO +31' ELEVATION)

| SYMBOL | BOTANICAL NAME | COMMON NAME | % MIX BY PLS (PURE LIVE SEED) |
|---|---|---|---|
| ▨ | AGROSTIS EXARATA | SPIKE BENTGRASS | 15% |
| | DANTHONIA CALIFORNICA | CALIFORNIA OATGRASS | 20% |
| | FESTUCA ROEMERI | ROEMER'S FESCUE | 20% |
| | GRINDELIA INTEGRIFOLIA | GUMWEED | 5% |
| | LUPINUS BICOLOR | SMALL-FLOWER LUPINE | 10% |
| | LUPINUS PLYPHYLLUS | LARGE-LEAFED LUPINE | 10% |
| | POTENTILLA GRACILIS | SLENDER CINQUEFOIL | 5% |
| | DESCHAMPSIA ELONGATA | SLENDER HAIRGRASS | 10% |
| | SOLIDAGO LEPIDA | GOLDENROD | 5% |
| | | TOTALS | 100% |

ZONE 3 SEEDING=11.8 ACRES (+31' ELEVATION AND ABOVE)

| SYMBOL | BOTANICAL NAME | COMMON NAME | % MIX BY PLS (PURE LIVE SEED) |
|---|---|---|---|
| 🟧 | ACHILLEA MILLEFOLIUM | YARROW | 5% |
| | ANAPHALIS MARGARTIACAE | PEARLY EVERLASTING | 5% |
| | DANTHONIA CALIFORNICA | CALIFORNIA OATGRASS | 20% |
| | ELYMUS GLAUCUS | BLUE WILDRYE | 5% |
| | FESTUCA ROEMERI | ROEMER'S FESCUE | 30% |
| | GRINDELIA INTEGRIFOLIA | GUMWEED | 5% |
| | LUPINUS BICOLOR | SMALL-FLOWER LUPINE | 5% |
| | LUPINUS POLYPHYLLUS | LARGE-LEAFED LUPINE | 10% |
| | DESCHAMPSIA ELONGATA | SLENDER HAIRGRASS | 10% |
| | SOLIDAGO LEPIDA | GOLDENROD | 5% |
| | | TOTALS | 100% |

NOTES:

1. ALL FINISHED GRADE SURFACES TO BE COVERED WITH COMPOST TO A THICKNESS OF 3" (MIN). DISK COMPOST BLANKET INTO UNDERLYING SOIL TO MIX TO A MINIMUM DEPTH OF 6" PRIOR TO HYDROSEEDING.
2. OVERLAP ZONE 1A AND 1B SEED MIXES BETWEEN ELEVATIONS 11' AND 12'.
3. APPLICATION SEED RATES FOR ALL SEEDING IS 29 LBS/ACRE.

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
| △ | 3/20/18 | COP PERMIT REVISIONS | J.D.H. |

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JAKE D. HOFELD
3/20/18
DATE
REGISTERED PROFESSIONAL ENGINEER
77870PE
OREGON
JANUARY 3, 2011
JAKE DYLAN HOFELD
EXPIRES: 6/30/2019

PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS, LLC

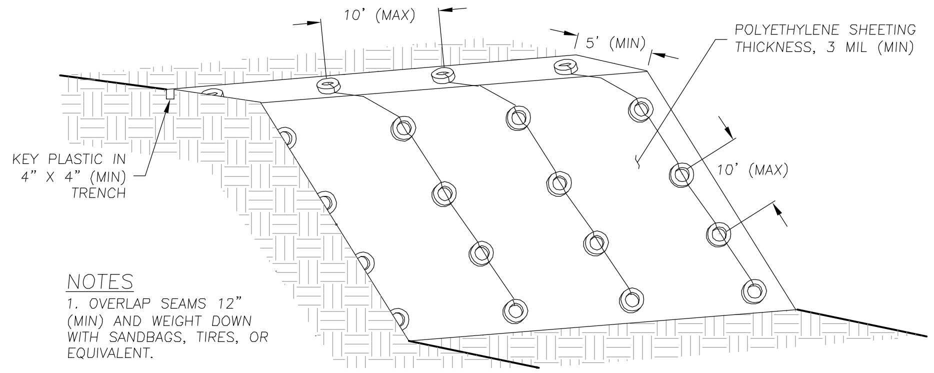
SEEDING AND PERMANENT EROSION CONTROL PLAN

LINNTON MITIGATION SITE
PHASE II - HABITAT RESTORATION
100% DESIGN SUBMITTAL

DESIGNED BY: J.H.
DRAWN BY: A.L./D.H.
CHECKED BY: J.H.
DATE: 03/20/18
JOB NO.: 13-044

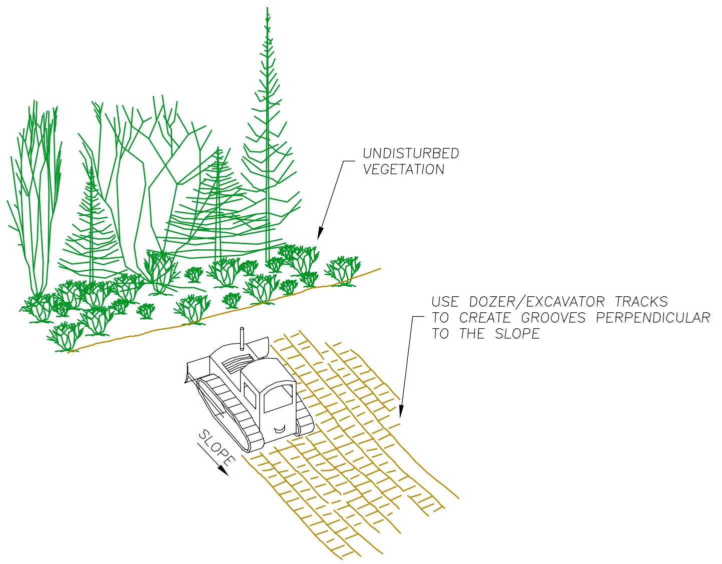
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

EC5

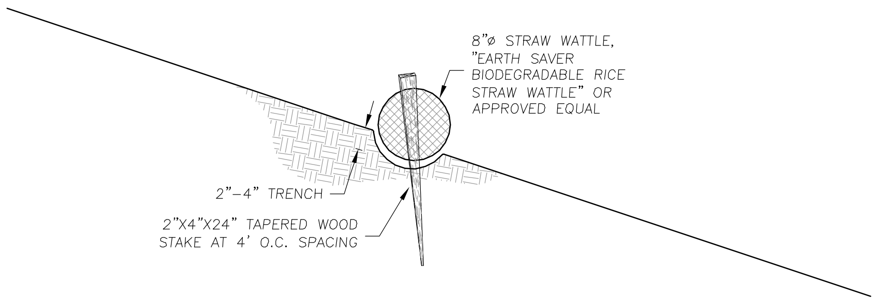


NOTES
1. OVERLAP SEAMS 12" (MIN) AND WEIGHT DOWN WITH SANDBAGS, TIRES, OR EQUIVALENT.
2. PROVIDE ENERGY DISSIPATION AT TOE OF SLOPE AS NECESSARY.

**PLASTIC SHEETING**
SCALE: NO SCALE
1 EC4 EC6



**CAT TRACKING**
SCALE: NO SCALE
2 EC4 EC6



**FIBER ROLL**
SCALE: 1"=1'
3 EC5 EC6

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JANUARY 3, 2011
JAKE DYLAN HOFELD
EXPIRES: 6/30/2019

PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS, LLC

EROSION CONTROL DETAILS

LINNTON MITIGATION SITE
PHASE 2 HABITAT
RESTORATION
EROSION AND SEDIMENT
CONTROL PLAN

DESIGNED BY: J.H.
DRAWN BY: D.H./J.H.
CHECKED BY: J.H.
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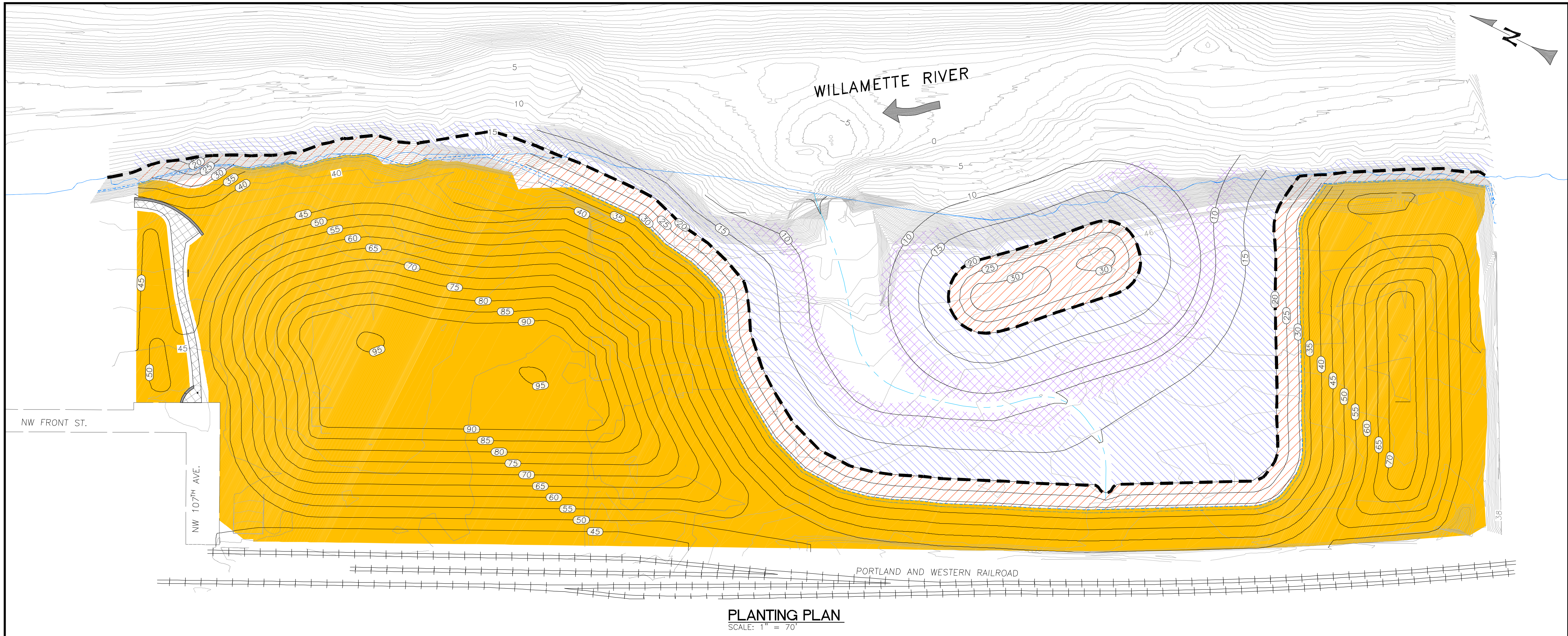
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

EC6
19 OF 21



## PLANTING PLAN

SCALE: 1" = 70'

## LEGEND

| | | | |
|---|---|---|---|
| 44 45 | (E) 1' CONTOURS | ▨ | ZONE 1A |
| 100 | PROPOSED 5' CONTOURS | ▨ | ZONE 1B |
| ┼┼┼┼ | (E) RAILROAD | ▨ | ZONE 2 |
| — - — | PROJECT BOUNDARY | ■ | ZONE 3 |
| —— | (E) ROADWAYS | | |
| — — — | (N) FLOW LINE | | |
| — — — | ORDINARY HIGH WATER (20.1') | | |
| —— | (E) FEMA FLOODWAY (APPROXIMATE) | | |
| - - - - | (N) 100-YEAR FEMA WSE | | |
| - - - - | (N) CITY OF PORTLAND 1996 WSE (APPROXIMATE) | | |

NOTES:

1. SEE PLANTING LIST AND SCHEDULES ON P2.
2. NO PLANTING SHALL OCCUR BELOW ELEVATION 13.0' (NAVD88) IN THE ACTIVE CHANNEL MARGIN ZONE (WILLAMETTE RIVER SHORELINE).
3. ALL PLANTING SHALL OCCUR BETWEEN OCTOBER 1 AND MARCH 31.
4. INVASIVE PLANTS SHALL BE REMOVED WITHIN A 10' RADIUS OF ALL NEW PLANTINGS.

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
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DATE

PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS, LLC

PLANTING PLAN

LINNTON MITIGATION SITE
PHASE II - HABITAT
RESTORATION
100% DESIGN SUBMITTAL

DESIGNED BY: J.H.
DRAWN BY: A.L./D.H.
CHECKED BY: J.H.
DATE: 03/20/18
JOB NO.: 13-044

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

P1

20 OF 21

## REVEGETATION NOTES

1. ZONE 1B PLANTING:
   1.1. ALL SALIX SPECIES EXCEPT SALIX SCOULERIANA SHALL BE LIMITED TO PLANTING BELOW ELEVATION 15'.
2. ZONE 2 PLANTING:
   2.1. QUERCUS GARRYANA SHALL BE LIMITED TO PLANTING ABOVE ELEVATION 25'.
3. BARE ROOT PLANT SIZES:
   - * 12–30" BARE ROOT WITH AVERAGE OF 16" MEASURED FROM THE ROOT COLLAR TO THE UPPERMOST BUD
   - ** 6–24" BARE ROOT WITH AVERAGE OF 10" MEASURED FROM THE ROOT COLLAR TO THE UPPERMOST BUD

ZONE 1A PLANTINGS=1.6 ACRES (+8.5' TO +13' ELEVATION)

| SYMBOL | BOTANICAL NAME | COMMON NAME | PLANT TYPE | PERCENT OF COMPOSITION |
|---|---|---|---|---|
| ▩ | SHRUBS – 3' O.C. (+10.5 TO +13 ELEVATION ONLY) | | | |
| | CORNUS SERICEA | RED–OSIER DOGWOOD | BARE ROOT* | 10% |
| | SALIX FLUVIATILIS | COLUMBIA RIVER WILLOW | BARE ROOT* | 20% |
| | SALIX HOOKERIANA VAR PIPERI | PIPER WILLOW | BARE ROOT* | 20% |
| | SALIX LUCIDA | PACIFIC WILLOW | BARE ROOT* | 10% |
| | SALIX SESSILIFOLIA | SOFT–LEAVED WILLOW | BARE ROOT* | 10% |
| | SALIX SITCHENSIS | SITKA WILLOW | BARE ROOT* | 10% |
| | SPIRAEA DOUGLASII | DOUGLAS SPIRAEA | BARE ROOT* | 20% |
| | | | TOTALS | 100% |
| | EMERGENTS – 3' O.C. (+8.5 TO +10 FT ELEVATION) | | | |
| | CAREX APERTA | COLUMBIA SEDGE | PLUG | 20% |
| | CAREX OBNUPTA | SLOUGH SEDGE | PLUG | 20% |
| | CAREX VESICARIA | INFLATED SEDGE | PLUG | 10% |
| | JUNCUS ACUMINATUS | TAPER–TIP SEDGE | PLUG | 10% |
| | LEERSIA ORYZOIDES | RICE CUTGRASS | PLUG | 10% |
| | POLYGONUM HYDROPIPEROIDES | SWAMP SMARTWEED | PLUG | 10% |
| | SAGITTARIA LATIFOLIA | WAPATO | BULB | 20% |
| | | | TOTALS | 100% |

ZONE 1B PLANTINGS=3.8 ACRES (+13' TO +20' ELEVATION)

| SYMBOL | BOTANICAL NAME | COMMON NAME | PLANT TYPE | PERCENT OF COMPOSITION |
|---|---|---|---|---|
| ▨ | TREES – 10' O.C. | | | |
| | CRATAEGUS SUKSDORFII | BLACK HAWTHORN | BARE ROOT* | 20% |
| | POPULUS BALSAMIFERA VAR. TRICHOCARPA | COTTONWOOD | BARE ROOT* | 30% |
| | FRAXINUS LATIFOLIA | OREGON ASH | BARE ROOT* | 30% |
| | SALIX RIGIDA | MCKENZIE WILLOW | BARE ROOT* | 10% |
| | SALIX SCOULERIANA | SCOULER'S WILLOW | BARE ROOT* | 10% |
| | | | TOTALS | 100% |
| | SHRUBS – 3' O.C. | | | |
| | CORNUS SERICEA | RED–OSIER DOGWOOD | BARE ROOT* | 10% |
| | PHYSOCARPUS CAPITATUS | PACIFIC NINEBARK | BARE ROOT* | 5% |
| | RIBES DIVARICATUM | SPREADING GOOSEBERRY | BARE ROOT* | 10% |
| | RUBUS PARVIFLORUS | THIMBLEBERRY | BARE ROOT* | 15% |
| | ROSA PISOCARPA | PEA–FRUIT ROSE | BARE ROOT* | 10% |
| | SALIX SITCHENSIS | SITKA WILLOW | BARE ROOT* | 20% |
| | SAMBUCUS RACEMOSA | RED ELDERBERRY | BARE ROOT* | 5% |
| | SPIRAREA DOUGLASII | DOUGLAS SPIRAEA | BARE ROOT* | 15% |
| | SYMPHORICARPOS ALBUS | SNOWBERRY | BARE ROOT* | 10% |
| | | | TOTALS | 100% |

ZONE 2 PLANTINGS=2.1 ACRES (+20' TO +31' ELEVATION)

| SYMBOL | BOTANICAL NAME | COMMON NAME | PLANT TYPE | PERCENT OF COMPOSITION |
|---|---|---|---|---|
| ▨ | TREES – 10' O.C. | | | |
| | ABIES GRANDIS | GRAND FIR | BARE ROOT** | 5% |
| | ACER MACROPHYLLUM | BIG LEAF MAPLE | BARE ROOT* | 10% |
| | ALNUS RUBRA | RED ALDER | BARE ROOT* | 15% |
| | CRATAEGUS SUKSDORFII | BLACK HAWTHORN | BARE ROOT* | 5% |
| | FRAXINUS LATIFOLIA | OREGON ASH | BARE ROOT* | 20% |
| | POPULUS BALSAMIFERA VAR. TRICHOCARPA | COTTONWOOD | BARE ROOT* | 20% |
| | THUJA PLICATA | WESTERN RED CEDAR | BARE ROOT** | 15% |
| | RHAMNUS PURSHIANA | CASCARA | BARE ROOT* | 10% |
| | | | TOTALS | 100% |
| | SHRUBS – 3' O.C. | | | |
| | ACER CIRCINATUM | VINE MAPLE | BARE ROOT* | 10% |
| | AMELANCHIER ALNIFOLIA | WESTERN SERVICEBERRY | BARE ROOT* | 15% |
| | CORYLUS CORNUTA | HAZELNUT | BARE ROOT** | 10% |
| | PHILADELPHUS LEWISII | MOCKORANGE | BARE ROOT** | 10% |
| | RUBUS PARVIFLORUS | THIMBLEBERRY | BARE ROOT* | 10% |
| | RUBUS URSINUS | TRAILING BLACKBERRY | BARE ROOT* | 5% |
| | SAMBUCUS RACEMOSA | RED ELDERBERRY | BARE ROOT* | 15% |
| | SYMPHORICARPOS ALBUS | SNOWBERRY | BARE ROOT* | 25% |
| | | | TOTALS | 100% |

ZONE 3 PLANTINGS=11.8 ACRES (+31' ELEVATION AND ABOVE)

| SYMBOL | BOTANICAL NAME | COMMON NAME | PLANT TYPE | PERCENT OF COMPOSITION |
|---|---|---|---|---|
| 🟨 | TREES – 10' O.C. | | | |
| | ABIES GRANDIS | GRAND FIR | BARE ROOT** | 10% |
| | ACER MACROPHYLLUM | BIG LEAF MAPLE | BARE ROOT* | 15% |
| | PSEUDOTSUGA MENZIESII | DOUGLAS FIR | BARE ROOT* | 40% |
| | RHAMNUS PURSHIANA | CASCARA | BARE ROOT* | 15% |
| | THUJA PLICATA | WESTERN RED CEDAR | BARE ROOT* | 20% |
| | | | TOTALS | 100% |
| | SHRUBS – 3' O.C. | | | |
| | ACER CIRCINATUM | VINE MAPLE | BARE ROOT* | 10% |
| | AMELANCHIER ALNIFOLIA | WESTERN SERVICEBERRY | BARE ROOT* | 10% |
| | CORYLUS CORNUTA | HAZELNUT | BARE ROOT** | 10% |
| | HOLODISCUS DISCOLOR | OCEANSPRAY | BARE ROOT* | 10% |
| | MAHONIA AQUIFOLIUM | TALL OREGON GRAPE | BARE ROOT** | 10% |
| | PHILADELPHUS LEWISII | MOCKORANGE | BARE ROOT* | 10% |
| | RIBES SANGUINEUM | RED CURRANT | BARE ROOT* | 10% |
| | SAMBUCAS NIGRA | BLUE ELDERBERRY | BARE ROOT* | 10% |
| | RUBUS URSINUS | TRAILING BLACKBERRY | BARE ROOT* | 10% |
| | SYMPHORICARPOS ALBUS | SNOWBERRY | BARE ROOT* | 10% |
| | | | TOTALS | 100% |

## PLANTING LIST

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
| △ | 3/20/18 | COP PERMIT REVISIONS | J.D.H. |

WATERWAYS CONSULTING INC.
1020 SW TAYLOR STREET, STE. 380, PORTLAND, OR 97205
PH:(503)227–5979 // FAX:(888)819–6847 // WWW.WATWAYS.COM

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS
151 South Worthen, Suite 101
Wenatchee, WA 98801
(509) 663-6300 | www.gretteassociates.com

Jake D Hofeld
JAKE D. HOFELD
77870PE
JANUARY 3, 2011
JAKE DYLAN HOFELD
EXPIRES: 6/30/2019
3/20/18
DATE

PREPARED AT THE REQUEST OF:
LINNTON WATER CREDITS, LLC

PLANTING LIST

LINNTON MITIGATION SITE
PHASE II - HABITAT
RESTORATION
100% DESIGN SUBMITTAL

DESIGNED BY: J.H.
DRAWN BY: A.L./D.H.
CHECKED BY: J.H.
DATE: 03/20/18
JOB NO.: 13–044

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

P2

# Technical Specifications

# For

# Linnton Mitigation Site
# Phase II – Habitat Restoration

Prepared for
Linnton Water Credits, LLC

**Draft 100% Submittal**

**April 10, 2017**

FOR USE IN CONNECTION WITH

**STATE OF OREGON, DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, 2015**

# Linnton Mitigation Bank
# Technical Specifications
# DRAFT 100% Submittal

## Table of Contents
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# INDEX
# SECTION 015000
# MOBILIZATION

**Paragraph** **Page**

# SECTION 015000
# TEMPORARY FACILITIES AND CONTROLS
# (a.k.a. Mobilization & Demobilization)

## 1. GENERAL

### 1.1 DESCRIPTION

A. The work covered by this section consists of the construction facilities and temporary controls, including mobilization and demobilization, as specified, as shown on the Drawings, or as otherwise directed by the Engineer. Work includes traffic control, temporary fencing – type ESA, temporary chain link fencing, and erosion control items not specifically addressed under other pay items.

B. Mobilization shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the site; for the establishment of all offices, and other facilities necessary for work on the project; and for all other work and operations which must be performed, or costs incurred prior to beginning work, on the various items on the project site.

C. Demobilization shall consist of work and operations necessary to disband all mobilized items and cleanup the site. The removal of all temporary crossings, ramps, access ways, roads, signs, and fencing; dewatering facilities; and temporary facilities or works, and the restoration of surfaces to an equal or better than existing condition shall also be included as part of demobilization.

### 1.2 SUBMITTALS

A. The following submittals shall be provided in accordance with Section 013300.

1. Hazardous Materials Controls and Spill Prevention Plan
2. Video recording of existing conditions surrounding project area.
3. Traffic Control Plan

### 1.3 REFERENCES

A. Oregon Department of Transportation (ODOT) Standard Specifications for Construction, current edition

### 1.4 RELATED SECTIONS

1. Section 015626, Temporary Fence – Type ESA
2. Section 015713.02, Silt Fence
3. Section 015713 Erosion and Sediment Control Plan Implementation

## 2. PRODUCTS

### 2.1 TEMPORARY CHAIN LINK FENCING

A. Unless otherwise indicated, type of temporary chain link fencing shall be Contractor's option. Following types are acceptable:

1. New materials or previously used salvaged chain link fencing in good condition.

2. Posts: Galvanized steel pipe of diameter to provide rigidity. Post shall be suitable for setting in concrete footings, driving into ground, anchoring with base plates, or inserting in precast concrete blocks.
3. Fabric: Woven galvanized steel wire mesh. Provide in continuous lengths to be wire tied to fence posts or prefabricated into modular pipe-framed fence panels.

### 2.2 GATES

A. Provide personnel and vehicle gates of the quantity and size required for functional access to site.

B. Fabricate of same material as used for fencing.

C. Vehicle gates: minimum width of 20 feet to allow access for emergency vehicles. Capable of manual operation by one person.

## 3. EXECUTION

### 3.1 CONTRACTOR'S PLANT AND EQUIPMENT

A. Security. Contractor shall, at all times, be responsible for security of their plant and equipment. Owner shall not be responsible for missing or damaged equipment, tools, or personal belongings.

B. Construction Power and Communication Facilities. Contractor shall be responsible for providing sufficient electrical power and communication facilities to construct the work.

C. Storage Facilities.

1. Provide storage facilities for the protection of materials and supplies from weather, and shall keep the facilities clean and in proper order at all times.
2. Provide a storage area for lubricants, oils, and hazardous materials with sufficient means to contain spills. Facilities, handling, and any required cleanup will comply with all current local, state, and federal standards. Petroleum products stored on the site shall be secured from vandalism.

D. Sanitary Facilities. Maintain adequate toilet facilities at or near the work site.

E. Solid Waste Handling. Provide sufficient solid waste handling facilities to maintain site in a clean, orderly condition.

F. Water. Contractor shall provide all water necessary for construction and maintenance as specified.

### 3.2 MOBILIZATION AND DEMOBILIZATION

A. General. Perform mobilization and demobilization activities in accordance with the Drawings, and as specified.

### 3.3 PROJECT SIGNS

A. General. Erect project, safety and hard hat signs at each work site within five (5) days after commencement of work at that site.

### 3.4 EXCAVATION

A. The Contractor, and any subcontractor, is required to notify Oregon Utility Notification Center forty-eight hours in advance of performing excavation work, by calling the toll free number (800) 332-2344.

## 3.5 PROTECTIVE BARRIERS

A. Protective barriers shall be erected around sensitive areas as designated on the Drawings or as directed by the Engineer. Barriers shall be constructed using bright orange plastic safety fencing (type ESA), per Section 015626, Temporary Fence – Type ESA.

B. Temporary fencing shall be maintained during construction. Except as directed by the Engineer, barriers shall be removed after completion of work.

## 3.6 BULLETIN BOARD

A. Provide a bulletin board at the project site, or in a location approved by the Engineer. The bulletin board shall be easily accessible at all times and shall contain wage rates, equal opportunity notice, and other items required to be posted.

## 3.7 CHAIN LINK FENCING

A. Chain link posts:

1. Space as 10 foot on center, maximum.
2. Drive posts, set in holes and backfill, or anchor in precast concrete blocks.
3. For soft and unstable ground conditions, cast concrete plug around post.
4. Posts over pavement: Use steel post plates or precast concrete blocks.
5. Gate posts: Use bracing or concrete footings to provide rigidity for accommodating size of gate.

B. Fabric: Securely attach to posts.

C. Gates: Install with required hardware.

D. Maintain fencing in good condition. If damaged, immediately repair.

E. Removal:

1. When Temporary Fence is no longer required, as determined by the Engineer, it shall be removed and disposed of.
2. Holes caused by the removal of Temporary Fence shall be backfilled in conformance with the provisions in Section 312323 (Engineered Fill).

## 3.8 STAGING AREAS

A. General. Staging areas at the project site are provided for the Contractor's use. By making this area available to the Contractor, the Engineer, and any other person or agency connected with the properties shall in no way be responsible or liable for any activity of the Contractor, subcontractors, or any individual or organization connected with the project.

B. Alternative Staging Areas. Alternative sites must be acceptable to Owner's Representative, and the Contractor must make all arrangements for their use at the Contractor's expense, and in accordance with all local, State and Federal regulations.

C. Additional Storage Areas. Should the Contractor require space in addition to that available on-site, the Contractor shall make arrangements for storage of materials and equipment in locations off the construction site, and shall provide the Engineer a copy of the letter of authorization for storage from the Owner's Representative.

## 3.9 DUST CONTROL

A. General. The Contractor shall be responsible for the control of dust within the limits of the project at all times. The Contractor shall take whatever steps are necessary to eliminate the nuisance of blowing dust. Responsibility for any damage to property, crops, or orchards from dust caused by the Contractor's operations shall be borne by the Contractor.

B. Dust Control. Periodically, water or otherwise treat access roads and haul roads, as required to suppress dust. Cover or control water content of earthen materials being hauled, as required to control dust emissions. Cover or otherwise stabilize soil stockpiles to prevent erosion by wind.

C. Cleanup. The Contractor shall keep all streets, roadways, and easements, as well as all ground adjacent to the project site, clean and free of dust, mud and debris resulting from the Contractor's operations. Daily cleanup throughout the project shall be required as the Contractor progresses with the work. Spillage of earth, gravel, concrete, asphalt, or other materials resulting from hauling operations along or across any public street or private driveway or access road shall be removed immediately by the Contractor.

## 3.10 HAZARDOUS MATERIALS CONTROL AND SPILL PREVENTION PLAN

A. General. Before starting work on the project, the Contractor shall submit for acceptance by the Engineer a Hazardous Materials Controls and Spill Prevention Plan. The Plan shall include provisions for preventing hazardous materials from contaminating soil or entering water courses and shall establish a Spill Prevention and Countermeasure Plan.

B. Facilities. Provide staging and storage areas for equipment, as required to contain contaminants away from water courses. Provide a contained, locked storage facility for fuels, lubricants, construction chemicals and other hazardous materials and supplies stored at site. Provide a lined pit for concrete washdown, located where spills or overflow cannot enter nearby watercourses or storm drains. The pit shall be located a minimum of 150 feet from any flowing watercourse.

C. Equipment Maintenance. Clean and maintain equipment to prevent any leakage of fuel and lubricants. Establish a designated equipment refueling area. All fueling and maintenance of vehicles and other equipment and staging area shall occur at least 150 feet from any riparian habitat or water body.

D. Spills Countermeasures. Isolate work areas during in-water construction activities by using oil containment booms. Maintain a supply of oil booms, sorbent pads and other supplies to contain and clean spills. Contain and cleanup any hazardous material spills immediately and notify Engineer.

## 3.11 CONSTRUCTION SITE HOUSEKEEPING

A. Remove rubbish, trash, and debris from site on a regular basis. Transport and dispose of all rubbish and debris in accordance with all local regulations. Maintain staging area in an orderly manner. Regularly clean mud and debris, resulting from work at the site, from roadways; per DEQ 1200-C General Permit governing pollution from construction activities, sweeping and washing construction site sediment tracked onto roadways into roadside ditches is a violation. Cleanup and dispose of all concrete debris and washings when concrete work is complete.

## 3.12 PROTECTION OF EXISTING IMPROVEMENTS

A. Existing facilities, utilities, and property shall be protected from damage resulting from the Contractor's operations. Roadways and other improved surfaces shall be protected from damage by vehicles with tracks or lugs. Any damage resulting from the Contractor's operations shall be repaired by the Contractor to the condition which existed prior to the damage, and to the satisfaction of the Engineer, at no additional cost to the Owner.

B. Submit a video recording of the areas surrounding the project to the Owner's Representative prior to Mobilization to document existing conditions.

## 3.13 RESTORATION OF STRUCTURES AND SURFACES

A. Structures, Equipment, and Pipework. The Contractor shall remove such existing structures, equipment, and pipework as may be necessary for the performance of the work, and shall rebuild, or replace, the items thus removed in as good a condition as found. Contractor shall repair any existing structures that were damaged as a result of the Work.

B. Roads and Streets. Roadways used by the Contractor for hauling materials, equipment, supplies, etc., shall be cleaned and repaired if the condition of the roadway is damaged, or otherwise affected, due to the Contractor's operations.

C. Curbs, Gutters, Driveways, and Sidewalks. All curbs, gutters, driveways, sidewalks, and similar structures that are broken, or damaged, by the installation of the work shall be reconstructed by the Contractor. Reconstruction shall be of the same kind of materials with the same finish, and in not less than the same dimensions as to original work. Repairs shall be made by removing and replacing the entire portions between joints or scores, and not merely refinishing any damaged part. All restoration work shall match the appearance of the existing improvements, as nearly as possible.

D. Cultivated Areas and Other Surface Improvements. All cultivated and natural areas, either agricultural or lawns, and other surface improvements which are damaged by actions of the Contractor, shall be restored, including roadside drainage ditches, as nearly as possible, to their original conditions.

## 3.14 STORAGE OF MATERIALS AND EQUIPMENT

A. Materials and equipment shall be stored so as to ensure the preservation of their quality and fitness for the work. Stores of equipment and materials shall be located so as to facilitate inspection. The Contractor shall be responsible for all damages that occur in connection with the care and protection of all materials and equipment, supplied by the Contractor, until completion and final acceptance of the Work by the Owner.

## 3.15 TRAFFIC CONTROL

A. General. The Contractor shall be responsible for public safety and traffic control at all times.

B. The Contractor shall furnish, install, and maintain temporary construction warning signs, flaggers, barricades, and other devices necessary to safeguard the general public and the work, and to provide for the safe and proper routing of all vehicular and pedestrian traffic within and through the limits of the project during the performance of the work.

C. Traffic Control Plan. The Contractor will provide a traffic control plan to the Engineer for review and approval prior to project construction including: access points to Oregon Highway 30, staging areas, dump sites, operating hours, project duration, scheduling and phasing, and total number of construction vehicles and their respective haul routes, per project phase.

D. Contractor to prepare and submit to the City of Portland Bureau of Transportation (PBOT) for approval, a written traffic control plan. The plan shall be submitted at least two weeks prior to construction. It shall be the sole responsibility of the Contractor to coordinate with the PBOT and obtain necessary approvals.

E. No construction activities shall cause delays of railroad operations. The Owner shall not be held liable by the Contractor for construction delays caused by railroad operations.

## 4. MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. Work under this section will be measured for payment on a lump sum basis.

### 4.2 PAYMENT

A. The lump sum contract price for Construction Facilities and Temporary Controls, also known as Mobilization and Demobilization**,** will include full compensation for the furnishing of all labor, materials, tools, equipment, administrative costs, and incidentals for mobilization; demobilization; and temporary facilities and controls.

B. Attention is directed to Section 00210.90, "Payments" of the Standard Specifications.

C. Payments for mobilization will be made as follows:

D. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 5 percent or more of the original contract amount, 50 percent of the contract item price for mobilization or 5 percent of the original contract amount, whichever is the lesser, will be included in the estimate for payment.

E. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 10 percent or more of the original contract amount, the total amount earned for mobilization shall be 100 percent of the contract item price for mobilization or 10 percent of the original contract amount, whichever is the lesser, and that amount will be included in the estimate for payment.

F. When all work is completed, the amount of mobilization cost exceeding 10 percent of the original Contract amount will be included in the estimate of payment.

G. The contract lump sum price paid for mobilization shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in mobilization as specified.

H. No separate payment will be made for compliance with the conditions of the permits identified in the Contract Documents. The lump sum price for mobilization-demobilization will include full compensation for these costs.

I. Payment will be made under:

| Pay Item | Pay Unit |
|---|---|
| Mobilization & Demobilization | Lump Sum |

**END OF SECTION**

# INDEX
# SECTION 015626
# TEMPORARY FENCE – TYPE ESA

**Paragraph** **Page**

# SECTION 015626
# TEMPORARY FENCE – TYPE ESA

## 1. GENERAL

### 1.1 DESCRIPTION

A. Work under this section includes furnishing all labor, materials, equipment, and incidentals to install, maintain, and remove Temporary Fence – Type ESA , as shown on the Drawings, as specified, or as otherwise directed by the Engineer.

### 1.2 RELATED SECTIONS

1. Section 015000, Mobilization
2. Section 015713 Erosion and Sediment Control Plan Implementation
3. Section 311100, Clearing and Grubbing
4. Section 312316, Stripping and Excavation

### 1.3 REFERENCES

A. Oregon Department of Transportation (ODOT) Standard Specifications for Construction, current edition

### 1.4 SUBMITTALS

A. The following submittals shall be provided in accordance with Section 013300.

1. Manufacturer’s data for proposed fencing fabric.
2. Manufacturer’s data or descriptive literature for proposed fence posts.

## 2. PRODUCTS

### 2.1 MATERIALS

A. High Visibility Fabric. High visibility fabric shall be machine produced, orange colored mesh manufactured from polypropylene or polyethylene. High visibility fabric may be made of recycled materials. Materials shall not contain biodegradable filler materials that can degrade the physical or chemical characteristics of the finished fabric. High visibility fabric shall be fully stabilized ultraviolet resistant and a minimum of four feet in width with a maximum mesh opening of 2” x 2”. High visibility fabric shall be furnished in one continuous width and shall not be spliced to conform to the specified width dimension.

B. Posts. Posts for temporary fence (Type ESA) shall be of one of the following:

1. Wood posts shall be fir or pine, shall have a minimum cross section of 2” x 2”, and a minimum length of 5.25 feet. The end of the post to be embedded in the soil shall be pointed. Wood posts shall not be treated with wood preservative.
2. Steel posts shall have a “U,” “T,” “L,” or other cross sectional shape that resists failure from lateral loads. Steel posts shall have a minimum weight of 0.75 pounds per linear foot and a minimum length of 5.25 feet. One end of the steel post shall be pointed and the other end shall have a high visibility colored top.

C. Fasteners. Fasteners for attaching high visibility fabric to the posts shall be as follows:

1. The high visibility fabric shall be attached to wooden posts with commercial quality nails or staples, or as recommended by the manufacturer or supplier.
2. Tie wire or locking plastic fasteners shall be used for attaching the high visibility fabric to steel posts. Maximum spacing of tie wire or fasteners shall be 24 inches along the length of the steel post.

D. Used materials may be installed provided the used materials conform to these Specifications.

## 3. EXECUTION

### 3.1 INSTALLATION

A. All fence construction activities shall be conducted from the work side of the ESA as shown on the Drawings or as flagged in the field by the Engineer.

B. Posts shall be embedded in the soil a minimum of 16 inches. Post spacing shall be eight feet maximum from center to center and shall at all times support the fence in a vertical position.

C. Temporary fence (Type ESA) shall be constructed prior to clearing and grubbing work, shall enclose the foliage canopy (drip line) of protected plants, and shall not encroach upon visible roots of the plants.

D. Temporary fence (Type ESA) shall be located so that it is clearly visible, as determined by the Engineer.

### 3.2 MAINTENANCE

A. Temporary fence (Type ESA) that is damaged during the progress of the work shall be repaired or replaced by the Contractor the same day the damage occurs.

### 3.3 REMOVAL

A. When Type ESA fence is no longer required, as determined by the Engineer, it shall be removed and disposed of, except when reused as provided in this section.

B. Holes caused by the removal of temporary fence (Type ESA) shall be backfilled.

## 4. MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. Temporary Fence – Type ESA will not be separately measured for payment.

### 4.2 PAYMENT

A. No separate payment will be made for Temporary Fence – Type ESA. Full compensation for all costs associated with this work shall be included in the contract price ESCP Implementation in accordance with Section 015713.

**END OF SECTION**

# INDEX
# SECTION 015713
# EROSION AND SEDIMENT CONTROL PLAN IMPLEMENTATION

**Paragraph** **Page**

# SECTION 015713
# EROSION AND SEDIMENT CONTROL PLAN IMPLEMENTATION

## 1. GENERAL

### 1.1 DESCRIPTION

A. The work covered by this section consists of implementation of the approved Erosion and Sediment Control Plan (ESCP), as specified in the Oregon DEQ 1200-C permit and as specified in this Section and in compliance with the requirements of the Oregon Department of Environmental Quality (DEQ) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, General Permit No. 1200-C, Expiration Date December 14, 2020, hereafter Construction General Permit (CGP).

B. The Contractor shall be responsible for penalties assessed on the Contractor or the Owner as a result of the Contractor's failure to comply with the CGP or with the applicable provisions of the Federal, State, and local regulations and requirements. Penalties as used in this section shall include fines, penalties, and damages, whether proposed, assessed, or levied against the State or the Contractor, including those levied under the Federal Clean Water Act, by governmental agencies or as a result of citizen suits. Penalties shall also include payments made or costs incurred in settlement for alleged violations of applicable laws, regulations, or requirements. Costs incurred could include sums spent instead of penalties, in mitigation or to remediate or correct violations.

C. The Contractor shall perform the role of Qualified ESCP Inspector, as outlined in the ESCP.

D. Nothing in the terms of the Contract nor in these Technical Specifications shall relieve the Contractor of the responsibility for compliance with applicable statutes relating to prevention or abatement of water pollution.

E. All areas of exposed earth created by the Contractor, beyond what is shown on the Drawings, and referred to in the Technical Specifications or the ESCP, shall also be subject to the provisions of this Section, except that the Contractor shall be fully responsible for all additional costs and liabilities associated with ESCP Implementation in these areas.

F. The ESCP will be periodically amended by the ESCP Inspector to reflect current site conditions. The Owner will not be liable to the Contractor for Contractor’s failure to accept all or any portion of an amended or revised ESCP program, nor for any delays to the Work due to the Contractor’s failure to implement the amended ESCP.

G. The measures outlined in the ESCP reflect the minimum requirements of the CGP. The Contractor is responsible to perform all additional work, beyond what is shown on the Drawings or the approved ESCP at the time the contract is awarded, as necessary to meet changing or unforeseen sight conditions and to comply with the CGP, at no additional cost to the owner.

H. Implementation of pollution control measures (BMPs) shall conform to the Drawings, the ESCP, the CGP conditions, and these Specifications.

## 1.2 RELATED SECTIONS

1. Section 015000, Mobilization
2. Section 015626, Temporary Fence – Type ESA
3. Section 015713.01, Fiber Roll
4. Section 015713.02, Silt Fence
5. Section 024100, Demolition

## 1.3 REFERENCES

A. Approved Project Erosion and Sediment Control Plan (ESCP).

B. State of Oregon Department of Environmental Quality, Water Quality Division, construction Stormwater Best Management Practices Manual, 1200-C NPDES General Permit, March 2013.

## 1.4 SUBMITTALS

A. The Engineer's review and approval of Contractor's submittals shall not waive any contract requirements and shall not relieve the Contractor from complying with the CGP, the ESCP, or Federal, State and local laws, regulations, and requirements.

B. Submit to the Engineer, for review, Manufacturer's product information for materials proposed for use on site for implementation of the ESCP.

C. The Contractor shall submit a Permit Transfer form with applicable fees to Owner's Representative a minimum of two (2) weeks prior to starting construction.

D. If directed by the Engineer or requested in writing by the Contractor and approved by the Engineer, changes to the pollution control measures specified in the ESCP will be allowed, provided they comply with the CGP conditions.

E. The Contractor shall keep a copy of the approved ESCP and inspection documentation at the job site. The ESCP and inspection documentation shall be made available when requested by the Engineer, Owner's Representative, a representative of the City of Portland, Oregon Department of Environmental Quality, and/or United States Environmental Protection Agency. Requests from the public shall be directed to the Owner's Representative.

F. The Contractor shall submit a Notice of Termination form to Owner's Representative and DEQ at the conclusion of construction activities after final stabilization of exposed soils has occurred.

# 2. PRODUCTS – NOT USED

# 3. EXECUTION

## 3.1 GENERAL

A. Transfer the ESCP to the Contractor's name prior to site disturbing activities.

B. Implement ESCP measures as the first order of business upon site mobilization.

C. Owner will not be responsible for delays caused by the Contractor's failure to conform to the approved ESCP, this Section, or the CGP. The Owner's Representative may order the suspension of construction operations which create or have the potential to create water pollution, at the sole expense of the Contractor.

D. The Contractor's responsibility for ESCP implementation shall continue throughout any temporary suspension of work ordered in conformance with the provisions in Section 00180.70, "Suspension of Work," of the Standard Specifications.

E. Disturbed soil areas shall be considered active whenever the soil disturbing activities have occurred, continue to occur or will occur during the ensuing 14 days. Non-active areas shall be protected as required within 14 days of cessation of soil disturbing activities or prior to the onset of precipitation, whichever occurs first.

F. The Contractor shall install temporary soil stabilization materials for water pollution control in all disturbed work areas that are considered inactive (i.e. excess of 14 days) or before forecast storm events. Should any temporary erosion control of this nature be required elsewhere as directed by the Engineer and/or regulatory agencies, the Contractor shall install them within 48 hours of notification. Where applicable and upon acceptance of the Engineer, the Contractor shall furnish and apply/install temporary mulch, temporary hydraulic mulch, temporary erosion control blankets, or temporary covers in conformance with the Standard Specifications and these Technical Specifications. Materials and construction methods shall comply with the Standard Specifications and these Technical Specifications.

G. The Contractor shall maintain a temporary cover on all stockpiles at all times; and shall install and maintain appropriate BMPs (filter fence, sediment logs, etc.) around the perimeter at the base of stockpile to control the potential runoff of any loose sediments and pollutants. Whenever a temporary cover is removed to perform other work, the temporary cover shall be replaced and secured within one (1) hour of stopping work.

## 3.2 MAINTENANCE, INSPECTION AND REPAIR

A. The Contractor shall maintain all temporary erosion control measures, devices, and/or BMPs placed in the work, for the duration of the project. Maintenance includes all Manufacture's recommendations, and includes but is not limited to the following:

1. Damage to any temporary erosion control devices and/or BMPs during the course of the project shall be repaired by the Contractor immediately upon discovery and at his expense.
2. Temporary erosion control devices and/or BMPs shall be inspected routinely and immediately after each rainfall event and at least daily during prolonged rainfall events. Any required repairs shall be made immediately.
3. Construction limit fencing shall be inspected daily and repaired, secured, and/or replaced as necessary to maintain and preserve its intended purpose.

4. All signage as required for the project shall be routinely inspected and repaired or replaced upon discovery of damage, vandalism, and/or missing parts.
5. Should the silt fabric decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, the fabric shall be replaced promptly.
6. Should a fiber roll decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, the fiber roll shall be replaced promptly.
7. Any stakes and/or rope used to secure a fiber roll in place shall be routinely inspected and repaired as necessary if found to be loose or ineffective.
8. Sediment deposits and other debris shall be removed when they reach approximately one-half the height of the sediment barrier (or as recommended by the Manufacture) and disposed of in a manner acceptable to the Engineer. Any sediment deposits remaining in place after the temporary erosion control measure and/or BMPs is no longer required shall be removed and disposed of.

B. For all project Risk Levels, the Inspector, or a approved substitute designated and trained by the Inspector (Inspector-substitute) shall inspect the site before a forecast storm (within 48 hours prior to a forecast storm), during the storm (at required intervals during extended rains), and after a storm (not later than 48 hours after rain event). Inspections shall be documented as specified in the ESCP. Inspection forms shall be provided to the Owner’s Representative within 72 hours of a request.

C. Stormwater inspections shall be performed at all active areas and all areas with installed BMPs as required by permit and the ESCP, and on a minimum weekly basis, year-round by the Inspector or individual trained by the Inspector. More frequent monitoring is required for rain events.

D. Non-Stormwater inspections shall be performed quarterly by the Inspector or Inspector-substitute (quarterly inspection time periods are January-March, April-June, July-September, and October-December).

E. The Inspector or Inspector-substitute shall conduct all inspections, sampling and analyses, as required by the CGP and the ESCP, at all active areas and all areas with installed BMPs.

F. If the Contractor, Owner’s Representative or Engineer identifies a deficiency in any aspect of the implementation of the approved ESCP or amendments, the deficiency shall be corrected immediately (within 72 hours of identification). The deficiency may be corrected at a later date and time if requested by the Contractor and approved by the Engineer in writing, but not later than the onset of precipitation. If the Contractor fails to correct the identified deficiency by the date agreed or prior to the onset of precipitation, the Project shall be in noncompliance.

G. Contractor shall provide Water Pollution Control training as required by the CGP.

H. The Inspector shall inspect the pollution control measures to identify their effectiveness and implement repairs as required by the CGP.

I. Furnish sufficient personnel, materials and adequate equipment to perform the water pollution control maintenance work immediately and to work continuously until its completion. Water pollution control maintenance work shall consist of maintaining and replacing temporary water pollution control measures throughout the duration of the Contract until permanent measures are accepted by the Engineer. Maintenance work shall be considered as integral functional practices to implement water pollution control. Failure to fully comply with the requirements of the CGP shall subject the Contractor to all fines, damages and job delays incurred due to failure to implement and properly update the ESCP.

J. If the measures being taken by the Contractor are inadequate to control water pollution effectively, the Engineer may direct the Contractor to revise its operations and its ESCP program. Such directions will be in writing and will specify the items of Work for which the Contractor's water pollution control measures are inadequate. No further Work shall be performed on said items until the water pollution control measures are adequate and, if also required, a revised ESCP program has been accepted.

## 4. MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. ESCP Implementation will be measured on lump sum basis.

### 4.2 PAYMENT

A. The lump sum contract price for ESCP Implementation will include full compensation for the furnishing of all labor, materials, tools, equipment, administrative costs, and incidentals for temporary erosion control measures, devices, and BMPs, stockpile management, dust control, sweeping, and maintenance of all such water pollution control measures that may be shown on the ESCP, and as specified in the Contract Documents, Project Permit(s), Standard Specifications, these Technical Specifications, and as directed by the Engineer, and no additional compensation shall be allowed therefore.

B. Payment will be made under:

| Pay Item | Pay Unit |
|---|---|
| Temporary Erosion Control and BMP's | Lump Sum |

**END OF SECTION**

# INDEX
# SECTION 015713.01
# FIBER ROLL

**Paragraph** **Page**

# SECTION 015713.01
# FIBER ROLL

## 1. GENERAL

### 1.1 DESCRIPTION

A. Work under this Section includes furnishing all labor, materials, equipment, and incidentals to install, maintain, remove and dispose of Fiber Roll, as shown on the Drawings, as specified in the Erosion and Sediment Control Plan, as specified herein, or as otherwise directed by the Engineer.

B. Fiber Roll shall be furnished, installed, and maintained at the locations shown on the Drawings, as specified, and as indicated on the approved Erosion and Sediment Control Plan. Fiber Roll shall be installed on excavation and embankment slopes and other disturbed soil areas, active or non-active.

C. Related Sections

1. Section 015000, Mobilization
2. Section 015713, Erosion and Sediment Control Plan Implementation
3. Section 312316, Stripping and Excavation
4. Section 313519.16, Slope Protection Fabric

### 1.2 SUBMITTALS

A. The following submittals shall be provided in accordance with Section 013300.

1. A certificate stating the name of the Fiber Roll manufacturer, product name, style compositions of filaments or yarns and other pertinent information to fully describe the geotextile, along with the manufacturer's certification of compliance with the material specifications contained herein.

## 2. PRODUCTS

### 2.1 MATERIALS

A. Fiber Roll. Fiber Roll shall be:

1. A pre-manufactured roll made from 100% weed free rice straw and wrapped in a 100% biodegradable tubular 7 oz. Plain Burlap liner. The burlap is Medium Weight Natural Burlap with a 9 X 8 Warp & Fill, and a minimum weight of 7 oz. per square yard. Plastic/photodegradable netting will not be accepted as an alternate.
2. 9-inch rolls shall have a minimum weight of approximately 1.6 pounds per foot.
3. 12-inch rolls shall have a minimum weight of approximately 3.8 pounds per foot.

B. Stakes. Wood stakes shall be a minimum of 2" x 4" x 24" (ripped diagonally) for Type 1 installation or a minimum of 1" x 2" x 24" in size for Type 2 installation. Wood stakes shall be untreated fir, redwood, cedar, or pine and cut from sound timber. They shall be straight and free of loose or unsound knots and other defects which would render them unfit for the purpose intended. Metal stakes shall not be used.

C. Rope. Rope shall be biodegradable, such as sisal or manila, with a minimum diameter of 1/4 inch.

## 3. EXECUTION

### 3.1 INSTALLATION

A. Fiber Roll shall be installed as follows:

B. Type 1: Furrows shall be constructed to a depth between three inches and four inches, and to a sufficient width to hold the Fiber Roll. Soil excavated from the trench shall be placed on the uphill or flow side of the roll to prevent water from undercutting the roll. Stakes shall be driven through the center of the roll (perpendicular to the finished grade) at 36 inches apart along the length of the Fiber Roll and stopped at 12 inches from each end of the rolls. Stakes shall be driven to between two and three inches above the top of the roll.

C. Type 2: Rope and notched stakes shall be used to restrain the Fiber Rolls against the slope. Stakes shall be driven into the slope until the notch is even with the top of the Fiber Roll. Rope shall be knotted at each stake and laced between stakes. After installation of the rope, stakes shall be driven into the slope such that the rope will hold the Fiber Roll tightly to the slope. Furrows will not be required.

D. Fiber Roll shall be placed at locations shown in the drawings at a maximum of 10 feet apart along the slope for slope inclination (horizontal:vertical) of 2:1 and steeper, 15 feet apart along the slope for slope inclination between 2:1 and 4:1, 20 feet apart along the slope for slope inclination between 4:1 and 10:1, and a maximum of 50 feet apart along the slope for slope inclination of 10:1 and flatter.

E. The bedding area for the Fiber Roll shall be cleared of obstructions including rocks, clods, and debris greater than one inch in diameter before installation.

F. Fiber Roll shall be installed approximately parallel to the slope contour and the terminus of rows shall be angled up-slope at 45 degrees for a distance of three feet. Where fiber rolls meet, provide an overlap of two feet, with adjacent rolls tightly abutting each other.

G. Fiber Roll shall be installed prior to seeding where used without slope protection fabric.

H. Fiber roll shall be installed over fabric (after seeding) where slope protection fabric is specified.

### 3.2 MAINTENANCE

A. The Contractor shall inspect all Fiber Roll immediately after each rainfall, and at least daily during prolonged rainfall. Any deficiencies shall be immediately corrected by the Contractor.

B. The Contractor shall also make a daily review of the location of Fiber Roll in areas where construction activities have altered the natural contour and drainage runoff to ensure that the Fiber Rolls are properly located for effectiveness. Where deficiencies exist as determined by the Engineer, additional Fiber Rolls shall be installed as directed by the Engineer.

C. Damaged or otherwise ineffective Fiber Roll shall be repaired or replaced promptly. Fiber Roll shall be maintained to disperse concentrated water runoff and to reduce runoff velocities. Split, torn, or unraveling rolls shall be repaired or replaced. Broken or split stakes shall be replaced. Sagging or slumping Fiber Roll shall be repaired with additional stakes or replaced. Locations where rills and other evidence of concentrated runoff have occurred beneath the rolls shall be corrected. Fiber Roll shall be repaired or replaced within 24 hours of identifying the deficiency.

## 3.3 REMOVAL

A. Fiber Rolls shown on the Drawings shall remain in place after project completion, unless otherwise specified, and be allowed to naturally degrade.

## 4. MEASUREMENT AND PAYMENT

## 4.1 MEASUREMENT

A. Fiber Roll will be measured by the linear foot of Straw Roll installed at the locations indicated on the Drawings, as specified, or as directed by the Engineer

B. Fiber Roll that the Contractor installs for the implementation of the ESCP, in addition to that shown on the Drawings, shall not be separately measured for payment.

## 4.2 PAYMENT

A. Fiber Roll will be paid for at the contract price per linear foot, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals necessary to install, maintain throughout the construction, and, where specified, to remove Fiber Roll after site stabilization.

B. Fiber Roll that the Contractor installs for the implementation of the ESCP, in addition to that shown on the Drawings, shall be paid for under Erosion and Sediment Control Plan Implementation, Section 015713.

C. Fiber Rolls required or used on a short term basis that are not permanently staked in place or are anticipated to be moved on a daily or routine basis (such as areas immediately adjacent to trench excavations, temporary stockpiles, active areas for soil processing/screening operations, spill containment devices, etc.) shall be considered as included in prices paid for the various contract items of work involved, and no additional compensation will be allowed.

D. Payment shall be made under:

| **Pay Item** | **Pay Unit** |
|---|---|
| Fiber Roll | Linear Foot |

**END OF SECTION**

# INDEX
# SECTION 015713.02
# SILT FENCE

# SECTION 015713.02
# SILT FENCE

## 1. GENERAL

### 1.1 DESCRIPTION

A. Work under this Section includes furnishing all labor, materials, equipment, and incidentals to install, maintain, and remove silt fence, as shown on the Drawings, as specified in the Erosion and Sediment Control Plan, and as specified, or as directed by the Engineer.

B. This Specification is applicable to the use of a geotextile as a vertical, permeable interceptor designed to remove suspended soil from overland water flow. The function of a temporary silt fence is to filter and allow settlement of soil particles from sediment-laden water. The purpose is to prevent the eroded soil from being transported off the construction site by water runoff.

C. Temporary silt fence shall be furnished, installed, maintained, and later removed at the locations shown on the approved Erosion and Sediment Control Plan and in conformance with details shown on the Drawings and these Specifications.

D. Temporary silt fence shall be one of the water pollution control practices for sediment control. The Erosion and Sediment Control Plan shall include the use of temporary silt fence.

### 1.2 RELATED SECTIONS

1. Section 015000, Mobilization
2. Section 015713 Erosion and Sediment Control Plan Implementation
3. Section 312316, Stripping and Excavation
4. Section 312319, Dewatering

### 1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. D 4355 - Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus).
2. D 4491 - Test Methods for Water Permeability of Geotextiles by Permittivity.
3. D 4632 - Test Method for Grab Breaking Load and Elongation of Geotextiles.
4. D 4751 - Test Method for Determining Apparent Opening Size of a Geotextile.
5. D 4833 - Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
6. D 4873 - Guide for Identification, Storage, and Handling of Geotextiles.

### 1.4 SUBMITTALS

A. The following submittals shall be provided in accordance with Section 013300.

1. The silt fence manufacturer, product name, style, chemical compositions of filaments or yarns and other pertinent information to fully describe the silt fence fabric.
2. The Manufacturer is responsible for establishing and maintaining a quality control program to assure compliance with the requirements of the Specification. Documentation describing the quality control program shall be made available upon

request.

3. Manufacturing Quality Control (MQC) test results shall be provided upon request.

## 1.5 DELIVERY, STORAGE, AND HANDLING

A. Silt fence fabric labeling, shipment and storage shall follow ASTM D 4873.

B. Product labels shall clearly show the manufacturer or supplier name, style name, and roll number.

C. Each shipping document shall include a notation certifying that the material is in accordance with the manufacturer's certificate.

D. Each silt fence roll shall be wrapped with a material that will protect the silt fence from damage due to shipment, water, sunlight, and contaminants.

E. The protective wrapping shall be maintained during periods of shipment and storage. If the wrapping is damaged prior to installation, the outer wrap of silt fence material must be discarded before installation.

F. During storage, silt fence rolls shall be elevated off the ground and adequately covered to protect them from the following: Site construction damage, extended exposure to ultraviolet (UV) radiation, precipitation, chemicals that are strong acids or strong bases, flames, sparks, temperatures in excess of 71 deg C (160 deg F) and any other environmental condition that might damage the silt fence.

## 2. PRODUCTS

## 2.1 MATERIALS

A. At the Contractor's option, temporary silt fence shall be prefabricated or constructed with silt fence fabric, posts, and fasteners.

B. Silt Fence Fabric. Silt fence fabric shall be geotextile manufactured from woven polypropylene or polymer material. Silt fence fabric may be virgin, recycled, or a combination of virgin and recycled polymer materials. No virgin or recycled polymer materials shall contain biodegradable filler materials that can degrade the physical or chemical characteristics of the finished fabric. Silt fence fabric shall conform to the following requirements:

| **Specification** | **Requirements** |
|---|---|
| Width, inches, min. | 36 |
| Grab tensile strength, KN (25 mm grip in each direction)<br>ASTM Designation: D 4632* | 0.45, min. |
| Elongation, percent minimum in each direction<br>ASTM Designation: D 4632* | 20, min. |
| Permittivity, 1/sec., min.<br>ASTM Designation: D 4491 | 0.1-0.15 |
| Ultraviolet stability, percent tensile strength retained after 500 hours, min.<br>ASTM Designation: D 4355 (xenon-arc lamp and water spray weathering method) | 90, min. |
| * or appropriate test method for specific polymer | |

C. Posts. Posts for temporary silt fence shall be one of the following:

1. Untreated fir or pine, a minimum of 2" x 2" in size, and four feet in length. One end of the post shall be pointed.
2. Steel and have a "U," "T," "L," or other cross sectional shape that can resist failure from

lateral loads. The steel posts shall have a minimum weight of 0.8-pound per foot and a minimum length of 4 feet. One end of the steel posts shall be pointed and the other end shall be capped with an orange or red plastic safety cap which fits snugly to the steel post. The Contractor shall submit to the Engineer for approval a sample of the capped steel post prior to installation.

D. Fasteners. Fasteners for attaching silt fence fabric to posts shall be as follows:

  1. When prefabricated silt fence is used, posts shall be inserted into sewn pockets.
  2. Silt fence fabric shall be attached to wooden posts with nails or staples as shown on the Drawings or as recommended by the manufacturer or supplier. Tie wire or locking plastic fasteners shall be used to fasten the silt fence fabric to steel posts. Maximum spacing of fasteners shall be eight inches along the length of the steel post.

## 3. EXECUTION

### 3.1 FIELD ASSEMBLY:

A. The silt fence fabric shall be installed on the side of the posts facing the slope.

B. The silt fence fabric at the bottom of the fence shall be buried in a “J” configuration to a minimum depth of 150 mm (six inches) in a trench so that no flow can pass under the silt fence. Mechanically pushing 12 inches of the silt fence fabric vertically through the soil may be allowed if the Contractor can demonstrate to the Engineer that the silt fence fabric will not be damaged and will not slip out of the soil resulting in sediment passing under the silt fence fabric.

C. The trench shall be backfilled and the soil compacted over the upslope side of the silt fence fabric.

D. When joints are necessary, filter fence fabric shall be spliced together only at a support post, with a minimum twelve (12) inches overlap and securely sealed or stitched.

E. The Contractor must demonstrate to the satisfaction of the Engineer that the silt fence fabric can withstand a sediment load of 1/3 the height of the fence.

F. The posts shall be placed at the spacing as shown on the Drawings. Post should be driven or placed a minimum of 450 mm (18 inches) into the ground. Depth shall be increased to 600 mm (24 inches) if fence is placed on a slope of 3:1 or greater. Where 450 mm (18 inches) depth is impossible to attain, the posts should be adequately secured to prevent overturning of the fence due to sediment loading.

G. Support fence, if required, shall be fastened securely to the upslope side of the fence post. The support fence shall extend from the ground surface to the top of the silt fence fabric.

H. When self-supported fence is used, the silt fence fabric shall be securely fastened to fence posts.

I. Temporary silt fence shall be installed parallel with the slope contour in reaches not to exceed 500 feet. A reach is considered a continuous run of temporary silt fence from end to end or from an end to an opening, including joined panels. Each reach shall be constructed so that the elevation at the base of the fence does not deviate from the contour more than 1/3 of the fence height. The fence shall be placed such that water cannot runoff around the end of the fence; this may be accomplished by constructing end-returns that angle up the slope.

J. The silt fence should be limited to handle an area equivalent to 90 square meters (100 sy) per three meters (ten feet) of fence. Caution should be used where the site slope is greater than

1:1 and water flow rates exceed three liters (0.8 gallons) per second per three meters (ten feet) of fence.

### 3.2 INSPECTION

A. The Contractor shall inspect all temporary silt fences immediately after each rainfall, and at least daily during prolonged rainfall. Any deficiencies shall be immediately corrected by the Contractor.

B. The Contractor shall also make a daily review of the location of silt fences in areas where construction activities have altered the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist as determined by the Engineer, additional silt fence shall be installed as directed by the Engineer. Damaged or otherwise ineffective silt fences shall be repaired or replaced promptly.

C. Should the filter fence fabric decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, the fabric shall be replaced promptly.

D. Sediment deposits shall either be removed when the deposit reaches one third the height of the fence, or a second silt fence shall be installed as directed by the Engineer.

### 3.3 REMOVAL

A. The silt fence shall remain in place for the complete duration of the project as necessary to conform to the Project Permit(s) and ESCP, or until the Engineer directs it be removed. Upon removal, the Contractor shall remove and dispose of any excess sediment accumulations, use hand tools to grade disturbed areas to drain in the pre-disturbance direction, and revegetate all bare areas in accordance with contract requirements. Trimming the silt fence fabric and leaving it in place will not be allowed.

B. Removed silt fence may be used at other locations provided the silt fence fabric and other material requirements continue to be met to the satisfaction of the Engineer.

C. Ground disturbance caused by the installation and removal of the temporary silt fence shall be backfilled and repaired in conformance with the provisions in Section 00280.70, “Removal” of the Standard Specifications.

## 4. MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. Temporary silt fence will not be separately measured for payment.

### 4.2 PAYMENT

A. No separate payment will be made for temporary silt fence. Full compensation for all costs associated with this work, as shown on the Drawings, as specified, or as directed by the Engineer shall be paid for under Section 015713, Erosion and Sediment Plan Implementation.

**END OF SECTION**

# INDEX
# SECTION 017123.16
# CONSTRUCTION SURVEYING

# SECTION 017123.16
# CONSTRUCTION SURVEYING

## 1. GENERAL

### 1.1 DESCRIPTION

A. The work required under this Section shall include, but is not limited to, all labor, tools, materials, equipment and incidentals required to perform construction surveying necessary to establish the lines and grades of the proposed work, as shown on the Drawings, as specified, or as directed by the Engineer.

### 1.2 WORK INCLUDED

A. The Contractor shall be responsible for procuring professional land surveying services as necessary to construct this project. An Oregon licensed Land Surveyor, or Civil Engineer authorized to practice land surveying as defined in the Oregon Revised Statutes 672, shall be in responsible charge of all survey work to be performed in conjunction with the scope of work of this project.

B. The Contractor shall preserve and protect all project survey control and reference points shown on the Drawings and located outside the limits of disturbance. Monuments disturbed by the Contractor shall be reestablished by the Contractor at his sole expense.

C. The Contractor shall be solely responsible for the protection and maintenance of all existing and Contractor-established survey marks and monuments.

### 1.3 SUBMITTALS

A. The Contractor shall provide the name, license number, and documentation for the required minimum qualifications of the Land Surveyor to be employed by the Contractor for the Project, prior to any work being completed by the Contractor or Surveyor.

### 1.4 REFERENCES

A. Oregon Standard Specifications for Construction, Oregon Department of Transportation (current edition).

### 1.5 QUALITY ASSURANCE

A. All Work shall be performed to the satisfaction of the Engineer.

B. The Engineer may, at his sole discretion, perform his own surveys for: verification of project control points, verification of lines and grades, and inspection of survey monument preservation. Contractor shall provide unrestricted access for the Engineer to spot-check the work. This does not relieve the Contractor of their responsibility to perform additional independent surveying, as need to complete the work.

C. In the event that the construction staking reveals a design inconsistency or error, Contractor shall notify the Engineer immediately and shall not proceed with the work until directed by the Engineer.

## 2. PRODUCTS (Not Used)

## 3. EXECUTION

A. The Engineer will establish a minimum of three survey control monuments, as shown on the Drawings. The Contractor's surveyor will be provided with the northing, easting and elevation of the control points existing in the field as shown on the Drawings. In addition the Engineer of Record will also provide the Contractor's surveyor with the final linework file developed in AutoCAD Civil 3D. The Contractor's surveyor will be required to access AutoCAD in order to use the electronic files. Civil 3D information does not transfer to base AutoCAD or older versions of AutoCAD and therefore will not be available to Land Surveyors who do not have this program.

B. From this information, the Contractor shall establish the baseline control points and reference points for horizontal and vertical control and make all additional detailed surveys and measurements and establish markings or monuments necessary for the construction of the work as dimensioned on the Drawings.

C. At a minimum, construction staking shall include the following:

1. Proposed clearing and grubbing limits,
2. Proposed channel alignment (centerline),
3. Proposed grading and contours for earthwork,
4. Proposed channel treatments, structures, and modifications,
5. Any other items required for a full, complete and accurately built project

D. All stakes and survey markers will be conspicuously marked with flagging tape or paint by the Contractor. The Contractor shall be responsible for protecting and maintaining all stakes from destruction.

## 4. MEASUREMENT AND PAYMENT

### **4.1** MEASUREMENT

A. Construction Surveying shall not be independently measured for payment.

### **4.2** PAYMENT

A. No separate payment will be made for the work covered under this section. Full compensation for all costs in connection with Construction Surveying shall be included in the contract price for related work.

B. The cost of resetting and verifying control points disturbed by the Contractor will be borne by the Contractor. The cost of any such verification or replacement of bench marks and/or control survey points will be deducted from any monies due to the Contractor. The Contractor will not be allowed any adjustment in working days for such verification or replacement of survey control points.

**END OF SECTION**

# INDEX
# SECTION 024100
# DEMOLITION

**Paragraph** **Page**

# SECTION 024100
# DEMOLITION

## 1. GENERAL

### 1.1 DESCRIPTION

A. This Section includes:

1. Demolition and removal of below grade structures.
2. Demolition and removal of site improvements.
3. Demolition and removal of capped and abandoned site utilities.
4. Demolition materials recycling requirements: The Work of this contract shall provide for a minimum of 75% by weight of the solid waste generated in the Work to be diverted from landfill disposal through a combination of re-use and recycling activities.

### 1.2 DEFINITIONS

A. ”Demolish”: Remove from the site as property of Contractor and dispose of in a lawful manner at a site other than the Owner’s property. Disposal includes demolition, removal, disconnecting, transportation, disposal permits and fees, and all other items required to remove the material or equipment from the site.

B. “Salvage”: Remove from the area of work and place in location, within the Owner’s property as designated by the Owner. Salvage includes removal, disconnecting, loading onto trucks, transportation, and all other items required to return materials or equipment to the Owner in the same condition as which it is found.

C. “Abandon”: Disconnect and leave in plan with a watertight plug for all piping and conduits.

D. “Recycle”: The process of sorting, cleansing, treating, and reconstituting materials for the purpose of using the altered for in the manufacture of a new product. Recycling does not include burning, incinerating, or thermally destroying solid waste.

E. “Reuse”: The use, in the same or similar form as it was produced, of a material which might otherwise be discarded.

### 1.3 OBSTRUCTIONS

A. Some constructions may not be shown on the Drawings. Bidders are advised to carefully inspect the existing facilities before preparing their proposals. The removal of minor obstructions such as electrical conduits, air, water, utility, site piping and similar items shall be anticipated and accomplished even though not shown or specifically mentioned.

B. Major obstructions encountered that are not shown or indicated on the Drawings, or could not have been foreseen by visual inspection of the site prior to bidding, should immediately be brought to the attention of the Owner’s Representative, who will make a determination for proceeding with the Work.

## 1.4 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain property of Owner, demolished materials shall become the Contractor's property and shall be removed, recycled, or disposed from Project site in an appropriate and legal manner.

1. Arrange a meeting no less than ten (10) days prior to demolition with the Owner's Representative and other designated representatives to review any salvageable items to determine if Owner wants to retain ownership, and discuss Contractor's Waste Management and Recycling Plan.

## 1.5 SUBMITTALS

A. The following submittals shall be provided in accordance with Section 013300:

1. Schedule of demolition activities indicating detailed sequence of demolition and removal work, including start and end dates for each activity, as well as dates for shutoff and capping of utility services.
2. If hazardous materials are encountered and disposed of, landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
3. Waste Management and Recycling Plan.
    - Contractor's name and project identification information;
    - Procedures to be used;
    - Materials to be re-used and recycled;
    - Estimated total quantities of materials generated in Project;
    - Names and locations of landfills, re-use and recycling facilities/sites;
    - Tonnage calculations that demonstrate that Contractor will re-use and recycle a minimum of 75% by weight of C&D materials generated in the Work.
    - Piling Removal Work Plan
4. Reuse, Recycling, and Disposal Report.
    - Report disposal or recycling either in tons or in cubic yards: if scales are available at disposal or recycling facility, report in tons; otherwise, report in cubic yards. Report in units for salvage items when no tonnage or cubic yard measurement is feasible.
    - Indicate locations to which materials are delivered for reuse, salvage, recycling, accepted as daily cover, inert backfill, or disposal in landfills or transfer stations.
    - Provide legible copies of weigh tickets, receipts, or invoices that specifically identify the project generating the material. Said documents must be from recyclers and/or disposal site operators that can legally accept the materials for the purpose of re-use, recycling, or disposal:

        Indicate project title, project number, progress payment number, name of company completing the Contractor's Report and compiling backup documentation, the printed name, signature, and daytime phone number of the person completing the form, the beginning and ending dates of the period covered on the Contractor's Report, and the date that the Contractor's Report is completed.

5. Piling Demolition GPS points in electronic format including whether each piling was fully removed or not.

## 1.6 RELATED SECTIONS

1. Section 015000, Mobilization
2. Section 015713, Erosion and Sediment Control Plan Implementation
3. Section 311100, Clearing and Grubbing
4. Section 312323, Engineered Fill

## 1.7 REFERENCES

A. Environmental Media Management Plan (EMMP), Farallon Consulting, Inc.

B. EPA Region 10 Best Management Practices For Piling Removal and Placement in Washington State, February 18, 2016.

## 2. PRODUCTS - Not Used

## 3. EXECUTION

## 3.1 GENERAL

A. Survey conditions of the site infrastructure prior to demolition and as Work progresses to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition.

1. Retain a licensed and qualified civil or structural engineer to provide analysis, including calculations, necessary to ensure the safe execution of the demolition work.
2. Strengthen or add new supports when required during progress of demolition.

B. Before beginning any work, carefully inspect the work and examine the Drawings and Specifications to determine the extent of the work to be performed. In the company of the Engineer, visit the site and verify the extent of the demolition and other work to be performed.

C. Contact all appropriate utilities and agencies to coordinate and verify all abandonments and relocations.

D. Provide a minimum of 48 hours of notice to any residences affected by a planned utility disruption.

E. Use of explosives will not be permitted.

F. Prevent dust from becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

G. Comply with all local regulations regarding dust generation, hauling and disposal.

H. Materials projecting above-ground shall be cut off at a minimum of three foot below finished grade. Backfill and compact all holes caused by removal of materials. Areas of site not detailed on the Drawings shall be filled and graded to drain, generally matching existing conditions.

I. Rock removed from the site may be re-used if it meets the materials specifications of the work item for which it is proposed.

J. All Work water ward of OHW, including piling demolition, shall be conducted during the approved in-water work window.

## 3.2 PROTECTION OF EXISTING WORK

A. Take all necessary precautions to ensure against damage to existing work to remain in place, or to be salvaged. Any damage to such work shall be repaired or replaced as directed by the Engineer.

B. Construct and maintain shoring, bracing, and supports, as required. Ensure that structural elements are not overloaded and increase structural supports, or add new supports, as may be required as a result of any cutting, removal, or demolition work performed.

C. Existing signs and mailboxes shall be temporarily relocated and replaced at completion of work, at locations to be approved by the Engineer.

## 3.3 UTILITY DISCONNECTS

A. Coordinate utility disconnections with responsible utilities as designated on the Drawings.

## 3.4 GENERAL DEMOLITION

A. Building Demolition: Demolish buildings completely and remove from the site. Use methods required to complete Work within limitations of governing regulations and as follows:

1. Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
2. Demolish concrete and masonry in sizes that will be suitable for acceptance at recycling or disposal facilities.
3. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
4. Break up and remove concrete slabs on grade in small sizes, suitable for acceptance at recycling or disposal facilities, unless otherwise shown to remain.
5. Remove all disconnected, abandoned above grade utilities on site.
6. Install suspended netting or tarps under all over water structures during demolition to prevent debris from entering the waterway.

B. Below-Grade Demolition: Demolish foundation walls and other below-grade construction in locations shown on the Drawings, as follows:

1. Completely remove below-grade construction, including foundation walls and footings to a minimum of 3 feet below finished grade.
2. Break up and completely remove below-grade concrete slabs, in small sizes, suitable for acceptance at recycling or disposal facilities.
3. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations to finished grade with Engineered Fill.

C. Selective Demolition

1. Pavement, Concrete and Masonry. Where portions of pavement, concrete or masonry facilities and foundations are to be selectively demolished, areas to be removed shall first be sawcut in neat and square lines for the full depth of the section. Pavement removal shall extend beyond limits of planned activities to extent required to maintain integrity of adjacent surfaces. If the straight edge or other immediate adjacent area of the saw cut concrete and/or asphalt pavement section is damaged prior to replacement of the structural section and surfacing, it shall be the Contractor's responsibility to re-cut any damaged, broken, or uneven portion prior to paving at his own expense. Under no circumstance shall the Contractor be allowed to pave against a joint with a broken, jagged, or uneven line.
2. Fences, Walls and Gates. Preserve access control where fencing, walls and gates are removed during construction. Repair damage caused by work under this contract to the satisfaction of the Engineer.

## 3.5 PILING DEMOLITION

A. Piling demolition shall be performed in accordance with the EPA Region 10 Best Management Practices For Piling Removal and Placement in Washington State dated February 18, 2016.

B. The Contractor and Engineer shall assess the condition of the pilings and identify whether the piling will be removed using a barge or upland equipment.

C. Prior to initiation of piling demolition, work area shall be confined within a floating containment boom with absorbent pads per the Drawings and ESCP. Floating debris shall be removed from the water within the confined area on a daily basis and placed in the piling confinement area. A turbidity curtain may also be required based on site conditions or permits.

D. Removal of pilings shall occur to the maximum extent practicable in-the-dry or during low water conditions.

E. Extract the pilings slowly to minimize turbidity in the water column and sediment disturbance.

F. Minimize overall damage to treated wood pilings during removal. This includes intentionally breaking the pilings by twisting, bending, or other deformation.

G. Upon removal from the substrate and water column, the piling shall be moved immediately to a containment area on a barge deck or upland area for processing and disposal.

H. The removed pilings shall not be intentionally shaken, hosed-off, stripped of scraped off, left hanging to drip or and other action intended to clean or remove adhering material from the piling. Any sediment associated with the removed piling shall be managed and disposed of in accordance with the Environmental Media Management Plan.

I. Submit a Piling Removal Work Plan to the Engineer that includes procedures for removing and handling removed pilings.

J. Vibratory Extraction of Pilings

1. Vibratory extraction shall be the first method employed for piling extraction.
2. The equipment operator shall “wake up” the piling by vibrating to break the skin friction bond between the piling and sediment, then slowly extract the piling with vertical upward pull to minimize turbidity in the water column and sediment disturbance.
3. Minimize overall damage to treated wood pilings during removal including intentionally breaking the pilings by twisting, bending, or other deformation.
4. Timber pilings located ordinary low water that break off above the mudline during vibratory extraction, shall be cut off at the mudline.
5. Timber pilings located above ordinary low water that break off less than two feet below the mudline shall be over-excavated and cut off two feet below the mudline.
6. Upon removal from the substrate and water column, the piling shall be moved immediately to a containment area on a barge deck or upland area for processing and disposal.
7. The removed pilings shall not be intentionally shaken, hosed-off, stripped of scraped off, left hanging to drip or and other action intended to clean or remove adhering material from the piling. Any sediment associated with the removed piling shall be managed and disposed of in accordance with the Environmental Media Management Plan.

K. Partial Cutting of Pilings

1. Partial cutting of the pilings shall be employed at the direction of the Owner’s Representative for pilings that broke off during vibratory extraction or a deteriorated to the point where vibratory extraction techniques are infeasible.
2. Hydraulic jetting devices shall not be used to move sediment away from piling.

L. Collect GPS location for each piling demolished per the above specifications. The GPS accuracy shall include if the piling was fully removed or cut off and shall have accuracy within 1’ of the pre-demolished piling location.

## 3.6 DEBRIS REMOVAL

A. Remove all trash, rubble and debris generated by demolition activities from the site on a regular basis

## 3.7 DISPOSITION OF MATERIALS

A. Salvaged Materials. Salvage of materials for reuse by the Owner shall include removal of the material, equipment, etc., from its present location and transporting, bundling, protecting, cleaning, and storing it in a designated location on the work site, as approved by the Engineer. Items which are specified to be reused, and are damaged during removal or storage, shall be repaired to the Engineer's satisfaction or replaced with new matching materials, at no cost to the Owner.

B. Wasted Materials. Title to all debris to be wasted and demolished materials is vested to the Contractor upon receipt of the Notice-to-Proceed. Contractor shall assume responsibility for any loss or damage to such property after the Notice-to-Proceed. Condition of such material is not guaranteed and the Contractor shall assume all liability for reuse of any such material.

C. Disposal. All materials removed under this section which are not salvaged by the facility owner for reuse or otherwise recycled, shall be disposed of off-site at appropriate disposal areas approved in advance by the Owner. The material shall be removed from the job site before completion of the contract. Material shall not be sold on the site. All loading, hauling, dumping, and disposal fees are the responsibility of the Contractor.

D. Hauling. Debris shall be removed and transported by approved haul routes in a manner as to prevent spillage on streets or adjacent areas.

## 4. MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. General Demolition work will not be separately measured for payment.

B. Piling Demolition will be measured by each piling embedded in substrate indicated on the Drawings, as specified, or as directed by the Engineer.

### 4.2 PAYMENT

A. General Demolition will be paid for at the lump sum contract price, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the demolition, salvage, disposal, recycling, and reuse of materials, as specified.

B. Piling Demolition, measured as specified, will be paid at the contract unit price for each piling demolished, which will include all costs in connection therewith.

C. Payment will be made under:

| Pay Item | Pay Unit |
|---|---|
| General Demolition | Lump Sum |
| Piling Demolition | Each |

**END OF SECTION**

# INDEX
# SECTION 101400
# SIGNAGE

# SECTION 101400
# SIGNAGE

## 1. GENERAL

### 1.1 DESCRIPTION

A. The work covered by this section includes providing all labor, materials, tools, and equipment necessary for furnishing and installing Signage, as shown on the Drawings.

### 1.2 REFERENCES

A. Oregon Standard Specifications for Construction, Oregon Department of Transportation, current edition.

### 1.3 SUBMITTALS

A. The following shall be provided in accordance with Section 013300.

   1. Submit complete shop drawings with detailed dimensions, specifications, and data on the complete signage and support assembly with associated accessories and parts.

## 2. PRODUCTS

### 2.1 MATERIALS

A. Panel signs shall be constructed of 80 mil thickness extruded aluminum with the following properties:

   1. Reflective white vinyl overlay.
   2. Lettering printed with weather, fead and abrasion resistant UV ink.

B. Support posts shall be constructed of 16 gauge galvanized steel.

C. Mounting hardware including nuts, bolts, and washers shall be aluminum.

D. Concrete used for collar shall conform to Section 00440 (Commercial Grade Concrete) of the Standard Specifications.

## 3. EXECUTION

### 3.1 GENERAL

A. Signage shall be installed in accordance with the manufacturer’s recommendations, as shown on the Drawings, and as specified herein.

B.

## 4. MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. Signage will be measured by the number of Signs installed, as shown on the Drawings, as specified, and as directed by the Engineer.

### 4.2 PAYMENT

A. Signage will be paid for at the contract unit prove for each sign installed including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing each Sign, complete in place, as shown on the Drawings, as specified herein, or as directed by the Engineer.

| Pay Item | Pay Unit |
|---|---|
| SIGNAGE | EA |

**END OF SECTION**

# INDEX
# SECTION 311100
# CLEARING AND GRUBBING

**Paragraph** **Page**

# SECTION 311100
# CLEARING AND GRUBBING

## 1. GENERAL

### 1.1 DESCRIPTION

A. The work covered by this section consists of furnishing all labor, equipment, and materials necessary to perform the clearing and grubbing, the salvage, removal or disposal of all cleared and grubbed materials, and the filling of all grubbing holes, as specified, as shown on the Drawings, or as directed by the Engineer.

B. Related Sections

1. Section 015000, Mobilization
2. Section 312316, Excavation
3. Section 312323, Engineered Fill
4. Section 024100, Demolition
5. Section 354200, Log Structures

### 1.2 REFERENCES

A. Oregon Department of Transportation (ODOT) Standard Specifications for Construction, current edition

## 2. PRODUCTS - Not Used

## 3. EXECUTION

### 3.1 CLEARING

A. General. All work shall comply with Section 311300, Natural Resource Protection, and Section 00320, Clearing and Grubbing of the Standard Specifications.

B. All trees, stumps, down timber, snags, brush, vegetation, old piling, stone, concrete rubble, abandoned structures, and similar debris shall be cleared within the limits of the construction extents, unless otherwise shown on the Drawings or directed by the Engineer.

C. In areas where grubbing is not required, the clearing operations shall consist of the complete removal of all obstructions above the ground surface.

D. Contractor shall flag all vegetation to be removed or salvaged for approval by Owner's Representative prior to its removal. Once the flagging is completed, Owner's Representative will walk the vegetation removal areas and approve them prior to Contractor initiating clearing and grubbing activities.

1. Salvaged vegetation for use in habitat features shall be stockpiled at a location approved by the Owner's Representative.

E. Contractor shall use hand-operated equipment for clearing and grubbing at any protected natural resource area or tree protection zone per sub-Sections

Environmentally Sensitive Area (ESA) Fencing Installation and Tree Protection Zone Fencing Installation.

F. Downed plant materials shall be removed from tree protection zones and protected natural resource areas by hand or with equipment located outside fencing. Contractor shall extract debris by lifting the material out, not skidding it across the soil surface,

G. Trees. Where trees are approved by the Owner's representative for removal or salvage, trees shall be felled in such a manner as to avoid damage to trees left standing, to the existing structures and installations, as well as with due regard for the safety of employees and others. Stumps shall be removed to minimum depth of 4 feet, or to a point where remaining roots are less than 1.5 inches in diameter, whichever depth is greater. Trees located beyond the limits for clearing and grubbing that are not marked for removal, shall be protected from damage, as indicated on the Drawings and as specified.

H. Vegetation. Vegetation to be removed shall consist of all heavy growth of brush and woody vegetation, unless shown otherwise on the Drawings or directed by the Engineer.

I. Debris Removal. Abandoned foundations, rip rap, drainage materials, debris, and other unsuitable material and any other debris designated for removal on the Drawings shall be removed and disposed of in accordance with this section. Buried unsuitable debris encountered during excavations shall be removed and disposed of in accordance with Section 312316, Stripping and Excavation.

## 3.2 GRUBBING

A. General. Grubbing shall consist of the removal of all stumps, roots, buried logs, old piling, old paving, concrete, abandoned utilities, timbers, fencing, and other objectionable matter encountered.

B. Limits. Except as noted on the Drawings, the entire area within the limits of the footprint of proposed habitat restoration project, shall be thoroughly grubbed.

C. Filling of Holes. All holes caused by grubbing operations, except in borrow areas, shall be excavated with 3 to 1 (horizontal to vertical) side slopes in conformance with Section 312316, Stripping and Excavation. The excavation shall then be backfilled with compacted embankment material in conformance with Section 312323, Engineered Fill.

## 3.3 DISPOSAL OF DEBRIS

A. Cleared and Grubbed Materials. Except as hereinafter specified or otherwise indicated on the Drawings, all logs, brush, strippings, concrete, asphalt, timbers, slash, and other non-organic debris which are the products of the clearing and grubbing operations shall be disposed of, unless shown otherwise on the Drawings or directed by the Engineer. Remove any or all of the products of clearing and grubbing operations from the site and dispose of the material at other locations or through other sources arranged for, by, and at the expense of the Contractor, in accordance with applicable laws and ordinances.

B. Clean woody plant material products of the clearing and grubbing operations not designated for salvage may be chipped and disposed of on site at the location shown on the Drawings, or as specified by the Engineer, subject to approval of the Owner.

## 4. MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. Clearing and Grubbing will be measured as a lump sum pay item.

### 4.2 PAYMENT

A. Clearing and Grubbing will be paid for at the lump sum contract price, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the clearing and grubbing operation as specified, including disposal or salvage of materials, and restoration of ground surfaces.

B. Removal and disposal of buried debris, not encountered during grubbing operations, will be paid for in accordance with Section 312316, Excavation – Unsuitable Debris.

C. Payment will be made under:

| Pay Item | Pay Unit |
|---|---|
| Clearing and Grubbing | Lump Sum |

**END OF SECTION**

# INDEX
# SECTION 312316
# STRIPPING AND EXCAVATION

**Paragraph** **Page**

# SECTION 312316
# STRIPPING AND EXCAVATION

## 1. GENERAL

### 1.1 DESCRIPTION

A. The work covered by this section consists of furnishing all labor, equipment, materials, and performing all operations necessary to complete Stripping and Excavation, as specified, as shown on the Drawings, or as directed by the Engineer. Work includes, but is not limited to the following:

1. Stripping for removal of vegetation and surface organics.
2. Excavation for removal of unsuitable material.
3. Channel Excavation
4. Other miscellaneous excavation incidental to the construction of the improvements.

B. Over-excavation for placement of RSP, log structures, manholes, and pipes is not included within this section, but is considered incidental to the work for which it is required.

### 1.2 RELATED SECTIONS

1. Section 015713, Erosion and Sediment Control Plan Implementation
2. Section 017123.16, Construction Surveying
3. Section 311100, Clearing and Grubbing
4. Section 312323, Engineered Fill

### 1.3 REFERENCES

A. Oregon Department of Transportation (ODOT) Standard Specifications for Construction, current edition

B. Environmental Media Management Plan (EMMP), Farallon Consulting, Inc.

C. Surveys. All construction staking shall be performed by the Contractor, in accordance with Section 017123.16, Construction Surveying. The Owner shall provide control points at the locations shown on the Drawings. Control points disturbed by the Contractor shall be replaced by the Contractor, at his sole expense

### 1.4 QUALITY ASSURANCE

A. Comply with all applicable permits and regulations.

B. Contractor shall provide necessary construction staking and references points, as required to meet the specified tolerances for the work.

## 2. PRODUCTS

### A. MATERIALS - SECTION NOT USED.

## 3. EXECUTION

### 3.1 GENERAL

A. The Contractor shall protect existing utilities in performing any excavation work.

B. The Contractor shall comply with all permit conditions in performing any excavation work.

C. Contractor shall perform an independent earthwork estimate for the purpose of preparing bid prices for earthwork. Quantities indicated on the Drawings are approximate estimates provided only for permitting purposes and are not suitable for bidding purposes.

D. The bid price shall include costs for any necessary export and proper disposal of excess or unsuitable earth materials off-site, at locations to be arranged and paid for by the Contractor.

### 3.2 STRIPPING

A. Stripping. Strip surfaces of excavations and fill foundations of heavy growth of crops, grass, weeds and other vegetation as specified in Section 311100, Clearing and Grubbing. Greater depths of stripping may be necessary in selected areas to remove vegetation, as determined by the Engineer.

B. Unless otherwise specified, the stripped materials shall be disposed of off-site, at locations to be arranged and paid for by the Contractor

### 3.3 EXCAVATION

A. General. Excavations shall extend into firm, undisturbed native soils. Excavation shall consist of removal of material for embankment foundation preparation, mass excavation and finish grading of the channel and slope improvements, and other miscellaneous excavations to the lines and grades shown on the Drawings, or as directed by the Engineer. In the event that organic materials, yielding sub-grade (pumping) or other deleterious materials are encountered during foundation excavations, they shall be removed as directed by the Engineer.

B. Control of Water. Water control shall be performed in accordance with project permit conditions, the approved ESCP, and Dewatering, Section 312319 of these Specifications. When water is encountered, either ground water or surface runoff, the Contractor shall furnish, install, maintain, and operate all necessary machinery and equipment required to keep the excavation reasonably free from water, as approved by the Engineer, until the placement of backfill material has been completed, inspected, and approved, and all danger of flotation and other damage is removed. Water pumped from the excavation shall be disposed of in such manner as will not cause injury to public or private property, or constitute a nuisance or menace to the public, and the disposal method shall be subject to the approval of the Engineer. Water shall be controlled until work is complete.

C. Excess Excavation. Care shall be exercised by the Contractor not to excavate below the grades shown on the Drawings, except as specified herein, and as directed by the Engineer. All excavations in excess of the grades shown on the Drawings which are not directed by the Engineer shall be backfilled with compacted embankment at the Contractor's expense, per Section 312323, Engineered Fill.

D. Temporary Excavations. With exposure and drying, on-site soils may experience progressive sloughing if excavated near vertical and left un-shored during construction. Engineer suggests that the soils on-site should be considered Type C when applying OSHA regulations.

E. Tolerances. The excavation tolerance at or below ordinary high water (OHW) elevation shall typically be +0.1 feet to -0.2 feet from the grades shown on the Drawings, except within the low flow channel, where excavation tolerance shall be +0.1 feet to -0.1 feet from the elevations shown on the Drawings. The excavation tolerance above ordinary high water shall typically be +1 foot to -.5 feet.

### 3.4 UNCLASSIFIED EXCAVATION

A. Unclassified Excavation. Unclassified excavation shall consist of the excavation and placement in upland fill areas of all material, regardless of its nature, which is not otherwise classified and paid for under Contaminated Media Excavation, Excavation of Unsuitables, or Rock Excavation described below. Unclassified Excavation includes excavation required to reach finished grade. Over-excavation for the placement of materials (e.g. Engineered Streambed Material, Plunge Pools, Log Structures, Manholes, and Pipes) or the removal of unsuitables, as described below under Excavation of Unsuitables, is not included in Unclassified Excavation.

### 3.5 CONTAMINATED MEDIA EXCAVATION

A. Contaminated Media Excavation. Areas of contaminated media at finished grade elevations, as indicated on the Drawings or as determined by the Owner's Representative, shall be over-excavated and managed according to the EMMP. All contaminated media excavations shall be backfilled to finished grades, per Section 312323, Engineered Fill.

### 3.6 EXCAVATION OF UNSUITABLES

A. Excavation of Unsuitables. Areas of unsuitable in-place soils, as determined by the Engineer, may also be encountered. Material shall not be classified as unsuitable solely based on moisture content. Material within the limits of Excavation, as described above under Unclassified Excavation, or within the limits of over-excavation for the placement of materials (e.g. Engineered Streambed Material, Weir Boulders, Plunge Pools, Log Structures, Manholes, and Pipes) shall not be classified as unsuitable. The Contractor shall anticipate having to over-excavate areas of unsuitables as directed by the Engineer and dispose of materials. The actual locations of these excavations will be determined in the field by the Engineer. The side slopes of the excavations shall be no steeper than 1 to 1 (horizontal to vertical). The over-excavations shall be backfilled with embankment materials in accordance with Section 312323, Engineered Fill.

B. Disposition of Unsuitable Materials. The excavated materials that are considered unsuitable based solely on moisture content shall be processed as necessary to meet specification requirements for suitability and used as embankment material. Materials which are unsuitable based on organic content will be ordered wasted and shall be disposed of in upland fill areas.

## 3.7 ROCK EXCAVATION

A. Rock Excavation. Rock excavation consists of the removal of hard igneous, metamorphic, and/or sedimentary rock in solid beds or masses in original or stratified position which can be removed only by continuous drilling, blasting or the use of pneumatic tools, and all boulders of 5 cubic yards in volume or larger. Material which can be loosened with a pick, frozen materials, soft laminated shale and hardpan, which for convenience or economy is loosened by drilling, blasting, wedging or the use of pneumatic tools, removal of concrete pavement and retaining walls, shall not be classified as rock excavation. When rock is encountered within the limits of the excavation, immediately notify the Owner's Representative and Engineer and do not proceed further until instructions are received and measurements made for the purpose of establishing the volume of rock excavation. Contractor shall note that blasting is not approved for this project. The need for specialized rock excavating equipment should be anticipated if rock is encountered.

## 4. MEASUREMENT AND PAYMENT

## 4.1 MEASUREMENT

A. Stripping. Stripping will not be separately measured for payment.

B. Unclassified Excavation. Unclassified Excavation will be measured by the cubic yard of Unclassified Excavation, based on the Dimensions shown on the Drawings. Where the dimensions of any portion of the work are revised by the Engineer, or a portion of the work is eliminated, the change will be measured by the neat volume cubic yard based on the Dimensions shown on the Drawings.

C. Contaminated Media Excavation. Contaminated Media be measured by the cubic yard of Unclassified Excavation, based on the Dimensions shown on the Drawings. Where the dimensions of any portion of the work are revised by the Engineer, or a portion of the work is eliminated, the change will be measured by the neat volume cubic yard based on the Dimensions shown on the Drawings.

D. Excavation - Unsuitable Materials. Excavation to remove materials that are designated by the Engineer as unsuitable for reuse will be measured by the cubic yard from the stripped foundation. Measurement will be based on surveyed cross sections before and after the excavation.

E. Rock Excavation. Rock Excavation will be measured by the cubic yard of rock excavation, as determined by cross sections surveyed before and after the excavation.

F. Other Miscellaneous Excavations. All other excavations will not be measured for payment.

G. Surveys: Construction staking will not be separately measured for payment.

## 4.2 PAYMENT

A. Stripping. No separate payment will be made for stripping. All costs in connection with this work will be considered incidental to the contract price per cubic yard for Unclassified Excavation.

B. Unclassified Excavation, measured as specified above, will be paid for at the contract unit price per cubic yard, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete Unclassified Excavation, as specified, including mass excavation and finish grading of channel banks, floodplains, and upland fill areas to the lines and grades shown on the Drawings.

C. Contaminated Media Excavation, measured as specified above, will be paid for at the contract unit price per cubic yard, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete Contaminated Media Excavation, as specified, including excavation and backfill to the lines and grades shown on the Drawings.

D. Excavation - Unsuitable Materials, measured as specified above, will be paid for at the contract unit price per cubic yard, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the excavation as specified, including dewatering, all handling of materials, and disposal of unsuitable materials.

E. Rock Excavation, measured as specified above, will be paid for at the contract unit price per cubic yard, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the Rock

Excavation as specified, including dewatering, all handling of materials, and disposal of unsuitable materials.

F. No separate payment will be made for other miscellaneous grading incidental to the work. All costs in connection with this work will be considered incidental to the cost of construction of associated improvement.

G. Surveys: No separate payment will be made for surveys or construction staking. All costs in connection with this work will be considered incidental to the contract price per cubic yard for Excavation.

H. No separate payment will be made for mixing and off haul of suitable materials for reuse.

I. Payment will be made under:

| Pay Item | Pay Unit |
|---|---|
| Unclassified Excavation | Cubic Yard (F) |
| Contaminated Media Excavation | Cubic Yard (F) |
| Excavation – Unsuitable Materials | Cubic Yard |
| Rock Excavation | Cubic Yard |

**END OF SECTION**

# INDEX
# SECTION 312319
# DEWATERING

**Paragraph** **Page**

# SECTION 312319
# DEWATERING

## 1. GENERAL

### 1.1 DESCRIPTION

A. The work covered in this section consists of the control of surface and groundwater during construction, as specified, as shown on the Drawings, or as otherwise directed by the Engineer. Work includes groundwater dewatering and diversion of surface water flow to the project site during construction.

B. Furnish all labor, materials, equipment, and incidentals necessary to design, construct, operate, maintain, and remove all cofferdams, flumes shoring, diversions, filtration systems and/or other measures, including pumping, to dewater the construction site and to divert streamflow and other surface waters through or around the project area 24 hours a day during the entire field construction period, as shown on the Drawings, as specified, or as directed by the Engineer.

C. Dewatering details on the Drawings (if provided) are schematic. The design and implementation of the Dewatering Plan is solely the responsibility of the Contractor. Contractor shall make their own independent evaluation of water sources (surface and groundwater) in preparing their Dewatering Plan.

D. Dewatering and diversion shall comply with all project permit conditions, applicable laws and local ordinances.

### 1.2 RELATED SECTIONS

1. Section 015713.01, Fiber Roll
2. Section 354237, Rock Slope Protection
3. Section 015713, Temporary Erosion Control and BMP’s
4. Section 015713, Erosion and Sediment Control Plan Implementation
5. Section 312316, Stripping and Excavation

### 1.3 SUBMITTALS

A. The Contractor shall submit the following for review and approval of the Engineer:

1. Site Dewatering Plan: The Dewatering Plan shall be prepared and stamped by a Professional Engineer or Registered Geologist licensed in the State of Oregon. The Dewatering Plan shall detail means and methods of controlling groundwater construction. This shall include listing materials, method of work, equipment to be used, methods for disposal of pumped water, estimated rate of water withdraw from groundwater, provisions to prevent scour and erosion, contingency plans for equipment failure or under-sizing, and the proposed schedule. Approval of the Engineer shall be required before the Contractor proceeds with any groundwater control measures.

2. Site Water Diversion Plan: The Site Water Diversion Plan shall detail means and methods of controlling surface water from the contributing streams flowing into the project site during construction. As part of this plan, submit product data for:
    a) Pumps
    b) Silt control filter fabric
    c) Washed rock
    d) Impervious liners
    e) Cofferdam material
    f) Other materials or systems used in water diversion

### 1.4 QUALITY ASSURANCE

A. Comply with scheduling requirements set forth in the project Erosion and Sediment Control Plan.

B. Comply with approved Hazardous Materials Control and Spill Prevention Plan, in accordance with Section 015000 paragraph 3.10.

C. Notify Engineer 48 hours in advance of installation of temporary cofferdam(s) or diversion.

D. Notify Engineer 48 hours in advance of removal of temporary cofferdam(s) or diversion.

## 2. PRODUCTS

### 2.1 MATERIALS

A. General. The Contractor shall be responsible for sizing and design of temporary cofferdams, well points, pumps, drains, pipes and other diversion and dewatering facilities. Comply with Drawings and regulatory requirements.

B. Imported Rock. Use only clean washed rock. Other materials, if used, shall be removed from river channel when dewatering work is complete.

C. Dewatering Facilities. Provide and operate dewatering facilities of suitable size and capacity. The use of equipment shall be consistent with the manufacturer’s recommendations.

D. Silt Fence. Comply with Section 015713.02, Silt Fence.

## 3. EXECUTION

### 3.1 GENERAL

A. Contractor is solely responsible for the design, construction, and maintenance and monitoring of the diversion and dewatering facilities. Comply with the Drawings, Specifications, and applicable permit conditions.

### 3.2 SEDIMENT CONTROL

A. General. Comply with Section 401 Water Quality Certification / approved ESCP in accordance with ***Section 015713***.

B. Materials. Earthen materials shall not be used within the flowing channel, with the exception of clean, washed rock.

C. Cofferdam Construction. During construction of the cofferdam, install silt barrier(s) along the water side of the installation, as necessary to minimize mobilization and entrainment of disturbed soils within the active flowing channel, to a level in accordance with the permit conditions.

D. Discharge of Seepage/Groundwater. Discharge of water from the dewatered construction site, either by gravity or pumping, shall be performed in a manner to prevent excessive turbidity from entering the Willamette River and to prevent scour and erosion outside of the construction site. Pumped water should be prefiltered with sand/gravel pack around sumps for subsurface flows and a silt fence or hay bales around pumps for surface flow. Pumped water shall be discharged into adjacent gravel bars, isolated local depressions, or temporary sediment basins, as shown on the Erosion and Sediment Control Plan. Where water to be discharged into the river will create excessive turbidity, the water shall be routed through a sediment interceptor or other facilities to remove sediment from water.

E. Isolation of Construction Area. Place silt fences, hay bale barriers, or cofferdams between construction area and flowing river channel, at all locations, in accordance with the approved Erosion and Sediment Control Plan.

## 3.3 HAZARDOUS MATERIAL CONTROL

A. General. Comply with the approved Hazardous Materials Control and Spill Prevention Plan (HMC&SPP) in accordance with Construction Facilities and Temporary Controls, Section 015000.

B. Equipment and Lubricants. Steam-clean all equipment prior to its use. Inspect all equipment for cleanliness and fluid leaks prior to use and monitor during its use. Maintain equipment as required. Equipment refueling shall only take place in a designated, contained area.

C. Isolation of Construction Area. Prior to performing work within flowing water, outside of cofferdams, install oil containment booms downstream of the work area. Maintain booms until completion of the work within the channel is complete.

D. Spills. Maintain a supply of oil spill booms, sorbent pads, and other supplies to contain and clean spills. Comply with approved HMC&SPP should spills occur.

## 3.4 COFFERDAMS

A. General. The Contractor is solely responsible for the design, construction, maintenance, and monitoring of cofferdams, dikes and other isolation facilities. Cofferdams with an exposed height greater than 10 feet shall be designed by a Professional Engineer registered in the State of Oregon, based on available soil data.

B. Configuration. Cofferdam alignments, as shown on the Drawings, reflect the maximum allowable encroachment into the channel. Construct cofferdam alignments as shown or the

Drawings, unless otherwise approved by Engineer. Provide cofferdams high enough to account for water surface fluctuations.

C. Secondary Dikes/Seepage Control. Secondary dikes within the isolated construction area can be used to control seepage and groundwater around excavations, provided all dike materials are removed from the exposed channel upon completion, prior to re-watering the work area.

## 3.5 FLOW BYPASS

A. Capacity. Bypass water around construction site using a cofferdam and bypass pipe as shown on the Drawings or equivalent facility, as approved by the Engineer. The bypass system shall be capable of passing the flows present at the time construction begins, with a minimum of 12 inches of freeboard (measured vertically from water surface to lowest point on dam).

B. Storm Events. During the designated period for instream work, the Contractor shall be solely responsible for the integrity of the dewatering system. If rain is predicted, the Contractor shall perform flood fighting activities as directed by the Engineer and regulatory agencies. If rain is predicted to increase the flow of the creek beyond what can be handled by the Contractor's established bypass, the Contractor shall make provisions for and have equipment (i.e. pumps, piping, gravel bags, plastic sheeting, temporary dams, etc.) on standby to either provide additional pumping capacity to handle the additional flow, or provide for a complete gravity flow by-pass system. The Contractor shall make all necessary provisions to provide adequate protection of the active work area(s), avoid flooding and inundation of excavation(s), divert runoff to stabilized downstream areas away from any active work site(s), and reduce and/or prevent erosion and discharge of sediment or other pollutants.

C. No additional compensation shall be provided for any adjustments, revisions, or reinstallations of diversion elements.

D. The diversion shall result in conditions that allow the required compaction to be achieved and shall prevent sediment-laden water that exceeds the effluent discharge limits from entering the drainage ways.

E. Unless otherwise specified, a diversion must discharge into the same natural drainage way in which its headworks are located.

## 3.6 DEWATERING

A. General. Remove water from construction area using pumping, well points, drains, or other approved methods. Discharge of water shall comply with 3.2.D. Construction water shall be segregated from seepage water and routed through sediment interceptors or other facilities to remove contaminants and sediment. Excavated slopes in the saturated soils may need to be retained, tied back, or otherwise stabilized. Refer to the Geotechnical Report.

B. Well Points. Well points shall be designed to preclude the loss of fine soil by sand/gravel packing or other suitable means.

C. Pumping Facilities. Pumps and discharge piping shall be suitable for the type of service provided and shall be a sufficient size and capacity to satisfactorily dewater work areas.

Engines shall be muffled to avoid excess noise and pump intakes shall be fitted with screens as required.

D. Power Supply. Contractor shall consider the availability and reliability of power sources for dewatering operation in dewatering system design, and make provisions for temporary or backup power supply as deemed necessary. Where the primary diversion is operated by pumping, a backup system shall be provided with automatic controls capable of starting the backup upon failure of the primary system.

E. Groundwater. Dewatering shall maintain water surfaces below the base of temporary excavations or trenches, to allow for visual inspection of the work, if requested by the Engineer. Lower groundwater tables within excavations for structures to a minimum of two (2) feet below foundations or as otherwise required to establish a firm, stable foundation. Control groundwater within excavation until completion of backfill operations.

## 3.7 WATER LEVELS DURING THE CONSTRUCTION PERIOD

A. The Contractor shall be responsible for making an independent evaluation of site conditions. The Contractor's dewatering plan shall address all potential sources of surface and groundwater, including but not limited to streamflow (natural or managed), backwatering of the channel from downstream blockages, domestic water lines, storm drain outfalls, irrigation tailwater, industrial discharges, seepage, and direct rainfall.

B. Willamette River. High water levels in Willamette River are generated by rain storms in winter and by management of upstream dams. The river stage is measured at the Morrison St. Bridge (gaging station ID 14211720 operated by USGS). Daily and historic information on river conditions can be obtained from the United States Geologic Survey. The Internet address for this gage is as follows:

http://waterdata.usgs.gov/nwis/inventory/?site_no=14211720&agency_cd=USGS

C. Construction Dewatering. Ground water in excavations is discussed in the Geotechnical Report.

## 3.8 CLEANUP

A. Prior to removal of the dewatering facilities, thoroughly cleanup area to remove debris and contaminated materials. Remove fine sediments and restore disturbed area. Clean, round, river run gravels or cobbles, if used in cofferdam construction, may be spread in the creek channel in lieu of removal, provided grading will not interfere with facility operation.

## 3.9 REMOVAL OF DEWATERING FACILITIES

A. Prior to removal of the dewatering facilities, complete the following activities:

1. Complete required tests and inspections.
2. Thoroughly cleanup work site.
3. Perform final walkthrough with Engineer.

B. Prior to removal of cofferdams and diversion, equalize the water surface levels on both sides of the dams.

## 4. MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. Dewatering will not be separately measured for payment.

### 4.2 PAYMENT

A. Dewatering will be paid for at the lump sum contract price for Dewatering, which price will include payment in full for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the dewatering operations, as specified, including temporary cofferdams, pumping, silt control, filter fabric, sediment control, erosion control, removal of muck, disposal of materials, and removal of dewatering facilities.

| Pay Item | Pay Unit |
|---|---|
| Dewatering | Lump Sum |

**END OF SECTION**

# INDEX
# SECTION 312323
# ENGINEERED FILL

**Paragraph** **Page**

# SECTION 312323
# ENGINEERED FILL

## 1. GENERAL

### 1.1 DESCRIPTION

A. The work covered by this section consists of furnishing all plant, labor, and materials, and performing all operations necessary for the construction of Engineered fills (unless separately designated elsewhere), including surveying, subgrade preparation, furnishing, loading, and on-site and off-site hauling of materials, processing, screening placement and compaction of Engineered Fill materials, construction of ramps, and other incidental earthwork as may be necessary to complete the Engineered Fills, as specified in the Geotechnical Report, as shown on the Drawings, as specified, or as otherwise directed by the Engineer.

B. All grading shall comply with Section 00300 of the Standard Specifications, and with the recommendations of the Geotechnical Investigation. Prior to beginning work, the Contractor shall be familiar with the geotechnical investigation. In the event of discrepancy between the report and the notes herein, the report shall prevail. It shall be the responsibility of the Contractor to visit the site and make his own interpretations with regard to materials, methods and equipment necessary to perform the work required for this project.

C. Temporary erosion control and BMP’s shall be installed and approved by the Engineer prior to beginning Engineered Fill Construction.

D. The Contractor is responsible to locate, identify, and protect all existing utilities from damage.

### 1.2 RELATED SECTIONS

1. Section 024100, Demolition
2. Section 312316, Stripping and Excavation
3. Section 311100, Clearing and Grubbing
4. Section 329200, Seeding

### 1.3 REFERENCES

A. Geotechnical Engineering Investigation by:

Geotechnics, LLC
7629 SE Harrison St.
Portland, Oregon 97215
503-774-1619
Project No. 13-016-2
Dated: October 21, 2014

B. American Society for Testing of Materials (ASTM) Standards:

| | |
|---|---|
| D1556 | Test Method for Density of Soil in Place by the Sand Cone Method |

| | |
|---|---|
| D1557 | Test Method for Moisture-Density Relations of Soils and Soil-Aggregate Moistures Using 10 lb (4.54 kg) Rammer and 18-inch (457 mm) Drop |
| D2974 | Test Method for the Organic Content of Soils |
| D2922 | Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth) |
| D3017 | Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shall Depth) |
| D4318 | Test Method for the Liquid Limit and Plastic Limit of Soils |
| D422C | Particle-Size Analysis of Soils |

C. Oregon Standard Specifications for Construction, Oregon Department of Transportation, current edition.

D. Surveys. All construction staking shall be performed by the Contractor. Survey control points are shown on the Drawings.

E. NRCS Construction Specification 903 – Engineered Fill, current edition.

## 2. PRODUCTS

### 2.1 MATERIALS

A. Engineered Fill Materials. To the extent they are needed, all suitable materials from the specified excavations shall be used in the construction of required permanent engineered fill. The suitability of materials for specific purposes will be subject to the approval of the Engineer, in conformance with these specifications. Materials used for engineered fill shall conform to the quality and gradation requirements as follows:

1. less than 3% organic material;
2. shall contain no rock or clods greater than 6 inches in diameter;
3. no more than 15 percent larger than 2 ½ inches;
4. The material should be predominantly granular
5. with a plasticity index of less than 15
6. liquid limit less than 35
7. not more than 15 percent passing the #200 sieve
8. shall contain no sod, brush, roots, or other perishable or unsuitable material, and
9. shall be approved by the Engineer prior to use.

B. Surplus Materials. All surplus or unsuitable excavated materials will be designated as waste and shall be disposed in accordance with Section 312316, Stripping and Excavation.

C. Imported Engineered Fill. Importing of Engineered Fill material, if necessary or required to meet the grades and elevations shown on the plans, shall be considered included in the Contractor's bid for the various items of work involved and no additional compensation will be made therefore. Should such imported material be required, the Contractor shall notify the Engineer of the borrow site location at least 72 hours in advance, and provide an adequate sample size so the Engineer can verify the suitability of the material. All imported materials shall be proposed by the Contractor in writing in accordance with the submittal requirements of these Special Provisions and the Standard Specifications. The Contractor shall perform and/or submit all material testing reports and other data as necessary to provide the Engineer with established laboratory values for optimum moisture and maximum dry density, for any imported material requiring density testing. Any proposed engineered fill that deviates from the criteria stated herein, shall have written acceptance from the Engineer and geotechnical engineer prior to import or placement in the work.

D. If a disagreement between the Contractor and the Engineer occurs over the suitability of materials, the Contractor shall perform laboratory testing to demonstrate compliance with the specifications. The failure of the Contractor to perform the testing shall not relieve the Contractor from the obligation to provide suitable materials.

## 3. EXECUTION

### 3.1 ENGINEERED FILL CONSTRUCTION

A. General. Compacted Engineered Fill in Engineered Fills shall be placed in the dry and compacted as specified herein.

B. The Contractor is only permitted to use “low impact equipment” within the floodplain areas for completion of this work.

C. Subgrade Preparation. Following Clearing and Grubbing, the subgrade surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill and loosened to a minimum depth of 2 inches. The moisture content of the loosened material shall be controlled as specified for the Engineered Fill, and the surface materials of the subgrade shall be compacted and bonded with the first layer of Engineered Fill.

D. Earth abutment surfaces shall be free of loose, uncompacted earth in excess of two inches in depth normal to the slope and shall be at such a moisture content that the Engineered Fill can be compacted against them to ensure a good bond between the fill and the abutments. Subgrade and abutment surfaces shall not be steeper than 1 horizontal to 1 vertical. The sites of the borrow area shall be stripped to sufficient depth to remove all vegetation, roots, brush, sod and other objectionable material. Clearing and disposal methods shall be in accordance with applicable state and county laws with due regards to the safety of persons and property. Fill shall not be placed until the required excavation and subgrade preparation has been completed.

E. Fill shall not be placed on or in standing water, nor upon a frozen surface, nor shall snow, ice, or frozen material be incorporated in the fill.

F. If soft, wet, or pumping subgrade soils are present, the required minimum level of compaction for the initial fill lift may be adjusted to eighty-five percent (85%) of the soil’s maximum dry density as determined in accordance with ASTM D 1557, subject to approval of the Engineer. The intent of the reduction is to limit the amount of construction traffic that could lead to further deterioration and destabilization of the exposed subgrade and to build a more stable pad upon which to place subsequent fill lifts.

G. Horizontal Layer Construction. The compacted Engineered Fill shall be constructed to a sufficient section so as to achieve the required compaction throughout the finished section. Materials to be compacted shall be placed or spread in layers not more than eight (8) inches in loose thickness prior to compaction. Materials excavated to form keyways or over-excavations, and suitable for use as Engineered Fill, shall be blended uniformly with other excavated soils or disposed of. All fill placed on slopes steeper than 5 horizontal to 1 vertical shall be keyed and benched as specified in Section 00330.42 of the Standard Specifications. If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill to a depth of not less than 2 inches before the next layer is placed. Fill placed around structures will be brought up at approximately uniform height on all sides of the structure.

H. Compaction. When, in the opinion of the Engineer, the surface of any compacted layer is too smooth to bond properly with the succeeding layer, it shall be scarified to a depth of 6 inches before the succeeding layer is placed thereon. The degree of compaction required is expressed as a percentage of the maximum dry density, based on laboratory test procedure, ASTM D 1557. The Engineered Fill shall be compacted to a minimum of 85% of the maximum dry density, unless otherwise specified herein or directed by the Engineer. Construction equipment shall be operated over each layer of fill to ensure that the required compaction is obtained. Special equipment shall be used if needed to obtain the required compaction. Heavy compaction equipment shall not be operated within 2 feet of any structure. Fill adjacent to structures, pipe, conduits, and anti-seep collars shall be compacted to a density equivalent to that of the surrounding fill by means of hand tampers or plate vibrators. Hand directed tampers or compactors shall be used on areas not accessible to heavy compaction equipment, fills compacted in this manner shall be placed in layers not greater than 4 inches in thickness before compaction, and shall meet the same density requirement as for the adjacent area.

I. At the discretion of the Engineer, the top 18 inches of fill, within areas specified to receive revegetation treatments, may be compacted to between 80% and 85% of the maximum dry density, to facilitate plant establishment. Prior to seeding, the surface shall be prepared as specified in Section 329200, Seeding.

J. Compaction of backfill adjacent to structures shall not be started until after the expiration of the following minimum time interval after placement of the concrete:

1. Counterforts, vertical or near-vertical
2. walls with earth loading on one side only 14 days
3. Walls and counterforts, backfilled on both
4. sides simultaneously 7 days
5. Anti-seep, collars, conduits,
6. and cantilever outlet bents 3 days

K. Moisture Control. The moisture content required is expressed as a percentage, based on laboratory test procedure ASTM D 1557. The moisture shall be uniformly distributed throughout the layer prior to compaction and shall be at least 1% above the optimum moisture content. If the material is not within the required moisture content, the Contractor will be required to moisture condition the soil. The moisture conditioning of fill materials shall be performed prior to placement in the section. The final minor moisture conditioning may be made on the fill, as required. Harrowing, or other approved methods will be required to work the moisture into the material until a uniform distribution of moisture is obtained. Water applied on a layer of fill shall be accurately controlled in amount and distribution so that free water will not appear on the surface during or subsequent to rolling. If the material is too wet for proper compaction or soft and yielding sub-grade is experienced (pumping), the Contractor will be required to aerate the material to a moisture content within the desired limits prior to compaction. If the top surface of the preceding layer of compacted fill or a subgrade or abutment surface in the zone of contact with the fill becomes too dry to permit suitable bond, it shall either be removed or scarified and moistened to an acceptable moisture content prior to placement of the next layer of fill.

L. Dressing. Engineered Fill slopes shall be dressed by over-building and cutting back to the required grade. The Contractor may compact the shoulder of each lift during the placement of fill materials to assist in the subsequent dressing of the slopes.

## 3.2 CROSS SECTIONS AND ZONING OF MATERIALS

A. Standard Engineered Fill Sections. The dimensions, slopes, and zoning of materials shall conform to the sections shown on the Drawings and specified herein.

B. Zoning of Materials. Unless otherwise specified, the Engineered Fill materials shall be homogeneous. The Engineered Fill shall be free of pockets, lenses, streaks, layers, etc. of different materials.

## 3.3 FINISH

A. The finished grades shall transition naturally into adjacent existing grades to provide a functional and naturalistic finished surface. Due to the complex nature of the project and the desired aesthetic and functional features, not all details can be accurately represented on the Drawings. As a result, the Contractor may be directed by the Engineer to make minor adjustments to finish grades to best achieve these results. These adjustments may include smoothing or rounding conforms, or changing slope angles or daylight points as necessary to conform to the variable geometry inherent in natural topography. Compensation for this work shall be considered as included in the price paid for the various contract items of work involved, and no additional compensation will be allowed.

B. After the placement of the engineered fills and spoils, the sides and top shall be dressed by final passage of compaction equipment or by dragging to give a smooth surface. The surface area shall be graded to provide surface drainage to flow to desired locations.

## 3.4 ROADS AND RAMPS

A. Maintain Access. At locations where access roads to existing facilities are destroyed because of the work required under this contract, the Contractor shall provide temporary roads, if directed by the Engineer, to give access to fields and buildings during the construction period. Such facilities shall be removed to the extent required by the Engineer.

B. Temporary Haul Roads. Temporary haul roads shall be constructed as required to transport materials from borrow source or excavation to Engineered Fill site. Temporary ramps to be constructed for the Contractors convenience need not comply with these foundation preparation and Engineered Fill construction requirements. Unless otherwise directed by the Engineer, temporary ramps shall be removed prior to completion of the work.

## 3.5 GRADE TOLERANCES

A. Engineered Fill:

1. General. Engineered Fills shall be constructed to the net grade and cross section shown on the Drawings.
2. Grade Tolerances. At all points at or below ordinary high water (OHW) a tolerance of 0.2 (two-tenths) foot above, and 0.1 (one-tenth) foot below the prescribed grade will be permitted in the final dressing, provided that any excess material is so distributed that the crown of the Engineered Fill drains in the desired direction and that there are no abrupt humps or depressions in surfaces. At all points above ordinary high water, a tolerance of 1 (one) foot above, and 0.5 (half) foot below the prescribed grade will be permitted in the final dressing. However, this tolerance above grade may be modified at locations where, in the opinion of the Engineer, such modifications will not impair the design or appearance of the project.

## 3.6 SLIDES

A. In the event of the sliding of any part of the Engineered Fill during its construction, or during the one year period after acceptance, the Contractor shall, upon written order of the Engineer, cut out and remove the slide and then rebuild that portion of the Engineered Fill.

## 3.7 SPECIAL MEASURES

A. Measures and construction methods shall be incorporated as needed and practical that enhances fish and wildlife values. Special attention shall be given to protecting visual resources and maintaining key shade, food, and den trees.

## 4. MEASUREMENT AND PAYMENT

## 4.1 MEASUREMENT

A. Payment Engineered Fill. Engineered Fill will not be separately measured for payment.

## 4.2 PAYMENT

A. No separate payment will be made for Engineered Fill. Full compensation for all costs in connection with Engineered Fill shall be included in the contract price for related work.

B. No payment will be made for the Engineered Fill foundation preparation, shrinkage of material or materials placed above the net grades and slopes as allowance for shrinkage.

C. No payment will be made for construction or removal of temporary roads or ramps.

No additional payment will be made for costs associated with stabilizing unstable materials.

**END OF SECTION**

# INDEX
# SECTION 313613
# GABION BOXES

# SECTION 313613
# GABION BOXES

## 1. GENERAL

### 1.1 DESCRIPTION

A. The work covered by this section includes providing all labor, materials, tools, and equipment necessary for furnishing and installing rock gabions, as shown on the Drawings.

### 1.2 REFERENCES

A. Oregon Standard Specifications for Construction, Oregon Department of Transportation, current edition.

### 1.3 SUBMITTALS

A. The following shall be provided in accordance with Section 013300.

1. Submit complete shop drawings with detailed dimensions, specifications, and data on the complete fence and gate assembly with associated accessories and parts.

### 1.4 RELATED SECTIONS

A. Section 321343, Pervious Concrete Paving

## 2. PRODUCTS

### 2.1 WIRE MESH MATERIAL

A. The wire mesh for the gabion boxes shall be welded wire manufactured from 9 gauge wire conforming to Section 02340.20 of the Standard Specifications.

### 2.2 ROCK FILL MATERIAL

A. The rock fill in the gabion boxes shall consist of Class 50 riprap conforming to Section 00390.11 of the Standard Specifications.

### 2.3 AGGREGATE BASE

A. Conform to Section 321343 (Pervious Concrete Paving), Part 2.1.H.

### 2.4 GEOTEXTILE SEPARATION FABRIC

A. Conform to Section 321343 (Pervious Concrete Paving), Part art 2.1.F.

## 3. EXECUTION

### 3.1 FOUNDATION

A. Install geotextile separation fabric and aggregate base in conformance with Section 321343 (Pervious Concrete Paving), Part 3.2.

### 3.2 FABRICATION

A. Fabricate gabions so that the sides ends, lid and diaphragms can be assembled at the construction site into baskets conforming to the locations and curvatures shown in the Drawings. Dimensions for heights, lengths, and widths of gabion baskets shall be as indicated on the Drawings with a tolerance of plus or minus 3 percent. Gabions shall be of a single unit construction. Either connect the base, lid, ends and sides into a single unit or connect one edge of these members to the base section of the gabion in such a manner that strength and flexibility at the point of connection is at least equal to that of the mesh.

B. If the length of the gabion exceeds its horizontal width, equally divide the gabion by diaphragms into cells whose length does not exceed the horizontal width. The diaphragm material shall be of the same mesh and size as the body of the gabions. Furnish the gabion with the necessary diaphragms secured in proper position on the base in such manner that no additional tying at this juncture will be necessary.

C. Assemble with wire mesh panels (base, ends, sides, diaphragms and lid) so strength and flexibility at connections is at least equal to that of a single panel.

### 3.3 ROCK FILL

A. Hand place rock fill in gabion boxes to avoid damaging or bending wire mesh and achieve tight packing with uniform voids throughout the gabion.

## 4. MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. Gabions shall be measured on a per linear foot basis along the centerline of the gabion structures, complete in place, including geotextile separation fabric, aggregate base, wire mesh, and rock fill, and accepted by the Engineer as conforming to all the requirements in the complete work.

### 4.2 PAYMENT

A. Gabions, measured as specified above, will be paid for at the contract unit price per linear foot of fence, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing the gabions, complete in place as shown on the Drawings, as specified herein, or as directed by the Engineer.

| Pay Item | Pay Unit |
|---|---|
| GABIONS | LF |

**END OF SECTION**

# INDEX
# SECTION 321343
# PERVIOUS CONCRETE PAVING

**Paragraph** **Page**

# SECTION 321343
# PERVIOUS CONCRETE PAVING

## 1. GENERAL

### 1.1 DESCRIPTION

A. The work covered by this section includes providing all labor, materials, tools, and equipment necessary for furnishing and installing pervious concrete pavement, as shown on the Drawings.

### 1.2 REFERENCES

A. Oregon Standard Specifications for Construction, Oregon Department of Transportation, current edition.

B. City of Portland 2016 Stormwater Management Manual.

C. American Society for Testing and Materials International (ASTM):

1. ASTM C29 – Standard Test Method for Bulk Density (Unit Weight) and Voids in Aggregate.
2. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field.
3. ASTM C33 – Standard Specification for Concrete Aggregates.
4. ASTM C94 – Standard Specification for Ready-Mixed Concrete.
5. ASTM C138 - Standard Test Method for Density (Unit Weight), Yield and Air Content (Gravimetric) of Concrete.
6. ASTM C140 – Standard Test Method for Sampling and Testing Concrete Masonry Units and Related Units.
7. ASTM C150 – Standard Specification for Portland Cement.
8. ASTM C171 – Standard Specification for Sheet Materials for Curing Concrete.
9. ASTM D1752 – Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
10. ASTM D3786 – Standard Test Method for Bursting Strength of Textile Fabrics – Diaphragm Bursting Strength Tester Method.
11. ASTM D4355 – Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus.
12. ASTM D4491 – Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
13. ASTM D4632 – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

D. American Concrete Institute (ACI):

1. ACI 305R – Specification for Hot Weather Concreting.
2. ACI 306.1 – Standard Specification for Cold Weather Concreting.
3. ACI 522.1 – Specification for Pervious Concrete Pavement.

### 1.3 SUBMITTALS

A. Provide submittals in accordance with Section 013300.

B. Shop Drawings: Indicate extent of pavement and location of contraction, construction, and isolation joints. When jointing requirements are not indicated on drawings, submit shop drawings indicating proposed joint locations. Provide edge details.

C. Mix Design Data: Submit concrete mix designs.

1. Concrete Production Facility: Submit name, address, and contact information.

2. Mix Design: Submit concrete mix design, including proportions, density, water/cement ratio, source, size, void content and amount of coarse aggregate and admixtures. Mix shall be signed and sealed by a Civil or Structural Engineer currently registered in the State of Oregon.
3. Test Reports: Submit copies of test reports demonstrating the proposed mixes produce concrete strengths and properties specified and is suitable for the job conditions. Include tests for cement, aggregates and admixtures. Provide gradation analysis.

D. Certificates: Submit certification of conformance to the following standards:

1. Portland cement: ASTM C150.
2. Aggregates: ASTM C33.
3. Aggregates: Submit evidence that the aggregate is not reactive in the presence of cement alkalis. In the absence of evidence, aggregate shall be tested per ASTM C289. If results of test are other than innocuous, aggregates shall be tested per ASTM C1567.

E. Product Data: Submit product data, manufacturer's specifications and installation/application instructions for:

1. Admixtures.
2. Joint materials, including samples, 12 inches long.
3. Curing materials.
4. Geotextile fabric, including samples, 12 inches by 12 inches.

F. Aggregate Base gradation and quality certification.

### 1.4 RELATED SECTIONS

A. Section 313613, Gabion Boxes

## 2. PRODUCTS

### 2.1 MATERIALS

A. Cement: Portland Cement Type I or II conforming to ASTM C150.

B. Aggregates:

1. Coarse Aggregate: 3/8" maximum (3/8 through No.8), washed, conforming to ASTM C33.
2. Fine Aggregate: If used, shall conform to ASTM C33.

C. Admixtures:

1. Type A, Water Reducing Admixtures per ASTM C494
2. Type B, Retarding Admixtures per ASTM C494.
3. Type D, Water Reducing/Retarding Admixtures per ASTM C494.
4. Hydration stabilizer shall meet the requirements of ASTM C494, Type B or D.
5. Air entraining agents shall comply with ASTM C260.
6. Calcium chloride admixtures shall not be used.

D. Water: Water for concrete mixes, curing and cleaning shall be potable, free from deleterious matter and in conformance to ASTM C1602.

E. Curing Materials: 6 mil thick polyethylene membrane per ASTM C171.

F. Geotextile Separation Fabric: Conform to the requirements for Subgrade Geotextile listed in Section 02320, Table 02320-1 of the Standard Specifications.

G. Premolded Joint Filler for Isolation Joints: Preformed strips, in conformance to ASTM D994, D1751 or D1752.

H. Aggregate Base: Conform to the requirements for Granular Drainage Blanket listed in Section 00340.11 of the Standard Specifications.

## 2.2 MIX DESIGN

A. Furnish mix design including data for unit weights determined in accordance with ASTM C29 paragraph 11, jigging procedure.

   1. Cement Content: Not less than 600 lbs/CY.
   2. Water/Cement Ratio: Between 0.26 to 0.35.
   3. Aggregate Content: Volume of aggregate per cubic yard shall be equal to 27 cubic feet when calculated as a function of the unit weight determined in accordance to ASTM C29 jigging procedure. Fine aggregate if used, should not exceed 3 cubic feet and shall be included in the total aggregate volume.
   4. Air voids: 18 to 22 percent.

B. Mix shall be signed and sealed by a Civil or Structural Engineer currently registered in the State of Oregon.

C. Ready-Mixed Concrete: Mix and deliver in accordance with requirements of ASTM C94.

D. Flexural Strength: 375 psi, per ASTM C78, samples shall be per ASTM C31.

# 3. EXECUTION

## 3.1 SUBGRADE PREPARATION

A. Owner will retain a geotechnical engineer, as an Owner Consultant for testing, sampling and observing the work of this section

B. Compact subgrade to 90 percent of maximum dry density per ASTM D1557. Compacted subgrade will be tested to percolation per ASTM D3385; percolation rate should be not less than 0.5 inch/hour

C. Do not proceed with installation of bedding until subgrade conditions are corrected.

## 3.2 AGGREGATE BASE INSTALLATION

A. Install geotextile fabric immediately after compacted subgrade acceptance. Lay smooth and free of tension, stress, folds, and wrinkles. Overlap ends of rolls or panels a minimum of 16 inches. Extend at least 4 feet beyond pavement ends to prevent any runoff or sediment from entering base course. Cut excess geotextile to gravel edge when area is fully stabilized.

B. Place aggregate base course and compact to a relative compaction of 90 percent per ASTM D1557. Base thickness shall be six inches and shall be placed in one layer, unless a thicker base is indicated on the drawings. Proof roll the top surface of the completed base course. If the base course yields, or fails, remove, replace with suitable materials, and recompact materials until satisfactory.

C. Keep traffic off of base course during construction to the maximum extent practical. Regrade and recompact disturbed subgrade. Ensure required pavement thickness is obtained throughout.

D. Determine subgrade permeability in accordance with ASTM D3385 before concrete placement. Confirm that subgrade permeability meets or exceeds 0.5 inch/hour.

## 3.3 FORMWORK

A. Forms may be of wood or steel, and capable of being removed without damaging the concrete.

B. Apply form release agent to the form face which will be in contact with concrete, immediately before placing the concrete. Vertical face of concrete curbs or previously placed concrete may be used as form; form release agents are not needed for these surfaces.

C. Concrete placement width shall not exceed 20 feet unless otherwise specified.

D. Check and correct grade elevations and alignment of the forms immediately before placing the concrete.

## 3.4 BATCHING, MIXING, AND DELIVERY

A. Batch and mix in accordance with ASTM C94, except that discharge shall be completed within 60 minutes of the introduction of mixture water to the cement. Time may be increased to 90 minutes when using an extended set control admixture.

B. Concrete mixed in transit mixer shall be mixed at the mixing speed designated by the manufacturer for minimum of 70-revolutions to a maximum of 100.

C. Truckloads shall be visually inspected for moisture consistency. Water addition shall be permitted at the point of discharge to obtain the required mixture consistency, as needed to maintain a wet metallic sheen but without causing paste drain or exceeding the specified water-cement ratio.

D. A minimum of 30 revolutions at the manufacturer’s designated mixing speed shall be required following the addition of any water to the mixture prior to any discharge. If water is added more than three times to a load, the dosage rate of hydration stabilizing admixture should be increased in subsequent loads.

E. Discharge shall be a continuous operation and shall be completed as quickly as possible. Concrete shall be deposited as close to its final position as practical and such that discharged concrete is incorporated into previously placed plastic concrete. If consolidation occurs during concrete discharge, placement shall be halted, the mixture shall be addressed, and the consolidated portion removed and replaced immediately.

## 3.5 PLACING AND FINISHING

A. Deposit concrete directly from transporting equipment or by conveyor onto the prewetted base. Deposit concrete between the forms to an approximately uniform height.

B. Strike off concrete between forms using a form-riding paving machine or vibrating screed. Compact and finish the pavement to the elevations and thickness specified in the drawings and to the tolerance indicated below. Surface vibration shall be controlled; hand tampers shall be used along slab edges. Edge top surface to a radius of 1/4 inch.

C. Sweep hardened pavement before testing for compliance with tolerances. Construct pavement to meet the following tolerances:

   1. Elevation: plus 3/8 inch, -minus 3/8 inch under a 10 foot straightedge.
   2. Thickness: plus 1 ½ inches, minus 1/4 inch.
   3. Contraction joint depth: plus 1/4 inch, minus 0 inch.

D. Care must be taken to prevent closing the void structure of pervious concrete.

E. Cross rolling should be performed using the minimum number of passes required to achieve an acceptable surface. Over working the concrete surface will close voids and limit porosity.

F. Care shall be taken during compaction that sufficient compaction force is achieved without excessively working the concrete surface that might result in sealing surface porosity.

## 3.6 JIONTING

A. Construct joints at the locations indicated on the drawings. Spacing between contraction joints shall not exceed 20 feet or two times the width, whichever is less. Align joints of adjacent pavement panels.

B. Contraction joint depth shall be 1/4 to 1/3 of the pavement thickness. Contraction joints shall be tooled.

  1. Tool contraction joints to the specified depth and width in fresh concrete immediately after the concrete is compacted.

C. Use isolation joints only where pavement abuts fixed objects such as foundations and manholes.

D. Transverse construction joints shall be installed whenever placement is suspended for 30 minutes or whenever concrete is no longer workable

### 3.7 CURING

A. Begin curing within 20 minutes of concrete discharge in accordance with ACI 522.1.

B. Completely cover the pavement surface with a minimum 6 mil thick polyethylene sheet overlapping a 12 inches minimum. Cover all exposed edges of pavement with polyethylene sheet, and extend 24 inches minimum beyond pavement edges. Secure curing cover material edges with weights, use of dirt or debris is not acceptable.

C. Cure pavement for a minimum of 7 uninterrupted days.

### 3.8 HOT AND COLD WEATHER CONSTRUCTION

A. When hot weather is anticipated, submit detailed procedures for the production, transportation, placement, protection, curing and temperature monitoring of concrete in accordance to ACI 305R.

B. In cold weather comply with ACI 306.1, recording concrete temperature no less than twice per 24-hour period.

### 3.9 TESTING

A. Inspector or testing lab personnel will collect samples of fresh concrete in accordance with ASTM C172 during each working day.

B. Lab personnel will perform concrete density tests in accordance with ASTM C1688. Tests will be performed at the beginning of concrete placement operation and for each 5,000 square feet to ensure that specification requirements are met. Average hardened density shall be within 5 pounds per cubic feet plus or minus of the accepted fresh density from the approved mix design.

C. After a minimum of seven days core three hardened concrete samples in accordance with ASTM C42, for testing:

  1. Density in accordance with ASTM C140, paragraph 9.3:
     a. Average hardened density shall be within 5 pounds per cubic feet plus or minus of the accepted fresh density from the approved mix design.
  2. Thickness in accordance to ASTM C174. Thickness tolerance:
     a. Average compacted thickness shall not exceed ¼ inch less than specified thickness.
     b. No single core shall exceed ½ inch less than the specified thickness.
     c. Average compacted thickness shall not exceed 1-1/2 inches more than the specified thickness.

3. Void Structure in accordance to ASTM C138: 15% minimum, 25% maximum, or within 4% of the specified void content indicated in the mix design.
4. Visual observation shall find no clogging, paste drain down or poorly hydrated paste.

D. Fill core holes with regular concrete meeting the pervious mix design.

### 3.10 OPENING TO TRAFFIC

A. Do not open the pavement to vehicular traffic until the concrete has cured for at least 14 days.

### 3.11 CLEANING

A. Prevent the migration of dirt, mulch or other materials and the flow of sediment-laden water onto the pavement during construction.

B. At completion of Work, sweep clean pavement surfaces.

C. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

### 3.12 PROTECTION

A. Protect the Work of this section until Substantial Completion.

## 4. MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. Pervious Concrete Paving shall be measured on a per square yard basis as shown in the Drawings, complete in place, including geotextile separation fabric and aggregate base, and accepted by the Engineer as conforming to all the requirements in the complete work.

### 4.2 PAYMENT

A. Pervious Concrete Paving, measured as specified above, will be paid for at the contract unit price per square yard of pavement, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing the pavement, complete in place as shown on the Drawings, as specified herein, or as directed by the Engineer.

| Pay Item | Pay Unit |
|---|---|
| PERVIOUS CONCRETE PAVEMENT | SY |

**END OF SECTION**

# INDEX
# SECTION 323113
# CHAIN LINK FENCES AND GATES

**Paragraph** **Page**

# SECTION 323113
# CHAIN LINK FENCES AND GATES

## 1. GENERAL

### 1.1 DESCRIPTION

A. The work covered by this section includes providing all labor, materials, tools, and equipment necessary for furnishing and installing chain link fencing, as shown on the Drawings.

### 1.2 REFERENCES

A. Oregon Standard Specifications for Construction, Oregon Department of Transportation, current edition.

### 1.3 SUBMITTALS

A. The following shall be provided in accordance with Section 013300.

  1. Submit complete shop drawings with detailed dimensions, specifications, and data on the complete fence and gate assembly with associated accessories and parts.

## 2. PRODUCTS

A. Comply with the Drawings and Section 01050 of the State Standard Specifications.

B. Use galvanized steel posts entirely for all types of fence

## 3. EXECUTION

### 3.1 GENERAL

A. The chain link fences and gates shall be installed in accordance with the manufacturer's recommendations, as shown on the Drawings, as specified herein, and in conformance with the provisions in Section 01050, “Fences” of the Standard Specifications.

## 4. MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. Type CL-4 Chain Link Fence shall be measured on a per linear foot basis along the centerline of the fence, complete in place and accepted by the Engineer as conforming to all the requirements in the complete work.

B. Type CL-6 Chain Link Fence shall be measured on a per linear foot basis along the centerline of the fence, complete in place and accepted by the Engineer as conforming to all the requirements in the complete work.

C. Gates will not be separately measured for payment.

### 4.2 PAYMENT

A. Type CL-4 Chain Link Fence, measured as specified above, will be paid for at the contract unit price per linear foot of fence, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing the fence, complete in place as shown on the Drawings, as specified herein, or as directed by the Engineer.

B. Type CL-6 Chain Link Fence, measured as specified above, will be paid for at the contract unit price per linear foot of fence, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing the fence, complete in place as shown on the Drawings, as specified herein, or as directed by the Engineer.

C. No separate payment will be made for gates. All costs in connection with this work will be considered incidental to the cost of construction of the associated improvements.

| Pay Item | Pay Unit |
|---|---|
| TYPE CL-4 CHAIN LINK FENCE | LF |
| TYPE CL-6 CHAIN LINK FENCE | LF |

**END OF SECTION**

# INDEX
# SECTION 329200
# SEEDING

**Paragraph** **Page**

# SECTION 329200
# SEEDING

## 1. GENERAL

### 1.1 DESCRIPTION

A. Work covered under this section consists of furnishing all labor, tools, materials, equipment and incidentals required to perform Seeding, as specified, as shown on the Drawings, or as directed by the Engineer.

### 1.2 REFERENCES

A. Oregon Department of Transportation (ODOT) Standard Specifications for Construction, current edition

### 1.3 RELATED SECTIONS

A. The work described under this section is related to the following sections of the Specifications:

1. Section 015713 Erosion and Sediment Control Plan Implementation
2. Section 015713.01, Fiber Rolls
3. Section 312316, Stripping and Excavation
4. Section 329000, Planting

### 1.4 SUBMITTALS

A. Submit to the Engineer, for review, the following:

1. List of origin/collection location for each seed species
2. A representative one-ounce sample of each seed mixture supplied for the job, labeled as to content, purity, and germination percentage.
3. Duplicate copies of invoices for all materials. Invoices for fertilizer shall show the grade furnished.

### 1.5 QUALITY ASSURANCE

A. All seed shall be labeled in accordance with the Oregon Revised Statue 633.520 and shall be delivered to the site in sealed individual, unmixed bags with the vendor's certificate attached. Seed shall be sampled and tested in accordance with the Oregon Department of Agriculture Commodity Inspection Division. Seed treated with mercury compounds shall not be used.

B. Fertilizer shall be delivered in containers labeled in accordance with applicable state regulations and bearing the warranty of the producer for the grade furnished.

C. Seed which has become wet, moldy, or otherwise damaged in transit or in storage, will not be acceptable.

## 1.6 PERFORMANCE CRITERIA

A. See Section 329300, Part 1.6 (Planting) of the Specifications for Maintenance Period criteria.

# 2. PRODUCTS

## 2.1 MATERIALS

A. Seed Source. Seed shall be collected or propagated from source populations within the Willamette Valley region.

B. Quantities shown on the Drawings represent pure live seed (pls).

C. Seed shall be mixed on-site in the presence of the Engineer. At no time shall the seed mix contain noxious weed seed. Seed shall be maintained in optimal health and be protected at all times from animal damage; vandalism; inclement weather conditions, including drought, wind, and frost; toxic water; sunlight; moisture; or contact with vehicles, equipment, and tools and any other conditions that would damage or reduce the viability of the seed.

D. Seed Mix. The seed mix and application rates are as shown on the Drawings. No substitutions are allowed without written consent of the Engineer.

E. Compost. The compost shall be derived from plant material and provided by a member of the US Composting Council Seal of Testing Assurance (STA) program. See www.compostingcouncil.org for a list of local providers.

1. The compost shall be the result of the biological degradation and transformation of plant derived materials under conditions designed to promote aerobic decomposition. The material shall be well composted, free of viable weed seeds, and stable with regard to oxygen consumption and carbon dioxide generation. The compost shall have no visible free water and produce no dust when handled. It shall meet the following criteria, as reported by the US Composting Council STA Compost Technical Data Sheet provided by the vendor.
    - 100% of the material must pass through a 1/2-inch screen.
    - The pH of the material shall be between 6 min. and 8.5 max.
    - Manufactured inert material (plastic, concrete, ceramics, metal, etc.) shall be less than 1.0% by weight.
    - The organic matter content shall be between 30 and 70% (dry weight basis).
    - Soluble salt content shall be less than 6.0 mmhos/cm.
    - Maturity Indicator shall be greater than 80% for Germination and Vigor.

- Stability shall be ‘Stable’ to ‘Very Stable’.
- Carbon/Nitrogen (C/N) ratio shall be less than 25:1.
- Trace metals test result = “Pass.”

F. Fiber. Fiber shall comply with Standard Specification 01030.15(a) (Hydromulch from Cellulose, Wood, or Straw Fiber), as modified below. Fiber shall be colored with a water-soluble, biodegradable, nontoxic green coloring agent free from copper, mercury, and arsenic, to provide a visual gauge for metering of material over the ground surfaces. Fiber shall be produced from natural or recycled (pulp) fiber, such as wood chips or sawdust. Newsprint, chipboard, or corrugated cardboard shall **NOT** be allowed.

G. Straw Mulch. Straw mulch shall comply with Standard Specification Section 01030.15(b) (Mulch).. The Contractor shall furnish evidence that straw source is “Oregon Certified Seed” field. Straw that has been used for stable bedding shall not be used. Straw shall be free of mold. Straw shall be cured and dry with no water added after baling. Source must meet or exceed state certification standards for “weed free”.

H. Water. Water shall be furnished by the Contractor and shall be free of chemicals detrimental to the seed mixture.

I. Stabilizing Emulsion (Tackifier). Tackifier shall comply with Standard Specification Section 01030.6 (Tackifier) for either liquid stabilizer emulsion or dry powder tackifier.

## 3. EXECUTION

### 3.1 PREPARATION

A. General. Seed the areas disturbed by construction activities, as specified herein or as directed by the Engineer.

B. Debris Removal. Prior to ground surface preparation operations remove and dispose of all wire, rubbish, stones, and other material which might hinder proper grading, and subsequent maintenance.

C. Compost. Apply compost to all finished grade surfaces to be seeded at a thickness as indicated on the Drawings.

D. Surface Preparation. Prior to seeding, all compost covered surfaces shall be mixed to a minimum depth of 6 inches, by disking or other methods approved by the Engineer, until the condition of the soil is acceptable. When conditions are such, by reason of excessive moisture or other factors, that satisfactory results are not likely to be obtained, the work shall be stopped and shall be resumed only when directed. Slopes in excess of 25% shall be prepared by track-walking or equivalent method approved by the Engineer.

### 3.2 APPLICATION OF SEED

A. Existing Features. During seeding operations, care shall be taken to avoid damaging existing facilities, vegetation to remain, or any other items on or around the planting areas

B. Seeding Areas: Apply seed to areas indicated on the Drawings, or as directed by the Engineer

C. Time of Seeding: Perform all seeding between September 15th and October 1st of the year construction begins. The seeding operation shall be halted when, in the opinion of the Engineer, conditions of high winds, excessive moisture or other factors are not conducive to satisfactory results. Upon written request of the Contractor, and upon written approval of the Engineer, seeding may be done during off seasons provided that:

1. The resulting stand of grass shall be at least equal to the stand that might be expected from planting during the normal season; and
2. The establishment period shall be lengthened, as required, to produce the above specified stand at no additional cost to the Owner.
3. Perform seeding prior to placement of slope protection fabric, where slope protection fabric is specified.

D. Method of Seeding: Seeding may be performed mechanically in a dry condition or with hydro-seeding equipment, at the Contractor’s option.

E. Hydro-seeding. The seed shall be mixed with cellulose fiber and water to form a slurry. Mix the slurry in tanks having continuous agitation so that a homogeneous mixture is discharged hydraulically through hoses on the area to be seeded. Seed species shall be added to the hydro-seeder in the Engineer’s presence to ensure a seeding rate and quality as specified on Drawings. Seed shall be discharged within 2 hours. If mixture remains in tank for more than 2 hours, it shall be removed from the job site and replaced at the Contractor’s expense. The Contractor shall employ the two-step Hydro-seeding process listed in Standard Specification Section 01030.48(a)(1).

F. Broadcast Seeding. Broadcast seeding may be used in lieu of hydro-seeding or to reseed any previously hydro-seeded areas disturbed during planting operations. Seed shall be dry-applied by the following method:

1. Broadcast seed and fertilizer (if specified), at the rates specified on the Drawings, uniformly by hand, mechanical hand seeder, combination seed spreader and cultipacker, or other approved equipment. Where seed is broadcast by hand or mechanical hand seeder, half the seed shall be sown with the sower moving in one direction, and the remainder sown with the sower moving at right angles to the first sowing. Broadcast seeding shall not be done during windy weather.
2. Rake seed into the soil to achieve a sowing depth of approximately 1/8 inch to 1/4 inch.
3. Following the application of seed, straw mulch shall be pneumatically applied or hand broadcast at the rate of 3,000 pounds per acre (typically 1.5 to 2 tons/acre), where slope protection fabric is not specified, and 500 lbs for acre where slope protection fabric will be used.

4. Following the application of straw mulch, Apply stabilizing emulsion with Hydro-seeding equipment at a rate of 100 pounds per acre.

### 3.3 REPAIR

A. General. When any portion of the ground surface becomes gullied or otherwise damaged following seeding within the period of Contractor's responsibility, repair the affected portion to re-establish the condition and grade of the soil prior to planting and then reseed as specified for initial planting, all at no cost to the Owner.

B. Reseeding. When it becomes evident that the seeding has been unsuccessful, the Engineer will require that these areas be reseeded with the same seed and quantity as specified for the initial seeding. Complete reseeding within fifteen (15) days following notification and these areas shall be maintained by watering, as specified above, until the successful grass is established. Prepare the area to be reseeded as directed by the Engineer, to receive the reseeding.

### 3.4 FIELD QUALITY CONTROL

A. During the course of work or upon completion of the project, a check of the quantities of materials will be made against the areas treated, and if the minimum rates of application have not been met, the Engineer will require the distribution of additional quantities of those materials to make up the minimum applications specified.

## 4. MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. Seeding will be measured on a per acre basis for each acre of seed mix furnished and installed by the Contractor and approved by the Engineer (as shown on the Drawings).

B. Areas disturbed by the Contractor and requiring seeding outside the designated limits of disturbance shall not be measured for payment.

C. Compost application will not be separately measured for payment.

### 4.2 PAYMENT

A. Seeding will be paid for at the contract unit price for each acre seeded, which price will include furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the Seeding as specified, as shown on the Drawings, or as directed by the Engineer.

B. The cost of seeding areas outside the designated limits of disturbance shall be solely borne by the Contractor.

C. No separate payment will be made for Compost. Full compensation for all costs in connection with Engineered Fill shall be included in the contract price for related work.

D. Payment will be made under:

| Pay Item | Pay Unit |
|---|---|
| Seeding | Acre |

**END OF SECTION**

# INDEX
# SECTION 329300
# PLANTING

**Paragraph** **Page**

# SECTION 329300
# PLANTING

## 1. GENERAL

### 1.1 DESCRIPTION

A. The work required under this Section shall include, but is not limited to, all labor, tools, materials, equipment and incidentals required to supply and install all of the plants and appurtenances, as shown on the Drawings, described in these Specifications or as directed by the Owner's Representative.

B. The intent of the Planting Plan is to establish persistent native plants growing within the vegetation types shown on the Drawings, and described in these Specifications, by the end of the maintenance period.

C. Fees. The Contractor shall pay all fees associated with the plant installation, testing and operation and maintenance, including plant replacements after the initial installation.

D. Healthy Plants. The Contractor shall be responsible for establishing and maintaining healthy plants throughout the Maintenance period. The Contractor will check the foliage of each plant for symptoms of disease, size, color, wilting, defoliation, new growth, browsing by wildlife, insect damage, and vandalism. The Contractor will check the wood and root crown of each plant for symptoms of disease, browsing by wildlife, insect damage, girdling, structural deformities, dieback, and sunburn. The Contractor shall be responsible for reporting any deficiencies to the Owner's Representative and taking required corrective actions to remedy all identified deficiencies.

### 1.2 RELATED SECTIONS

A. The work described under this Section is related to the following Sections of the Specifications:

1. Section 015713, Erosion and Sediment Control Plan Implementation
2. Section 313519.16, Slope Protection Fabric
3. Section 329219, Seeding

### 1.3 SUBMITTALS

A. Provide 72 hour notice to allow the Owner's Representative the ability to observe the planting stock before shipment from the nursery. Only planting stock approved by the Owner's Representative shall be delivered to the Project site. Planting stock shall be segregated by species at the nursery.

B. Provide written description and map of the willow stake collection area to be used to harvest willow stakes for the project.

C. Owner's Representative Owner's Representative Complete as-built Drawings showing all deviations from the planting plans and specifications and submit to the Owner's Representative upon completion of construction and before the start of the Maintenance period. Prepare one additional set of as-built Drawings and submit at the end of the Maintenance period. Refer to Section 320190, Vegetation Maintenance, for the as-built Drawing requirements.

D. Guarantee. Plants installed under the Contract shall be guaranteed for the length of the Maintenance period against mortality resulting from defects in materials, installation, and plant establishment. The guarantee period begins upon the Owner's Representative's approval and acceptance of the revegetation installation portion of this Project. The Contractor shall submit a written guarantee to the Owner's Representative prior to the beginning of the Maintenance period.

E. Maintenance Reports. Submit Maintenance Reports detailing the maintenance activities (e.g. watering events, weeding events, plant replacements etc.) to the Owner's Representative on a monthly basis.

## 1.4 REFERENCES

A. Oregon Department of Transportation (ODOT) Standard Specifications for Construction, current edition

## 1.5 QUALITY ASSURANCE

A. Proper Installation. The Contractor shall be responsible for proper installation of the native plants to ensure healthy and vigorous growth and development according to the Plans, these Specifications and the Owner's Representative's direction.

B. Substitutions. No materials substitutions will be allowed without approval from the Owner's Representative.

C. Responsibility. If plants are damaged before or during installation, the Contractor shall be responsible for purchasing, securing, and paying all associated costs for replacement plants of the same species and size, unless otherwise approved by the Owner's Representative.

D. Willows. ASTM International. (2003). D6765-02 Standard Practice for Live Staking.

## 1.6 PERFORMANCE CRITERIA

A. Maintenance Period:

1. The intent of the Maintenance Period is to sustain the native seed and plants shown on the Drawings by providing supplemental water and weed control. The Maintenance Period shall extend from the time of all plantings have been installed and approved to 12 months thereafter.
2. Seeded Area Cover: The cover requirement for the Maintenance Period shall be 80 percent ground cover by vegetation on all slopes, as estimated by the Owner's Representative. All areas not achieving the minimum cover requirement shall be reseeded in accordance with Section 329200 at no additional cost to the Owner.

3. Plant Survival: The plant survival requirement for the Maintenance Period shall be 90 percent, as quantified by the Owner's Representative. The Contractor shall replace container plants using species shown on the Drawings to achieve the minimum survival requirement at no additional cost to the Owner.
4. Weed Control: The Contractor shall control the establishment and proliferation of species not listed in the Drawings for the duration of the Maintenance Period.

B. The Contractor shall use invasive species control techniques that are approved by the Owner's Representative. Invasive species shall be controlled at no additional cost to the Owner.

## 2. PRODUCTS

### 2.1 GENERAL

A. Delivery. All materials and equipment delivered to the job site shall be clearly marked to identify the item or the materials. All materials shall be new and installed in accordance with the Drawings and the Specifications.

B. Handling. The Contractor shall ensure that the plants and planting supplies are not damaged at any time. After acceptance by the Owner's Representative, handling and storage of the plants and bulk materials delivered to the site shall become the responsibility of the Contractor.

C. Plants Storage. Plants shall be maintained in optimal health and be protected at all times from animal damage; vandalism; inclement weather conditions, including drought, wind, and frost; toxic water; sunlight; moisture; or contact with vehicles, equipment, and tools and any other conditions that would damage or reduce the viability of the plants. Plants may be stored on the site in the Contractor's staging area provided a temporary fence is erected for plant protection. Shade, frost, and wind protection may be used if necessary to protect the health of the plants. Plants shall be maintained moist at all times before planting and shall be completely watered 1-hour or less before installation and shall be moist when installed.

### 2.2 MATERIALS

A. Bare Root Plants. Bare Root plants shall be provided by the Contractor. Plant species shall be as indicated on the Drawings. No substitutions will be allowed without approval from the Owner's Representative.

B. Source. Container plants shall be propagated from plant material originating in the Metro area (Multnomah, Washington, or Clackamas Counties).

C. Willow Stakes. Willow stakes are woody plant cuttings, capable of rooting, that are taken from trees and shrubs. All plant materials must be top quality stock. Plant materials shall be of the Salix genus. They shall be sound, healthy specimens and first-class representatives of their species. Plant materials that have serious injuries, insect pests, diseases or are shriveled will be rejected. Willow stakes shall be cut from approved sources using a sharp tool. Live willow stakes shall be from 5 to 8 ft in length with a basal end of 1.5 to 2.5 in. in diameter. The top ends shall be blunt; butt ends shall be angled at 45 degrees. Stakes shall be stripped of all stems and leaves, taking care to minimize scarring or bruising of the willow stakes.

D. Plant Fertilizer. Plant Fertilizer shall be Biosol® Mix, or equivalent organic fertilizer made from the fermentation of soybean meal, cottonseed meal, and sulfate of potash magnesia. Said mix shall be sterilized and free of weed seeds and shall be composed of 96% fungal and bacterial biomass and 4% water with an NPK value of 7:2:3.

E. Backfill Soil. Backfill soil material for planting pits shall be native soil found in the immediate vicinity of each planting pit or salvaged topsoil from the excavation of the Project area.

F. Replacement Plants. The Contractor shall supply all replacement plants required to meet the Performance Criteria during the Maintenance period. Replacement plants shall be propagated from stock collected from within the Metro area (Multnomah, Washington, and/or Clackamas Counties). Replacement plants shall be container plants of same species and size according to Section 329300, Planting, or as directed by the Owner’s Representative. Sources proposed by the Contractor for acquisition of replacement plant material must be approved by the Owner’s Representative before plant material acquisition. Recommendations for species substitutions based on documented survivorship records for plants growing at the Project site may be submitted by the Contractor in writing to the Owner’s Representative, for consideration.

G. Herbicide. Any herbicides used for the control of noxious weeds and other undesired or invasive plants shall be nonselective and effective against both broad-leaf plants and grasses. The herbicide shall have low toxicity to wildlife, including both terrestrial and aquatic organisms, and shall be approved for use in wild land settings, within proximity or over water, and in aquatic habitats by the U.S. Environmental Protection Agency (EPA) and the Oregon Department of Fish and Wildlife (ODFW). The herbicide must be approved by the Owner’s Representative before application and shall be applied according to manufacturer’s specifications.

## 3. EXECUTION

### **3.1** GENERAL

A. Drawings. The Drawings are partially diagrammatic for graphic clarity and, therefore, do not show the exact individual planting locations for each species to be installed. The Contractor shall be responsible for the installation of all of the plants at the typical spacing and layouts shown on the Drawings and described in these Specifications, and as directed by the Owner’s Representative.

B. Schedule. The Contractor's strict conformance to the Project schedule is essential for the success of this Project. Unless otherwise directed by the Owner’s Representative, planting shall be conducted from November 1 through March 30. Planting shall not occur in saturated soils or while heavy rain is falling.

C. Disturbed areas. Do not disturb areas outside of the designated limits of disturbance, unless authorized in writing by the Owner’s Representative.  All associated restoration and revegetation of disturbed areas outside the designated limits of disturbance, as shown on the drawings, shall be borne solely by the contractor.

D. Sequence of Operations. The planting operations shall be conducted according to the following sequence of operations:

1. Flag tree and shrub locations, for the approval by the Owner's Representative,
2. Make incisions in the slope protection fabric (where present),
3. Excavate planting holes and apply soil amendment,
4. Install trees or shrubs in the prepared planting hole,
5. Reposition the slope protection fabric (where present) around the base of the installed plant and secure fabric with landscape stakes,
6. Provide sufficient irrigation to the each installed plant.

E. Existing Trees. The Contractor shall be responsible for providing soil amendment and mulch to the existing trees that will have grading disturbance within their drip lines.

### **3.2** PREPARATION

A. Laws, Codes, Ordinances and Regulations. All local, municipal and State laws, codes, ordinances and regulations governing or relating to any part of this work are considered a part of these Specifications and shall be conformed to by the contractor. These Specifications and the Drawings shall take precedence whenever they call for a higher quality or larger size than is required by the aforementioned codes, ordinances, and regulations. The Contractor shall be responsible for conformance to all applicable codes governing the materials and work at this Project site. Manufacturer's specifications shall govern should their directions and detailed drawings address information not included in these Specifications and the Drawings.

B. Timing. Planting operations shall begin after all seeding is installed according to Section 328400.

### **3.3** SITE CONDITIONS

A. Site Conditions. The contractor shall verify site conditions and be familiar with existing grade conditions, locations of existing features to be preserved, and all existing vegetation to remain. Field adjustments may be necessary to avoid disturbances to existing vegetation to remain. Before ordering materials or proceeding with work, the Contractor shall verify all dimensions and quantities between the Drawings, these Specifications and field conditions; any and all discrepancies shall be reported immediately to the Owner's Representative.

B. Field Adjustments. Field Adjustments necessary to accommodate or to minimize disturbances to existing site conditions shall be done at the Contractor's expense. Work shall be postponed in any area of discrepancy with the Drawings or these Specifications until the Owner's Representative has provided a written resolution to the conflict. The Contractor shall assume full responsibility for proceeding with work without written approval.

C. Coordination. The Contractor shall coordinate the planting installation to avoid conflicts with roads, utilities, other construction, and any existing features.

D. Vandalism. Throughout the Contract period, the Contractor shall be responsible for the replacement or repair of any part of the plant installation that is damaged as a result of vandalism; the Contractor shall be responsible for securing the Project site to minimize negative effects from vandalism.

## **3.4** PLANT INSTALLATION

A. The Contractor shall be responsible for providing and installing each of the plant species and related quantities, as indicated on the Drawings.

B. Installation Procedure. The plant installation shall conform to the Drawings and these Specifications. If planting adjustments are necessary, the Contractor shall proceed only after receiving approval from the Owner's Representative for such adjustments. Plants shall be set out daily, ensuring that the number of plants distributed to the planting areas can actually be installed and watered. To assure quality installation, onsite workers shall be trained and supervised until satisfactory planting techniques are achieved according to the satisfaction of the Owner's Representative.

C. Plant Layout. Individual planting locations shall be field marked (e.g. staked or flagged) per plant species by the Contractor. Field marked plant locations must be approved by the Owner's Representative before the start of any plant installation operations. Plant species shall be distributed throughout the Project site according to the locations and quantities indicated and as detailed on the Drawings. At no time shall plants be located within the access road locations indicated on the Drawings. At all times, plants will be located 5 feet clear of any access roads, ramps, or other structures.

D. Weed Removal. Before plant installation, weeds shall be removed within a 4-foot radius, minimum, of individual planting sites by mechanical or manual methods. At no time shall herbicides be used for weed control. At all times, native volunteer plants shall be preserved as directed by the Owner's Representative.

E. Planting on Slopes. There shall be no planting basin required for plant installations on slopes that are covered with slope protection fabric.

F. Plants. At all times, plants shall be installed into soil that does not exceed field soil moisture capacity. The plant shall be placed in the planting pit and the backfill shall be completed, tamped, and watered. Add water to planting hole to allow for settling of the soil. Position the plant so that the root crown is set 1/2 inch above finish grade at the time of planting. Place the plant in the hole and back fill with excavated soil.

G. Finish Grade. The planting hole shall be filled with moist, pulverized backfill. Backfill material shall make good contact with the roots, leaving no air pockets. Planting pit filling shall be completed so that the root crown is covered with a maximum of 1/4 inch layer of backfill above finish grade. The Contractor shall be responsible for filling the planting pit to avoid settlement before plant placement. The Contractor shall add backfill, firmly packed in place to avoid air pockets, and adjust plants due to settlement as required.

H. Watering Installed Plants: The Contractor shall be responsible for ensuring that the plants are watered before, during, and after the installation. Plants shall be thoroughly watered immediately after installation at individual plant locations. Water shall be applied according to ***Section 320190,*** Vegetation Maintenance.

### **3.5** WILLOW STAKE AND LIVE FASCINE INSTALLATION

A. Timing. Collect willow stakes while dormant, between December 1 and February 1. They shall be planted no later than February 15. During all stages, the plant materials shall be protected from exposure to wind and direct sunlight.

B. Delivery. The Contractor shall notify the Owner's Representative of the delivery schedule in advance so the plant materials may be inspected upon arrival at the job site. The Owner's Representative will inspect the cuttings for damage immediately upon receipt. Unacceptable cuttings will be removed from the job site immediately and disposed of at an authorized site.

C. Handling. Install willow stakes within 6 hours of collection. If planting does not occur within 6 hours, plant material must be properly stored according to the guidelines given in the following section.

D. Storage. All woody plant cuttings collected more than 6 hours prior to installation, must be carefully bound, secured, and stored submerged in clean fresh water for a period of up to one week. If stored outdoors temperatures must be less than 50 degrees F. Temperature indoors and in storage containers must be between 34 and 50 degrees F. If the willow stakes cannot be installed during the dormant season, cut during the dormant season and hold in cold storage at temperatures between 33 and 39 degrees F for up to 2 months.

E. Location. Prior to placement or installation of willow stakes and live fascines, the Contractor shall flag all plant material locations for approval by the Owner's Representative. The Owner's Representative may require adjustments to willow stake locations to meet field conditions.

F. Willow Stake Installation. Planting of willow stake shall be performed during above periods only when weather and soil conditions are suitable. Deviation from the above planting dates will be permitted only when approved in writing by the Owner's Representative. Plant materials shall be placed at intervals as indicated on the Drawings, with butt end down. Installed eighty percent of the stake below ground, leaving only twenty percent of the willow stake extending above ground.

### **3.6** CLEAN UP

A. Daily Cleanup. Site cleanup shall occur on a daily basis. All garbage, construction debris, excess plants and dirt, other discarded materials, and extraneous equipment caused by or due to the Contractor shall be removed offsite at the Contractor's expense and in accordance with State and local regulations.

B. Salvage. All materials designated to be salvaged shall be handled and removed with care. The Contractor shall be responsible for salvaging, removing offsite, and recycling all plant containers and racks; at no time will the Agency or the Owner's Representative be responsible for recycling plant containers and racks.

### **3.7** OBSERVATION AND TESTING

A. Observations. The Contractor shall provide the Owner’s Representative with 48-hours advance notification for the following required planting stage acceptance observations.

   1. Field marking of individual planting site locations,
   2. Observation and acceptance of plant materials before installation,
   3. Preparation for individual planting sites,
   4. Planting operations. The Contractor shall be responsible for the complete installation of plants according to the Drawings and as specified herein. Any unacceptable plants or planting operations shall be corrected according to the Owner’s Representative’s direction and at the Contractor’s expense before the Final Acceptance observation.

## **3.8** MAINTENANCE PERIOD

A. Site Conditions. The contractor shall verify site conditions and be familiar with existing grades, locations of existing features to be preserved, and all existing vegetation to remain.

B. Site Observations. The Contractor shall observe the entire Revegetation Project site to ensure that all plants are in a healthy and vigorous condition. The Contractor shall examine the condition of each plant, weed growth, plant protection cages, the stability of the watering basins and berms, and mulch. The Contractor shall also examine soil moisture around each plant to ensure that the watering is providing appropriate moisture to each plant during the irrigation season.

C. Vandalism. Throughout the Maintenance period, the Contractor shall be responsible for the replacement or repair of any part of the plant installation that is damaged as a result of vandalism; the Contractor shall be responsible for securing the Project site to minimize negative effects from vandalism.

D. Records. All regular observations and subsequent maintenance activities shall be recorded monthly in Maintenance Report forms, according to this Specification section.

E. Watering. Watering applications shall be conducted to establish and maintain healthy and vigorous plants. Water shall be applied in a manner that promotes deep root development and the “weaning off” of plants. The frequency of the watering shall depend on current weather patterns and site-specific moisture conditions. Should water be retained within a watering basin for more than 3-hours, the Contractor shall breach the berm of said basin in order to provide drainage at said plant, especially during the rainy season and at other times as necessary. The Contractor shall take corrective actions to ensure positive drainage at said plant; the berm shall then be restored to reform the watering basin as detailed on the Drawings and as prescribed in these Specifications. At no time shall any water be applied in a way that will cause erosion, damage to plants, or excessive runoff.

F. Weed Control. Weed control shall consist of maintaining the individual planting sites, plant clusters, areas between individual planting sites and plant clusters, free of weeds for the duration of the Maintenance period. Weed control shall consist of mechanical or manual methods, whenever possible, to maintain the seeded areas free of weeds for the duration of the Contract period. Grass and broadleaf weeds shall at no time exceed 18 inches in height or occupy 10% of the ground cover between planting sites. Broadleaf weeds shall be removed before they set seed. The Contractor shall provide spot applications of herbicide as required to maintain control of weeds and other undesired vegetation at times directed by the Owner's Representative. Native volunteer plants shall be preserved whenever possible. Throughout the Maintenance period, weeds shall be removed within a 48-inch diameter of each plant. Weed removal at the trunks of individual plants, shall be conducted by hand pulling. At no time shall weed removal disrupt the root systems of the installed plants. Herbicide shall be used in spot applications only, as approved by the Owner's Representative.

G. Dead Plants. Plant material that has no easily observable viable aboveground living matter, as determined by the Owner's Representative, will be considered dead and must be replaced by the Contractor, at the Contractor's expense, according to the Drawings and the Specifications. Dead plants shall be removed before installation of replacement plants. All dead plants shall be removed offsite according to State and local regulations at the Contractor's expense.

## 4. MEASUREMENT AND PAYMENT

### **4.1** MEASUREMENT

A. Plantings. Bare Root and Willow Stake plantings will be measured on a unit basis for each individual plant completely supplied and installed by the Contractor and approved by the Owner's Representative.

### **4.2** PAYMENT

A. Plantings. Payment for Bare Root and Willow Stake plantings, measured as specified, will be paid at the contract unit price for each Planting, which will include all costs in connection therewith.

| Pay Item | Pay Unit |
|---|---|
| Planting | Each |

END OF SECTION

# INDEX
# SECTION 330533
# HDPE UTILITY PIPE

**Paragraph** **Page**

# SECTION 330533
# HDPE UTILITY PIPE

## 1. GENERAL

### 1.1 DESCRIPTION

The work covered by this section consists of furnishing and installing the HDPE utility pipe as shown on the Drawings, as specified herein, or as otherwise directed by the Engineer.

### 1.2 RELATED SECTIONS

1. Section 017123.16, Construction Surveying
2. Section 312319, Dewatering
3. Section 312316, Stripping and Excavation
4. Section 312323, Engineered Fill
5. Section 330561, Concrete Manholes
6. Section 354237, Rock Slope Protection

### 1.3 REFERENCES

A. Oregon Department of Transportation (ODOT) Standard Specifications for Construction, current edition

### 1.4 SUBMITTALS

A. Submit to the Engineer, for review the following:

1. Proposed gradation and quarry source for all rock and bedding materials.
2. HDPE Pipe. Manufacturer's catalog data and installation instructions for pipe materials. A Certificate of Compliance(s) for each type of plastic pipe furnished and proposed for installation. The certificate shall also certify that the plastic pipe and joints comply with the requirements of the specifications, and shall include the resin material cell classification, unit weight of pipe, average pipe stiffness, joint property requirements, and date of manufacture. Submit the manufacturer's certification or copy of plant audits and test results from the National Transportation Product Evaluation Program (NTPEP) for the current cycle of testing for each pipe diameter furnished and its conformance with AASHTO minimum requirements.
3. Flexible PVC Coupling. . Manufacturer's catalog data and installation instructions for installing coupling between dissimilar pipe materials.

## 2. PRODUCTS

A. Comply with the Drawings, and Section 00445 of the Standard Specifications.

B. Pipe. Pipe shall be Type S, conforming to the provisions in Section 02410.60 of the Standard Specifications and this Section. Pipe shall be dual-walled high-density polyethylene (HDPE) pipe with a smooth (non-corrugated) interior surface, and shall have a Manning's roughness coefficient of 0.035 or less.

C. Backfill. Backfill shall comply with Section 00405 of the Standard Specifications.

D. Flexible PVC Coupling. The coupling connecting the new HDPE pipe to the existing concrete pipe shall be flexible PVC coupling with reducing bushings (as necessary depending on pipe diameter difference).

1. Type 304 stainless steel clamps with up to 120 in./lbs. of torque.
2. Maximum test pressure: 4.3 psi.
3. Fernco, or approved equal.

## 3. EXECUTION

### 3.1 GENERAL

A. The drainage materials shall be installed in accordance with the manufacturer's recommendations, as shown on the Drawings, as specified herein, and in conformance with the provisions in Section 00445.43(d), "Polyethylene Pipe" of the Standard Specifications.

### 3.2 ENERGY DISSIPATORS

A. Boulder Plunge Pools shall be installed as shown on the Drawings, and in accordance with Section 354237, Rock Slope Protection.

### 3.3 PLASTIC PIPE.

A. Plastic pipe, fittings, gaskets, and other components shall be stored in a way that protects materials from the weather, heat sources, and corrosive liquids, in addition to protection from direct sunlight by storing in containers and/or covering with tarpaulins or other suitable materials. To minimize the potential for pipe shrinkage after installation, the temperature of pipe to be laid must not be more than five (5) degrees Fahrenheit higher than the ambient temperature of the trench. Should the Contractor not provide adequate cover of the pipe or install during changes in temperature the Engineer will not accept the pipe and the Contractor will be required to replace the pipe which is deemed unacceptable by the Engineer. The Contractor will bare all costs associated with the replacement and no additional compensation will be allowed for.

B. Pipes shall be laid to the lines and grade shown on the Plans with the sections properly jointed, following generally accepted practices, the Manufacturer's recommendations, the Standard Specifications, these Special Provisions, and as directed by the Engineer. Care shall be taken not to damage pipe sections, joints, or gaskets during assembly. Contractor shall make use of pipe lubricant, installation stub, etc. and follow manufacture recommendations to ensure all pipe sections are pushed "home." A "come-along" or other similar method should be used; construction equipment such as an excavator bucket, etc. must not have direct contact with the plastic pipe end sections unless an installation stub and large timber or other suitable cushioning medium is utilized. The Contractor shall clean the interior of the pipeline as work progresses and the pipeline shall be clear and free of debris and sediment before acceptance by the Engineer.

C. The trench shall be excavated to the depth and width as necessary to allow for proper installation of the pipe and compaction of backfill material to the lines and grades as shown on the Project Plans and applicable details. The bottom of the trench shall be graded and prepared so as to provide a firm and uniform bearing for the pipe along its entire length. Where the trench bottom or immediate adjacent side walls are unsuitable (i.e. clay, peat, soft muck/refuse or bedrock/unyielding material unable to provide long-term pipe support), the Contractor shall excavate to a depth required by the Engineer and replace with suitable material as specified or directed by the Engineer. In addition and at the discretion of the Engineer, a geotextile material may be required to stabilize the bottom of the trench. In-situ trench foundation shall be no less than 90% standard proctor; any materials placed to stabilize trench bottom foundation shall be no less than 95% standard proctor. Suitable bedding material shall be Class I or II in accordance with ASTM D2321, or accepted native soils. Minimum bedding thickness shall be 4 inches. Suitable material for the initial backfill or pipe embedment (up to minimum 12 inches above top of pipe) including the haunch area and pipe zone shall be Class I or II in accordance with ASTM D2321. Any trench backfill shall be placed in uniform lifts (not to exceed 8 inches) and shall be compacted to a relative compaction of 95 percent. Where conditions (i.e. space constraints, poor trench wall soil qualities, etc.) are cause for the Contractor’s inability to achieve the backfill compaction requirements, flowable fill or controlled low strength material (CLSM) shall not be placed in the work without prior acceptance of the Engineer.

D. In situations where the plastic pipe is placed under asphalt concrete paving or other concrete surface improvement and the cover over the pipe, from top of pipe to top to finished grade is 18-inches or less, then structural backfill shall be slurry cement backfill.

E. Allowable joint deflection or longitudinal bending is dependent on pipe size and/or joint design, and shall not exceed the pipe manufacturer’s published limits. No deflection in pipe shall be allowed without prior written acceptance by the Engineer.

F. Where pipes are installed in manholes, drainage inlets, junction boxes or other structures, the connection shall be at least equal to that of the pipe joint performance requirements. Soil-tight pipe joints are specified, the ends of the pipes shall be placed flush or cut off flush with the inside face of the structure, and be grouted in place with hydraulic cement “non-shrink” grout, unless otherwise directed by the Engineer. Performance of the pipe, fittings, and connections is highly dependent on proper installation procedures. Installation shall be in conformance with all manufacture recommendations, the Project Plans and applicable details, the Standard Specifications, these Special Provisions, and as directed by the Engineer. The costs for these connections (including all materials, adapters, gaskets, seals, band clamps, couplings, grout, concrete collars, etc.) shall be included in the associated bid item of work and no additional compensation will be allowed for. There will be no separate payment for the connections required for a complete construction of the project.

G. Where pipes are to connect to existing pipes, proper couplings and methods shall be utilized to connect the plastic pipe to the existing pipe (including differing sizes and material), and the connection shall be at least equal to that of the pipe joint performance requirements. The connection shall be in conformance with all manufacturer recommendations, these Special Provisions, the Standard Specifications, and as directed by the Engineer. The costs for these couplings (including all materials, gaskets, seals, grout, concrete collars, etc.) shall be included in the associated bid item of work and no additional compensation will be allowed for. There will be no separate payment for the couplings required for a complete construction of the project.

## 4. MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. 24” HDPE Pipe shall be measured on a per linear foot basis along the centerline of the facility from the outside face of any adjoining structures, complete in place and accepted by the Engineer as conforming to all the requirements in the complete work.

### 4.2 PAYMENT

A. Drainage Facilities will be paid for at the lump sum contract price, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the drainage facilities, as specified, as shown on the Drawings, or as directed by the Engineer.

B. Full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing the yard drain, complete in place, including precast structures, formwork, concrete, reinforcement, metal frames, grates, hoods, structure excavation and backfill, sub-grade preparation, fabrics, permeable material, pervious material, aggregate base, backfill, compaction, grading, core drilling, pipe connections, gaskets, seals, grout, curing compound, disposal of materials, and any other appurtenances, as shown on the Drawings, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer shall be at the contract unit price per each yard drain constructed and accepted by the Engineer under the bid items for Yard Drain, and no additional compensation will be allowed therefore.

C. 24” HDPE Pipe Full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing the plastic pipe, complete in place, including pipe, fittings, couplings, gaskets, seals, fabrics, transport, excavation, sub-grade preparation, bedding, installation, connections, backfill, compaction, disposal of materials, and any other appurtenances, as shown on the Drawings, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer shall be at the contract unit price per linear foot for every linear foot of plastic pipe installed and accepted by the Engineer under the bid items for 24” HDPE Pipe, and no additional compensation will be allowed therefore.

| Pay Item | Pay Unit |
|---|---|
| 12” HDPE PIPE | LF |

**END OF SECTION**

# INDEX
# SECTION 330561
# CONCRETE MANHOLES

**Paragraph** **Page**

# SECTION 330561
# CONCRETE MANHOLES

## 1. GENERAL

### 1.1 Description

A. The work covered by this section consists of furnishing and installing the concrete manholes as shown on the Drawings, as specified herein, or as otherwise directed by the Engineer. Work includes, but is not limited to the following:

1. Install all pre-cast concrete manholes, pipe to manhole connections, cast-in-place concrete benches, manhole steps, joint seals, tracer wire, grade rings, manhole cover and frame, and perform associated structural excavation, backfill, and compaction.

### 1.2 Submittals

A. The following submittals shall be provided in accordance with Section 013300.

1. Submit complete shop drawings with detailed dimensions, specifications, and data on the complete unit with its accessories and parts.

### 1.3 References

A. Oregon Department of Transportation (ODOT) Standard Specifications for Construction, current edition

### 1.4 Related Sections

A. Dewatering**,** Section 312316
B. Stripping and Excavation, Section 312316
C. Engineered Fill, Section 312323
D. HDPE Utility Pipe, Section 330533

## 2. PRODUCTS

### 2.1 Precast Manholes and Accessories

A. Precast concrete manholes including risers, cones, and cover slabs shall conform to the requirements of ASTM C478 as shown on the Drawings, except as specifically modified herein.

B. Manhole steps shall be steel reinforced copolymer polypropylene conforming to ASTM A-615 and D-4101, and meet the dimensions and spacing shown in the Drawings.

C. Manhole Frames and Covers shall conform to Section 02450.30 (Metal Frames, Covers, Grates, and Ladders) of the Standard Specifications and the Drawings.

D. Pipe to manhole connectors shall be resilient connectors as shown on the Drawings.

E. Cast-in-place concrete used for base sections and concrete benches and channels within the manholes shall conform to Section 00440 (Commercial Grade Concrete) of the Standard Specifications.

## 3. EXECUTION

A. Concrete manholes and accessories shall be installed per Section 00470 of the Standard Specifications and manufacturers recommendations.

## 4. MEASUREMENT AND PAYMENT

### 4.1 Measurement

A. Concrete Manholes. Concrete Manholes shall be measured per each based on the number of concrete manholes, complete in place and accepted by the Engineer.

B. Manhole frames and covers shall not be separately measured for payment.

C. Pipe to manhole connectors shall not be separately measured for payment.

### 4.2 Payment

A. Full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing the concrete manhole, complete in place, including precast structures, pipe to manhole connections, concrete benches, manhole steps, joint seals, tracer wire, grade rings, manhole cover and frame, structure excavation and backfill, sub-grade preparation, aggregate base, backfill, compaction, grading, core drilling, grout, disposal of materials, and any other appurtenances, as shown on the Drawings, as specified in the Standard Specifications, and as directed by the Engineer shall be at the contract unit price per each concrete manhole constructed and accepted by the Engineer under the bid items for Manholes, and no additional compensation will be allowed therefore.

B. Payment will be made under:

| Pay Item | Pay Unit |
|---|---|
| 48” Diameter Manholes | EA |

**END OF SECTION**

# INDEX
# SECTION 354200
# LOG STRUCTURES

**Paragraph** **Page**

# SECTION 354200
# LOG STRUCTURES

## 1. GENERAL

### 1.1 Description

A. Work within this section includes furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the Log Structures, Snag Logs, and Debris Piles, complete in place, including excavation, and backfilling, Log/Log Connections, log, debris, ballast boulder supply, preparation and placement, and backfill of voids, as specified, as shown on the Drawings, or as otherwise directed by the Engineer.

B. Related Sections

1. Section 311100, Clearing and Grubbing
2. Section 312319, Dewatering
3. Section 312316, Stripping and Excavation
4. Section 354237, Rock Slope Protection

### 1.2 Submittals

A. Submit to the Engineer, for review and approval, the following, prior to delivering materials to the work site:

1. Product data sheet for Log/Log Connections and associated hardware.
2. Photos of all logs. Each log shall be tagged with a number, referenced in the photos.

## 2. PRODUCTS

### 2.1 Materials

A. Ballast Boulders. Conform to the material requirements of ***Section 354237, Rock Slope Protection.***

B. Engineered Streambed Material. Conform to the material requirements of ***Section 354237, Rock Slope Protection.***

C. Threaded Rebar. Rebar shall be ASTM A615 Grade 75. The bar shall be #8 with ¾” UNC threads. Finish shall be plain finish (no galvanizing).

D. Steel plates and Bolts. Steel plates and bolts shall not be galvanized. Size bolts to match rebar thread dimensions. Size steel plates per dimensions shown on the drawings.

E. Logs.

1. Logs may be imported or salvaged from the construction site, and shall meet the material specifications shown on the Drawings.
2. All logs shall be inspected for approval by the Engineer, prior to installation.
3. Refer to the Drawings and Section 311100 (Clearing and Grubbing) for trees available for salvage.

F. Debris. Debris Piles shall be constructed from logs, rootwads, and slash of native trees salvaged from the construction site during clearing and grubbing as directed by the engineer. No invasive species or materials containing seeds of invasive species shall be used.

G. Backfill. Backfill shall consist of “Engineered Streambed Material” to match surrounding surface treatments shown on the Drawings.

## 3. EXECUTION

### 3.1 General

A. Prior to the start of work, the Engineer shall designate representatives authorized to observe the Contractor’s placement of Habitat Features. Contractor shall notify the authorized representative 72 hours prior to placement of Habitat Features. Construct all Log Structures and other Habitat Features in the presence of the authorized representative.

B. Log Structure designs are shown conceptually due to the inherent variability of material properties. The design requires that the Engineer will observe construction of the Log Structures and other Habitat Features to ensure the intent of the design is met. Observations must include log and boulder selection, placement, connections, ballasting, and placement of backfill. Any log structures constructed without the Engineer present may result in rejection of the work by the Engineer.

C. The construction of Log Structures requires equipment which can place rock and logs in precise locations. An excavator of a suitable size and containing a thumb is suggested.

D. Placement of the foundation logs and ballast boulders are critical to the success of the Log Structures. To ensure proper placement, the Contractor shall provide a portable pump or other method to de-water excessive ground water from the excavation, as necessary.

E. Ballast Boulders shall be individually placed on Log Structures and other applicable Habitat Features at the direction of the Engineer,

F. The number of Ballast Boulders shown on the Drawings is diagrammatic. Actual count shall vary, as necessary to achieve the dimensions shown on the Drawings.

G. Log to Log connections. Each rebar connection shall be secured with two bolts, tightened to the manufacturer’s recommended torque. Cut off excess rebar flush with surface of the log.

H. Log Placement. Log placement locations shown on the Drawings are approximate. Exact locations shall be as approved by the Engineer, or his authorized representative.

I. Log Salvage. Trees shown to be removed on the Drawings and Specifications shall be salvaged with their rootwad intact and placed in habitat structures, as directed by the Engineer.

### 3.2 Field Quality Control

A. Tolerances. Log and Ballast Boulder placements shall be as approved by the Engineer.

B. Logs. All logs shall be inspected for approval by the Engineer, prior to installation.

## 4. MEASUREMENT AND PAYMENT

### 4.1 Measurement

A. Log Structures will be measured by the number of Log Structures installed, as shown on the Drawings, as specified, and as directed by the Engineer.

B. Snag logs will be measured by the number of Snag Logs installed, as shown on the Drawings, as specified, and as directed by the Engineer.

C. Debris Piles will be measured by the number of Debris Piles installed, as shown on the Drawings, as specified, and as directed by the Engineer.

D. Habitat Logs Below Ordinary High Water will be measured by the number of Habitat Logs Below Ordinary High Water installed, as shown on the Drawings, as specified, and as directed by the Engineer.

E. Habitat Logs Above Ordinary High Water will be measured by the number of Habitat Logs Above Ordinary High Water installed, as shown on the Drawings, as specified, and as directed by the Engineer.

### 4.2 Payment

A. Log Structures will be paid for at the contract unit price for each Log Structure installed including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing each Log Structures, complete in place, including excavation and backfill, ballast boulder placement, and connections, as shown on the Drawings, as specified herein, or as directed by the Engineer.

B. Snag Logs will be paid for at the contract unit price for each Snag Log installed including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing each Snag Log, complete in place, including excavation and backfill, as shown on the Drawings, as specified herein, or as directed by the Engineer.

C. Debris Piles will be paid for at the contract unit price for each Debris Pile installed including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing each Debris Pile, complete in place, including excavation and backfill, as shown on the Drawings, as specified herein, or as directed by the Engineer.

D. Habitat Logs Below Ordinary High Water will be paid for at the contract unit price for each Habitat Log Below Ordinary High Water installed including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing each Habitat Log, complete in place, including excavation and backfill, and ballast bounder placement, as shown on the Drawings, as specified herein, or as directed by the Engineer.

E. Habitat Logs Above Ordinary High Water will be paid for at the contract unit price for each Habitat Log Above Ordinary High Water installed including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing each Habitat Log, complete in place, as shown on the Drawings, as specified herein, or as directed by the Engineer.

F. No separate payment will be made for trees and slash salvaged and used in Habitat Features. All costs in connection with salvage work will be considered incidental to the cost of Clear and Grubbing per Section 311100, Clearing and Grubbing.

G. Payment will be made under:

| Pay Item | Pay Unit |
|---|---|
| Log Structures | Each (EA) |
| Snag Logs | Each (EA) |
| Debris Piles | Each (EA) |
| Habitat Logs Below Ordinary High Water | Each (EA) |
| Habitat Logs Above Ordinary High Water | Each (EA) |

**END OF SECTION**

# INDEX
# SECTION 354237
# ROCK SLOPE PROTECTION

Paragraph Page

# SECTION 354237
# ROCK SLOPE PROTECTION

## 1. GENERAL

### 1.1 DESCRIPTION

A. Work within this section shall include furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in placing, Rock Slope Protection (RSP), Boulder Plunge Pools, Rock Grade Control Structures, Engineered Streambed Material, Boulder Clusters, backing layers, and backfill where shown on the Drawings, as specified herein, or as otherwise directed by the Engineer. Stone protection, rock slope protection, and riprap are interchangeable in these Specifications and Drawings.

B. All loading, transport, temporary stockpiling, processing and mixing of stone materials to achieve designated gradations, washing, on-site hauling, excavation, preparation of sub-grade, placement, embedment, backfill, grading, compaction, finish grading, clean-up, and off-haul and disposal of excess materials needed to install all Rock Slope Protection work, where incorporated in the work, shall be considered as included in the applicable bid item unit price, and no additional compensation will be allowed.

C. The location, alignment, angles, elevations, grades, slopes, dimensions, etc. of the proposed creek channel improvements, treatments, and structures as described in this section are shown on the Project Plans to provide a basis for construction and bidding purposes. The Engineer is expected to make minor revisions and provide direction in the field to fit any varying field conditions. The Contractor shall include all costs for working under the direction of the Engineer in his/her bid for this work, as no additional compensation will be allow therefore.

D. Related sections:

1. Section 354200, Log Structures
2. Section 312319, Dewatering
3. Section 329000, Planting
4. Section 312316, Stripping and Excavation

### 1.2 SUBMITTALS

A. Submit to the Engineer, for review, the following:

1. Certified weights of the rock delivered to the site.
2. Certificate(s) and other material testing data as necessary to validate the source of the Rock Materials and their conformance with the Standard Specifications and these Technical Specifications. Include all applicable test results for grading, specific gravity, resistance to degradation, absorption, durability index, and soundness (as described elsewhere in these Technical Specifications).
3. A representative 5 cubic yard sample of each of the proposed Rock Materials specified herein shall be provided to the Engineer for approval, ten days prior to delivery of the remainder of material to the project site. The Engineer reserves to the right to reject said materials.

B. Sampling and Testing Assistance. Any difference of opinion between the Engineer and the Contractor shall be resolved by dumping and checking the gradation of the two random truck loads of rock. Mechanical equipment, a sorting site and labor needed to assist in checking gradation shall be provided by the Contractor at no additional cost to the Client.

### 1.3 QUALITY ASSURANCE

A. Tolerances. Place rock to a vertical tolerance of minus 2 to plus 3 inches.

B. Subgrade Preparation. Prior to placement of rock, Engineer shall verify subgrade preparation, and placement of fabric for rock. Where backing is shown on the Drawings, Engineer shall verify subgrade preparation and backing placement prior to placement of outer rock course.

## 2. PRODUCTS

### 2.1 MATERIALS

A. Salvaged Rock Material. Native rock found on site may be salvaged for reuse, subject to compliance with the material requirements for the intended use, and subject to the approval by the Engineer. The Engineer may require the Contractor to provide testing (e.g. gradation curve, hardness, etc.) to ensure that materials are suitable for reuse. Salvaged creek bed material shall be placed on a hardened surface or other suitable material (i.e. steel plate, pavement, filter fabric) in order to protect the said material from contamination or mixing with other soils, earthen material and debris. The Engineer may, at his sole discretion, waive certain testing requirements to facilitate the Contractor's use of locally salvaged materials.

B. Rock Material Shape. Cobble and Boulders identified for use in the proposed creek channel improvements, treatments, and structures, and other areas subject to or where it is expected to be exposed to hydraulic conditions (creek water flow) shall be smooth and rounded in shape, as is typical of river run cobblestone, fieldstone, or that from a former stream deposited source. **Angular rock, quarried, split rock, crushed rock or shot rock shall not be used** (except where specified or allowed as shown on the Plans or directed by the Engineer). All creek channel grade control structure boulders, and other specified boulders that are located within and immediately adjacent to the proposed creek channel (exposed or expected to be exposed over time to creek water flows) shall be smooth and rounded in shape as noted above and of a natural earth tone color/hue that blends with the surrounding environment. Attention is directed to the submittal requirements as noted in this section.

C. Rock materials shall conform to Section 00390 of the State Standard Specifications. Stones shall be sound, durable, hard, resistant to abrasion and free from laminations, weak cleavage planes, and the undesirable effects of weathering. It shall be of such character that it will not readily disintegrate from the action of air, water, or the typical conditions experienced during handling and placing. All aggregate material shall be clean and free from deleterious impurities, including alkali, earth, clay, refuse, and adherent coatings.

D. Rock size classes not designated below shall be as shown on the Drawings, or as directed by the Engineer. All stone, rock, aggregate materials, and soils imported to the site shall be from a certified "Weed Free" source.

1. RSP. Comply with Section 00390 of the State Standard Specifications for the rock classes indicated on the Drawings. RSP shall be sub-rounded to angular.
2. Ballast Boulders. Ballast Boulders shall be sub-rounded to sub-angular. Minimum weight of Ballast Boulders shall be 4 tons each.
3. Boulder Cluster Boulders. Boulder Cluster Boulders shall be sub-rounded to sub-angular. Minimum weight of Ballast Boulders shall be 4 tons each.
4. Backing. Comply with Section 00390.13 (Filter Blanket) of the State Standard Specifications for the backing class indicated on the Drawings.
5. Backfill. Backfill within RSP voids shall consist of "Stream Substrate" material, as specified below

E. Boulder Plunge Pool Material. Boulder Plunge Pool Material shall consist of dense, hard, durable non-friable stone free of organic debris and other deleterious substances. The rock shall have a minimum specific gravity of 2.5. Volcanic cinder material shall not be acceptable. The material shall be washed (at the point of supply) to reduce the percentage of fines (sieve #200 or less) and protected during all associated operations (i.e. loading, transport, stockpiling, on-site hauling, placement, etc.) to minimize or eliminate the potential for contamination.

1. Boulder Plunge Pool Material shall conform to the gradation requirements of Table 1, below.

| **Table 1: Gradation requirements for Boulder Plunge Pool Material, inches or sieve size** | |
|---|---|
| Percent of Mix (by weight | Size Range (inches) |
| 40 | 36-48 |
| 20 | 24-36 |
| 10 | 12-24 |
| 15 | .5-12 |
| 5 | < .5 |

F. Engineered Streambed Material. Engineered Streambed Material shall consist of dense, hard, durable non-friable stone free of organic debris and other deleterious substances. The rock shall have a minimum specific gravity of 2.5. Volcanic cinder material shall not be acceptable. The material shall be washed (at the point of supply) to reduce the percentage of fines (sieve #200 or less) and protected during all associated operations (i.e. loading, transport, stockpiling, on-site hauling, placement, etc.) to minimize or eliminate the potential for contamination.

1. Engineered Streambed Material shall conform to the gradation requirements of Table 2, below.

| **Table 2: Gradation requirements for Engineered Streambed Material, inches or sieve size** | |
|---|---|
| Percent of Mix (by weight | Size Range (inches) |
| 20 | 18-30 |
| 30 | 12-18 |
| 30 | 2-12 |
| 12 | .08-2 |
| 8 | < .08 |

## 3. EXECUTION

### 3.1 GENERAL

A. Salvaged rootwad transplants and live stakes shall be incorporated into the rock work as rock placement proceeds. Contractor shall coordinate with revegetation crew as necessary to ensure that materials are prepared prior to placing rock and shall provide access to revegetation crews through the duration of the work.

B. Rounded and smooth gravel, cobbles, and boulders shall not be placed on slopes steeper than 2:1 (horizontal: vertical) unless otherwise directed by the Engineer.

C. All rock materials shall be placed in such a manner as to smoothly conform with adjacent graded areas. Smaller rock shall be chinked into the margins of larger rock placements, as necessary to conform to earthwork and prevent migration of fines from adjacent graded areas into the rock matrix.

## 3.2 ENGINEERED STREAMBED MATERIAL

A. Engineered Streambed Material shall be placed to the lines, grades and depths shown on the Drawings, or as directed by the Engineer. Uniformly distribute large stones to produce the required gradation of rock. Prevent contamination of rock materials by excavation and/or earth materials. Subgrade shall be uniform with no soil clumps or rocks greater than two inches. Where the specified depth of placement exceeds twelve inches, the material shall be placed in lifts not exceeding twelve inches depth and water jetted after each lift is placed, as outlined below.

B. Following placement of each ESM lift, rock surface shall be jetted with water to improve compaction and embed the fines within the mix. Jetting shall start at the upstream limits of placement and progress downstream. Jetting shall continue until water ponds at the surface, and until the turbidity levels of runoff produced from the jetting process have reached an acceptable level. All sediment-laden runoff generated by the jetting operations shall be pumped to a settling tank or similar device to reduce turbidity to acceptable levels, in compliance with permit conditions, prior to discharge to the creek. Comply with Section 312319, Dewatering.

C. In the event that the Engineered Streambed Materials are manipulated after placement, there is the potential for segregation by size class, which typically results in the larger fraction rising to the surface and fines being lost to the base of the lift. If in the opinion of the Engineer, there is excessive segregation of materials, the contractor shall remove all Engineered Streambed Materials, re-mix to a uniform gradation, and replace as specified.

D.

## 3.3 BOULDER PLUNGE POOLS

A. Rock will not be allowed to be “dumped”. Following Engineer’s approval of backing material, the rock shall be placed as directed by the Engineer for a natural appearance, which will require hand placement of rock. The Contractor shall take all necessary measures to protect backing from damage. All rock is to be placed to minimize the potential for movement when flow is induced into the channel and this will be accomplished by interlocking the angular nature of the rock with itself, and by placing larger stones first, with direct stone to stone contact, and then chinking the voids with the smaller materials. The energy dissipater geometry shall conform to the finished grades of the slopes on all sides. Local surface irregularities of the rock rip-rap shall not vary from the planned slopes by more than four inches (4-in) measured at right angles to the slope.

## 3.4 BOULDER CLUSTER

A. Boulder Clusters shall consist rock loosely placed to meet the gradation and dimensions indicated on the drawings. Specific placement locations shall be at the direction of the Engineer.

## 3.5 BALLAST BOULDERS

1. Ballast Boulders shall be placed on Log Structures per the Drawings, and Section 354200.

## 4. MEASUREMENT AND PAYMENT

### 4.1 MEASUREMENT

A. Engineered Streambed Material will be measured by the ton of “Engineered Streambed Material”, to the nearest 2 ton, for Engineered Streambed Material placed as shown on the Drawings and approved by the Engineer.

B. Ballast Boulders. Ballast Boulders will not be separately measured for payment.

C. Boulder Plunge Pools will be measured by the number of Boulder Plunge Pools installed, as shown on the Drawings, as specified, and as directed by the Engineer.

D. Boulder Clusters will be measured by the number of Boulder Clusters installed, as shown on the Drawings, as specified, and as directed by the Engineer.

E. Volumetric measurements will be determined from the dimensions as shown on the Drawings or the dimensions constructed as directed by the Engineer. Materials placed in excess of these dimensions will not be included the measurement for payment. Surface areas will be measured to the horizontal limits parallel to the ground surface.

F. Excavation and backfill for rock slope protection will not be separately measured for payment.

G. Backing will not be separately measured for payment.

### 4.2 PAYMENT

A. Engineered Streambed Material, measured as specified above, will be paid for at the contract unit price per Ton, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in placing the Engineered Streambed Material, complete in place, including subgrade preparation, processing work, excavation, and jetting, as shown on the Drawings, as specified herein, or as directed by the Engineer.

B. Boulder Plunge Pools will be paid for at the contract unit price for each Boulder Plunge Pool installed including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing each Boulder Plunge Pools, complete in place, including excavation and backfill, as shown on the Drawings, as specified herein, or as directed by the Engineer.

C. Boulder Clusters will be paid for at the contract unit price for each Boulder Clusters installed including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing each Boulder Clusters, complete in place as shown on the Drawings, as specified herein, or as directed by the Engineer.

D. No separate payment will be made for excavation and backfill incidental to slope protection work. All costs in connection with this work will be considered incidental to the cost of construction of the associated slope protection work. Where embankment is shown to be placed over completed rock slope protection, the embankment shall be considered incidental to the cubic yard price paid for associated Rock Slope Protection work.

E. No separate payment will be made for rock backing materials. All costs in connection with this work will be considered incidental to the cost of construction of the associated improvement.

F. No separate payment will be made for ballast boulders. All costs in connection with this work will be considered incidental to the cost of construction of the associated improvement.

G. Payment will be made under:

| Pay Item | Pay Unit |
|---|---|
| Engineered Streambed Material | CY(F) |
| Boulder Plunge Pool | Each (EA) |
| Boulder Cluster | Each (EA) |

**END OF SECTION**

# Exhibit B. Site Specific Performance Plan (Grette Associates)

# LINNTON MILL RESTORATION SITE

# EXHIBIT B: SITE-SPECIFIC PERFORMANCE PLAN

PREPARED FOR:

**LINNTON WATER CREDITS LLC**
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DECEMBER 4, 2018

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

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Attachment 2. Technical Memorandum: Linnton Mill Restoration Site Pre-Construction Monitoring Plan and Results
Attachment 3. Linnton Mill Restoration Project – Bird and Bat Protection Guidance (Memorandum from S. Barnes, 4/21/17)

# 1 PROJECT OVERVIEW

Linnton Water Credits, LLC (the Project Implementer) plans to carry out a habitat restoration action in the lower Willamette River/Portland Harbor for the purpose of offsetting Natural Resource Damage (NRD) liabilities. Additionally, the Project Implementer will seek to develop the site as a mitigation bank under other applicable mitigation programs. The proposed Project will provide valuable habitat credits (known as Discounted Service Acre Years or DSAYs) from within Portland Harbor that will be important for the Portland Harbor Natural Resources Damages Assessment (NRDA) process. Additionally, it is anticipated that other potential 404 Mitigation credits generated by the site will be needed to offset impacts from Portland Harbor remediation activities and other in-water projects with unavoidable aquatic impacts.

The Linnton Mill Restoration Site Project (hereafter the "Site" or "Project") involves transforming an existing industrial parcel along the Willamette River into a habitat site that includes new Off-Channel habitat, enhanced Shallow Water and Active Channel Margin (ACM) habitats, and new/restored Riparian and Upland forested habitat. The Project is located on the west bank of the Willamette River between approximately River Miles (RM) 4.7 and 5.0 (Attachment 1; Sheets 1 and 2).

This document represents the monitoring plan for the Implementation and Effectiveness Monitoring phases of the project. This document builds on the data collected during the Baseline Monitoring phase at the site. The Baseline Monitoring phase of the project is described in the Pre-Construction Monitoring Plan, which is included as Attachment 2.

## 1.1 SITE DESCRIPTION

### 1.1.1 Location

The Linnton Mill Site is a highly disturbed industrial site that encompasses approximately 27.83 acres over approximately 1,800 linear ft of the western bank of the Lower Willamette River, at approximately river mile 5. The site is located at 10504 NW. St. Helens Rd, Portland, OR, within portions of Section 2, Township 1N, Range 1W (Figure 1; Attachment 1: Sheets 3 and 4). The center of the site is located at 45.59747° N latitude, -122.78245° W longitude.

### 1.1.2 History

Development within the Lower Willamette River has drastically altered aquatic, riparian and upland habitat, particularly within Portland Harbor. By 1990, approximately 93% of forested floodplain land within the Lower Willamette River Study Area (RM 0-11.6) had been developed (Hulse, Gregory and Baker, *eds.* 2002). Approximately 44% of the shorelines of the Study Area are armored with revetment (Hulse, Gregory and Baker, *eds.* 2002). Along with the reduction in forested habitat and increased shoreline revetment have come either direct reductions or reduced opportunities for development of high quality shoreline and off-channel habitat in the Study Area.

The Linnton Mill Site has been used as an industrial property since the late 1800s (CH2M Hill 2007). The entire site was developed and operated as a sawmill from 1894 to 1947, when it was destroyed by fire. The northern part of the site was then used as a plywood mill from 1951 to

2001, with the southern portion of the property used for stockpiling/dewatering of Columbia River sand from 1997 until recent years (CH2M Hill 2007). Based on historic aerial photos, stockpiling/dewatering operations ended within the past two to three years. Currently, the site includes extensive piles and pile stubs, overwater structures, shoreline armoring, a sheetpile wall, small isolated patches of riparian vegetation, and highly developed and industrial upland.

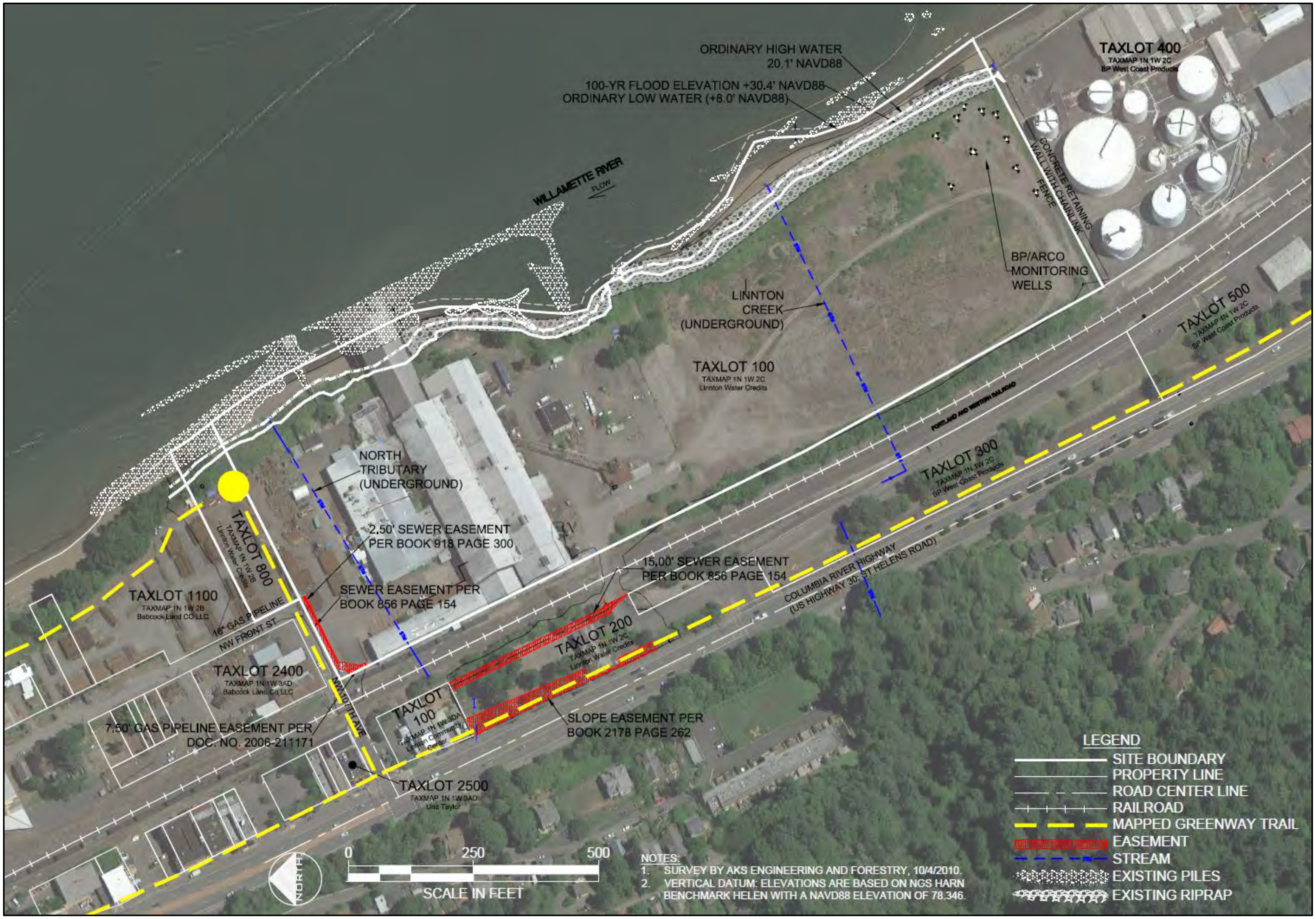

**Figure 1. Linnton Mill site**

## 1.2 EXISTING CONDITIONS

### 1.2.1 Shallow Water Zone

The Portland Harbor Trustee Council (herein the Trustee Council) defines the Shallow Water zone between OLW (+8 ft NAVD88) and 15 ft below OLW (-7 ft NAVD88).

#### Habitat

The Shallow Water zone is dominated by piles or pile stubs and overwater buildings. The old Linnton Plywood Mill building includes a pile-supported overwater portion that extends out to approximately -7 ft and is located approximately 1,200 ft downstream of the upstream property boundary. This overwater structure, formerly associated with plywood mill operation, is supported by dozens of creosote-treated timber piles. The structure covers approximately 8,700 sq ft (0.2 acre) within the Shallow Water zone. A second, much smaller pile-supported structure is located immediately downstream of this, which was used for fire suppression. This structure encompasses approximately 930 sq ft within the Shallow Water zone. Piles and pile stubs are scattered throughout the Shallow Water zone. Approximately 350 piles and pile stubs are present in this zone, either as piles, pile stubs, mooring dolphins, or piles that are supporting the overwater structures. A sheetpile wall is present in the Shallow Water zone, near the center of the property. This seawall is approximately 100 ft long, and extends up to approximately +11 ft where a concrete seawall begins and extends up to +35 ft. Substrate in the Shallow Water zone is river sand.

#### Fish Use

Three ESA-listed species of concern among five ESUs/DPSs are associated with the Shallow Water habitat at the site: Lower Columbia River Chinook salmon (*Oncorhynchus tshawytscha*), Upper Willamette River Chinook salmon, Lower Columbia River coho (*O. kitsuch*), Lower Columbia River steelhead trout (*O. mykiss*), and Upper Willamette River steelhead trout. The Shallow Water habitat at the site is used for migration and limited rearing by juveniles. Adults are expected to remain in deeper water, further offshore.

Common non-ESA-listed resident fish expected to use the Shallow Water habitat include Coastal cutthroat trout (*O. clarki clarki*), Pacific lamprey (*Entosphenus tridentatus*), largescale sucker (*Catostomus macrocheilus*), northern pikeminnow (*Ptychocheilus oregonensis*), white and black crappie (*Pomoxis annularis, P. nigromaculatus*), bluegill (*Lepomis macrochirus*), pumpkinseed (*Lepomis gibbosus*), smallmouth bass (*Micropterus dolomieui*), largemouth bass (*M. salmoides*), walleye (*Stizostedion vitreum vitreum*), and yellow perch (*Perca flavescens*) (Farr and Ward 1993). These species use the Shallow Water habitat generally for rearing and foraging.

Two small tributaries—referred to herein as Linnton Creek and North Tributary—pass under the site through culverts and drain the adjacent hillside. Linnton Creek is mapped as fish-bearing by ODFW. However, fish use is limited to resident fish upstream of the Linnton site as as a natural fish barrier (waterfall) immediately upslope of Hwy 30 prevents fish migration between Linnton Creek and the Willamette River. North Tributary is mapped by ODFW as non-fish-bearing. Additionally, as mentioned, both tributaries pass through culverts under the site for several hundred feet. For these reasons, these tributaries do not currently provide fish habitat and do not represent current or potential migratory pathways between upper tributaries and the Willamette River.

**Portland Harbor Superfund Site**

A Sediment Management Area (SMA) has been identified offshore of the Linnton Site in the Portland Harbor Superfund Site Record of Decision (ROD), issued January 2017. This SMA includes a combination of capping and dredging as the selected remedy.

### 1.2.2 Active Channel Margin Zone

The Trustee Council defines the ACM zone between OHW (+20.1 ft NAVD88) and OLW (+8 ft NAVD88).

**Habitat**

The ACM consists of relatively flat-sloped sandy nearshore habitat, transitioning to riprap in the upper portion of this zone. Either pile stubs or riprap are present for the entire length of the shoreline within the ACM. Approximately 465 timber piles and pile stubs are present within the ACM. Riprap is present from the toe of the shoreline bank slope, which varies between approximately +12 ft to approximately +17 ft, up to the top of the slope. Riprap is present on the surface for all but the downstream-most approximately 450 ft. Pile stubs are present in the ACM for most of the length of the shoreline, including the entirety of the shoreline downstream of the overwater building.

Two drainages pass under the property via culvert. Both are unnamed, but for the purpose of this application, they will be referred to as “Linton Creek” and “North Tributary”. Both creeks drain the adjacent hillside. Both creeks daylight on the bank of the Willamette River on the subject property, one from a 60-inch culvert approximately 500 ft downstream of the upstream property boundary and the other from a 36-inch culvert approximately 200 ft upstream of the downstream property boundary. The outfalls of both of the culverts are perched above OHW and are non-fish bearing.

**Vegetation Types and Condition**

The upper portion of the ACM habitat includes trees and shrubs from approximately +13 ft NAVD88 up to OHW. Scattered trees are present, including black cottonwood (*Populus balsamifera ssp. trichocarpa*) and Pacific willow (*Salix lucida var. lasiandra*). Himalayan blackberry (*Rubus armeniacus*) is prevalent on the lower portion of the bank as well. Overall, vegetation in the ACM is typical of a disturbed, industrial site.

**Fish Use**

The Active Channel Margin is expected to be used for rearing and outmigration by juvenile salmonids, primarily by sub-yearlings. Sub-yearling juvenile Chinook salmon from the Lower Columbia River ESU and the Upper Willamette River ESU use outmigrate through the lower Willamette River from February through June (Friesen, Vile and Pribyl 2004). Residence time of these ocean-type juveniles is a matter of days (Friesen, Vile and Pribyl 2004), though a limited number of Upper Willamette River ESU juveniles likely rear for a longer period of time. Larger, yearling Chinook salmon are less shoreline-dependent. The Active Channel Margin may also be used as rearing by juveniles of the resident fish mentioned above.

## Wildlife Use

Baseline monitoring of bird and wildlife use of the site will be conducted as part of the pre-construction monitoring plan. No other baseline data of wildlife use specific to the Linnton Mill site exists, though the Lower Willamette River Wildlife Habitat Inventory (City of Portland Bureau of Planning 1986) includes some broad-scale data of the area. The Active Channel Margin is expected to be used by aquatic mammals typical of riparian shoreline environments, such as raccoon and beaver. Waterfowl such as ducks and geese are expected to use the Active Channel Margin as well.

### 1.2.3 Riparian and Upland Zones

The Trustee Council defines the Riparian Zone from OHW (+20.1 ft) to 200 ft landward of the OHW, and the Upland Zone as all habitat greater than 200 ft landward of OHW.

## Habitat

The Riparian zone includes a steep, high shoreline bank with a berm at the top, then transitioning to a flat, disturbed area at the top of the bank. Riprap armoring is present on the bank up to the top of the slope from the upstream property boundary down to the overwater building. Downstream of the dock, no riprap is present on the bank and the slope flattens slightly. As with the Shallow Water zone and the ACM, the two overwater structures pass through the Riparian zone, though few piles are actually present in this zone. Associated with the sheetpile seawall is a concrete bulkhead leading up to a loading dock at the top of the bank. An approximately 5-6 ft high berm is present at the top of the bank.

Because the habitat landward of the berm is very similar whether within the Riparian or Upland zones, both zones will be discussed together here. Landward of the berm is a highly disturbed upland area. The remainder of the parcel is entirely developed and disturbed as a result of past land uses. In the upstream portion of the site, the area landward of the berm was formerly used as a dredge disposal site and is essentially unvegetated with the exception of some weedy species that may establish opportunistically, but in general unvegetated sandy dredged soils are present on the surface. The old mill building is present in the downstream portion of the site, with associated outbuildings, paving and concrete.

Two small tributaries (Linnton Creek and the North Tributary) are conveyed via culverts underground through the site to the Willamette River (Attachment 1; Sheet 5).

The Site is within the Portland Harbor Superfund Site. An Environmental Assessment (CH2M Hill 2007), conducted in 2007, led to a “No Further Action” letter from ODEQ for the Site. This stated that no further action was required to address environmental contamination at the Site while also acknowledging that limited contamination may remain, but may be left in place because it does not present unacceptable risks.

As part of a Consent Judgment, LWC agreed to perform additional remedial activities to ensure that the resulting soil surface is protective of public health, safety, and welfare, and the environment (Farallon 2016). That sampling revealed five locations in which sediment exceeded Portland Harbor Preliminary Remediation Goals (PRG) screening levels[1]. These areas will be over-excavated and capped with clean fill to final elevations as set forth in the project design documents. Contaminated sediment will be removed from the Site and disposed of at an appropriate disposal facility. The remaining analytes were not detected above screening levels.

The adjacent BP/ARCO parcel is a known source of a trespass petroleum hydrocarbon plume onto the Linnton site. The plume's extent is known and monitored through several monitoring wells on the Linnton site. BP has been engaged in remedial efforts since the 1960s. Specifically, BP has implemented a source control measure, using several extraction wells that contain liquid phase hydrocarbons in the central portion of the site. This system is designed to maintain groundwater flow toward the central portion of the BP site and away from the Willamette River or adjacent properties, and includes several wells along the property boundary with the Linnton site. In conjunction with expansion of the hydraulic source control measures, in June and July 2015, BOS-200 (Trap and Treat) was injected into 83 injection points on the Linnton property to treat a trespass groundwater plume. Post remedial groundwater monitoring was initiated in December 2015. Six events are planned over a two-year period to gauge the effectiveness of the injections. The effectiveness of these measures will be evaluated in a pending Source Control Evaluation. Until such evaluation is completed, Site design avoids excavation in the extreme southern portion of the Property.

Source control and remediation at BP/ARCO Terminal 22T and related groundwater monitoring at the Linnton Mill property are being performed under a Voluntary Agreement for Remedial Investigation and Source Control Measures between Atlantic Richfield Company (ARCO, a BP affiliated company) and DEQ. According to DEQ, pursuant to the terms of this agreement, BP/ARCO is responsible for monitoring the effectiveness of remediation activities. Based upon recent discussions with the DEQ and BP/ARCO, a Source Control Evaluation for Terminal 22T is expected to be completed in the spring of 2018. It is anticipated that the Source Control Evaluation will describe a plan for long-term remediation monitoring, and include a request to discontinue groundwater monitoring and decommission the monitoring wells at the Linnton Mill property. DEQ's timely approval of the request will allow for the removal of the monitoring wells prior to planned habitat construction activities at the Linnton site. In the event that further response action is required at the BP/Arco site, the Long Term Steward will coordinate with the Trustee Council or its designee on any possible impacts to the Project including but not limited to required site access or land disturbance.

## Vegetation Types and Condition

The river bank is vegetated almost entirely with invasive vegetation such as Himalayan blackberry (*Rubus armeniacus*), and reed canarygrass (*Phalaris arundinacea*). Occasional patches of native trees and shrubs are scattered throughout the zone, including Pacific willow

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[1] Boring **B2** (cPAH toxic equivalent concentration (TEC)), **B3** (cPAH TEC), **B15** (cPAH TEC), **B24** (cPAH TEC, PCBs/Aroclors, total DDx), and **B35** (cPAH TEC, PCBs/Aroclors)

and black cottonwood. As mentioned above, the area from the berm landward is either unvegetated or vegetated with invasive, weedy forbs and grasses typical of an industrial site.

### Wildlife Use

As with the ACM habitat above, pre-construction monitoring will gather data on wildlife use of the Upland and Riparian zones. The portion of the Riparian Zone waterward of the top of the bank likely is used by typical mammals associated with riparian habitat, including raccoon. Songbirds and, potentially, raptors, likely use the riparian habitat as well. The area from the top of the bank landward is little used by wildlife, likely only species common to highly developed areas such as raccoon or opossum, and song birds.

## 1.3 DESCRIPTION OF RESTORATION ACTIVITIES

The Project will convert an existing riverfront industrial site to a restoration site that includes new off-channel habitat as well as restored Shallow Water, Active Channel Margin (ACM), Riparian, and Upland Habitat. See Attachment 1; Sheets 1-12 for detailed drawings of the Project.

### 1.3.1 Demolition

The site includes two pile-supported overwater structures: a loading dock/overwater building with a conveyor structure, and a narrow catwalk out to a fire suppression dock. The loading dock encompasses approximately 0.34 acre below OHW, and the fire suppression dock encompasses approximately 0.02 acre below OHW. The piles supporting the structures (approximately 300) will be removed.

Approximately 700-800 piles or pile stubs are present within the nearshore habitat, approximately 100 of which are creosote-treated timber piles and eight of which are steel piles. To the extent possible, all piles and pile stubs will be removed (Attachment 1; Sheet 5).

Per EPA's Piling Removal BMPs, to the extent possible all piles will be fully extracted but if full extraction is not possible, piles will be cut at the mudline and its location mapped using GPS. All piles removed (both fully extracted and cut at mudline) from within the SMA identified in the Portland Harbor Superfund Site ROD would be capped with clean sand. Additionally, any creosote-treated timber piles that are cut at mudline outside the SMA would also be capped with clean sand.

The site included several structures in the upland, including the mill building and associated outbuildings. All buildings in the upland of the site will be demolished and removed prior to commencement of habitat construction as part of a separate action. The concrete foundation will be left in place and buried with on-site fill placement (discussed below), with the exception of the concrete nearest the top of the riverbank (Attachment 1; Sheet 5). Building demolition will follow best management practices to avoid impacts to migratory birds and protected bats that may be utilizing the buildings (Attachment 3).

### 1.3.2 Earthwork

The focus of the Project will be to excavate an existing upland area to create an off-channel habitat with a high water flow-through channel (Attachment 1; Sheets 1-12). The existing upland area is generally flat between +40 and +50 ft elevation, above a steeply-sloped shoreline bank. Excavation of this area is proposed to create 4.34 acres of new habitat below OHW, off the main channel of the Willamette River. The habitat will extend approximately 360 ft landward of the existing OHW line, and will be approximately 700 ft wide. The width of the newly-created aquatic habitat (i.e. below OHW) within this off-channel habitat area will vary between approximately 180 ft and 290 ft (Attachment 1; Sheet 6).

The downstream end of the off-channel habitat will have a minimum elevation of the +5 ft (Attachment 1; Sheets 6 and 9). This elevation has been selected in order to maintain over 99% inundation[1] throughout the year (Waterways Consulting Inc. 2013) and ensures that the open-water portion of off-channel habitat is available for rearing juvenile salmonids even during low water periods. Additionally, this open water is expected to provide cold water refugia for juvenile salmonids due to the inputs from both ground and surface water from a daylighted portion of Linnton Creek (discussed below).

A connection to the river will be created at the upstream end of the off-channel habitat by means of a high water flow-through channel (Attachment 1; Sheets 6 and 9). The minimum elevation of the channel will be approximately +9 ft. This elevation was selected based on water level data from the Lower Willamette River, to maintain 75-85% inundation from November through July (Waterways Consulting Inc. 2013). Slopes within this habitat will be 8H:1V or flatter. An existing sheetpile wall and concrete seawall is present at the downstream end of the proposed off-channel habitat, extending up to approximately +35 ft NAVD88. The concrete seawall will be removed, and the sheetpile wall will be cut off at +5 ft NAVD88 elevation to provide a sill at or below finished grade (Attachment 1; Sheets 6 and 9). This sill will protect the outlet of the channel from head-cutting during periods of high flow through the channel as well as provide stability for the off-channel habitat upstream of this connection to the Willamette River.

The main channel through the off-channel habitat area will be designed with a maximum depth of 1 ft relative the surrounding banks, and a width of approximately 15 ft (Attachment 1; Sheets 6, 8 and 9). The channel will be protected using five sub-grade channel grade controls, consisting of rock strips oriented perpendicular to the direction of flow. These will be approximately 3-5 ft wide and approximately 12-30 ft long, extending perpendicular from the channel such that they reach at least 2 ft vertical on the bank above the top of the channel. These strips will not project above the grade and are expected to be covered with silt and sand upon the first inundation of the site.

Native tree and shrub plantings are proposed to be planted over the entire site, down to approximately +13 ft. In the off-channel habitat only, an additional zone of shrub live stakes are proposed down to +10.5 ft NAVD88, and a band of emergent species is proposed from +13 ft down to +8.5 ft NAVD88 (Attachment 1; Sheets 7 and 10). Based on existing conditions in the

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[1] Based on 25 years' data from USGS river gage at Morrison Street Bridge (USGS gage ID 14211720).

vicinity, persistent woody vegetation is expected down to approximately +13 ft on the Willamette River shoreline. In the off-channel habitat with lower energy, native woody vegetation may persist to a lower elevation, but this elevation is uncertain. The proposed planting scheme will allow vegetation to establish a natural lower limit while excluding noxious weed species. A variety of native trees, shrubs, and herbs will be included A detailed discussion of the planting plan is presented below.

An “island” of riparian habitat will be formed by excavation of the off-channel habitat (Attachment 1; Sheet 6). This island will be re-graded and remain in place along the outer edge of the off-channel habitat. This will provide protection to the off-channel habitat. The riparian island will be 100 ft wide by approximately 265 ft long. Slopes of the “island” will be 8H:1V below OHW, then 3H:1V above OHW up to a maximum elevation of approximately +30 ft.

The Project includes substantial improvement to the habitat along the Willamette River to occur in conjunction with creation of the off-channel habitat (Figures 5-12). Much of the existing shoreline of the Linnton Mill site is sloped at approximately 2H:1V, armored with riprap, and vegetated with invasive vegetation. Excavation of the off-channel habitat (discussed above) will remove approximately 1,000 linear ft of riprap on the shoreline. The re-graded slopes will be a contoured to 5H:1V to 8H:1V below OHW and 3H:1V above OHW. The regraded slopes above approximately +13 ft OHW will be revegetated with native tree/shrub species, which is the lowest elevation anticipated to support permanent vegetation along the mainstem Willamette River based on existing conditions. The planting areas are discussed in detail below.

Downstream of the docks, the shoreline slope does not contain surface riprap armoring (Attachment 1; Sheet 5). This shoreline section will be scraped of non-native species and revegetated with native tree/shrub species over approximately 350 linear ft. Additionally, the upstream-most 270 linear ft contains surface riprap, but it will remain in place. Removal was infeasible due to the presence of soil contamination that originated from the adjacent parcel to the south and an on-going remedial investigation.

### 1.3.3 Fresh Water Inputs

Currently, two small tributaries (Linnton Creek and North Tributary) are conveyed via culverts underground through the site to the Willamette River (Attachment 1; Sheet 5). These drainages are entirely sub-surface as they pass through the site until they daylight on the bank of the Willamette River.

Linnton Creek—the upstream-most tributary—contains a combination of natural surface water from the nearby Tualatin Hills, as well as stormwater from the surrounding area. Water chemistry from this culvert was preliminarily sampled on June 12, 2013 (EES Environmental Consulting 2013), and the general chemistry parameters were detected at levels consistent with expectations for natural stormwater conditions in the area. In general, chemical constituents were not detected above Method Reporting Limits (MRLs) or were detected below Portland Harbor Joint Source Control Strategy (JSCS) screening values. The only exception was manganese at 75 µg/L, above the JSCS level of 10 µg/L but below the EPA and DEQ Fish Consumption Water Quality Criteria of 100 µg/L. It was noted that manganese is commonly found in both surface and ground water, and the low concentration detected is not expected to adversely affect the suitability of this water for fish use. Water temperature was field-measured at 13.8°C, substantially colder than the temperature of the Willamette River on that date of approximately 19.5°C (USGS 2016).

The existing Linnton Creek culvert would be cut so that the water empties into the off-channel habitat. The elevation of the new pipe is a function of where the existing pipe daylights with respect to the new off-channel habitat, and will be located at approximately +24 ft. This outfall will remain perched at most water levels, and would not be fish-bearing. The culvert will empty into a plunge pool to dissipate energy, then passing through a cobble-lined outfall channel that joins the off-channel habitat (Attachment 1: Sheets 6 and 8).

North Tributary--the downstream-most tributary--passes under the northern portion of the project area, and conveys creek flow from a drainage originating in Forest Park to the southwest. The existing 24” culvert is constructed of reinforced concrete pipe for approximately 600 feet before transitioning to a 36 inch diameter corrugated metal pipe for approximately 10 feet before discharging along the bank of the Willamette River. A survey revealed significant structural damage to the culvert. Additionally, the existing outfall is failing due to the over-steepened bank. Because of these issues, the culvert will be abandoned in-place and reconstructed further downstream. Minor grading of the shoreline bank will occur to ensure the new outfall is stable. A plunge pool will be constructed at the outfall to dissipate energy, similar to the one proposed in the off-channel habitat. The new culvert will discharge into the Willamette River as before, with no change to the volume or source of the water. The Linnton Mill site contributed stormwater to the creek through several inputs, which are still connected. As part of the project, all stormwater inputs to this creek will be disconnected, thus improving water quality in the creek.

It is also anticipated that the excavation to create the off-channel habitat feature will intercept groundwater, causing new freshwater inputs to daylight on the slope and provide surface water to the newly-excavated habitat. These are anticipated to provide additional cold water inputs to the site. These two water sources (existing streams and new daylighted groundwater) will provide cold water inputs to the open water habitat and create an off-channel cold water refuge for rearing juvenile salmonids in the lower Willamette River.

### 1.3.4 Future Habitat Types and Acreage

The Project will result in the following habitat benefits:

- 5.48 acres of new aquatic habitat, 4.34 acres of which will be new off channel habitat within the Off-Channel Zone, and 1.14 acres of which will be new ACM habitat;

- 4.93acres of restored shallow water habitat, including removal of approximately 0.36 acres of overwater coverage, and removal of approximately 700 piles and pile stubs within approximately 0.77 acres of aquatic habitat, including many creosote piles;

- 1.76 acres of restored Active Channel Margin (ACM) habitat, including removal of 0.49 acres/1,050 linear feet of shoreline armoring within the ACM, vegetated down to +13 ft NAVD88;

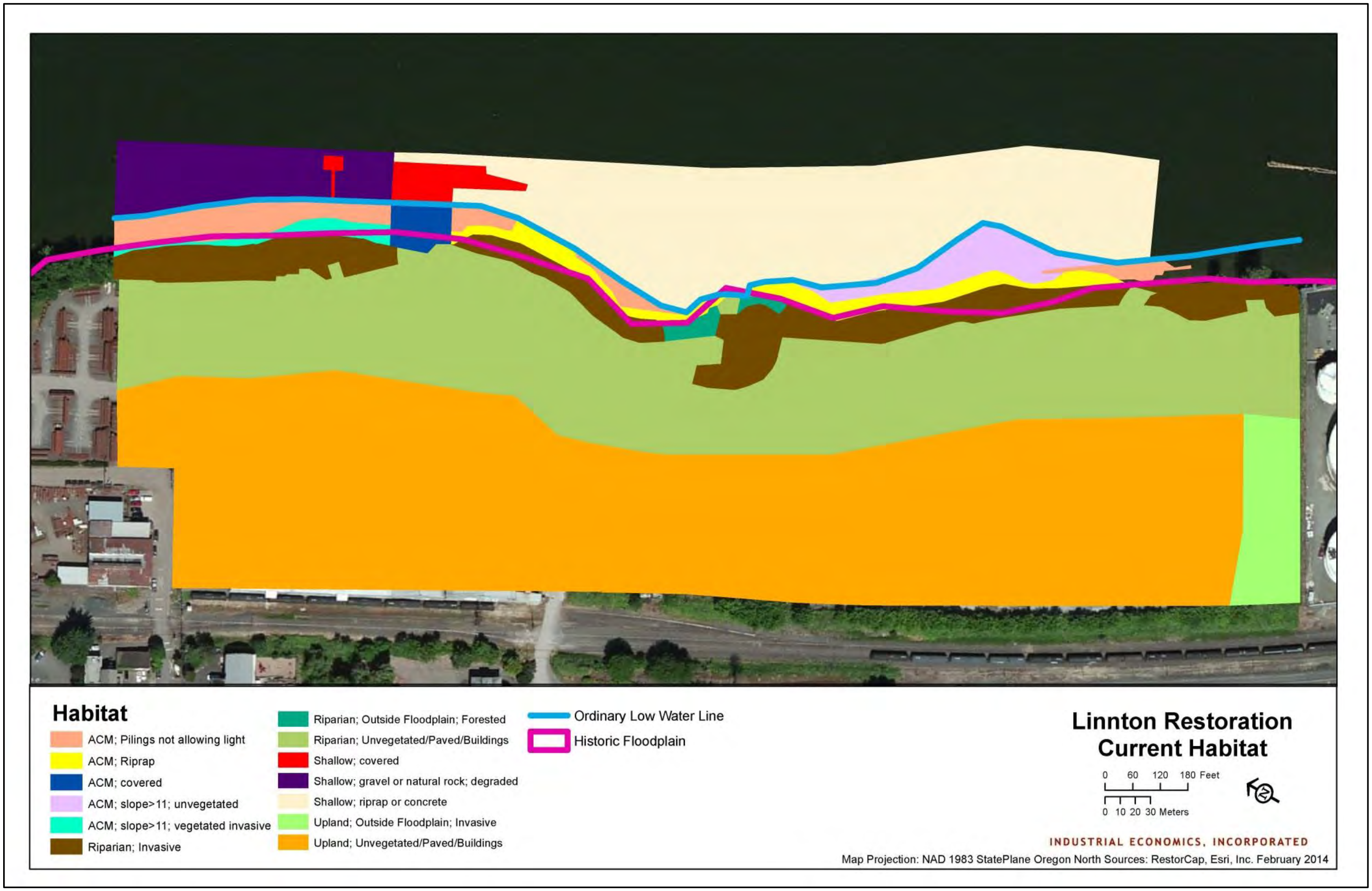
- 9.60 acres of restored riparian habitat and 4.90 acres of restored upland habitat, including conversion of buildings, concrete pads, compacted gravel, and invasive vegetation to native forested habitat; and
- Removal of approximately 700 piles and pile stubs within approximately 0.77 acre of aquatic habitat, including many creosote-treated piles.

Pre- and post-construction acres by habitat type are presented in Table 1 below.

**Table 1. Acres of each Habitat Type, Pre- and Post-Project.**

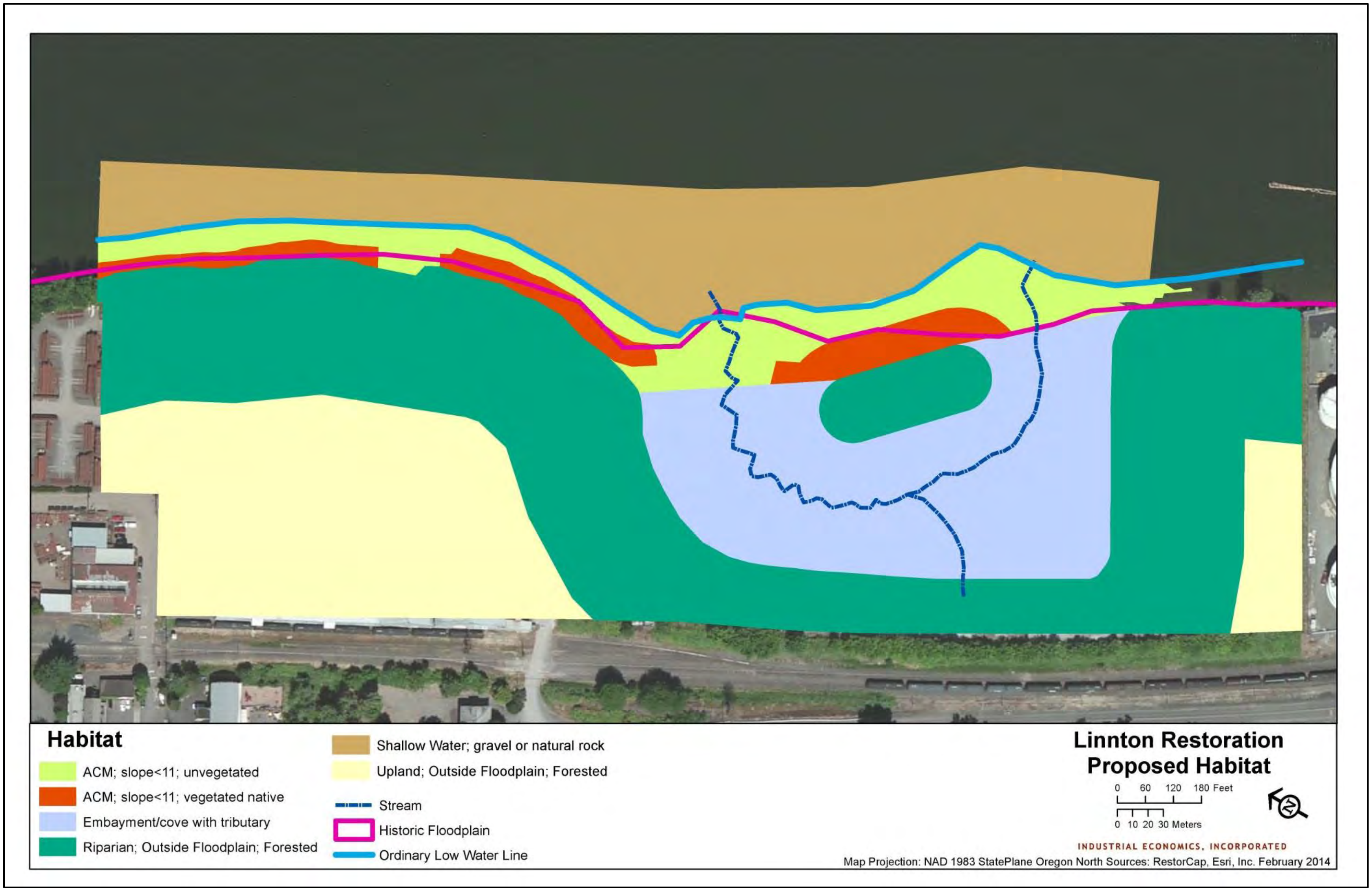
| Habitat Type | Pre-Project acres | Post-Project acres |
|---|---|---|
| Upland | 11.45 | 4.90 |
| Riparian | 8.80 | 9.60 |
| ACM | 1.76 | 2.90 |
| Shallow Water | 4.93 | 4.93 |
| Off-Channel | 0 | 4.34 |
| Total | 26.94 | 26.67* |

*Total of 26.94 acres, minus 0.27 acre of easements that will not be counted toward the total.



Map Projection: NAD 1983 StatePlane Oregon North Sources: RestorCap, Esri, Inc. February 2014

**Figure 2. Existing habitat conditions**



Map Projection: NAD 1983 StatePlane Oregon North Sources: RestorCap, Esri, Inc. February 2014

**Figure 3. Proposed habitat conditions**

### 1.3.5 Planting Scheme

The entire site will be densely planted with native trees and shrubs, down to the lowest elevation that vegetation is expected to persist. All species have been chosen from the Trustee Council's Preferred Plant List or the City of Portland Plant List (City of Portland 2011). A local native plant expert[1] has been consulted for selection of all species to ensure that the species that are selected will thrive at the site. Three separate planting zones (Zones 1-3) have been proposed, with a different planting list in each zone based on elevation zone and expected moisture regime. Three planting zones have been proposed: Zones 1-3. Native tree and shrub species have been selected according to the elevation/moisture regime. In addition to trees and shrubs, the entire vegetated area will be hydroseeded with native herbaceous seeds appropriate for the zone. To encourage rapid establishment and aid in soil fertility, an organic biotic soil amendment (Perma-Matrix) will be added to the hydroseeding mixture. If necessary, compost or topsoil may also be used. Herbivory protection will be installed as needed, such as plant collars around woody species or goose exclusion systems over emergent vegetation. If used, plant collars will be removed within three years. Alternatively, the Project Implementer may elect to plant at a higher density to account for herbivory. For a full planting layout and species lists, see Attachment 1: Sheets 7 and 10.

#### *Zone 1A – +8.5 ft to +13 ft*

Zone 1A is limited to the Off-Channel habitat, where low energy will likely allow vegetation to persist lower than on the Willamette River shoreline. To prevent noxious weeds from colonizing, Zone 1A will include herbaceous vegetation down to +8.5 ft NAVD88, which appears to be the lowest elevation to which emergent vegetation will persist based on a review of monitoring data from other similar habitat sites in the lower Willamette River. An emergent mix will be applied by a combination of bulb and plug, between +8.5 ft and +12 ft NAVD88. This mix will include freshwater marsh emergent species from +8.5 ft to +10 ft NAVD88 such as Columbia sedge (*Carex aperta*), slough sedge (*Carex obnupta*), and wapato (*Sagittaria latifolia*), and grass and forb species seeded from +8.5 ft up to +12 ft NAVD88 including Columbia tickseed (*Coreopsis tinctoria*), spike bentgrass (*Agrostis exarata*) and common spikerush (*Eleocharis palustris*). From +11 ft up to OHW (+20.1 ft NAVD88), a slightly higher elevation seed mix will be applied (described in Zone 1B below). These two zones overlap due to the uncertainty of the elevation at which species will ultimately establish.

Native shrubs will be installed from +10.5 ft up to +13 ft NAVD88 to further prevent noxious weed establishment[2], such as red osier dogwood (*Cornus sericea*), Columbia River willow (*Salix fluviatilis*), and Douglas spiraea (*Spiraea douglasii*).

#### *Zone 1B – +13 ft to OHW*

The area within the parcel between +13 ft and OHW (+20.1 ft NAVD88) will be densely planted to form vegetated nearshore habitat. Species in Zone 1 were selected that tolerate inundation as well as drought, as the site will be both inundated and dry seasonally. Sandy, well-drained soil

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[1] George Kral of Ash Creek Forest Management

[2] +10.5 ft is approximately the lowest elevation that shrubs are expected to establish based on a review of monitoring data from similar sites in the lower Willamette River.

will also add to the drought-like conditions during much of the year. Consideration was also given to species that are native to the lower Willamette River that will tolerate the conditions present, as well as fish and wildlife habitat benefits.

A variety of native tree and nine shrub species are proposed for Zone 1, such as black cottonwood (*Populus balsamifera ssp. trichocarpa*), black hawthorn (*Crataegus suksdorfii*), Oregon ash (*Fraxinus latifolia*), McKenzie willow (*Salix rigida*), Pacific ninebark (*Physocarpus capitatus*), and pea-fruit rose (*Rosa pisocarpa*). In addition to planting native woody vegetation, a native herbaceous seed mixture will be applied to the planting area. Species were chosen that tolerate periods both of inundation and drought, and also tolerate well-drained soils, such as spike bentgrass, tall mannagrass (*Glyceria elata*), and small-fruited bulrush (*Scirpus microcarpus*). As mentioned above, to provide overlap with Zone 1A species, this seeding zone will begin at +11 ft and continue up to OHW (+20.1 ft).

#### *Zone 2 - Riparian Forested Habitat OHW to +31 ft*

Zone 2 will include riparian habitat within approximately 10 vertical feet of OHW. The area between +20.1 ft (OHW) and +31 ft NAVD88 will be vegetated with native trees and shrubs to form a native forested riparian habitat. Zone 2 will include some of the same species as Zone 1, but will also include species that are less water-dependent such as cascara (*Rhamnus purshiana*), serviceberry (*Amelanchier alnifolia*), mock orange (*Philadelphus lewisii*), and snowberry (*Symphoricarpos albus*).

A native seed mix, suitable to the elevation range, will also be applied to the entirety of Zone 2. This will include species such as California oatgrass (*Danthonia californica*), small-flowered lupine (*Lupinus bicolor*), and goldenrod (*Solidago lepida*).

#### *Zone 3 – Riparian/Upland Forested Habitat Above +31 ft*

Zone 3 will encompass the remainder of the site that is above +31 ft. The entirety of this zone will be planted with native trees and shrubs to form riparian/upland forested habitat. Riparian/upland species will include big leaf maple, (*Acer macrophyllum*), Douglas fir (*Pseudotsuga menziesii*), vine maple (*Acer circinatum*), red currant (*Ribes sanguineum*), beaked hazelnut (*Corylus cornuta*), or similar native species.

A suitable native seed mix will also be applied to the entirety of Zone 3 including species such as yarrow (*Achillea millefolium*), pearly everlasting (*Anaphalis margaritaceae*), and blue wildrye (*Elymus glaucus*).

### 1.3.6 Structural Habitat Elements

The Project Implementer proposes to incorporate structural habitat features in the site design. Per guidance from the Portland Harbor NRDA Monitoring and Stewardship Framework (5/15/14; "Framework"), 3-4 pieces of large woody debris (LWD) per acre are proposed in the Off-Channel, Riparian, and Upland habitats.

Once the Off-Channel habitat area is excavated, 15 large woody debris (LWD) habitat structures will be placed in the habitat below OHW over the entire 4.34 acre Off-Channel habitat area (see Attachment 1: Sheet 7). This will include five large habitat structures and 10 single logs, for approximately 3.5 LWD structures per acre. Each large structure will include multiple surface logs (including some with and some without rootwads), ballast boulders, horizontal buried ballast logs, vertical logs, and branches/slash within the interior of the structure (see Attachment 1: Sheet 10 for details). Live vegetation—as appropriate based on elevation—will also be installed within the interior of the structure to encourage accumulation of organic and fine material. Vertical logs and ballast material will be installed by excavation and backfill, with vertical logs pushed or vibrated further in if needed. Excavation and backfill will occur prior to the off-channel habitat being connected to the mainstem. The logs and ballast boulders will be pinned together with rebar, with boulders buried below substrate to anchor the LWD structure in place (Attachment 1; Sheet 10). No cables or chains will be used on the structures. Large LWD structures will be placed between approximately +10 to +12 ft. This elevation balances the need for the structures to be inundated for the maximum percentage of the period when the majority of juvenile salmonids are present in the lower Willamette River[1], while also remaining out of the lowest portion of the flow-through channel to avoid creating debris dams.

Scour behind the LWD structures in the off-channel habitat is not anticipated to be significant. All of the LWD structures are located within the low energy backwater area of the project where scouring flow is not likely to occur. The only potential for high energy flow comes from the daylighted Linnton Creek when the Willamette is low and a high intensity rain event occurs in the West Hills (September/October). Protection against high energy flows from Linnton Creek has been included by incorporating the coarse bed channel through the backwater area.

The 10 single logs will be placed between +12 ft and OHW (+20.1 ft NAVD88), and each will be ballasted with at least three boulders pinned to the logs with rebar. Several of these will be placed in the outside of the bend of the off-channel habitat to provided additional bank protection in the event of high flows.

Fifty (50) habitat structures will be placed over the entire riparian and upland area, a total of 14.50 acres, for a rate of approximately 3.5 structures per acre. At minimum, 17 of the 50 habitat structures will be large multi-log habitat structures. In addition, the riparian and upland area will contain at least 3 raptor perch poles made of conifers with three or more side branches, and rising at least 30 ft above ground (WSDOT 2008). The remaining habitat structures will be a mixture of single logs, debris piles, boulder clusters, and/or snags. Logs placed below the 100-year flood elevation (+30.4 ft NAVD88) will be ballasted with boulders.

Additionally, as mentioned above, the soil excavated to create the off-channel habitat will be placed on site in the uplands and vegetated to form upland habitat.

### 1.3.7 Public Access

The Portland Greenway Trail is mapped as passing by the Site along St. Helens Rd to the west, then turning riverward down NW 107th Ave to a mapped viewpoint over the river. This viewpoint is mapped on Linnton property (Figure 1). Although much of the site will be

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[1] According to Friesen, Vile and Pribyl (2004), peak outmigration of juvenile chinook and coho salmon occurs in April and May. During this period, 10 ft elevation is inundated approximately 70-75% of the time, and 12 ft elevation is inundated approximately 40-45% of the time,

protected as a natural area and will limit public access to achieve that goal, the proximity of the site to the commercial center of the Linnton neighborhood and its adjacency to an existing Willamette Greenway easement, prompted the inclusion of a public access corridor.

The public access will be located at the north end of the property and consist of a corridor ranging from 80 to 100 feet wide from NW Front Street near the Linnton core to the bank of the Willamette River (Attachment 1; Sheet 6). The corridor will be approximately 300 feet long with an access point and interpretive signage at NW Front Street. The overlook at the Willamette River will have benches, interpretive signage and an art display with views of the River and the St. Johns Bridge. Interpretive signage will detail the history of the historic lumber company and Linnton Plywood Mill, and the relationship of these two businesses to the timber and lumber industries in the Pacific Northwest. A low berm will be constructed to the north of a pervious asphalt walkway to enhance the aesthetics of the site and limit views to the industrial properties directly to the north. The corridor will also be planted with native vegetation that is representative of the species proposed for the natural area and will include both riparian and upland species. Although a direct connection to the existing Willamette Greenway easement will not be included in the design, due to the fact that the easement has not been developed with a trail, the design will consider the location of the easement to facilitate a future connection. Access to the south and the larger natural area will be restricted with a fence to protect the habitat area.

## 1.4 CONSTRUCTION SCHEDULE

City, state, and federal permits were issued for construction of the Site as of August, 2017. Construction of the Site is planned to commence in summer/fall 2017 and be completed by the end of 2018. Building demolition commenced in early September 2017 upon receipt of permits and favorable season for avoidance of impacts to birds and bats. Excavation of the off-channel habitat will commence as soon as is practicable in 2018, but will require the building demolition to be completed first in order to provide a placement location for the excavated soil. Outside of the in-water work window (July 1 – October 31), only work landward of OHW will occur.

Within the in-water work window (July 1-October 31), work waterward of OHW will be prioritized. This includes pile and building removal, shoreline grading, new outfall construction and associated shoreline re-contouring, and breaching of the off-channel habitat site. The Project Implementer intends to demolish upland and over-water buildings prior to the end of the 2017 in-water work season on October 31, then remove piles in the 2018 in-water work season.

Planting is planned for fall-spring 2017 or fall 2018, depending on progress. The Project Implementer intends to plant the off-channel habitat prior to breaching the berm to connect it to the river. However, it is possible that planting will occur after breaching the habitat. If this is the case, planting will only occur in the dry. Based on this anticipated schedule, As-Built/Year 0 will be 2018 and Year 1 will be 2019 for the purposes of credit accounting (see Table 2). If the construction schedule is not met (e.g. planting does not occur until spring 2019), starting years will be adjusted accordingly[1].

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[1] If the construction schedule is delayed, year 0 will be adjusted to the year when the Project is completed. For example if Planting is completed in 2019, year 1 will be adjusted to 2020.

**Table 2. Anticipated construction schedule**

| Activity | 2017 | | | | 2018 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| Upland building demolition | | ← | — | → | | | | | | | | | | | | |
| Overwater building demolition | ← | → | | | | | | | | | | | | | | |
| Excavation/grading (landward of OHW) | | | ← | — | — | — | — | — | — | → | | | | | | |
| Upland outfall replacement | | | | | | | | | ← | → | | | | | | |
| Habitat structure placement (off-channel habitat) | | | | | | | | | ← | — | — | → | | | | |
| Habitat structure placement (landward of OHW) | | | | | | | | | ← | — | — | → | | | | |
| Excavation/grading (waterward of OHW) | | | | | | | | | | | ← | — | → | | | |
| Pile removal (in-water) | | | | | | | | | | | ← | — | — | → | | |
| Outfall shoreline contouring | | | | | | | | | | | ← | — | — | → | | |
| Breaching off-channel habitat | | | | | | | | | | | | | ← | → | | |
| Planting (off-channel habitat) | | | | | | | | | | | | | | ← | — | → |
| Planting (waterward of OHW) | | | | | | | | | | | | | | ← | — | → |
| Planting (landward of OHW) | | | | | | | | | | | | | | ← | — | → |

[1] According to the schedule presented here, 2018 will be year 0. Year 1 will be 2019 and so forth.

[2] If the construction schedule is delayed, year 0 will be adjusted to the year when the Project is completed. For example if Planting is completed in 2019, year 1 will be adjusted to 2020.

# 2 GOALS AND OBJECTIVES

The goals and objectives of the Linnton Mill Restoration Site are as follows.

- **Goal 1: Restore 26.67 acres of industrial land by removing existing abandoned infrastructure.**
  - Objective 1a: Remove existing docks and all piles in the Active Channel Margin and Shallow Water habitat zones.
  - Objective 1b: Remove all buildings on site.
  - Objective 1c: Remove concrete and asphalt, with the exception of the concrete foundation under the buildings.

- **Goal 2: Restore 26.67 acres of industrial land into a complex of fully functioning habitats to benefit fish and wildlife species in Portland Harbor.**
  - Objective 2a: Through grading and excavation, create 5.48 acres of new aquatic habitat, including 4.34 acres of off-channel habitat and 1.14 acres of new ACM habitat.
  - Objective 2b: Restore 1.76 acres of Active Channel Margin habitat on the Willamette River through re-grading, riprap removal, and revegetation.
  - Objective 2c: Improve the quality of 4.93 acres of shallow water habitat through piling removal and improvements to adjacent Active Channel Margin habitat.
  - Objective 2d: Through grading and excavation, create 9.60acres of fully-functioning forested riparian habitat and 4.90 acres of fully-functioning forested and upland habitat.
  - Objective 2e: Remove approximately 700 piles and pile stubs, including many creosote-treated piles, within 0.77 acres of aquatic habitat.
  - Objective 2f: Plant and manage appropriate native vegetation throughout the different habitat types to facilitate the establishment of vegetative cover and minimize non-native plant establishment.
  - Objective 2g: Install 3 to 4 structural habitat features per acre of Active Channel Margin, Off-Channel, Riparian and Upland habitat to provide complexity for fish and wildlife.

- **Goal 3: Ensure the long-term success of the restored habitat through monitoring, maintenance and stewardship.**
  - Objective 3a: Conduct select pre-construction baseline lamprey and wildlife monitoring.
  - Objective 3b: Implement a site-specific performance plan with performance standards to track the development of the site.
  - Objective 3c: Minimize colonization of the site by noxious species, as defined in the performance standards.
  - Objective 3d: Maintain fish access to the Off-Channel habitat.
  - Objective 3e: Identify and rectify obstacles to habitat development or use, as defined in the performance standards.
  - Objective 3f: After the Performance Period, implement a long-term stewardship program.

- **Goal 4: Support human enjoyment of the site.**
    - Objective 4a: Construct a view platform and path, which connects to the City of Portland Greenway Trail that is mapped as passing by the site.
    - Objective 4b: Discourage human use of the habitat site through fences and signage.
    - Objective 4c. Place educational signage on site that informs the public about the habitat site, as well as the history of the site as a lumber and plywood mill.

# 3 MONITORING QUESTIONS

In order to determine if the site is meeting the goals and objectives of the site, listed in Section 2 above, the site's trajectory toward achieving those goals will be monitored per the current (5/15/2014) version of the Portland Harbor NRDA Monitoring and Stewardship Framework (Framework) and per the final Mitigation Banking Instrument (MBI). The Framework prescribes a performance period in which the site will be compared with interim performance standards to gauge the trajectory of the site toward final success criteria.

## 3.1 PERFORMANCE STANDARDS MONITORING QUESTIONS

The following questions form the basis for monitoring at the site, both Implementation and Effectiveness Monitoring.

- Was the project constructed according to its final design? Are any adjustments necessary to achieve desired site conditions as described in the restoration plan for the site?
- Did the constructed restoration project create the quantity and quality of fish and wildlife habitat that were proposed?
- Is the restoration site meeting its interim performance standards (IPSs)?
- Have the performance standards been met? If so, is the site ready to move into the long-term stewardship phase?

To answer these larger questions, a series of monitoring parameters will be compared against performance standards. These are listed below.

### *Geomorphic/Structural Habitat Elements*

- Were as many habitat elements placed on site as proposed in designs?
- Are habitat elements being retained on site?
- Is the total quantity of Off-Channel and ACM habitat that was created being retained over time?
- Are the fish able to enter the site, access available aquatic habitat, and exit the site?

### *Hydrology and Hydraulics*

- What is the total area of the site that is inundated by the river during periods of high flow?

### *Vegetation*

- Is vegetation developing in a way that will ultimately generate a native assemblage of appropriate vegetation types?

Performance Standards related to these questions are discussed in Section 4.

## 3.2 PORTLAND HARBOR NRDA RESTORATION GOALS QUESTIONS

In addition to the monitoring questions associated with performance standards, monitoring will be conducted to determine whether the Trustee Council's overall restoration program goals are being met for Portland Harbor. This subset of monitoring will not have associated performance standards. The goals of this monitoring are:

- Verify that habitat created is appropriate for use by target fish and wildlife species.
- Detect trends in species use of restored sites.
- Identify other environmental factors that could be influencing performance and species utilization of the restored sites (e.g., water quality).

Specific monitoring questions to address these goals are listed below.

### *Geomorphic/Structural Habitat Elements*

- How much mink and bald eagle habitat was restored?

### *Water Quality*

- Is water quality at the site improving over time and comparable to an appropriate reference condition?

### *Fish and Wildlife*

- Are native fish using the newly restored habitat?
- What size salmonids and lamprey are using the site?
- What birds are using the site? Do changes in the bird assemblage, diversity and abundance at the site indicate that habitat quantity and quality have improved?
- Are bald eagles using the site? If so, how often and for what activities?
- Are mink using the newly restored habitat? Has mink abundance at the site increased?

This component of the monitoring plan is addressed in further detail in Sections 5 and 6. Table 3 summarizes the monitoring questions, performance standards, monitoring schedules, and monitoring methods to be employed to ensure that the Site's goals and objectives are achieved.

**Table 3. Monitoring questions, performance standards, monitoring schedule, and monitoring methods at the Linnton Mill Restoration Site[1],[2]**

| Monitoring Element | Monitoring Question | Performance Standards | Years Monitored | Timing of Monitoring | Monitoring Methods |
|---|---|---|---|---|---|
| **Performance Standard Monitoring Questions** | | | | | |
| Geomorphic/ Structural Habitat Elements | • Did the constructed restoration project create the quantity and quality of fish and wildlife habitat that were proposed?<br>• Was the project constructed according to its final design? Are any adjustments necessary to achieve desired site conditions as described in the restoration plan for the site?<br>• Were as many habitat elements placed on site as proposed in designs?<br>• Are the fish able to enter and exit the site? | A1. Constructed acreage within 10% of proposed acreage in all habitat categories | A1. Year 0 | A1. As built | A1. Habitat zone mapping; CAD |
| | | A2. Elevations of the Off-Channel habitat are within 0.67 ft of proposed elevation; | A2. Year 0 | A2. As built | A2. Topographic survey |
| | | A3. Elevations of the bottom of the flow-through channel at the upstream and downstream ends are within 0.67 ft of proposed elevation. | A3. Year 0 | A3. As built | A3. Topographic survey |
| | | A4. Presence of 100% of the installed structural habitat elements. | A4. Year 0 | A4. As built | A4. Visual survey |
| | | A5. Fish passage/accessibility to the site maintained. | A5. Year 0 | A5. As built | A5. Visual survey |
| Geomorphic/ Structural Habitat Elements | • Is the restoration site meeting its interim performance standards (IPSs)?<br>• Is the total quantity of Off-Channel and ACM habitat that was created being retained over time?<br>• Are the fish able to enter and exit the site?<br>• Are habitat elements being retained on site?<br>• Have the performance standards been met? If so, is the site ready to move into the long-term stewardship phase? | A6. Total area of Off-Channel habitat or ACM habitat within 10% of the as-built condition (minimum 0.5 ft); | A6. Year 1, 3, 5, 7, 10 | A6. Jul-Oct | A6. Habitat zone mapping; CAD |
| | | A7. Increase in elevation within the Off-Channel habitat of no greater than 20%; | A7. Year 1, 3, 5, 7, 10 | A7. Jul-Oct | A7. Topographic survey |
| | | A8. Increase in elevation within the ACM habitat of no greater than 20%; | A8. Year 1, 3, 5, 7, 10 | A8. Jul-Oct | A8. Topographic survey |
| | | A9. No physical conditions that prevent fish access to the Off-Channel habitat. The channel gradient throughout the off-channel habitat will not exceed 4% slope and jump heights will not exceed 6 inches, the Linnton Creek culvert outlet will discharge from November 1st through June 30th, when juvenile Chinook are likely present in the | A9. Year 1-10 | A9. Jul-Oct | A9. Visual survey, longitudinal profile |

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[1] Please note that monitoring elements and metrics related to Pacific lamprey are detailed in Appendix 11: Lamprey Monitoring Budget (Evaluation of Portland Harbor Superfund Area Restoration: Larval Pacific Lamprey Linnton Restoration Site)

[2] Please see Section 6.3 for footnotes to performance standards.

| | | | | | |
|---|---|---|---|---|---|
| | | Willamette River, and the channel thalweg downstream of Linnton Creek will remain wetted during low water conditions in Years 1 through 10.<br>A10. Presence of at least 80% of the total number of large woody debris/structural habitat elements that were placed below the 100-year flood elevation, including any volunteer LWD ≥18” diameter and ≥30’ length. | A10. Year 1-10 | A10. Jul-Oct | A10. Visual survey |
| Hydrology and Hydraulics | • What is the total area of the site that is inundated by the river during periods of high flow? | B1. Areal extent of the 50% inundation level within 20% relative to the as-built condition. | B1. Years 1, 3, 7, 10 | B1. Jul-Oct | B1. Water level data logger |
| Vegetation | • Was the project constructed according to its final design? Are any adjustments necessary to achieve desired site conditions as described in the restoration plan for the site? | ***Riparian/Upland Forested***<br>C1. A minimum of 2,000 native woody stems planted per acre.<br>C2. At least 3 native tree species and 5 native shrub species.<br>***Off-Channel Shrub***<br>C3. A minimum of 2,000 native woody stems planted per acre.<br>C4. At least 5 native shrub species.<br>***Off-Channel Emergent***<br>C5. At least 5 native emergent species.<br>C6. A minimum of 5,000 plugs per acre from +8.5 to +10 ft (Off-Channel Emergent Zone only)<br>C7. A minimum of 50 lbs of grass/emergent seed mix per acre from +8.5 ft to +12 ft NAVD88 (Off-Channel Emergent Zone only) | C1. Year 0<br>C2. Year 0<br>C3. Year 0<br>C4. Year 0<br>C5. Year 0<br>C6. Year 0<br>C7. Year 0 | C1. Jul-Aug<br>C2. Jul-Aug<br>C3. Jul-Aug<br>C4. Jul-Aug<br>C5. Jul-Aug<br>C6. Jul-Aug<br>C7. Jul-Aug | C1. Transect surveys<br>C2. Transect surveys<br>C3. Transect surveys<br>C4. Transect surveys<br>C5. Transect surveys<br>C6. Transect surveys<br>C7. Transect surveys |

| | | | | | |
|---|---|---|---|---|---|
| Vegetation | • Is vegetation developing in a way that will ultimately generate a native assemblage of appropriate vegetation types?<br>• Is the restoration site meeting its interim performance standards (IPSs)? | ***Riparian/Upland Forested*** | | | |
| | | C8. A minimum of 1,200 native woody stems per acre. | C8. Years 1-5 | C8. Jul-Aug | C8. Transect surveys |
| | | C9. At least 3 native tree species and 5 native shrub species. | C9. Years 1-5 | C9. Jul-Aug | C9. Transect surveys |
| | | C10. Cover (during the first 5 years, trees/shrubs will be excluded from percent cover):<br>○ ≥ 10% native herbaceous<br>○ ≤ 30% non-native herbaceous<br>○ The remaining percentage of cover can be made up of bare ground, rocks or native herbaceous | C10. Years 1-5 | C10. Jul-Aug | C10. Transect surveys |
| | | ***Off-Channel Shrub*** | | | |
| | | C11. A minimum of 1,200 native woody stems per acre. | C11. Years 1-5 | C11. Jul-Aug | C11. Transect surveys |
| | | C12. At least 5 native shrub species. | C12. Years 1-5 | C12. Jul-Aug | C12. Transect surveys |
| | | C13. Cover (during the first 5 years, shrubs will be excluded from percent cover):<br>○ ≥ 10% native herbaceous<br>○ ≤ 30% non-native herbaceous<br>○ The remaining percentage of cover can be made up of bare ground, rocks or native herbaceous | C13. Years 1-5 | C13. Jul-Aug | C13. Transect surveys |
| | | ***Off-Channel Emergent*** | | | |
| | | C14. At least 5 native emergent/herbaceous species. | C14. Years 1-5 | C14. Jul-Aug | C14. Transect surveys |
| | | C15. Cover (during the first 5 years, trees/shrubs will be excluded from percent cover):<br>○ ≥ 30% native herbaceous<br>○ ≤10% non-native herbaceous<br>○ The remaining percentage of cover can be made up of bare ground, rocks or native herbaceous. | C15. Years 1-5 | C15. Jul-Aug | C15. Transect surveys |

| | | | | | |
|---|---|---|---|---|---|
| Vegetation | • Is vegetation developing in a way that will ultimately generate a native assemblage of appropriate vegetation types?<br>• Is the restoration site meeting its interim performance standards (IPSs)? | ***Riparian/Upland Forested*** | | | |
| | | C16. At least 3 native tree species and 5 native shrub species. | C16. Year 7 | C16. Jul-Aug | C16. Transect surveys |
| | | C17. Cover:<br>o ≥ 55% native woody species<br>o ≥ 10% native herbaceous<br>o ≤ 20% non-native herbaceous<br>o ≤ 5% non-native shrubs<br>o The remaining percentage of understory cover can be made up of bare ground, rocks, native shrubs or native herbaceous. | C17. Year 7 | C17. Jul-Aug | C17. Transect surveys |
| | | ***Off-Channel Shrub*** | | | |
| | | C18. At least 5 native shrub (Off-Channel Shrub Zone only). | C18. Year 7 | C18. Jul-Aug | C18. Transect surveys |
| | | C19. Cover:<br>o ≥ 55% native woody species<br>o ≥ 10% native herbaceous<br>o ≤ 20% non-native herbaceous<br>o ≤ 5% non-native shrubs<br>o The remaining percentage of understory cover can be made up of bare ground, rocks, native shrubs or native herbaceous. | C19. Year 7 | C19. Jul-Aug | C19. Transect surveys |
| | | ***Off-Channel Emergent*** | | | |
| | | C20. At least 5 native emergent/ herbaceous species (Off-Channel Emergent Zone only). | C20. Year 7 | C20. Jul-Aug | C20. Transect surveys |
| | | C21. Cover:<br>o ≥ 50% native herbaceous (Off-Channel Emergent zone only)<br>o ≤10% non-native herbaceous1 (Off-Channel Emergent zone only)<br>o The remaining percentage of understory cover can be made up of bare ground, rocks, native shrubs or native herbaceous. | C21. Year 7 | C21. Jul-Aug | C21. Transect surveys |

| | | | | | |
|---|---|---|---|---|---|
| Vegetation | • Have the performance standards been met? If so, is the site ready to move into the long-term stewardship phase? | ***Riparian/Upland Forested***<br>C22. At least 3 native tree species and 5 native shrub species.<br>C23. Cover:<br>○ ≥ 80% native woody species<br>○ ≥ 10% native herbaceous<br>○ ≤ 20% non-native vegetation<br>***Off-Channel Shrub***<br>C24. At least 5 native shrub species.<br>C25. Cover:<br>○ ≥ 80% native woody species<br>○ ≥ 10% native herbaceous<br>○ ≤ 20% non-native vegetation<br>***Off-Channel Emergent***<br>C26. At least 5 native emergent/herbaceous species<br>C27. Cover:<br>○ ≥ 70% native herbaceous<br>○ ≤10% non-native herbaceous | C22. Year 10<br>C23. Year 10<br>C24. Year 10<br>C25. Year 10<br>C26. Year 10<br>C27. Year 10 | C22. Jul-Aug<br>C23. Jul-Aug<br>C24. Jul-Aug<br>C25. Jul-Aug<br>C26. Jul-Aug<br>C27. Jul-Aug | C22. Transect surveys<br>C23. Transect surveys<br>C24. Transect surveys<br>C25. Transect surveys<br>C26. Transect surveys<br>C27. Transect surveys |
| **Portland Harbor NRDA Restoration Goals Questions** | | | | | |
| Geomorphic/ Structural Habitat Elements | • How much mink and bald eagle habitat was restored? | N/A | Pre-Const., Year 0, Year 10 | Any time | Habitat map; CAD |
| Water Quality | • Is water quality at the site improving over time and comparable to an appropriate reference condition? | N/A | Years 1-10 | Continuously | Data logger |
| Fish and Wildlife | • Are native fish using the newly restored habitat? | N/A | Years 1, 3, 5, 7, 10 | 2x/mo, Feb-May | Snorkeling or beach seining |
| | • What size salmonids and lamprey are using the site? | N/A | Fish: Years 1, 3, 5, 7, 10<br>Lamprey: Years 0, 1-5, 10, 15, 20 | 2x/mo, Feb-May<br>Once, Apr-Oct | Snorkeling or beach seining;<br>Electrofishing, sediment sample |
| | • What birds are using the site? Do changes in the bird assemblage, diversity and abundance at the site indicate that habitat quantity and | N/A | Years 0, 1, 3, 5, 10 | 3x, Apr-Jun | Bird surveys |

| | | | | | |
|---|---|---|---|---|---|
| | quality have improved? | | | | |
| | • Are bald eagles using the site? If so, how often and for what activities? | N/A | Years 3, 5, 7, 10 | Weekly, mid-Dec-Aug | Observation |
| | • Are mink using the newly restored habitat? Has mink abundance at the site increased? | N/A | Years 3, 5, 7, 10 | 6x, Apr-Jun | Shoreline survey, camera traps |
| Photo Monitoring | • Is vegetation developing in a way that will ultimately generate a native assemblage of appropriate vegetation types? | N/A | Years 0-10 | Jul-Oct | Photo points |

# 4 PERFORMANCE STANDARDS

Monitoring will be conducted at the restoration site to determine if the site is successfully providing the habitat that was proposed. This will include Implementation Monitoring, which will consist of as-built surveys, and Effectiveness Monitoring, which will track site progress through interim performance standards (IPSs).

## 4.1 GEOMORPHIC/STRUCTURAL HABITAT ELEMENTS

Implementation Monitoring will ensure that the quantity and characteristics of Off-Channel, Shallow Water, ACM, Riparian, and Upland habitats are built as specified. Effectiveness Monitoring will ensure that the physical characteristics of these habitats are retained, derelict structures (including piles) are removed, that the physical characteristics of the Off-Channel and ACM habitats are preserved, and that there are no barriers to fish access into the off-channel habitat.

Effectiveness Monitoring will ensure that those habitat types are retained, that the physical characteristics of the Off-Channel and ACM habitats are preserved, and that there are no barriers to fish access into the off channel habitat. The following attributes of physical habitat will be monitored:

- Total area of habitats by habitat type;
- Elevation of habitats;
- Elevation of the upstream and downstream connections of the flow-through channel;
- Channel slope and jump heights;
- Total number and retention of structural habitat elements; and
- Fish passage/accessibility to the site post-construction and during low water conditions.

The geomorphic/structural habitat performance standards are listed below. Failure to meet these performance standards will trigger a project review with representatives of the Trustee Council and Interagency Review Team (IRT) co-chair agencies, the Corps and DSL, to determine what, if any, adaptive management actions are necessary. A timeline of monitoring activities is presented in Table 5, monitoring methods are presented in 6.1, and the reporting timeline is discussed in 7.

### *Implementation Monitoring—Year 0 (As-Built Survey)*

A1. Constructed acreage within 10% of proposed acreage in all habitat categories;

A2. Elevations of the Off-Channel habitat are within 0.67 ft of proposed elevation;

A3. Elevations of the bottom of the flow-through channel at the upstream and downstream ends are within 0.67 ft of proposed elevation.

> *For Performance Standards 2 and 3, a rise in elevation of 0.67 ft will represent an approximately 10% reduction in inundation frequency (Waterways Consulting 2013). This standard only applies of the site is higher than proposed. If the habitat is lower than proposed, review will not be triggered.*

A4. Presence of 100% of the installed structural habitat elements.

A5. Fish passage/accessibility to the site maintained.

***Effectiveness Monitoring—Years 1-10***

A6. Total area of Off-Channel habitat or ACM habitat within 10% of the as-built condition;

*Since Off-Channel and ACM habitats are subject to variability, these will be sampled in years 1, 3, 5, 7, and 10. Riparian and Upland habitat zones, which will not be subject to the same variability, will be surveyed in the As-Built survey and again in the Year 10 survey, but not in Years 1-9.*

A7. Increase in elevation within the Off-Channel habitat of no greater than 20% (compared to as-built condition);

A8. Increase in elevation within the ACM habitat of no greater than 20% (compared to as-built condition);

*Performance Standards A7 and A8 measure percent change in elevation. This will be measured relative to elevation below OHW (+20.1 ft NAVD88). For example, if the elevation is +10 ft, the distance below OHW is 10.1 ft; thus a 20% increase will be ~2 ft and an elevation of greater than +12 ft will exceed this performance standard (Table 2). If the elevation is +15 ft, elevation below will be 5.1 ft and 20% change will be ~1 ft, or +16 ft NAVD88. The minimum elevation change that will trigger review is 0.5 ft.*

**Table 4. +20% Change from Select Elevations.**

| Elevation | Feet below OHW | 20% | Compliance Elevation (i.e. 20% increase) |
|---|---|---|---|
| +5 ft | 15.1 | 3.0 ft | +8.0 ft |
| +6 ft | 14.1 | 2.8 ft | +8.8 ft |
| +7 ft | 13.1 | 2.6 ft | +9.6 ft |
| +8 ft | 12.1 | 2.4 ft | +10.4 ft |
| +9 ft | 11.1 | 2.2 ft | +11.2 ft |
| +10 ft | 10.1 | 2.0 ft | +12.0 ft |
| +12 ft | 8.1 | 1.6 ft | +13.6 ft |
| +14 ft | 6.1 | 1.2 ft | +15.2 ft |
| +16 ft | 4.1 | 0.8 ft | +16.8 ft |
| +18 ft | 2.1 | 0.5 ft | +18.5 ft |
| +20 ft | 0.1 | 0.5 ft | +20.5 ft |

A9. No physical conditions that prevent fish access to the Off-Channel habitat. The channel gradient throughout the off-channel habitat will not exceed 4% slope and jump heights will not exceed 6 inches, the Linnton Creek culvert outlet will discharge from November 1st through June 30th, when juvenile Chinook are likely present in the Willamette River, and the channel thalweg downstream of Linnton Creek will remain wetted during low water conditions in Years 1 through 10..

*This will be limited to physical obstructions within the flow-through channel, such as an accumulation of woody debris, sediment, or trash at either end and the sheetpile at the downstream end, such that fish cannot physically access the site. This will be monitored after the wet season, during each monitoring year (1-10).*

A10. Presence of at least 80% of the total number of large woody debris/structural habitat elements that were placed below the 100-year flood elevation, including any volunteer LWD ≥18” diameter and ≥30’ length.

*This performance standard is limited to the structural habitat elements below the 100-year flood elevation because only these will be at any risk of washing away. Further, any volunteer LWD in excess of the above-mentioned dimensions will be counted toward the performance standard.*

## 4.2 HYDROLOGY AND HYDRAULICS

This performance standard will focus on the inundation of the Off-Channel habitat areas. Monitoring will ensure that the areal extent of flooding is retained relative to the as-built conditions. The habitat objectives that monitoring will endeavor to verity are listed below. Failure to meet these objectives will trigger a project review with the Trustee Council representative to determine what, if any, adaptive management actions are necessary. A timeline of monitoring activities is presented in Table 5, monitoring methods are presented in Section 6.2, and the reporting timeline is discussed in Section 7.

### *Years 1, 3, 7, and 10*

B1. Areal extent of the 50% inundation level within 20% relative to the as-built condition.

*This will be measured relative to the portion of the site that is inundated 50% of the time from April – June, which is +11.56 ft NAVD88 (Waterways Consulting 2013). The total area below this elevation within the Off-Channel habitat will be calculated from the as-built survey, based on a polygon connecting the +11.56 ft NAVD88 elevation points from the monitoring transects described in Section 6.2.*

## 4.3 VEGETATION

These performance standards will verify that the vegetation that is to be planted in the Off-Channel, ACM, Riparian, and Upland habitats are developing on a positive trajectory. A timeline of monitoring activities is presented in Table 5, monitoring methods are presented in Section 6.3, and the reporting timeline is discussed in Section 7. Three monitoring schemes are proposed as described below and illustrated in Figure 1:

- **Riparian/Upland Forested** – This monitoring scheme is to be used for all planting areas above +13 ft NAVD88 as all areas above +13 ft NAVD88 include trees, shrubs and forbs. This area will be monitored using “Riparian Forested, Scrub-Shrub and Upland Forest” performance standards.

- **Off-Channel Shrub** – This monitoring scheme is to be used for areas between the elevations of +10.5 ft and +13 ft NAVD88 in the Off-Channel Habitat zone. This area will be planted with shrubs and forbs only, and will be monitored using the "Riparian Forested, Scrub-Shrub and Upland Forest" performance standards, excluding tree-specific standards.

- **Off-Channel Emergent** – This monitoring scheme is to include all areas between the elevations of +8.5 ft to +10.5 ft in the Off-Channel Habitat zone. This area includes only emergent vegetation and will be monitored using the "Emergent Marsh" performance standards.

There is uncertainty about the lowest elevation at which vegetation will establish successfully in the Off-Channel Habitat. Thus, it is possible that vegetation does not establish in the entirety of the zone proposed for monitoring. Based on discussions with the Trustee Council, if as the monitoring program progresses it becomes apparent that vegetation is establishing at a higher—or lower—elevation than anticipated, the performance standards will be modified accordingly[1]. This may include modifying the bottom elevation to which the performance standards apply, or modifying which specific performance standards apply in a particular elevation zone depending on the vegetation types that establish there, or eliminating performance standards for the Off-Channel Emergent zone if vegetation is not establishing in this elevation zone, or another mutually agreed-upon resolution. Vegetative performance standards are as follows.

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[1] Any modification of performance standards will also require the concurrence of the IRT.

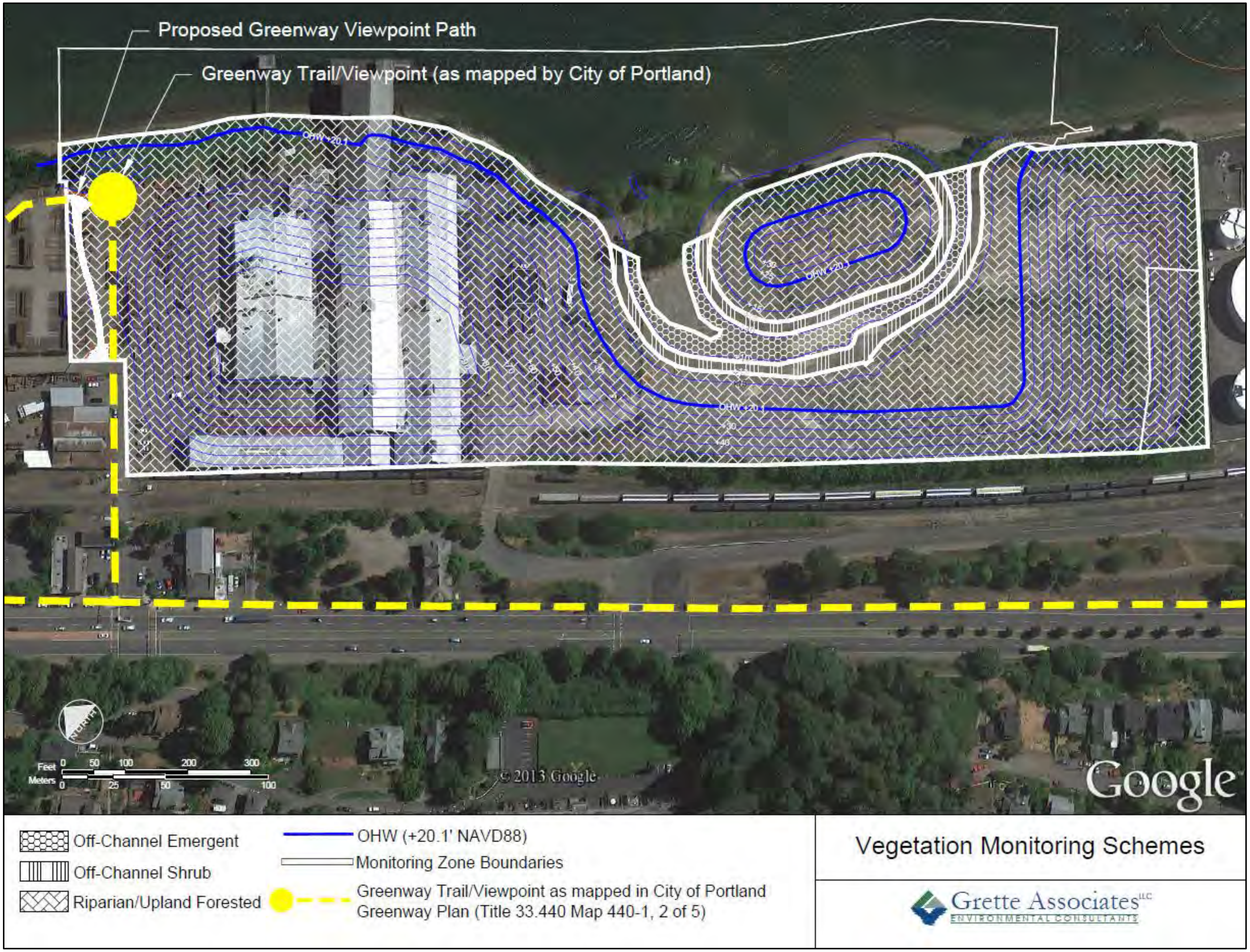

**Figure 4. Vegetation Monitoring Scheme map.**

## Implementation Monitoring—Year 0 Post-Planting/As-Built

### *Riparian/Upland Forested*

C1. A minimum of 2,000 native woody stems planted per acre.
C2. At least 3 native tree species and 5 native shrub species.

### *Off-Channel Shrub*

C3. A minimum of 2,000 native woody stems planted per acre.
C4. At least 5 native shrub species

### *Off-Channel Emergent*

C5. At least 5 native emergent/herbaceous species
C6. A minimum of 5,000 plugs per acre from +8.5 to +10 ft (Off-Channel Emergent Zone only)
C7. A minimum of 50 lbs of grass/emergent seed mix per acre from +8.5 ft to +12 ft NAVD88 (Off-Channel Emergent Zone only)

## Effectiveness Monitoring—Years 1-5, 7, 10

### Years 1-5:

### *Riparian/Upland Forested*

C8. A minimum of 1,200 native woody stems per acre.
C9. At least 3 native tree species and 5 native shrub species.
C10. Cover (during the first 5 years, trees/shrubs will be excluded from percent cover):
  - ≥ 10% native herbaceous
  - ≤ 30% non-native herbaceous[1]
  - The remaining percentage of cover can be made up of bare ground, rocks or native herbaceous.

### *Off-Channel Shrub*

C11. A minimum of 1,200 native woody stems per acre.
C12. At least 5 native shrub species
C13. Cover (during the first 5 years, trees/shrubs will be excluded from percent cover):
  - ≥ 10% native herbaceous
  - ≤ 30% non-native herbaceous[1]
  - The remaining percentage of cover can be made up of bare ground, rocks or native herbaceous.

### *Off-Channel Emergent*

C14. At least 5 native emergent/herbaceous species
C15. Cover (during the first 5 years, trees/shrubs will be excluded from percent cover):

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[1] Non-native species are defined as those found on the Oregon Department of Agriculture (ODA) noxious weed list or the Portland Plant List, rank A, B, and C. The versions of those lists current at the time of Year 1 monitoring will be used for the duration of the performance period. However, if new, highly invasive species are discovered in Portland Harbor and added to the above lists, they will be controlled as well.

  - ≥ 30% native herbaceous
  - ≤10% non-native herbaceous[1]
  - The remaining percentage of cover can be made up of bare ground, rocks or native herbaceous.

**Year 7:**

***Riparian/Upland Forested***

C16. At least 3 native tree species and 5 native shrub species.
C17. Cover:
  - ≥ 55% native woody species
  - ≥ 10% native herbaceous
  - ≤ 20% non-native herbaceous[1]
  - ≤ 5% non-native shrubs[1]
  - The remaining percentage of understory cover can be made up of bare ground, rocks, native shrubs or native herbaceous.

***Off-Channel Shrub***

C18. At least 5 native shrub (Off-Channel Shrub Zone only)
C19. Cover:
  - ≥ 55% native woody species
  - ≥ 10% native herbaceous
  - ≤ 20% non-native herbaceous[1]
  - ≤ 5% non-native shrubs[1]
  - The remaining percentage of understory cover can be made up of bare ground, rocks, native shrubs or native herbaceous.

***Off-Channel Emergent***

C20. At least 5 native emergent/herbaceous species (Off-Channel Emergent Zone only)
C21. Cover:
  - ≥ 50% native herbaceous (Off-Channel Emergent zone only)
  - ≤10% non-native herbaceous[1] (Off-Channel Emergent zone only)
  - The remaining percentage of understory cover can be made up of bare ground, rocks, native shrubs or native herbaceous.

**Year 10:**

***Riparian/Upland Forested***

C22. At least 3 native tree species and 5 native shrub species.
C23. Cover:
  - ≥ 80% native woody species
  - ≥ 10% native herbaceous
  - ≤ 20% non-native vegetation[1]

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[1] Non-native species are defined as those found on the Oregon Department of Agriculture (ODA) noxious weed list or the Portland Plant List, rank A, B, and C. The versions of those lists current at the time of Year 1 monitoring will be used for the duration of the performance period. However, if new, highly invasive species are discovered in Portland Harbor and added to the above lists, they will be controlled as well.

***Off-Channel Shrub***

C24. At least 5 native shrub species
C25. Cover:
  - o ≥ 80% native woody species
  - o ≥ 10% native herbaceous
  - o ≤ 20% non-native vegetation[1]

***Off-Channel Emergent***

C26. At least 5 native emergent/herbaceous species
C27. Cover:
  - o ≥ 70% native herbaceous
  - o ≤10% non-native herbaceous[1]

Volunteer native species—even if different species than originally planted—will be credited towards the applicable performance standard. If the density, diversity or cover rates fall below the required performance standards, the Project Implementer will consult with the Trustee Council and the IRT to determine a plan for replanting. Replanting will occur during the appropriate season following monitoring.

# 5 OTHER PARAMETERS TO BE MONITORED

In addition to parameters with associated performance standards, monitoring will occur to track progress toward NRDA related restoration goals. These items are monitored for the purpose of gathering data and will not be compared to performance standards or trigger contingency actions by the results. A timeline of monitoring activities is presented in Table 5, monitoring methods are presented in Sections 6.4 through 6.7, and the reporting timeline is discussed in Section 7.

## 5.1 FISH MONITORING

### *Native Fish (Non-Lamprey)*

Native fish monitoring will be conducted in the Off-Channel habitat area to determine native fish are using the site. Monitoring will focus on target salmonid species , but data on all native fish use will be recorded. To the extent possible, components to be reported include presence/absence, species richness, and approximate size. Monitoring will be conducted in years 1, 3, 5, 7, and 10. Eight monitoring events will occur each year, twice per month from February through May.

### *Lamprey*

In addition to fish observations made in the Off-channel habitat, monitoring for Pacific lamprey will be conducted at the Site. Monitoring will be conducted by USFWS according to the Evaluation of Portland Harbor Superfund Area Restoration: Larval Pacific Lamprey Linnton Restoration Site. This is included as Appendix 11 to the Linnton Mill Restoration Site Restoration Plan (Restoration Plan; Grette Associates 2017).

## 5.2 WILDLIFE MONITORING

### *Bird Assemblages*

Data on bird use of the site will be collected, as it was during pre-construction monitoring. This monitoring component will include surveys to determine species and numbers of each bird observed and qualitative observations of habitat use. Bird monitoring was conducted during the pre-construction baseline monitoring. Post-construction monitoring will occur in years 1, 3, 5, and 10. Each monitoring year, three monitoring events will be conducted—once per month during peak breeding season of May through June.

### *Mink*

Mink presence and site use has been chosen by the Trustee Council as an indicator of progress toward restoration goals. Thus, monitoring will be conducted to determine if mink are using the site, and how mink presence compares to observations made during pre-construction monitoring. Mink monitoring will use scent stations and camera traps, as well as transects along the shoreline to look for signs of mink such as scat, tracks, or dens. Mink monitoring was conducted during pre-construction baseline monitoring. Post-construction mink monitoring will occur during years 3, 5, 7, and 10. Six on-site monitoring events will occur each monitoring year, twice per month from mid-April through mid-July, in addition to continuous camera trap monitoring during that period.

### *Bald Eagle*

Bald eagle surveys will be conducted to document species use of the site. Surveys will report on bald eagle presence/absence, abundance, behavior, habitat element use, time of use, and changes over time. Bald eagle monitoring was conducted during pre-construction baseline monitoring. Post-construction bald eagle monitoring will be conducted in years 3, 5, 7, and 10. Monitoring will be conducted weekly from mid-December through August.

## 5.3 WATER QUALITY

Water quality monitoring will be conducted in the open-water portion of the Off-Channel habitat. As proposed, the open water habitat will provide cold water refugia for juvenile salmonids during summer months. Temperature monitoring will determine if the site is providing this. In addition, dissolved oxygen will be measured. Water quality parameters will be measured continuously from years 1-10.

## 5.4 PHOTO MONITORING

The site will be monitored through photo points located throughout the site. Photo points will document developing conditions at the site qualitatively, with no associated performance standard. Photos will be taken at the photo points annually from years 1-10 along pre-selected photo locations. Each year, photos will be taken at the same points facing in the same directions, whether cardinal directions or directions relative to the site orientation (e.g. facing the river, facing parallel to the river, etc.). Photo monitoring will be conducted during late spring or early summer.

**Table 5. Monitoring schedule summary**

| **Monitoring Parameter** | **Performance Standard?** | **Baseline** | **Monitoring Year** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **As-Built/ Yr 0** | **Yr 1** | **Yr 2** | **Yr 3** | **Yr 4** | **Yr 5** | **Yr 6** | **Yr 7** | **Yr 8** | **Yr 9** | **Yr 10** | **Yr 15** | **Yr 20** |
| Structural habitat elements presence/retention | **Yes** | | X | X | | X | | X | | X | | | X | | |
| Area/elevation of habitats | **Yes** | | X | X | | X | | X[2] | | X | | | X | | |
| Fish passage/ accessibility | **Yes** | | X | X | X | X | X | X | X | X | X | X | X | | |
| Lateral extent of flooding | **Yes** | | | X | | X | | | | X | | | X | | |
| Water level | **Yes** | | | X | | X | | | | X | | | X | | |
| Vegetation | **Yes** | | X | X | X | X | X | X | | X | | | X | | |
| Acreage of mink and eagle shoreline habitat restoration | No | X | X | | | | | | | | | | X | | |
| Water temperature | No | | | X | X | X | X | X | X | X | X | X | X | | |
| Dissolved oxygen | No | | | X | X | X | X | X | X | X | X | X | X | | |
| Fish presence | No | | | X | | X | | X | | X | | | X | | |
| Bird | No | X | | X | | X | | X | | | | | X | | |
| Bald eagle | No | X | | | | X | | X | | X | | | X | | |
| Mink | No | X | | | | X | | X | | X | | | X | | |
| Photo points | No | X | X | X | X | X | X | X | X | X | X | X | X | | |
| Lamprey | No | X | X | X | X | X | X | X | | | | | X | X | X |

[1] This schedule assumes As-Built/Year 0 is 2017, and Year 1 is 2018.

[2] Includes full topographic survey.

**Table 6. Monitoring timing chart**

| Monitoring Activity | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Structural habitat elements | | | | | | | <- - - | - - - | - - - | - - -> | | |
| Area/elevation of habitats | | | | | | | <- - - | - - - | - - - | - - -> | | |
| Mink/eagle habitat restoration | | | | | | | | | | | | |
| Fish passage/accessibility | | | | | | | <- - - | - - - | - - - | - - -> | | |
| Lateral extent of flooding | | | | | | | <- - - | - - - | - - - | - - -> | | |
| Water level | | | | | | | <- - - | - - - | - - - | - - -> | | |
| Vegetation | | | | | | | <- - - | - - -> | | | | |
| Water temperature | <——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ———> |
| Dissolved oxygen | <——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ———> |
| Fish presence | | | | | | | <- - - | - - - | - - - | - - -> | | |
| Bird | | | | <——— | ——— | ———> | | | | | | |
| Bald eagle | ——— | ——— | ——— | ——— | ——— | ——— | ——— | ———> | | | | <——— |
| Mink | | | | <——— | ——— | ——— | ———> | | | | | |
| Photo points | | | | | | | <- - - | - - - | - - - | - - -> | | |

Dashed denotes one-time monitoring event may occur in this period <- - - - - - - - ->

Solid line indicates monitoring occurs multiple times or continuously over this period <———————>

# 6 EFFECTIVENESS MONITORING STUDY DESIGN

## 6.1 GEOMORPHIC/STRUCTURAL HABITAT ELEMENTS AND HYDROLOGY

Physical attributes of the site will be surveyed by topographic surveys, which will be completed post-construction and again in years 1, 3, 5, 7, and 10. Data will be collected once each monitoring year, after the wet season when water levels are most likely to be low enough to conduct effective monitoring of all parameters (e.g., July-October). An as-built topographic survey of the entire site will be performed by a surveyor and again in Year 10 at the end of the Performance Period. During the Effectiveness Monitoring period, topography and bathymetry will be sampled along transects at critical locations within the Off-Channel and ACM habitats. In the as-built survey, the riverward corners of the upstream and downstream ends of the Off-Channel habitat site will be surveyed and permanently staked to provide a consistent measurement of the Off-Channel habitat through the performance monitoring period.

Acreage for performance standard compliance will be measured by conducting a limited topographic survey. The horizontal locations of the OHW (+20.1 ft NAVD88) and OLW (+8.0 ft NAVD88) contours will be located and recorded throughout the site. A surveyor will record points along the +20.1 ft NAVD88 elevation contour on the entire site, including the “island” feature in the off-channel habitat (Figure 5), using dGPS equipment capable of sub-meter horizontal precision. This contour will be recorded with data points at a maximum spacing of 10 m along the entire shoreline. Additionally, the location of the lower end of the ACM zone—OLW (+8.0 ft NAVD88)—will be mapped either using land-based survey equipment (if accessible) or using boat-based bathymetric survey equipment. This will be accomplished by recording elevations/depths along pre-determined transects (discussed below). If boat-based, depths will be correlated to the water level at the time of the survey and converted to bottom elevations in NAVD88. The resulting survey will produce polygons of habitat that can be compared with the as-built acreages using computer-aided drafting software (e.g. AutoCAD).

Topographic monitoring of the Off-Channel and ACM habitat will be conducted to monitor trends in accretion/erosion within these habitats. Topographic monitoring may be conducted by any method that will return elevation data to a tenth-foot precision: whether an electronic topographic survey, or using manual elevation surveying methods. Topographic data will be collected along a series of transects that will be established that pass through these habitats perpendicular to the OHW (Figure 5). Transects will be spaced every 25 m along the entire shoreline. The end-points will be precisely located at the horizontal position of the OHW elevation (+20.1 ft NAVD88) using surveying equipment. Both end-points of each transect[1] will be permanently marked in the field with capped PVC pile or other means. Elevation data will be collected by recording elevation points along these transects[2]. Elevation data will be collected every 3 meters along the transect, at the same survey point location each sampling year in order to more closely identify changes in elevation. Elevations in the ACM transects that terminate in

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[1] The waterward end of ACM transects that terminate in the Willamette River will not be marked, but the coordinates of the riverward end-point should be recorded.

[2] Elevation points may be recorded using electronic GPS-based elevation survey equipment, or calculated using manual surveying methods such as stadia rods and clinometers along a tape measure stretched between transect end points, as appropriate.

the river will be recorded on foot as far waterward as the water level at the time of the survey allows. In addition, the location of the bottom of the flow through channel and, if possible, the tops of banks of the flow-through channel, will be recorded on each transect and out to the riverward end of the Off-Channel habitat area. A full topographic survey of the Off-Channel Habitat will be conducted again in Year 5. Also, the lower limit of woody vegetation will be recorded on each transect. For transects within the Off-Channel habitat, this will include two vegetation points: one on each side of the flow-through channel.

Monitoring transects are also proposed extending out to the sheet pile wall, including two transects that begin from OHW and extend out to the low point of the sheet pile wall, and one along the top of the sheet pile wall. This transect will be primarily for the purpose of gathering qualitative data (e.g. visual observation of erosion/accretion at the wall), but the elevation of the sheet pile wall will be recorded at three foot intervals if conditions permit.

Fish passage monitoring will be conducted annually in years 1-10, during the dry season (e.g., July-October). Monitoring will consist of visual observations of fish passage throughout the site, including at the ingress and egress points, to supplement the above-mentioned topographic data to identify any barriers to fish passage. Visual monitoring will be used to confirm that the Linnton Creek culvert outlet will discharge between November 1 and June 30, and the channel thalweg downstream of Linnton Creek remains wetted during low water conditions. Photographs will be taken of each end of the flow-through channel and at the Linnton Creek culvert outlet. A longitudinal profile will measure the channel gradient throughout the off-channel habitat to confirm that the channel will not exceed 4% slope and jump heights will not exceed 6 inches.

Structural habitat retention monitoring will occur in years 1, 3, 5, 7, and 10. Monitoring will consist of a count of placed structures as well as naturally-recruited wood, limited to structures placed below the 100-year flood elevation. It is assumed that structural elements placed above this elevation will remain in place.

### 6.2 HYDROLOGY/HYDRAULICS

Hydrology monitoring will measure the area of the site below the 50% inundation elevation from April-June (+11.56 ft NAVD88; Waterways Consulting 2013). A water data logger will be installed on site in the open water area, in the downstream portion of the Off-Channel habitat, on one of the monitoring transects (Figure 5). The logger will collect water level information every 2 hours, recording either at the top or bottom of the hour[1]. In addition, this data will be correlated with stream gage data from the nearest applicable USGS river gage on the Willamette River. Water levels will be measured relative to OHW (+20.1 ft NAVD88). Hydrologic monitoring will occur in years 1, 3, 7, and 10. However, the water data logger will be installed permanently and will collect data continuously throughout the performance period.

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[1] The nearby USGS stream gage records temperature every half hour at the top and bottom of the hours. Therefore, if site temperature data were collected consistently at the top (e.g. 12:00, 2:00, etc.) or bottom (e.g. 12:30, 2:30, etc.) of the hour, this will allow site data to be collected simultaneously with the USGS data and allow a more direct comparison between the two datasets.

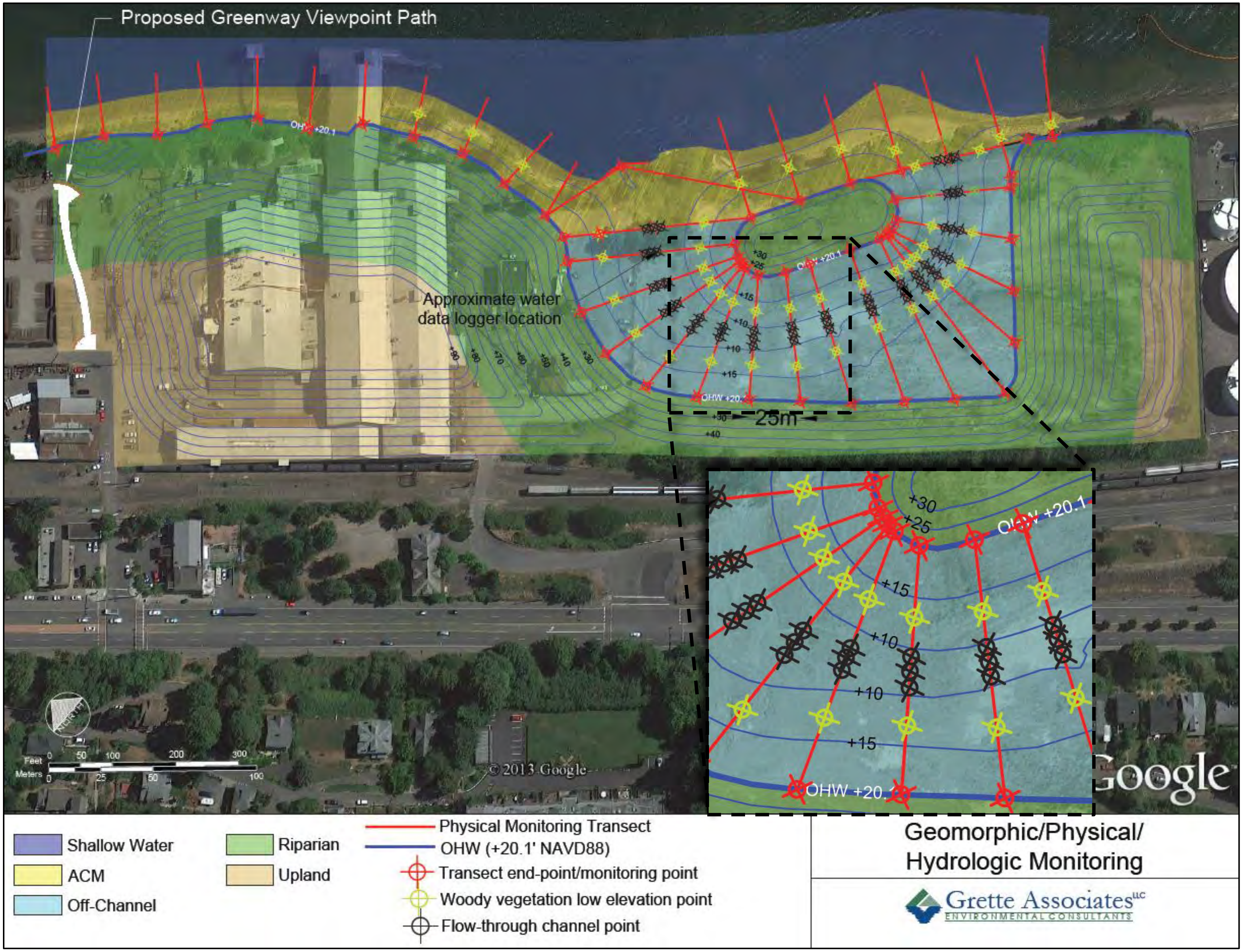

**Figure 5. Geomorphic/Physical/Hydrologic Monitoring.**

## 6.3 VEGETATION

Vegetation surveys will be conducted in Years 1-5, 7, and 10. Surveys will occur between July 1 and August 31. All four proposed habitat types with vegetation (ACM, Off-Channel, Riparian, and Upland) will be surveyed. Monitoring the areas above OHW (Riparian/Upland Forested Zone) will occur with a series of sub-transects perpendicular to the physical transects established for pre-construction bird assemblage monitoring. Sub-transects will be evenly spaced approximately 30 m apart, at fixed locations. To provide more focused and detailed monitoring data in the areas below +13 ft (Off-Channel Shrub and Off-Channel Emergent zones), these zones will be monitored along a subset of the transects identified in Section 6.1 above, which pass across the off-channel habitat perpendicular to the flow-through channel. Vegetation transects are depicted in Figure 6.

### *Riparian/Upland Forested Zone*

Monitoring plots in the Riparian/Upland Forested Zone (above +13 ft NAVD88) will occur along the sub-transects at a fixed interval of 100 m, beginning at a randomly-selected distance (5-100 m) from either end of each sub-transect (Figure 6). This spacing will generate approximately 23 monitoring plots, relatively evenly divided by habitat type (ACM, Riparian, and Upland).

At each monitoring plot location, herbaceous vegetation will be sampled within a $1m^2$ plot centered at the monitoring plot location, in which cover of herbaceous vegetation will be estimated by species per Daubenmire (1958), as described in Table 3, below. Herbaceous monitoring plots below +13 ft NAVD88 will occur every 6 meters, beginning at a random starting point along each transect (Figure 6).

At each Riparian/Upland Forested monitoring plot, woody stem density and/or cover will be measured within 10 m diameter circular plots per Roegner et al. (2009) (Figure 6). A second tape measure will be laid out perpendicular to the sub-transect, measuring 10 m (5 m in either direction), to form a circular plot. In years 2-5, all woody individuals within each circular plot will be counted and identified to species to determine woody stem density. All stems at 0.5 m above the ground are counted as individual plants (Peet *in* Roegner 2009)[1].

In years 7 and 10, percent cover by woody species will also be measured within each plot. This will be measured using a densitometer, with four readings taken per plot, each approximately 2 m from the plot center and facing each of the four cardinal directions. Percent cover by species will be assigned within the range of cover specified using Daubenmire Cover Classes (Daubenmire 1959), and the midpoint of that range will be the percent cover of each species (Table 7).

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[1] I.e. if a shrub has multiple stems that branch closer than 0.5 m to the ground, each stem is an individual. Stems that branch greater than 0.5m above the ground are not considered separate individuals.

### *Off-Channel Shrub and Emergent Zones*

In the Off-Channel habitat below +13 ft NAVD88, monitoring will occur along the transects indicated in Figure 6, with monitoring plots spaced approximately every 6 m (20 ft) beginning at a random starting point. This will generate approximately 40 plots below +13 ft.

At each monitoring plot, herbaceous vegetation will be sampled within a 1m$^2$ plot centered at the monitoring plot location, in which cover of herbaceous vegetation will be estimated by species per Daubenmire (1958), as described above (Table 7).

Additionally, at every monitoring plot within the Off-Channel Shrub zone (+10.5 ft to +13 ft NAVD88), a 6 m diam. plot will be sampled for woody vegetation. This diameter is approximately the anticipated width of the Off-Channel Shrub zone. Methods will be identical to those described above for woody vegetation in the Riparian/Upland Forested habitat, with total individual counts in years 1-6, then percent cover in years 7-10 (Figure 6). Shrubs are not anticipated to persist below +10.5 ft. However, if shrubs do persist to a lower elevation, shrub monitoring will occur at all Off-Channel monitoring plots within the area of permanent shrub establishment.

**Table 7. Daubenmire Cover Classes.**

| Cover Class | Percent Cover | Percent Cover Class Midpoint |
|---|---|---|
| 1 | 0-5% | 2.5 |
| 2 | 6-25% | 15 |
| 3 | 26-50% | 37.5 |
| 4 | 51-75% | 62.5 |
| 5 | 76-95% | 85 |
| 6 | 96-100% | 97.5 |

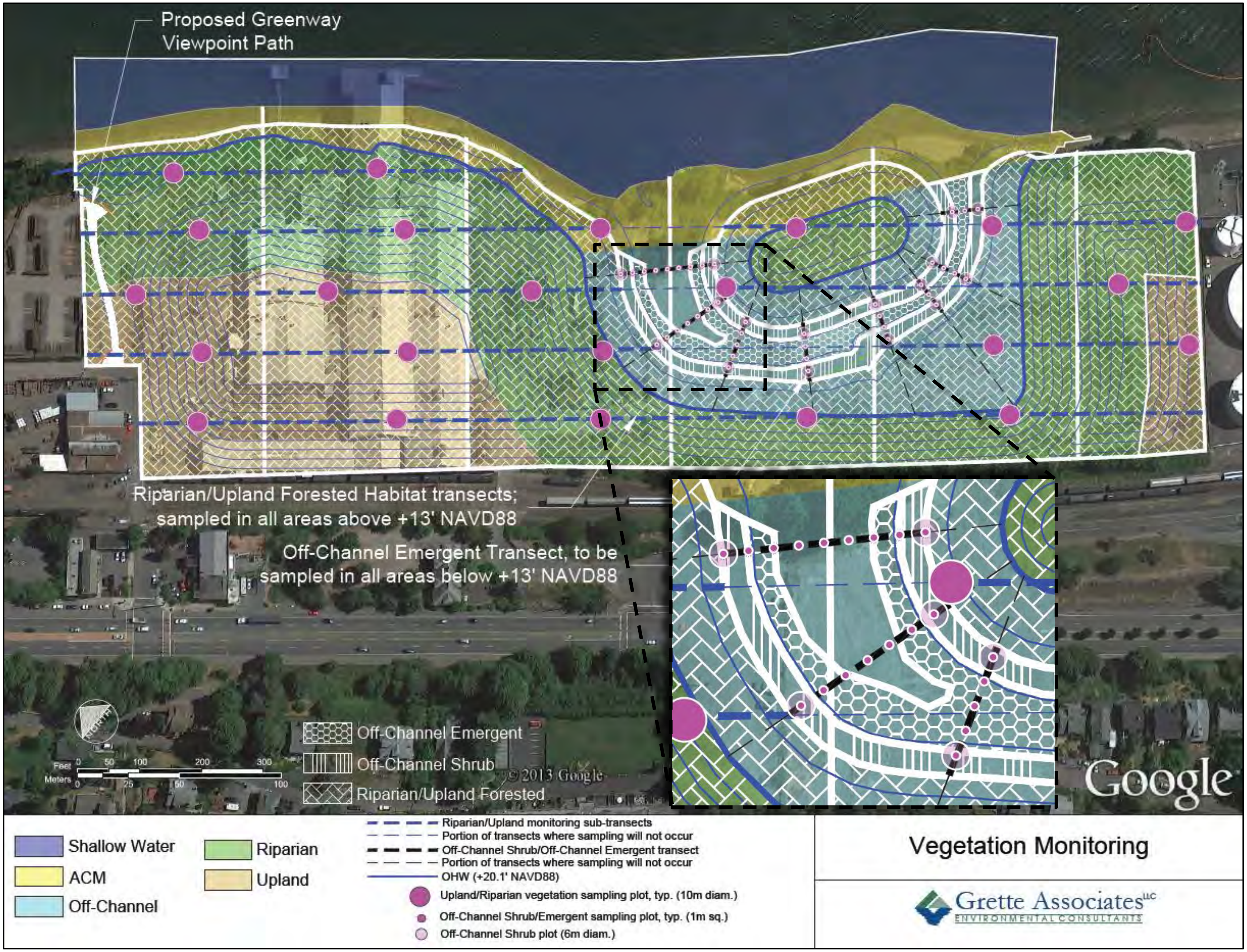

**Figure 6. Vegetation Monitoring**

## 6.4 FISH MONITORING

Native fish use of the site will be monitored in the off-channel habitat. Observations will be conducted by snorkeling or beach seining and observing from shore in monitoring years 1, 3, 5, 7, and 10. Sampling by beach seining will only be conducted if snorkeling is not feasible and will only be conducted until the presence of ESA-listed salmonids is documented. Surveys will occur twice monthly from February through May, for a total of eight sampling events. During each event, sampling will consist of at least one hour observing by snorkeling and at least two hours observing from the shore. The specific dates of sampling will be determined based on predicted water levels and expected weather conditions to allow selection of conditions suitable for observing fish use.

When snorkeling, the observer will move throughout the Off-Channel habitat by floating at the surface for at least one hour. Observers will cover the entire area in a systematic manner, such as by swimming transects. When observing from the shore, the observer (equipped with polarized sunglasses and binoculars) will sit at the shoreline for at least two hours. To the extent possible, surveys will record species, number by species, approximate length or age group (i.e., fry versus presmolts), origin (i.e., hatchery or wild), and general activity.

### *Lamprey*

Lamprey monitoring will be conducted by USFWS as described in the Evaluation of Portland Harbor Superfund Area Restoration: Larval Pacific Lamprey Linnton Restoration Site (see Appendix 11 to the Restoration Plan; Grette Associates 2017).

## 6.5 WILDLIFE MONITORING

### *Bird Assemblages*

Assemblages of bird species using the site will be surveyed in years 1, 3, 5, and 10 using the point count monitoring method described in Huff et al. 2008. Point count monitoring involves tallying all birds observed at a fixed location during specific, repeated observation periods. Monitoring will occur three times during the spring breeding season, once per month during the months of April-June. Bird assemblage monitoring will occur along five monitoring transects that were established during pre-construction monitoring. The transects are spaced approximately 100 m apart, run perpendicular to the river, and cross all post-project habitat types (Figure 7). Point count surveys will occur at a maximum of every 50 m along transects, beginning at a random distance (0-50 m) from the end of the transect. Two to three point surveys will occur on each transect, depending on length. The point surveys will occur at the locations recorded during pre-construction monitoring. If high flows prevent access to point survey locations in or through the open water habitat, point surveys will occur as close to the point as possible. Sampling will record transect number, all species observed, abundance by species, and use of habitat elements as applicable.

### *Bald Eagle*

Bald eagle surveys will be conducted in years 3, 5, 7, and 10 on a weekly basis, beginning in mid-December and continuing through August. Bald eagle surveys will occur consistent with the methods used for pre-construction monitoring to the extent possible. Observations will occur from one advantageous and non-intrusive vantage point that allows observation of the entire site. This point will be selected at the time of the first post-construction monitoring (year 3). If possible, the same location used during pre-construction monitoring will be used. Each survey will include two hours of observations, either just after dawn or just before dusk. Surveys will record bald eagle presence/absence, abundance, behavior, habitat element use, time of use, and changes over time.

### *Mink*

Mink surveys will consist of remote cameras and scent stations set up at three select locations along the shoreline. Additionally, a monitoring transect will be sampled along the shoreline to look for tracks, scat, and den sites (Figure 7). Mink use of the site will be surveyed in years 3, 5, 7, and 10. As with the pre-construction mink monitoring, sampling will be conducted twice monthly for 12 weeks, totaling six surveys from approximately mid-April through mid-July. Surveys will consist of camera traps and scent stations located around the riverbank.

To the extent possible, monitoring will overlap with pre-construction monitoring locations. Three camera traps will be installed, placed as close to the pre-construction locations as feasible. To include the newly-constructed Off-Channel habitat in monitoring, the upstream-most camera trap will be located within the Off-Channel habitat (Figure 7). Additionally, the pre-construction monitoring transect will be appended to include an additional transect that encompasses the Off-Channel habitat (Figure 7). Data to be recorded will include any sign of mink presence (including photos), as well as records of passing individuals captured by the camera trap, with an emphasis on the presence of juveniles.

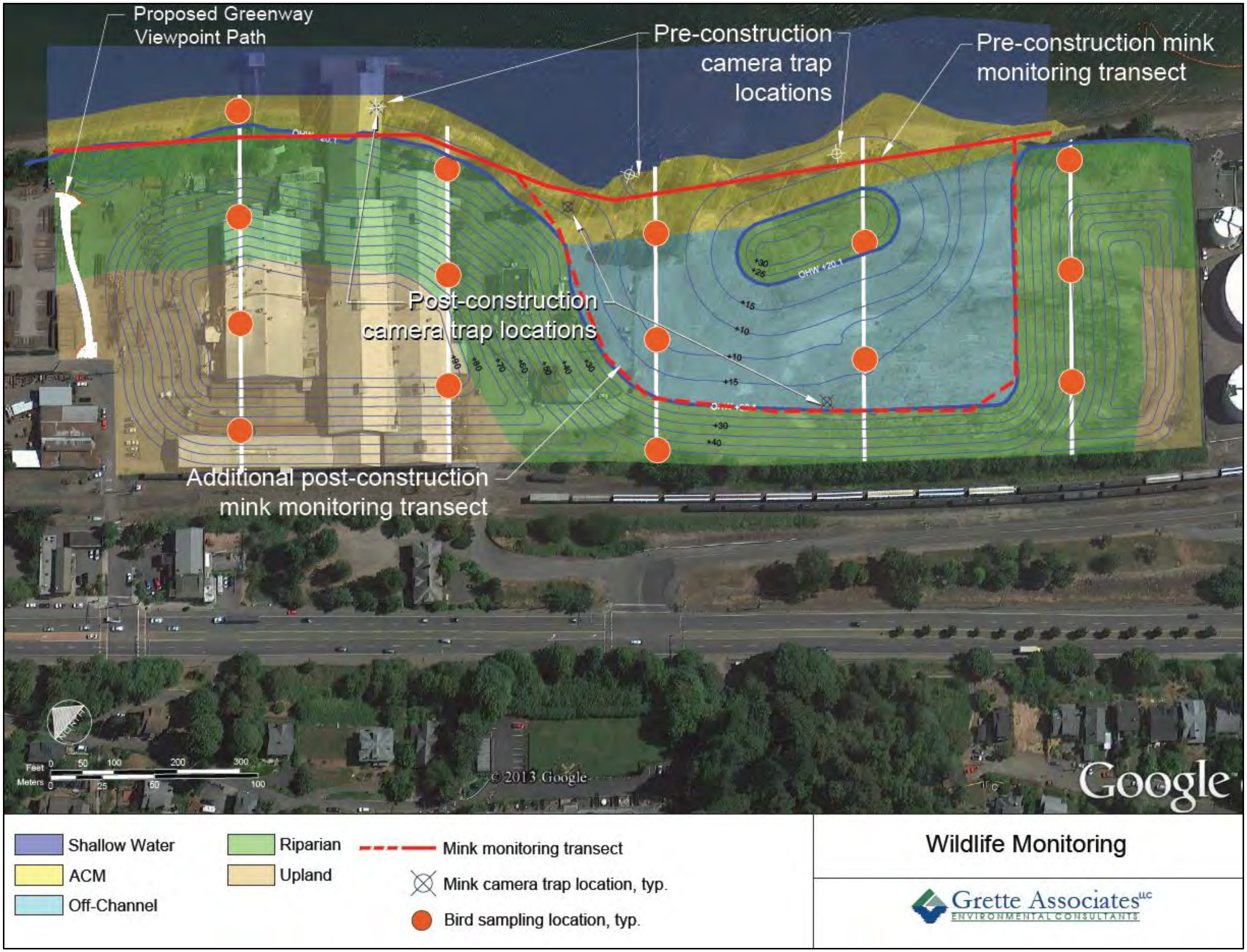

**Figure 7. Wildlife Monitoring Plan.**

## 6.6 WATER QUALITY

A water data logger will be permanently installed in the low-water portion of the Off-Channel habitat to record water quality data throughout the performance period (Figure 5). The data logger will record data on temperature and dissolved oxygen. A temperature probe will be used to record water temperature continuously throughout the performance period (years 1-10), with samples recorded at minimum every 2 hours at the top or bottom of the hour[1]. Data collection times will be synchronized with and compared to temperature data collected from the nearby USGS river gage on the Willamette River at Portland, OR (USGS Station #14211720). This will allow for a comparison of water temperatures within the Off-Channel habitat and the mainstem Willamette River to determine if the Site is providing off-channel cold water refugia for juvenile salmonids. It was decided that a single temperature logger in the downstream end of the off-channel habitat, with comparison to temperature collected in the mainstem Willamette River, will be sufficient to observe the cold water refugia function of the off-channel habitat, and that an additional logger is not warranted. This is because an additional data logger in the upstream portion of the off-channel habitat would be dry much of the year, and would be sampling water that is expected to be very similar temperature as the mainstem Willamette River. Temperature data collected at the site will be compared to Oregon Department of Environmental Quality's standard for 7-day average maximum temperature of salmonid and trout rearing and migration; should not exceed 18 deg C (64.4 Deg F) (OAR 340-0401-0101 to 340-04100340).

Dissolved oxygen will also be recorded at the site using either a hand-held dissolved oxygen sensor, or by installing a sensor connected to the water data logger mentioned above. Dissolved oxygen will be measured, at a minimum, once each month during years 1 and 2, then monthly during summer months in years 3-10. Dissolved oxygen data collected at the site will be compared to Oregon Department of Environmental Quality's standard: the dissolved oxygen should not be less than 11.0 mg/l (OAR 340-0401-0101 to 340-04100340).

## 6.7 PHOTO MONITORING

Photographs will be taken at 24 permanently marked photo point locations throughout the site (Figure 8). Photo monitoring will be conducted annually (years 1-10), after the wet season. Photo point locations have been selected to provide the best coverage possible of the entire site, taking advantage of high points, slope shoulders, top of banks, and slope breaks. Photo points will provide vantage points of all habitat types. Photo points will be permanently marked in the field during the as-built monitoring and the coordinates of each point will be recorded using sub-meter dGPS (where inundation makes permanent marking infeasible, dGPS coordinates and a text description of the photo location will be used, e.g. the inlet and outlet of the Off-Channel habitat). Eight photographs will be taken at each point, facing each of the cardinal directions (N, W, S, E), plus the four intermediate directions (NE, NW, SE, SW). Photographs will include a time/date stamp on the image if possible, or time/date will be recorded in a data notebook.

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[1] The nearby USGS stream gage records temperature every half hour at the top and bottom of the hours. Therefore, if site temperature data were collected consistently at the top (e.g. 12:00, 2:00, etc.) or bottom (e.g. 12:30, 2:30, etc.) of the hour, this will allow site data to be collected simultaneously with the USGS data and allow a more direct comparison between the two datasets.

### 6.8 VIEWPOINT TRAIL SURVEY

Visual monitoring of the public viewpoint trail will be conducted annually. The qualitative condition of the trail, including all physical features such as the fence, bench, substrate, signage, will be inspected for vandalism. Additionally, any signs of trespass onto the habitat site will be documented.

The City of Portland's Greenway Trail system is mapped as passing by the site. Linnton Water Credits has requested that the City accept maintenance and liability of the trail in the future pursuant to City of Portland Municipal Code 33.272.070 and 343.440.250, and discussions are ongoing. Until an agreement with the City is reached, maintaining the viewpoint and trail will be the responsibility of the Project Implementer (during the performance period) or Steward (during the stewardship phase).

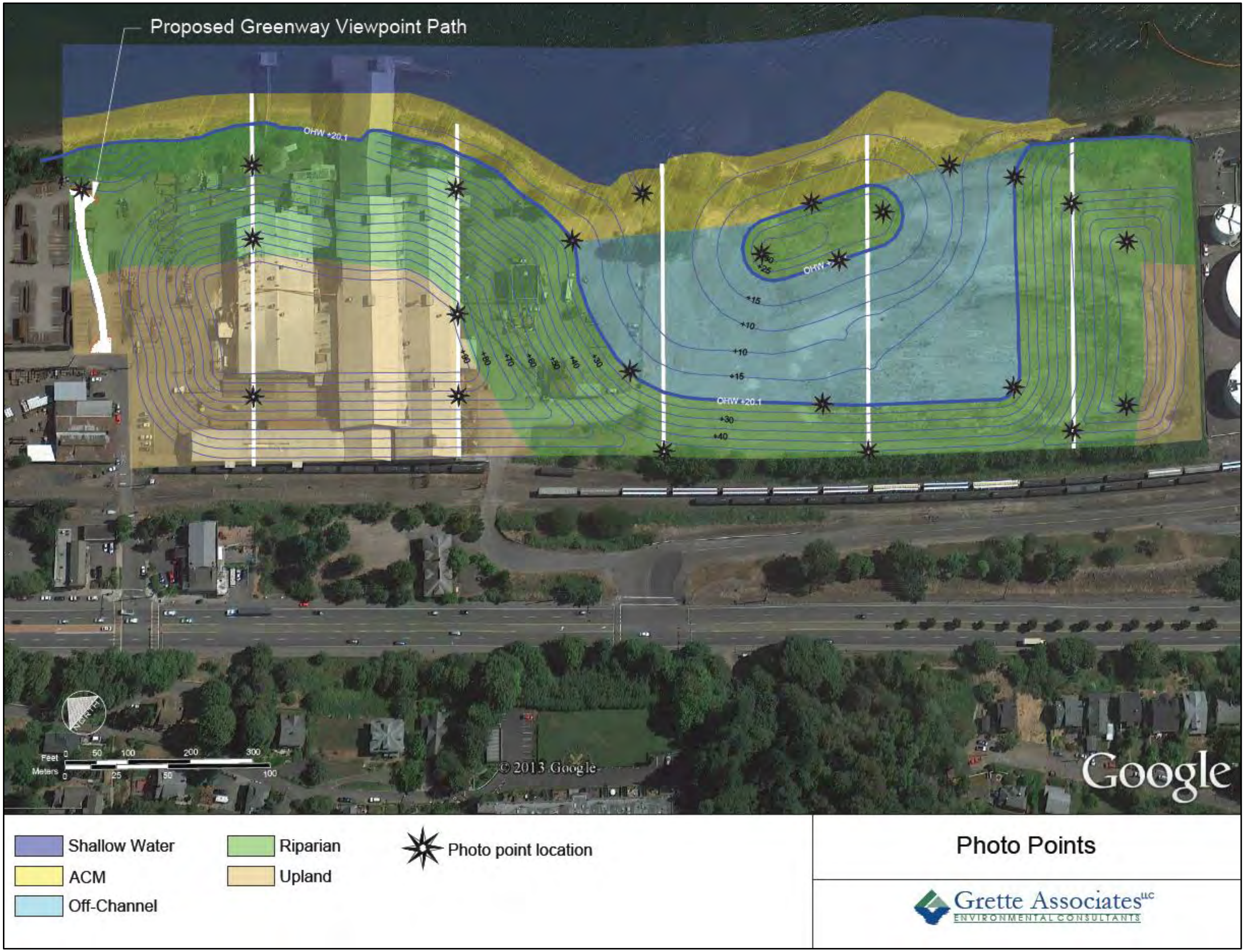

**Figure 8. Photo Point Locations.**

# 7 DATA ANALYSIS AND REPORTING

## 7.1 DATA ANALYSIS

Analysis of the data recorded during monitoring will vary depending on the data. Analysis methods are presented below in Table 8.

**Table 8. Data Analysis Methods.**

| Parameter | Analysis Method |
|---|---|
| Geomorphic/ Structural Features | Data will be compared to as-built surveys using graphical and GIS analysis to determine percent change.<br>Elevation points, taken at the same location every year along each transect, will be labeled sequentially/numerically to be tabulated and compared with the as-built elevation to determine percent change in elevation.<br>Elevation cross sections will be plotted graphically using a computer aided drafting (CAD) program to visually depict changes in elevation.<br>Total number of habitat complexity features will be tabulated by type (e.g. large wood clusters, single logs, boulder clusters, etc.) and compared to the number originally installed.<br>The presence of any potential fish passage barriers in the Off-Channel habitat will be documented, described in field notes, photographed, and compared with previous years' results.<br>Longitudinal profile will be compared to the as-built profile to confirm that slopes are less than 4% and jump heights do not exceed 6 inches. |
| Hydrology and Hydraulics | Table of stream gage height data will be used in combination with elevation cross section data to determine lateral extent of inundation. |
| Vegetation | Graphical comparison and statistical analysis based on before-after-control-impact paired series (BACIPS) study design/minimal recovery repeated measures design, or similar statistical methods. |
| Water Quality | Graphical time series with comparison to Willamette River data as a reference site. |
| Fish | Graphical time series of abundance and size frequency histograms for salmonids. |
| Birds | Graphical or statistical comparison of species richness values; develop species lists; tabulate numbers of individuals observed for each species detected to determine relative abundance. |
| Bald Eagles | Comparison of presence/absence data, categorical behavioral observations and changes in type and frequency of use to identify trends in use over time. |
| Mink | Tabulate mink camera passes (single or multiple individuals) observed by remote cameras. Record presence of juveniles observed by remote cameras. Identify individuals to the extent possible by unique frontal markings or other features observed on mink in photos. Tabulate and report observations of scat, tracks, or den sites. Prepare maps depicting the quantity and quality of the restored shoreline mink and bald eagle habitat. Compare quantity and quality of restored shoreline habitat to pre-construction acres, by habitat type. |
| Trail | Any indication of vandalism, any maintenance needs, and any evidence of trespassing will be documented and compared to previous years' notes. |

## 7.2 DATA MANAGEMENT

At the completion of each sampling effort, data will be entered and stored in a project specific database. A database for tabular data and geodatabase for spatial data is available through the Portland Harbor Restoration Committee, for entering data. Whenever possible, monitoring data will be georeferenced and spatial information will be stored in the geodatabase. The field forms will be created to be compatible with the database in order to reduce the possibility of error during data entry.

## 7.3 REPORTING

A monitoring report shall be submitted to the Trustee Council, as well as to the permitting agencies and ESA Services (U.S. Army Corps of Engineers, NOAA Fisheries, U.S. Fish and Wildlife Service, and Oregon Department of State Lands), for each year that monitoring activities occur. The as-built drawing report shall be submitted within 3 months of the closure of the construction contract. Construction contract closure is anticipated in late 2018. The as-built drawing report will include an as-built topographic survey and tabular elevation data along transects, final as-built planting details, geographic locations of placed habitat features, maps indicating the locations of transects, monitoring equipment, and photo points, discussion about any deviations the permitted design, and discussions of any other challenges encountered during construction.

Annual monitoring reports shall be due by December 31 of each year, to capture data collected from November 1 through October 31 of that year. Monitoring reports will include a summary of project performance with respect to interim performance standards, as well as all data monitored in the year in question and a discussion of any maintenance performed. Results will be presented both in narrative and graphical/tabular form, as appropriate, and with field data sheets attached to the report, as applicable. Any observed issues that require immediate response, such as the presence of fish access barriers, will be reported to the Trustee Council immediately after they are identified.

Annual monitoring reports will also include a log of all maintenance or adaptive management activities conducted during the year, including but not limited to activities such as invasive plant management, trash removal, native vegetation planting, and site visits to check for trespass. The log will describe the date, level of effort (number of individuals or labor hours), and a description of the work performed.

Annual monitoring reports will also include a section on the current state of the BP/ARCO Petroleum Hydrocarbon Plume. This will include a short summary of recent monitoring results and effectiveness of remediation activities. This will also include information on when the monitoring wells on the project site will be removed and whether any subsequent habitat restoration actions are planned.

# 8 ADAPTIVE MANAGEMENT FRAMEWORK

As discussed above, final performance standards apply to the site to determine if the site has developed as planned and if full restoration credit is to be assigned. To track progress toward the final performance standards, interim performance standards have been established. Meeting the interim performance standards indicates the likelihood that the site will meet the final performance standards.

If the site is not meeting interim performance standards, adaptive management of the site may be necessary to ensure its long-term success. This adaptive management framework provides a plan for taking action if the restoration site fails to meet interim performance standards. Adaptive management actions will be implemented by the Project Implementer. The adaptive management actions will vary depending on whether physical or biological processes are responsible for non-attainment of performance standards and the level of shortfall. If the project fails one or more performance standards but the Trustee Council agrees the shortfall is minor, then additional monitoring prior to undertaking more intense corrective actions may be proposed.

Contingency funds will be allocated by the Project Implementer to an interim management and contingency fund, equal to 25% of habitat-related construction costs. These funds will either be expended to implement contingency actions resulting from performance standard failure, or refunded to the Project Implementer at the end of the performance period. The habitat-related construction cost will not include costs for one-time demolition or removal actions (e.g. pile or overwater structure removal), since these actions will be completed at demolition and will not require on-going monitoring and potential contingency actions.

## 8.1 CONTINGENCY ACTIONS

This adaptive management plan identifies a planning process for selecting appropriate actions to address failure of specific performance standards. In order to maintain the flexibility needed to respond effectively and appropriately to biological and/or physical conditions, this plan does not present a specific list of actions that will be taken to remedy all specific types of failures at the restoration site.

Site-specific contingency options do exist for the restoration site, and sample options are outlined below. The list of sample corrective actions is not exclusive, nor is it a commitment to undertake a specific action. It is expected that any shortfall in habitat performance can be remedied within the confines of the restoration site.

For example, if excessive deposition of sediments occurs within the off-channel habitat such that it no longer supports off-channel aquatic habitat, potential contingency actions include:

- Review design of the upper and lower mouths of the off-channel habitat to determine if adjustments in elevation will be appropriate; or
- Minor reconfiguration of the flow-through channel.

Failure of biological components of the habitat/mitigation actions is more difficult to predict and specific responses are impossible to present in detail. However, the following general approaches are anticipated:

- If the vegetation fails to survive or fails to meet the performance standards, additional planting may occur;
- If vegetation failure appears to be due to poor soil conditions, soil amendments or other methods may be necessary to improve soil fertility;
- If herbivory appears to be a cause, additional plant protection or herbivore deterrents may be utilized.

## 8.2 CONTINGENCY PLANNING PROCEDURE

The contingency planning procedure consists of two elements: (1) problem recognition, and (2) contingency planning and response.

**Problem Recognition Process.** The problem recognition process is an integral part of the monitoring program. As monitoring data are collected, they will be examined and interpreted relative to the interim performance standards. If monitoring data shows that the site fails to meet the interim performance standards, this will trigger a consultation between the Trustee Council and the Project Implementer to determine if there is a problem and if so, the nature and extent of the problem. The Project Implementer and the Trustee Council shall meet in good faith and shall use their best efforts to reach consensus regarding an appropriate response. In the event that consensus cannot be reached, the Trustee Council will determine if modified or continued monitoring is adequate. Diagram 1 outlines this process and shows potential outcomes of the problem recognition step.

**Contingency Planning and Response Process.** The purpose of the contingency planning process is to develop contingency actions that may be necessary, depending on the results of the monitoring program and problem recognition step. If contingency measures are judged by the Trustee Council and the Project Implementer to be feasible and cost-effective, such actions will be implemented, upon the Trustee Council's written recommendation. The Project Implementer will be responsible for any design, permitting, or permit agency coordination required. Diagram 2 outlines the contingency planning process.

The contingency planning process could result in the implementation of an approved response action. Alternatively, it could result in agreement on an approach or set of criteria for taking further action, depending on the results of future monitoring.

The Trustee Council will make a final determination on an appropriate response, based on available information and scientifically and economically feasible recommendations. No contingency action will be undertaken until the Trustee Council give approval in writing. Potential responses include, but are not limited to, one or more of the following:

- Concluding that the situation does not require further action.
- Expanding or modifying the monitoring program.
- Developing more specific criteria to evaluate the data during future monitoring.
- Initiating a corrective action.

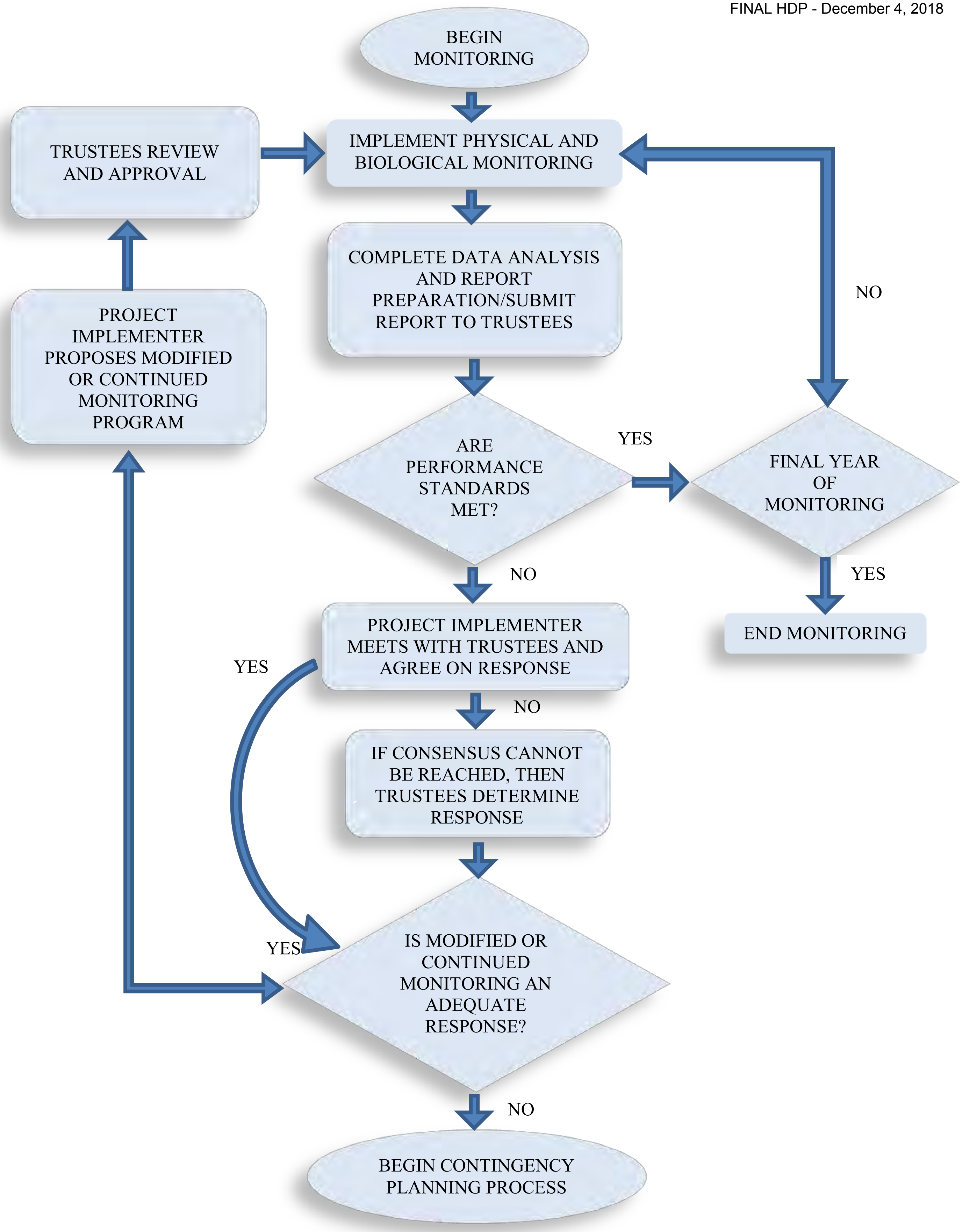

**Diagram 1. Problem Recognition Process.**

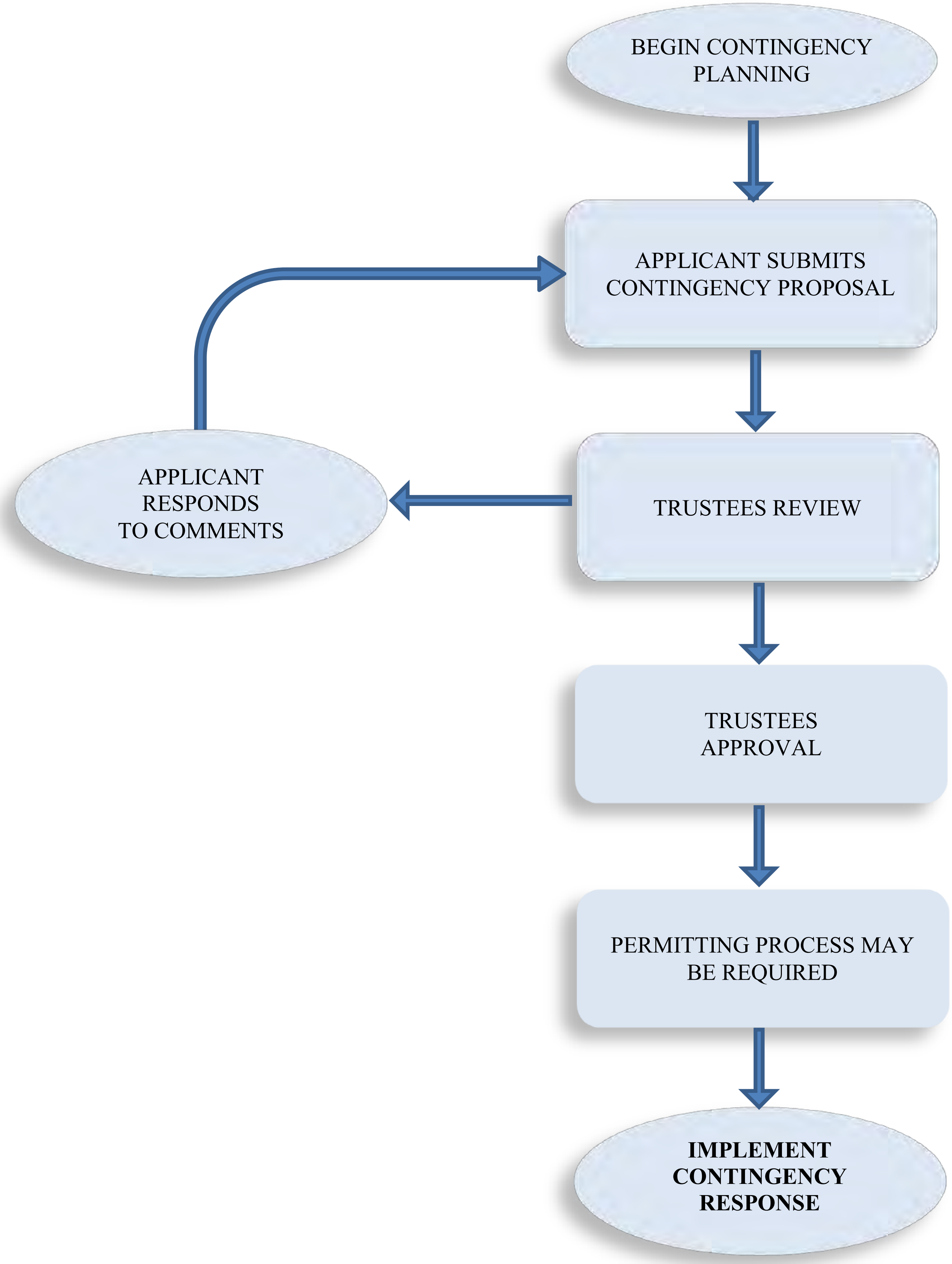

**Diagram 2. Contingency Planning and Response Process**

## 8.3 CONTINGENCY ACTIONS AND FINAL CREDIT RELEASE

In the event contingency actions have been implemented and all of the contingency funds have been expended, yet the site still has not fully met performance standards, the Project Implementer and the Trustee Council will decide on final credit release. Based on the 5/15/14 Framework, if contingency funds are expended and 90% or more of the standards have been met, no further actions are necessary and 100% credit release will occur. If less than 90% of the performance standards are met, the Project Implementer may elect to allocate additional funds toward further contingency actions, or accept a final credit release of less than 100%.

# 9 LONG-TERM STEWARDSHIP

This section presents a summary of the long-term stewardship framework, which is presented in full in Appendix 12. The long-term stewardship framework describes the Project Implementer's and the Trustee Council's expectations and commitments for long-term stewardship of the Linnton Mill Restoration Project.

Long-term stewardship will involve tasks such as:

- Regularly scheduled site visits to observe and document site conditions.
- Managing invasive vegetation.
- Maintaining fences and gates.
- Ensuring any public uses are appropriate and any illegal or incompatible uses are addressed.
- Long-term monitoring of parameters such as vegetation survival.
- Clean-up and debris removal.
- Maintaining positive relationships with adjacent landowners and interested community members.
- Remain apprised of the BP/ARCO remediation action on the adjacent property.
- Any other tasks required to maintain project effectiveness and full functionality of a given NRDA restoration project.

The goal of long-term stewardship is to ensure that the Project continues to meet the goals and objectives outlined in this Plan in perpetuity. In addition to active stewardship of the site through the types of activities listed above, the Trustee Council expects that the Project's conservation features be permanently, legally protected prior to the end of the performance period.

## 9.1 STEWARDSHIP ROLES AND SELECTION OF ROLES

The Trustee Council has identified up to six roles that may be involved in long-term stewardship at a given Portland Harbor NRDA restoration project:

**Long-term steward:** responsible for monitoring and maintaining the restoration site after the performance period, and for coordinating with the Trustee Council on any ongoing impacts to the Site by the BP/Arco site, into perpetuity;

**Conservation easement holder:** enforce the Site's integrity per the terms of a conservation easement;

**Stewardship fund manager:** responsible for managing the stewardship fund as a non-wasting fund that accrues sufficient interest to finance annual stewardship activities in perpetuity;

**Landowner:** coordinates with stewardship entities to ensure access and coordinate activities;

**Project Implementer:** same as landowner (Linnton Water Credits, LLC);

**Trustee Council:** provide oversight of Site stewardship

### 9.2 LONG-TERM STEWARDSHIP TASKS

Long-term stewardship tasks at the Site will likely include:

- Monitoring
- Maintenance
- Program Management
- Community Relations and Enforcement
- Reporting, Documentation, and Data Management

Some key stewardship tasks specific to the project include:

**Initial Site Assessment:** The initial site assessment will document the Site through site visit observations, notes, photo documentation, and mapping as needed to establish baseline conditions. These baseline conditions will establish what has been agreed to and what should be maintained or adaptively managed through time.

**Annual Stewardship Plan:** The Long-Term Steward (to be determined) will complete or manage the inspection and maintenance of the Site.

**Vegetation Management:** This will include removing invasive plant species and replanting native plants throughout the Site.

**General Habitat Inspection and Maintenance Need:** Comparison to the Initial Site Assessment for guidance as to when intervention is required to maintain habitat, or when natural processes that slowly change habitat should be allowed to continue.

**Infrastructure Maintenance, Inspection and Clean-up:** Fences, gates, access roads and trails, will all require inspection and maintenance when or where they exist. Trespassing, dumping, or other illegal activities will require time and labor to manage.

**Neighborhood Communication:** Communication with the local community could aid the Steward by providing accounts of illegal activity or physical problems at the site in-between steward site visits.

**Documentation and Annual Reporting:** Documentation of monitoring, adaptive management, and stewardship tasks will be provided to the Trustee Council or its designee(s) and other interested parties on a regular basis, as well as made available to the general public in the form of a website, online database, and/or online mapping feature.

# 10 REFERENCES

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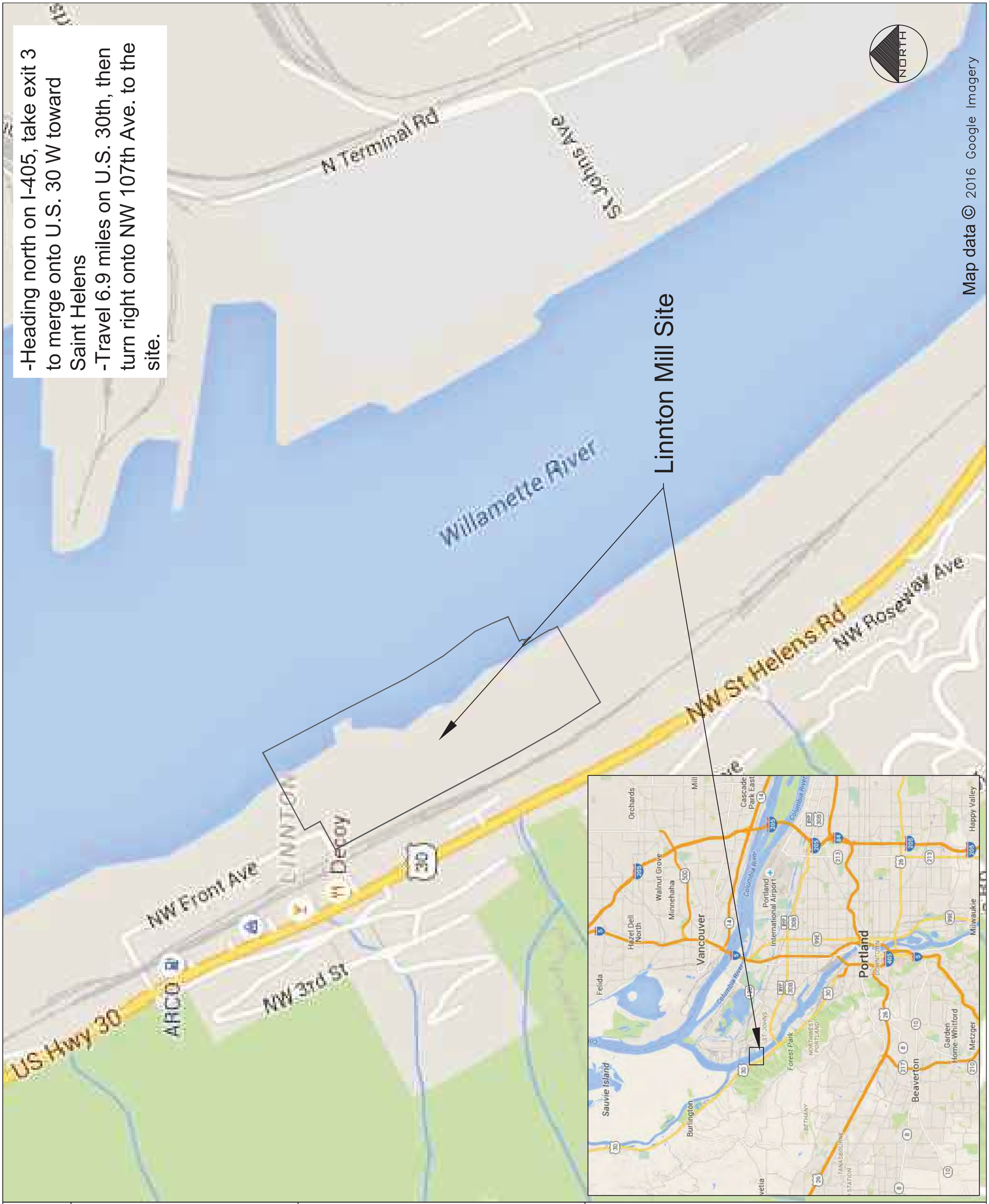
# LINNTON MILL RESTORATION SITE

# EXHIBIT B: SITE-SPECIFIC PERFORMANCE PLAN

## Attachment 1: Linnton Mill Restoration Site Permit Drawings



-Heading north on I-405, take exit 3 to merge onto U.S. 30 W toward Saint Helens

-Travel 6.9 miles on U.S. 30th, then turn right onto NW 107th Ave. to the site.

SHEET: 1
OF: 12
DATE: 3/1/16

## LOCATION MAP

CORPS NO. NWP-2014-477
DSL FILE 57064

LINNTON MILL RESTORATION SITE

| | |
|---|---|
| APPLICANT:<br>LINNTON WATER CREDITS, LLC<br>337 17TH STREET SUITE 101<br>OAKLAND, CA 94612 | AUTHORIZED AGENT:<br>GLENN GRETTE; GRETTE ASSOCIATES<br>151 S. WORTHEN ST. SUITE 101<br>WENATCHEE, WA 98801 |

| SITE ADDRESS: | DRAWING SCALE: | DATUMS: |
|---|---|---|
| 10504 ST HELENS RD<br>PORTLAND, OR 97231 | N/A | H: OR ST PLANE N<br>V: NAVD 1988 |

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151 South Worthen, Suite 101
WENATCHEE, WA 98801
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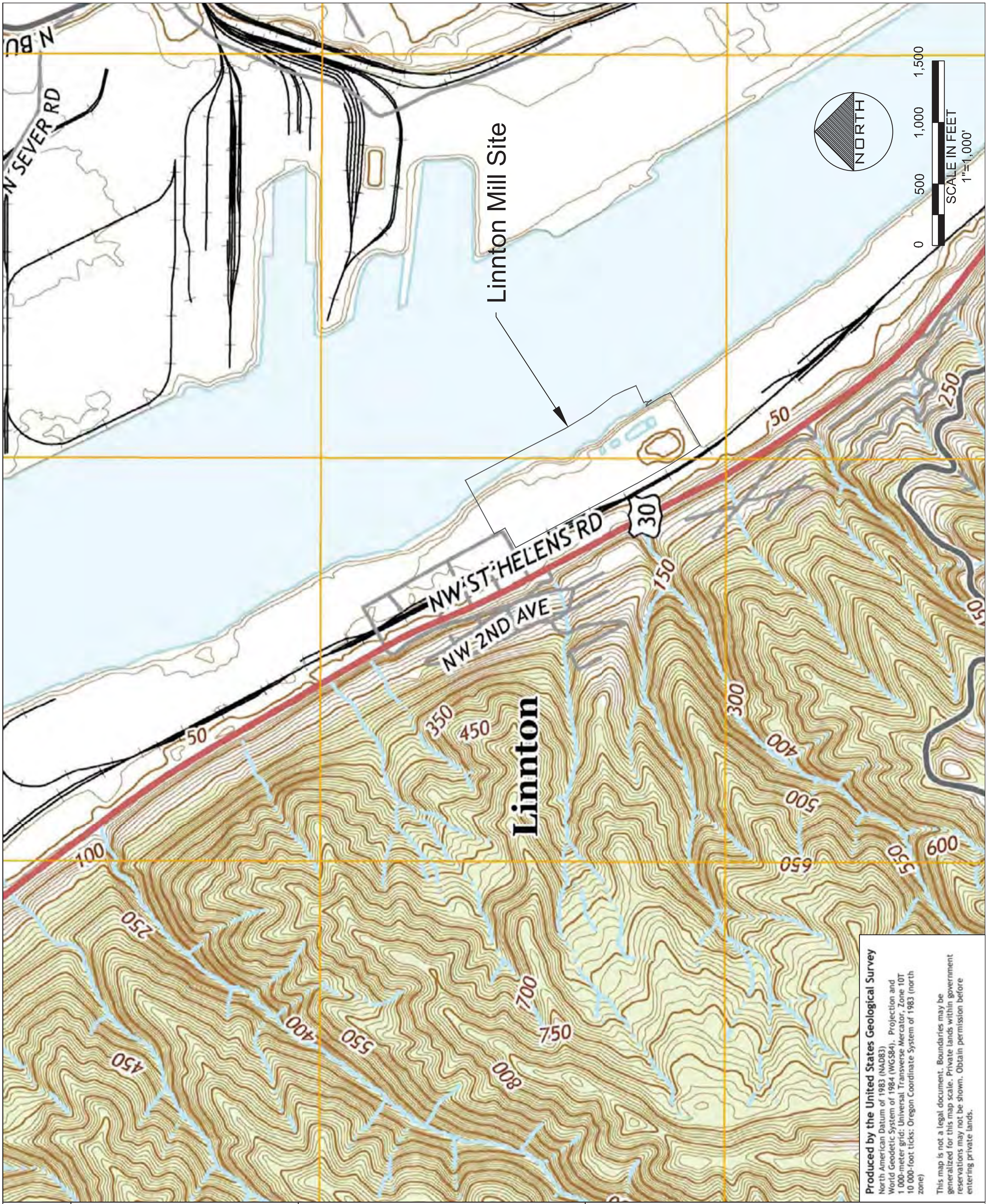

**Produced by the United States Geological Survey**
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid: Universal Transverse Mercator, Zone 10T
10 000-foot ticks: Oregon Coordinate System of 1983 (north zone)

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

SHEET: 2
OF: 12
DATE: 3/1/16

USGS TOPOGRAPHIC MAP

CORPS NO. NWP-2014-477
DSL FILE 57064

LINNTON MILL RESTORATION SITE

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OAKLAND, CA 94612

AUTHORIZED AGENT:
GLENN GRETTE; GRETTE ASSOCIATES
151 S. WORTHEN ST. SUITE 101
WENATCHEE, WA 98801

SITE ADDRESS:
10504 ST HELENS RD
PORTLAND, OR 97231

DRAWING SCALE:
1"=1,000'

DATUMS:
H: OR ST PLANE N
V: NAVD 1988

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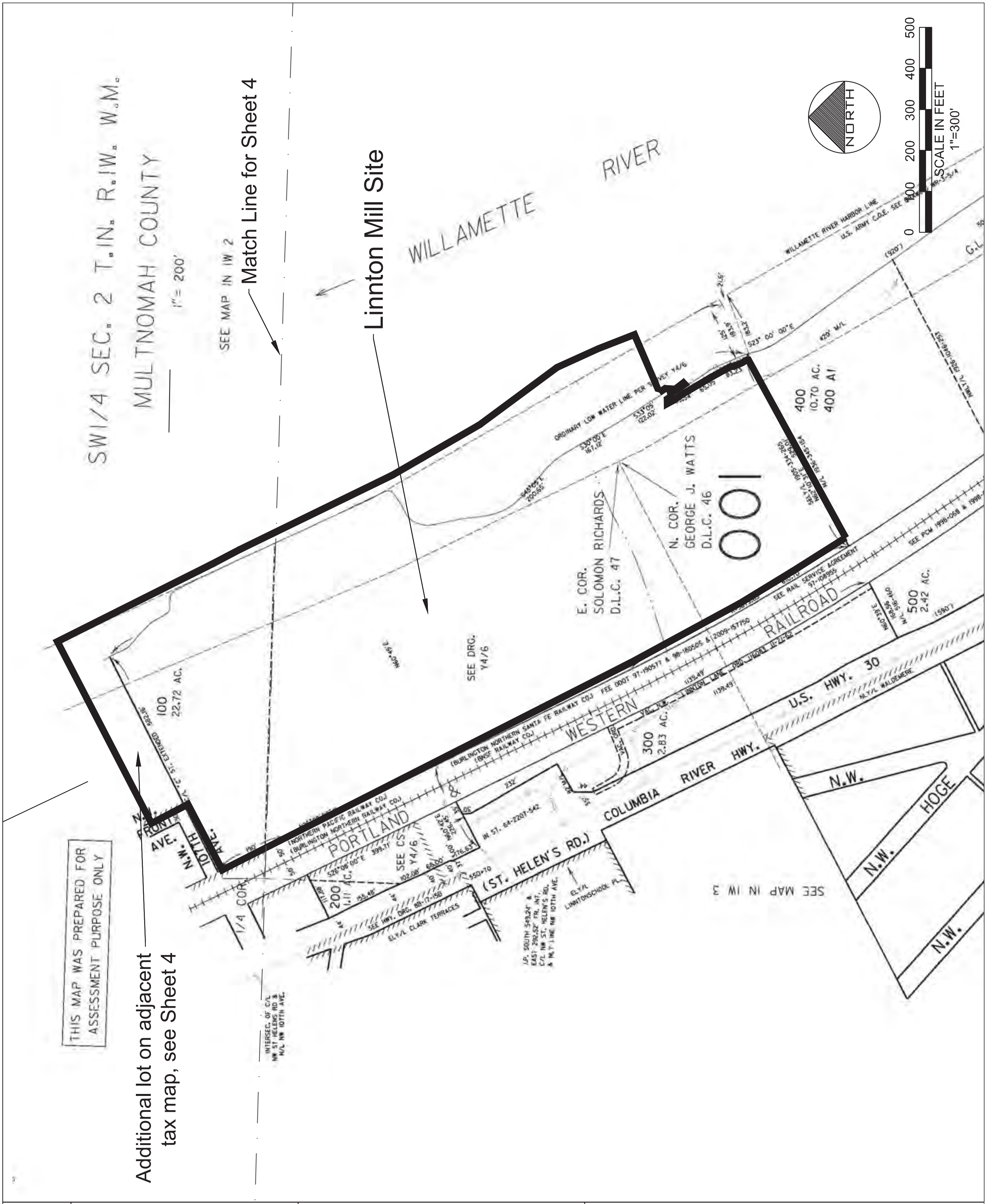

SHEET: 3
OF: 12
DATE: 3/1/16

ASSESSOR MAP (1)

CORPS NO. NWP-2014-477
DSL FILE 57064

LINNTON MILL RESTORATION SITE

APPLICANT:
LINNTON WATER CREDITS, LLC
337 17TH STREET SUITE 101
OAKLAND, CA 94612

AUTHORIZED AGENT:
GLENN GRETTE; GRETTE ASSOCIATES
151 S. WORTHEN ST. SUITE 101
WENATCHEE, WA 98801

SITE ADDRESS:
10504 ST HELENS RD
PORTLAND, OR 97231

DRAWING SCALE:
1"=300'

DATUMS:
H: OR ST PLANE N
V: NAVD 1988

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SHEET: 4

OF: 12

DATE: 3/4/16

## ASSESSOR MAP (2)

CORPS NO. NWP-2014-477
DSL FILE 57064

LINNTON MILL RESTORATION SITE

APPLICANT:
LINNTON WATER CREDITS, LLC
337 17TH STREET SUITE 101
OAKLAND, CA 94612

AUTHORIZED AGENT:
GLENN GRETTE; GRETTE ASSOCIATES
151 S. WORTHEN ST. SUITE 101
WENATCHEE, WA 98801

SITE ADDRESS:
10504 ST HELENS RD
PORTLAND, OR 97231

DRAWING SCALE:
1"=300'

DATUMS:
H: OR ST PLANE N
V: NAVD 1988

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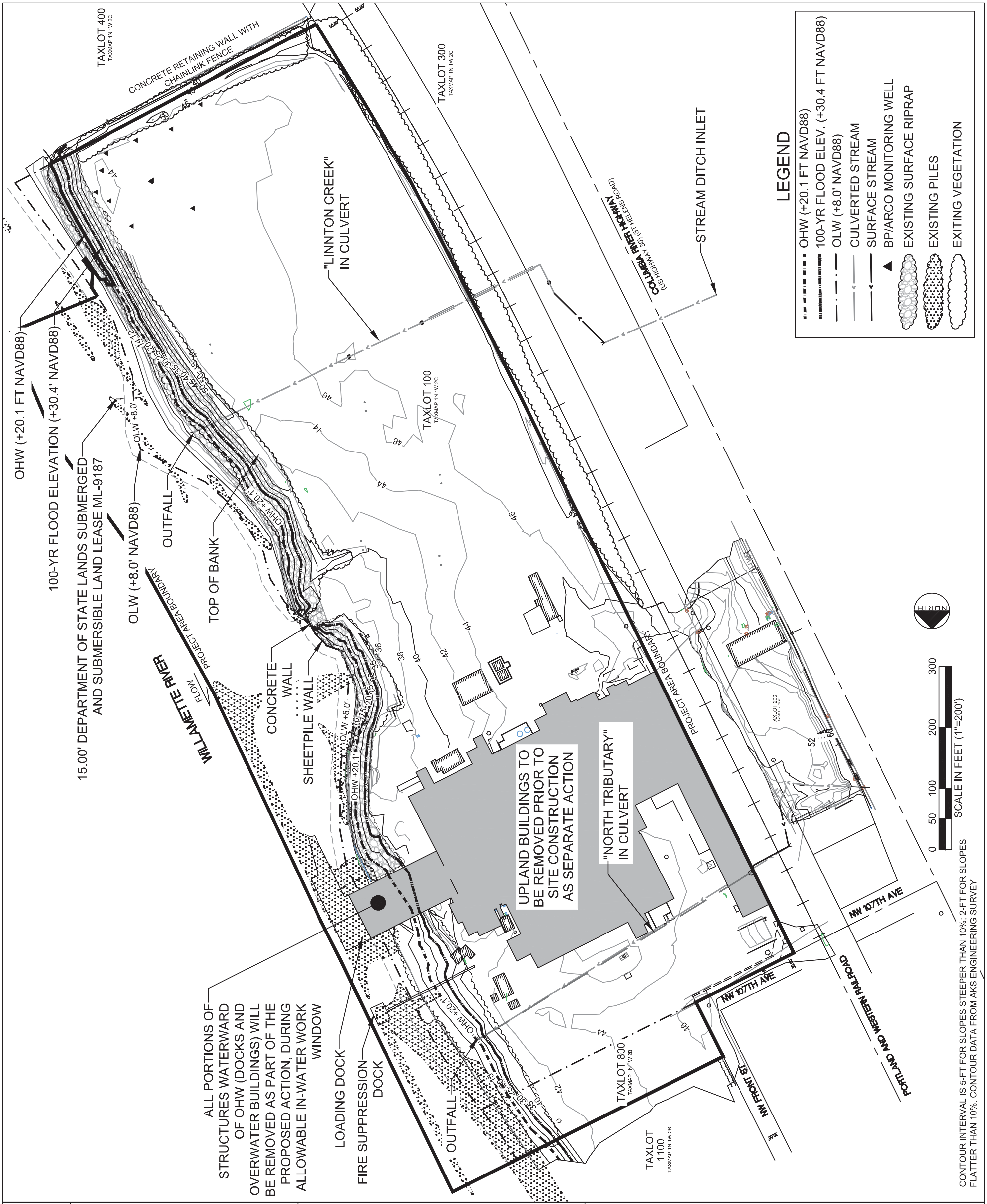

SHEET: 5
OF: 12
DATE: 3/1/16

EXISTING CONDITIONS

CORPS NO. NWP-2014-477
DSL FILE 57064

LINNTON MILL RESTORATION SITE

APPLICANT:
LINNTON WATER CREDITS LLC
337 17TH STREET SUITE 101
OAKLAND, CA 94612

AUTHORIZED AGENT:
GLENN GRETTE; GRETTE ASSOCIATES
151 S. WORTHEN ST. SUITE 101
WENATCHEE, WA 98801

SITE ADDRESS:
10504 ST HELENS RD
PORTLAND, OR 97231

DRAWING SCALE:
1"=200'

DATUMS:
H: OR ST PLANE N
V: NAVD 1988

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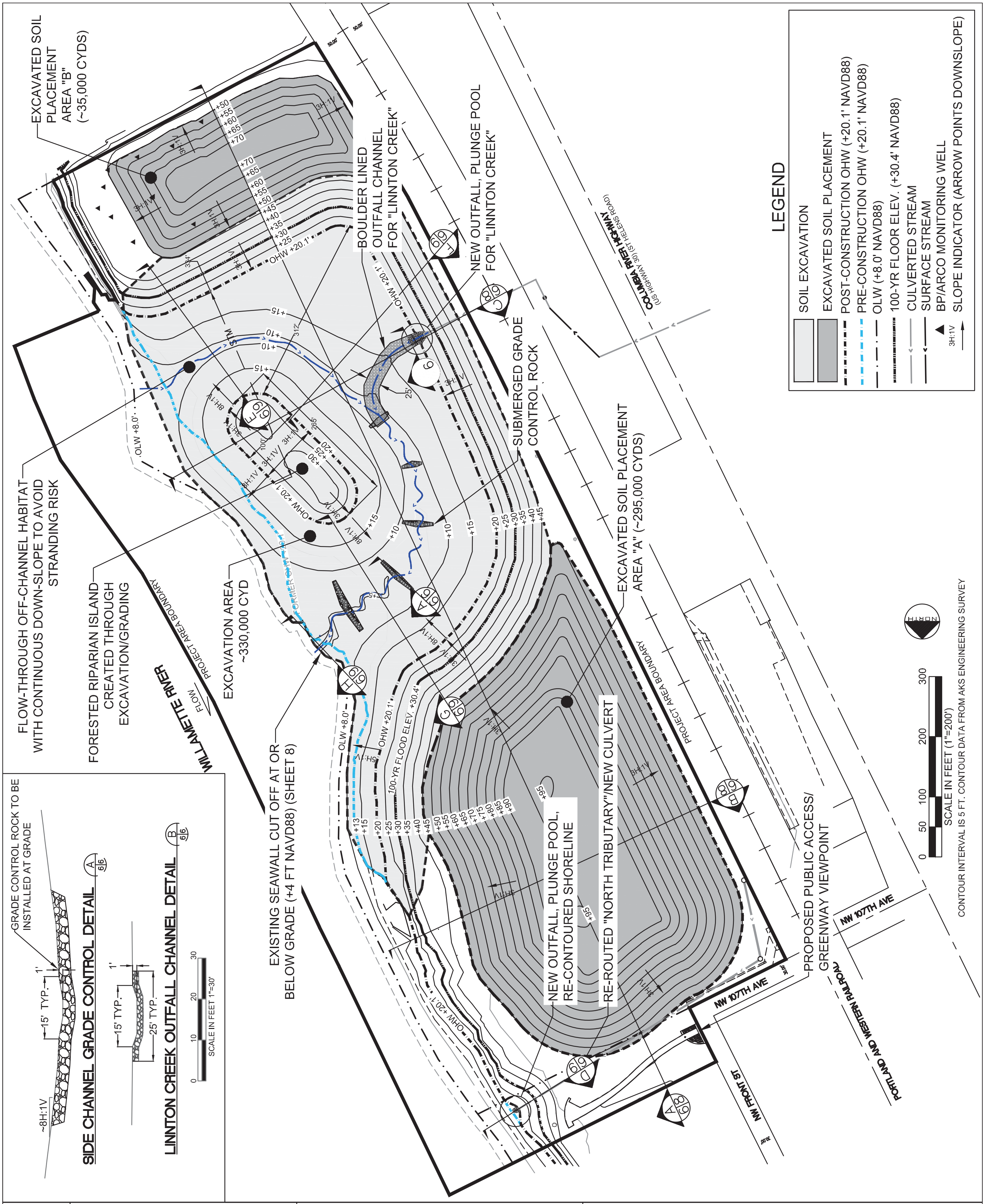
FINAL HDP - December 4, 2018



SHEET: 6

OF: 12

DATE: 3/1/16

PROPOSED CONDITIONS: EARTHWORK

CORPS NO. NWP-2014-477
DSL FILE 57064

LINNTON MILL RESTORATION SITE

APPLICANT:
LINNTON WATER CREDITS, LLC
337 17TH STREET SUITE 101
OAKLAND, CA 94612

AUTHORIZED AGENT:
GLENN GRETTE; GRETTE ASSOCIATES
151 S. WORTHEN ST. SUITE 101
WENATCHEE, WA 98801

SITE ADDRESS:
10504 ST HELENS RD
PORTLAND, OR 97231

DRAWING SCALE:
1"=200'

DATUMS:
H: OR ST PLANE N
V: NAVD 1988

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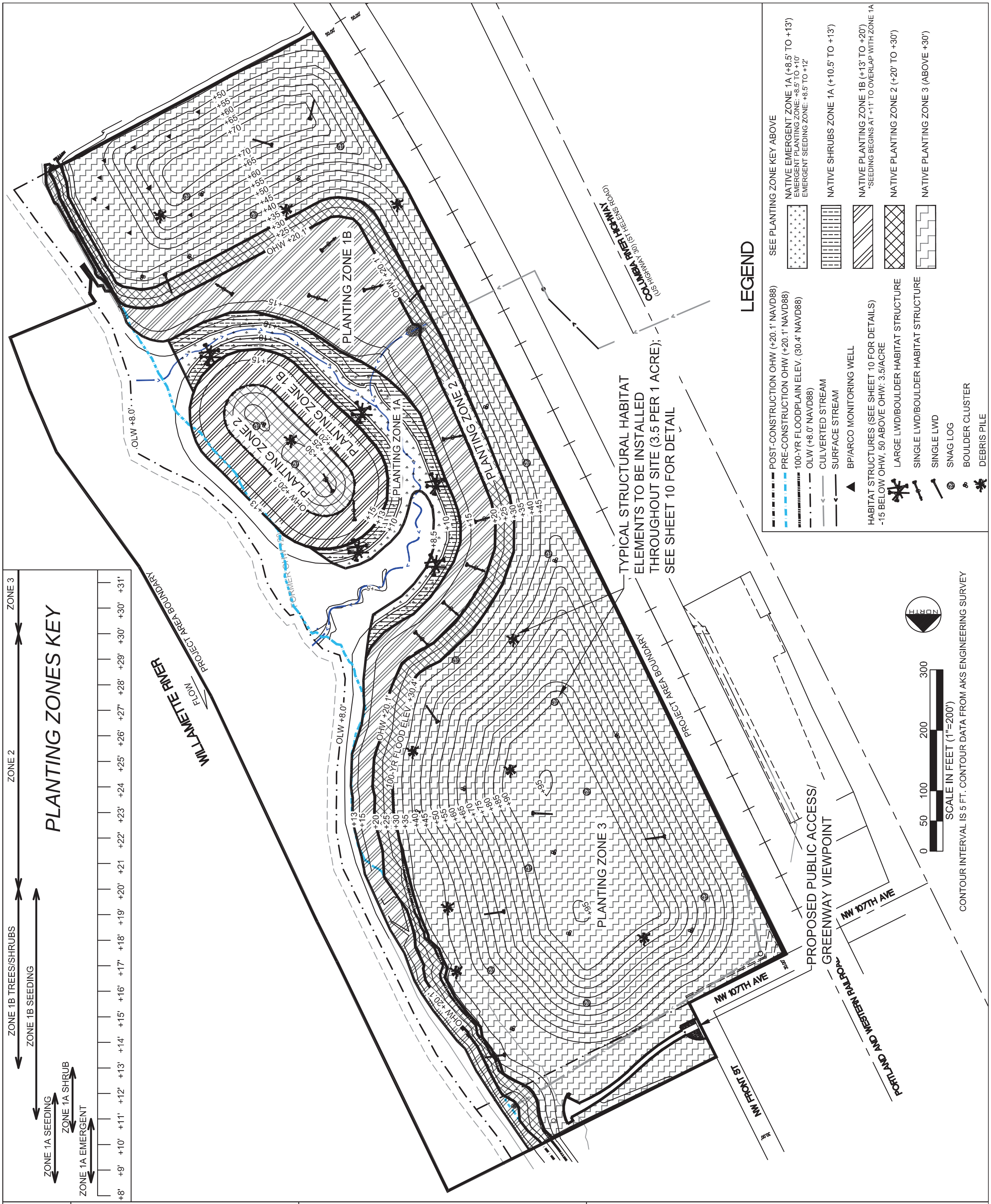

SHEET: 7
OF: 12
DATE: 3/1/16

PROPOSED CONDITIONS: PLANTING AND HABITAT FEATURES
CORPS NO. NWP-2014-477
DSL FILE 57064

LINNTON MILL RESTORATION SITE

APPLICANT:
LINNTON WATER CREDITS, LLC
337 17TH STREET SUITE 101
OAKLAND, CA 94612

AUTHORIZED AGENT:
GLENN GRETTE; GRETTE ASSOCIATES
151 S. WORTHEN ST. SUITE 101
WENATCHEE, WA 98801

SITE ADDRESS:
10504 ST HELENS RD
PORTLAND, OR 97231

DRAWING SCALE:
1"=200'

DATUMS:
H: OR ST PLANE N
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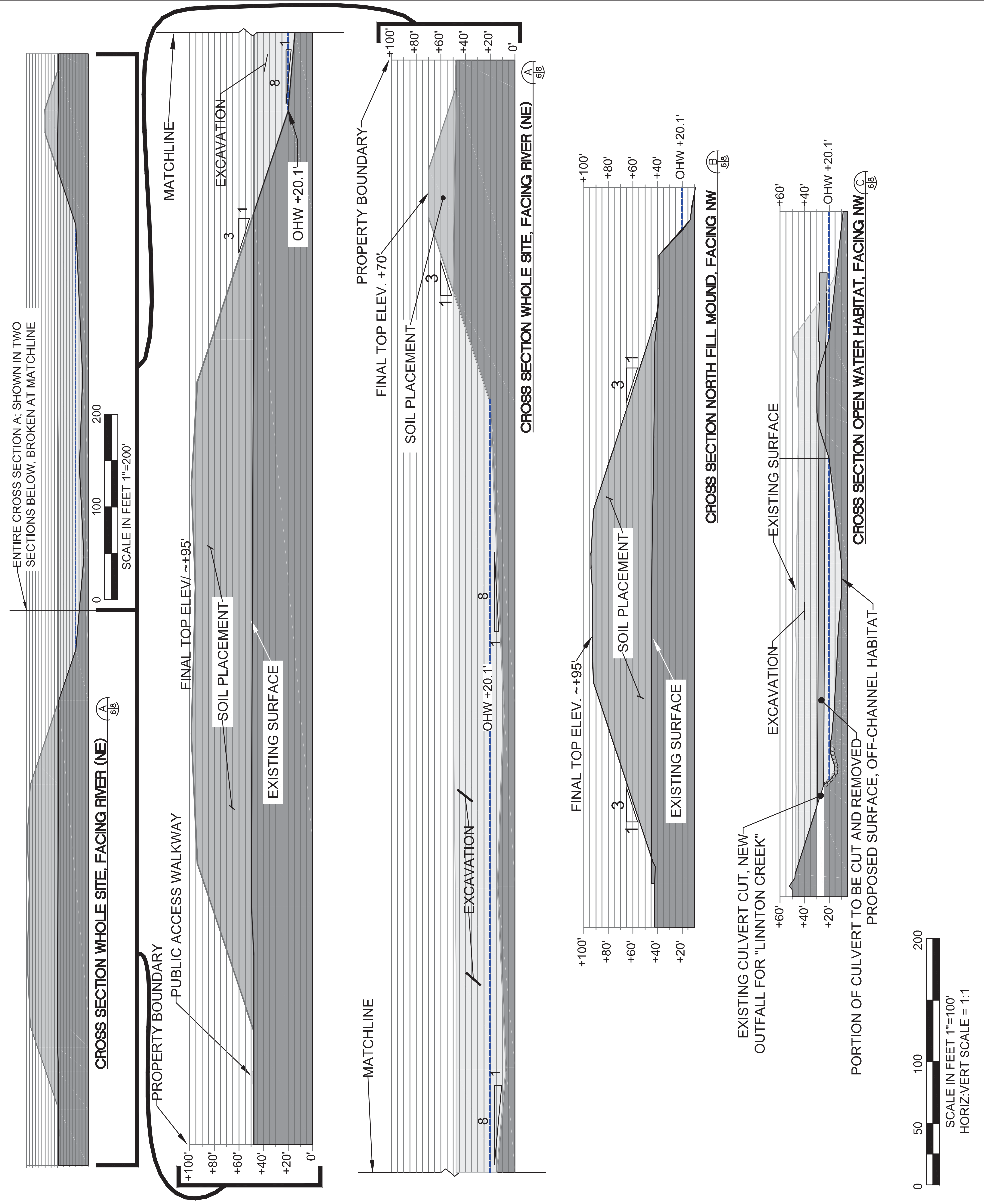

SHEET: 8
OF: 12
DATE: 3/1/16

CROSS SECTIONS (1)

CORPS NO. NWP-2014-477
DSL FILE 57064

LINNTON MILL RESTORATION SITE

APPLICANT:
LINNTON WATER CREDITS, LLC
337 17TH STREET SUITE 101
OAKLAND, CA 94612

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WENATCHEE, WA 98801

SITE ADDRESS:
10504 ST HELENS RD
PORTLAND, OR 97231

DRAWING SCALE:
1"=100'

DATUMS:
H: OR ST PLANE N
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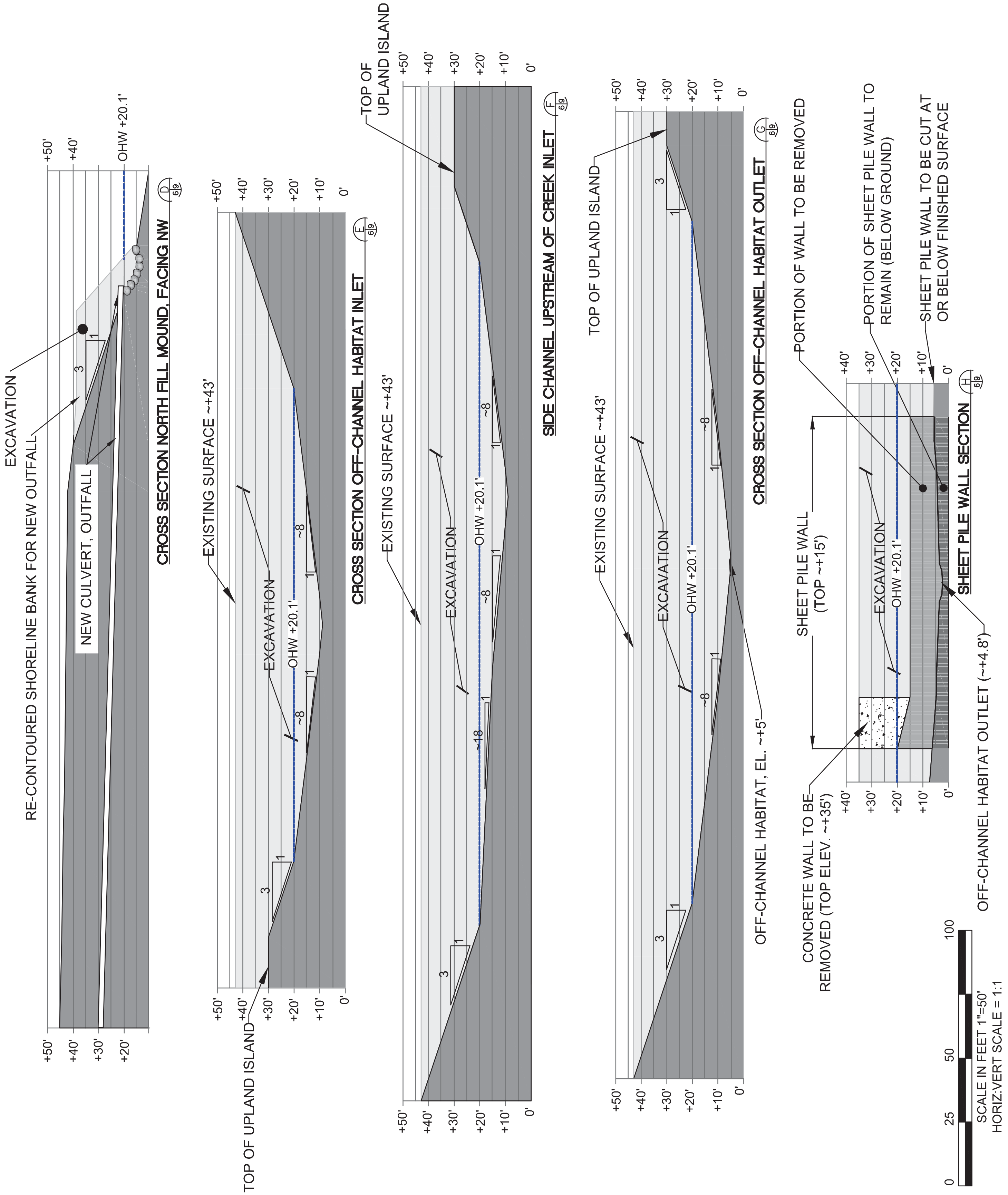

SHEET: 9
OF: 12
DATE: 3/1/16

CROSS SECTIONS (2)

CORPS NO. NWP-2014-477
DSL FILE 57064

LINNTON MILL RESTORATION SITE

APPLICANT:
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SITE ADDRESS:
10504 ST HELENS RD
PORTLAND, OR 97231

DRAWING SCALE:
1"=50'

DATUMS:
H: OR ST PLANE N
V: NAVD 1988

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# PLANTING LISTS BY PLANTING ZONE

| ZONE 1A EMERGENT PLANTINGS (+8.5' TO +10) | | | | |
|---|---|---|---|---|
| **HATCH PATTERN** | ***BOTANICAL NAME*** | **COMMON NAME** | **MIN SIZE** | **% TOTAL** |
| ▨ | *CAREX APERTA* | COLUMBIA SEDGE | PLUG | 20% |
| | *CAREX OBNUPTA* | SLOUGH SEDGE | PLUG | 20% |
| | *CAREX VESICARIA* | INFLATED SEDGE | PLUG | 10% |
| | *JUNCUS ACUMINATUS* | TAPER-TIP SEDGE | PLUG | 10% |
| | *LEERSIA ORYZOIDES* | RICE CUTGRASS | PLUG | 10% |
| | *POLYGONUM HYDROPIPEROIDES* | SWAMP SMARTWEED | PLUG | 10% |
| | *SAGITTARIA LATIFOLIA* | WAPATO | BULB | 20% |
| | **SEEDING (+8.5' TO +13')** | | | |
| | *AGROSTIS EXARATA* | SPIKE BENTGRASS | | 35% |
| | *COREOPSIS TINCTORIA* | COLUMBIA STICKSEED | | 10% |
| | *ELEOCHARIS OBTUSA* | OBTUSE SPIKERUSH | | 10% |
| | *ELEOCHARIS PALUSTRIS* | CREEPING SPIKERUSH | | 20% |
| | *LEERSIA ORYZOIDES* | RICE CUT-GRASS | | 20% |
| | *SAGITTARIA LATIFOLIA* | WAPATO | | 5% |

| ZONE 1A SHRUB PLANTINGS (+10.5' TO +13') | | | | |
|---|---|---|---|---|
| **HATCH PATTERN** | ***BOTANICAL NAME*** | **COMMON NAME** | **MIN SIZE** | **% TOTAL** |
| ▨ | *CORNUS SERICEA* | RED-OSIER DOGWOOD | BR 1-0 | 10% |
| | *SALIX FLUVIATILIS* | COLUMBIA RIVER WILLOW | BR c-1 | 20% |
| | *SALIX HOOKERIANA VAR PIPERI* | PIPER WILLOW | BR 1-0 | 20% |
| | *SALIX LUCIDA* | PACIFIC WILLOW | BR 2-0 | 10% |
| | *SALIX SESSILIFOLIA* | SOFT-LEAVED WILLOW | BR 1-0 | 10% |
| | *SALIX SITCHENSIS* | SITKA WILLOW | BR 1-0 | 10% |
| | *SPIRAEA DOUGLASII* | DOUGLAS SPIRAEA | BR 2-0 | 20% |

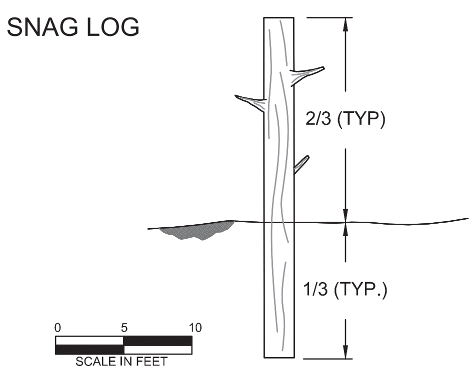
| ZONE 1B PLANTINGS (+13' TO +20') | | | | |
|---|---|---|---|---|
| **HATCH PATTERN** | ***BOTANICAL NAME*** | **COMMON NAME** | **MIN SIZE** | **% TOTAL** |
| ▨ | **TREES - 10' O.C.** | | | |
| | *CRATAEGUS SUKSDORFII* | BLACK HAWTHORN | BR 1-0 | 20% |
| | *POPULUS BALSAMIFERA VAR. TRICHOCARPA* | COTTONWOOD | BR 1-0 | 30% |
| | *FRAXINUS LATIFOLIA* | OREGON ASH | BR 1-0 | 30% |
| | *SALIX RIGIDA* | MCKENZIE WILLOW | BR 1-0 | 10% |
| | *SALIX SCOULERIANA* | SCOULER'S WILLOW | BR 1-0 | 10% |
| | **SHRUBS - 3' O.C.** | | | |
| | *CORNUS SERICEA* | RED-OSIER DOGWOOD | BR 1-0 | 10% |
| | *PHYSOCARPUS CAPITATUS* | PACIFIC NINEBARK | BR 1-0 | 5% |
| | *RIBES DIVARICATUM* | SPREADING GOOSEBERRY | BR 1-0 | 10% |
| | *RUBUS PARVIFLORUS* | THIMBLEBERRY | BR 1-0 | 15% |
| | *ROSA PISOCARPA* | PEA-FRUIT ROSE | BR 1-0 | 10% |
| | *SALIX SITCHENSIS* | SITKA WILLOW | BR 1-0 | 20% |
| | *SAMBUCUS RACEMOSA* | RED ELDERBERRY | BR 1-0 | 5% |
| | *SPIRAEA DOUGLASII* | DOUGLAS SPIRAEA | BR 1-0 | 15% |
| | *SYMPHORICARPOS ALBUS* | SNOWBERRY | BR 1-0 | 10% |
| | **SEEDING** | | | |
| | *AGROSTIS EXARATA* | SPIKE BENTGRASS | | 50% |
| | *GLYCERIA ELATA* | TALL MANNA-GRASS | | 10% |
| | *JUNCUS ACUMINATUS* | TAPER-TIP RUSH | | 2% |
| | *DESCHAMPSIA ELONGATA* | SLENDER HAIRGRASS | | 10% |
| | *LEERSIA ORYZOIDES* | RICE CUT-GRASS | | 20% |
| | *SCIRPUS MICROCARPUS* | SMALL-FRUIT BULRUSH | | 8% |

| ZONE 2 PLANTINGS (+20' TO +31') | | | | |
|---|---|---|---|---|
| **HATCH PATTERN** | ***BOTANICAL NAME*** | **COMMON NAME** | **MIN SIZE** | **% TOTAL** |
| ▨ | **TREES - 10' O.C.** | | | |
| | *ABIES GRANDIS* | GRAND FIR | BR 2-0 | 5% |
| | *ACER MACROPHYLLUM* | BIG LEAF MAPLE | BR 1-0 | 10% |
| | *ALNUS RUBRA* | RED ALDER | BR 1-0 | 10% |
| | *CRATAEGUS SUKSDORFII* | BLACK HAWTHORN | BR 1-0 | 5% |
| | *FRAXINUS LATIFOLIA* | OREGON ASH | BR 1-0 | 20% |
| | *POPULUS BALSAMIFERA VAR. TRICHOCARPA* | COTTONWOOD | BR 1-0 | 15% |
| | *THUJA PLICATA* | WESTERN REDCEDAR | BR 2-0 | 10% |
| | *RHAMNUS PURSHIANA* | CASCARA | BR 1-0 | 10% |
| | **SHRUBS - 3' O.C.** | | | |
| | *ACER CIRCINATUM* | VINE MAPLE | BR 1-0 | 10% |
| | *AMELANCHIER ALNIFOLIA* | WESTERN SERVICEBERRY | BR 1-0 | 15% |
| | *CORYLUS CORNUTA* | HAZELNUT | BR 1-0 | 10% |
| | *PHILADELPHUS LEWISII* | MOCKORANGE | BR 1-0 | 10% |
| | *RUBUS PARVIFLORUS* | THIMBLEBERRY | BR 1-0 | 10% |
| | *RUBUS URSINUS* | TRAILING BLACKBERRY | BR 1-0 | 5% |
| | *SAMBUCUS RACEMOSA* | RED ELDERBERRY | BR 1-0 | 15% |
| | *SYMPHORICARPOS ALBUS* | SNOWBERRY | BR 1-0 | 25% |
| | **SEEDING** | | | |
| | *AGROSTIS EXARATA* | SPIKE BENTGRASS | | 15% |
| | *DANTHONIA CALIFORNICA* | CALIFORNIA OATGRASS | | 20% |
| | *FESTUCA ROEMERI* | ROEMER'S FESCUE | | 20% |
| | *GRINDELIA INTEGRIFOLIA* | GUMWEED | | 5% |
| | *LUPINUS MICRANTHUS* | SMALL-FLOWER LUPINE | | 10% |
| | *LUPINUS POLYPHYLLUS* | LARGE-LEAFED LUPINE | | 10% |
| | *POTENTILLA GRACILIS* | SLENDER CINQUEFOIL | | 5% |
| | *DESCHAMPSIA ELONGATA* | SLENDER HAIRGRASS | | 10% |
| | *SOLIDAGO CANADENSIS* | GOLDENROD | | 5% |

| ZONE 3 PLANTINGS (ABOVE +31') | | | | |
|---|---|---|---|---|
| **HATCH PATTERN** | ***BOTANICAL NAME*** | | | |
| ▨ | **TREES - 10' O.C.** | | | |
| | *ABIES GRANDIS* | GRAND FIR | BR 2-0 | 10% |
| | *ACER MACROPHYLLUM* | BIG LEAF MAPLE | BR 2-0 | 15% |
| | *PSEUDOTSUGA MENZIESII* | DOUGLAS FIR | BR 2-0 | 40% |
| | *RHAMNUS PURSHIANA* | CASCARA | BR 2-0 | 15% |
| | *THUJA PLICATA* | WESTERN REDCEDAR | BR 2-0 | 20% |
| | **SHRUBS - 3' O.C.** | | | |
| | *ACER CIRCINATUM* | VINE MAPLE | BR 1-0 | 10% |
| | *AMELANCHIER ALNIFOLIA* | WESTERN SERVICEBERRY | BR 1-0 | 10% |
| | *CORYLUS CORNUTA* | HAZELNUT | BR 1-0 | 10% |
| | *HOLODISCUS DISCOLOR* | OCEANSPRAY | BR 1-0 | 10% |
| | *MAHONIA AQUIFOLIUM* | TALL OREGON GRAPE | BR 1-0 | 10% |
| | *PHILADELPHUS LEWISII* | MOCKORANGE | BR 1-0 | 10% |
| | *RIBES SANGUINEUM* | RED CURRANT | BR 1-0 | 10% |
| | *SAMBUCUS NIGRA* | BLUE ELDERBERRY | BR 1-0 | 10% |
| | *RUBUS URSINUS* | TRAILING BLACKBERRY | BR 1-0 | 10% |
| | *SYMPHORICARPOS ALBUS* | SNOWBERRY | BR 1-0 | 10% |
| | **SEEDING** | | | |
| | *ACHILLEA MILLEFOLIUM* | YARROW | | 5% |
| | *ANAPHALIS MARGARTIACAE* | PEARLY EVERLASTING | | 5% |
| | *DANTHONIA CALIFORNICA* | CALIFORNIA OATGRASS | | 20% |
| | *ELYMUS GLAUCUS* | BLUE WILDRYE | | 5% |
| | *FESTUCA ROEMERI* | ROEMER'S FESCUE | | 30% |
| | *GRINDELIA INTEGRIFOLIA* | GUMWEED | | 5% |
| | *LUPINUS MICRANTHUS* | SMALL-FLOWER LUPINE | | 5% |
| | *LUPINUS POLYPHYLLUS* | LARGE-LEAFED LUPINE | | 10% |
| | *DESCHAMPSIA ELONGATA* | SLENDER HAIRGRASS | | 10% |
| | *SOLIDAGO CANADENSIS* | GOLDENROD | | 5% |

# *HABITAT STRUCTURE DETAIL: 3.5/ACRE*

## SNAG LOG



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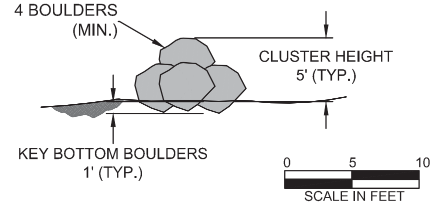

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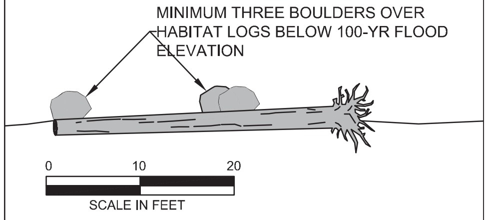
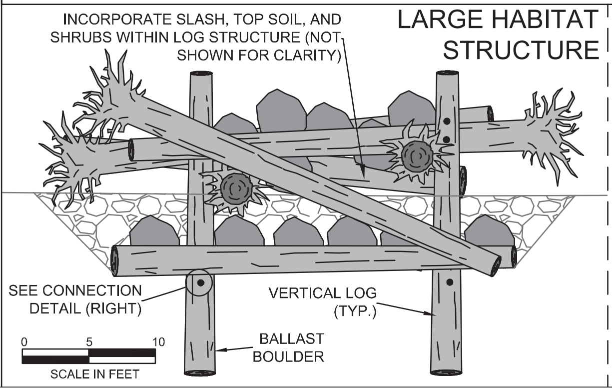
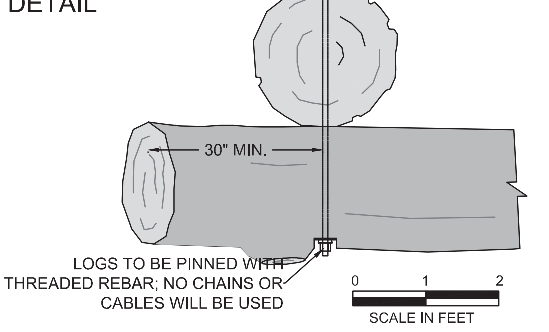


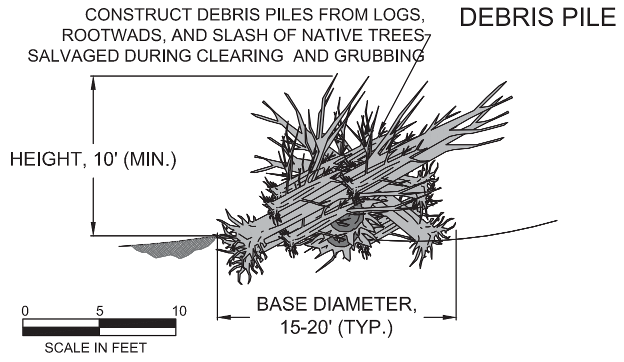
## LARGE HABITAT STRUCTURE



## LOG CONNECTION DETAIL



## DEBRIS PILE



SHEET: 10
OF: 12
DATE: 4/5/17

PLANTING LIST AND HABITAT STRUCTURE DETAIL

CORPS NO. NWP-2014-477
DSL FILE 57064

LINNTON MILL RESTORATION SITE

APPLICANT:
LINNTON WATER CREDITS, LLC
337 17TH STREET SUITE 101
OAKLAND, CA 94612

AUTHORIZED AGENT:
GLENN GRETTE; GRETTE ASSOCIATES
151 S. WORTHEN ST. SUITE 101
WENATCHEE, WA 98801

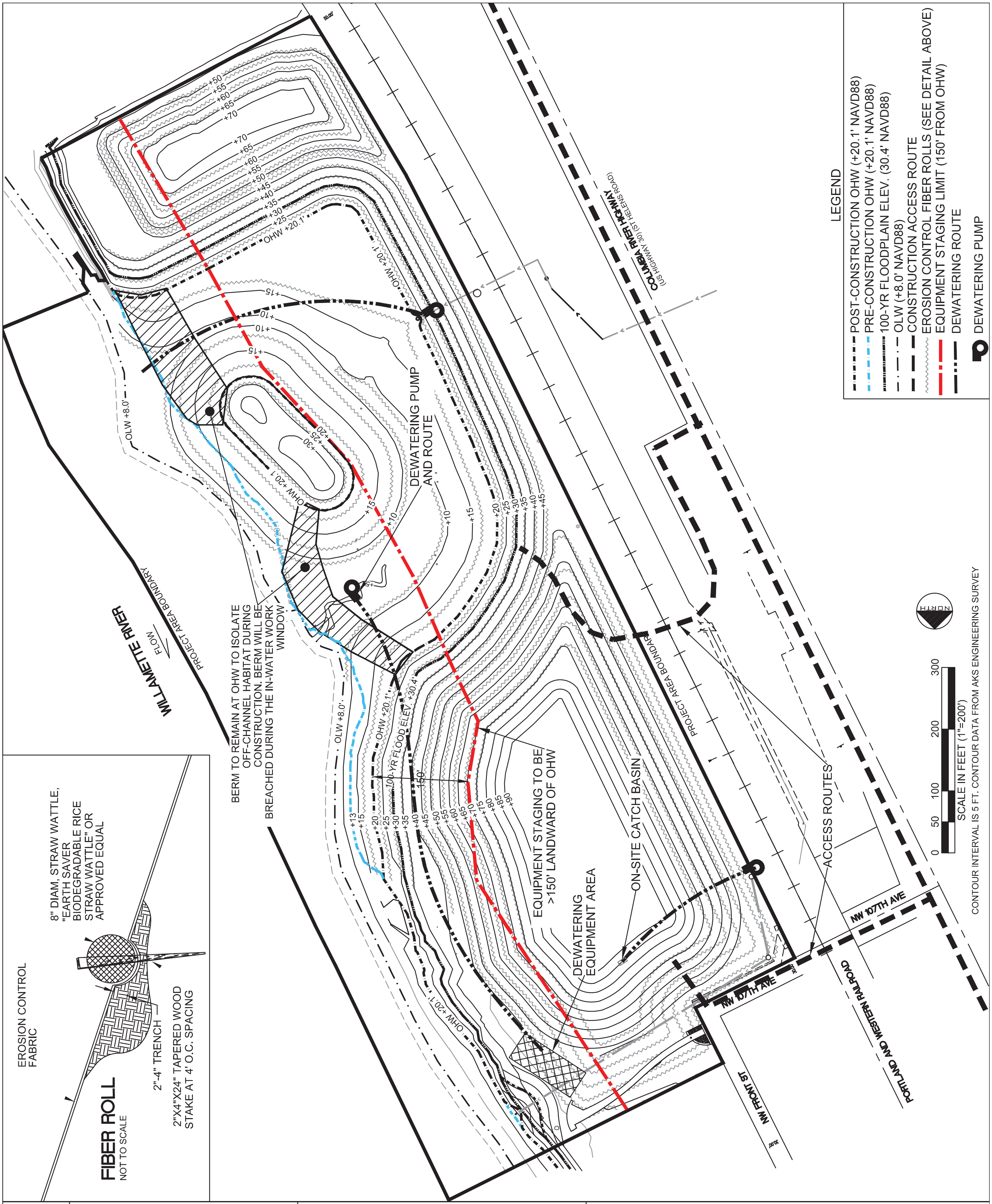
SITE ADDRESS:
10504 ST HELENS RD
PORTLAND, OR 97231

DRAWING SCALE:
GRAPHICAL, AS NOTED

DATUMS:
H: OR ST PLANE N
V: NAVD 1988

WATERWAYS
CONSULTING INC.

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS
151 South Worthen, Suite 101
WENATCHEE, WA 98801
(509) 663-6300 | www.gretteassociates.com



SHEET: 11

OF: 12

DATE: 3/1/16

## CONSTRUCTION MANAGENMENT PLAN

CORPS NO. NWP-2014-477
DSL FILE 57064

LINNTON MILL RESTORATION SITE

APPLICANT:
LINNTON WATER CREDITS, LLC
337 17TH STREET SUITE 101
OAKLAND, CA 94612

AUTHORIZED AGENT:
GLENN GRETTE; GRETTE ASSOCIATES
151 S. WORTHEN ST. SUITE 101
WENATCHEE, WA 98801

SITE ADDRESS:
10504 ST HELENS RD
PORTLAND, OR 97231

DRAWING SCALE:
1"=200'

DATUMS:
H: OR ST PLANE N
V: NAVD 1988

WATERWAYS CONSULTING INC.

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SHEET: 12

OF: 12

DATE: 3/4/16

AERIAL PHOTO

CORPS NO. NWP-2014-477
DSL FILE 57064

LINNTON MILL RESTORATION SITE

APPLICANT:
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# LINNTON MILL RESTORATION SITE

# EXHIBIT B: SITE-SPECIFIC PERFORMANCE PLAN

## Attachment 2: Technical Memorandum: Linnton Mill Restoration Site Pre-Construction Monitoring Plan and Result

# TECHNICAL MEMORANDUM: LINNTON MILL RESTORATION SITE – PRE-CONSTRUCTION MONITORING

Prepared for: Linnton Water Credits/Rob Marinai
Prepared by: Grette Associates$^{LLC}$
Date: February 5, 2015
File No.: 421.002

## 1. INTRODUCTION

The applicant is proposing to transform the Linnton Mill Site into an NRD Restoration Site for the purpose of providing habitat credits to offset Natural Resource Damages (NRD) obligations in the lower Willamette River. The Portland Harbor NRDA Monitoring and Stewardship Program (Stewardship Program) requires pre-construction baseline monitoring. The purpose of this memo is to describe the monitoring plan proposed to satisfy the required pre-construction monitoring.

## 2. SCHEDULE

The Project would begin with de-construction of the structures, tentatively scheduled to start July 1. However, the existing structures are in disrepair and represent a safety liability. Linnton Water Credits (LWC) is consulting with its insurance providers to determine if the risks posed by the buildings are within the scope of their policy. LWC would prefer to de-construct the buildings sooner than July 1, if possible, to minimize liabilities.

The project schedule is dependent on the Environmental Protection Agency (EPA) issuing a Consent Decree on the property. The applicant is deferring a detailed project schedule until that time. Once the Consent Decree is issued, a detailed schedule will be prepared and provided to the Trustees. In general, the applicant intends to begin in-water demolition of piles and docks as early as July 2015. In-water work windows limit the amount of work that can be accomplished below OHW in one calendar year. For this reason it is likely that construction of the site will be finalized in 2016. However, every effort will be made to complete the site in a timely manner. Thus, LWC is not ruling out completion of the site in 2015. The calendar year in which construction is completed will be considered Year 0 for the purposes of monitoring.

## 3. REQUIRED PRE-CONSTRUCTION MONITORING

The Stewardship Program requires five aspects of pre-construction monitoring, as listed in Table 1 below. The first monitoring question will be conducted by U. S. Fish and Wildlife Service (USFWS) and funded by the applicant. The second can be answered with existing data. The remaining three will require a pre-construction field monitoring program.

**Table 1. Pre-construction monitoring required through the Stewardship Program**

| Monitoring Question | Monitoring Attribute | Monitoring Technique | Sampling Frequency/Timing |
|---|---|---|---|
| ***Lamprey:***<br>How does the project affect lamprey and their habitat? | Occupancy, colonization of site, size/life/health history of colonizers on site, habitat characteristics | Electroshocking; sampling of physical habitat | Pre-construction baseline, Years 1-5, 10, 15, 20 |
| ***Habitat Restored:***<br>How much mink and bald eagle habitat was restored along the shorelines? | Length of shoreline and amount of shallow water and riparian habitat | Topographic survey; topographic maps | Pre-construction baseline, as built, and Year 10 |
| ***Bird Assemblages:***<br>What birds are using the site? Has bird assemblage changed, and if so, are changes indicative of expected habitats? | Relative abundance/ diversity/species | Bird surveys: point counts along 300-meter transects | Three times (approximately monthly) within each habitat type during breeding season/ Pre-construction baseline, and Years 1, 3, 5, and 10. |
| | Habitat usage | | |
| ***Bald Eagle Use:***<br>Are bald eagles using the site? If so, how often and for what activities? | Bald eagle presence/absence at the site; frequency of site use, behavior and habitat elements used | Site surveys for eagle use and behavior during the breeding season; habitat metrics (acreage of potential foraging habitat restored) | Weekly from mid-December through August/Pre-construction baseline, and Years 3, 5, 7, and 10. |
| ***Mink Use:***<br>Are mink using the newly restored habitat? Has mink abundance at the site increased? | Presence/absence; abundance | Scent stations with remote cameras, transect surveys, maps showing mink use locations | Twice monthly for 3 months of the spring-summer to include mid-April through mid-July at a minimum; Pre-construction baseline, and Years 3,5,7, and 10 |
| | Type and location of habitat usage | | |

## *Lamprey*

Lamprey monitoring will be conducted by USFWS, both pre-construction and post-construction monitoring, as well as data analysis and reporting. Thus, lamprey monitoring is not discussed further in this document. Lamprey monitoring will be funded by the applicant.

## *Bird Assemblages: Once monthly, April through June*

Assemblages of bird species using the site will be surveyed prior to construction, as well as throughout the monitoring period. Monitoring would occur three times during the spring breeding season, once per month during the months of April-June, 2015 (Table 2). Per the Stewardship Program, monitoring would consist of point surveys along transects. Point surveys would consist of bird counts, including species and numbers of each bird observed, and qualitative observations of habitat use. Species occurrences, proportionate abundance, species richness and information such as percent native/non-native and sensitive species presence will be reported.

Prior to the initial monitoring event, five monitoring transects would be permanently established, spaced approximately 100 m apart. The transects would run perpendicular to the river, located so as to sample all post-project habitat types, including upland forested habitat and the open water/side channel habitat. Point surveys would occur at a maximum of every 50 m along transects. Two to three point surveys would occur on each transect, depending on length. The point survey locations would be recorded with GPS and the coordinates noted for future monitoring. If high flows prevent access to point survey locations in or through the open water habitat, point surveys would occur as close to the point as possible. Transects that pass near the buildings will take special note of bird use and colonization of the buildings to inform changes of use after demolition of the buildings.

### *Bald Eagle Use: Weekly mid-December through August*

Bald eagle surveys will be conducted at the site to determine site use by the species. Pre-construction monitoring would occur on a weekly basis, beginning in mid-December and continuing through August regardless of the start of demolition/construction. It is assumed that construction would begin approximately July 1; on this schedule, up to approximately 37 bald eagle surveys would occur (Table 2).

Surveys would consist of observations from one advantageous and non-intrusive vantage point that allows observation of the entire site. This point will be selected at the time of monitoring. Each survey would include two hours of observations, varying between just after dawn or just before dusk. Surveys would record bald eagle presence/absence, abundance, behavior, habitat element use, time of use, and changes over time.

### *Mink Use: Twice monthly, April through mid-July*

Mink use of the site will be surveyed as part of the pre-construction survey. Sampling would be conducted twice monthly for three months, totaling a minimum of six surveys (Table 2), beginning in early April and continuing through mid-July.

Surveys would consist of remote cameras and scent stations set up at three select locations along the shoreline (Figure 1). To the extent possible, scent/camera stations would be placed in locations that can continue to be monitored post-project as well. Cameras would be checked and scent stations serviced twice monthly. Additionally, a shoreline transect would be sampled for mink tracks, scat, signs of use, and dens. The transect would be located near the shore (Figure 1)[1]. Data to be recorded would include presence of any sign of mink presence (including maps of scat/track locations and photos), as well as records of individuals passing captured by the camera trap, with an emphasis on the presence of juveniles.

---

[1] The transect would be modified for post-construction monitoring as needed to accommodate the reconstructed shoreline and off-channel habitat.

**Table 2. Monitoring schedule**

| Monitoring Parameter | Frequency | Duration | Description |
|---|---|---|---|
| Bird Assemblages | Monthly | April/May/<br>June | Point counts along 5 transects; 10-15 points |
| Bald eagle | Weekly | mid-December through August | 2 hr observation, dawn or dusk |
| Mink study | 2x/month | mid-April through mid-July | Camera traps/scent stations, walk shoreline transects for tracks |

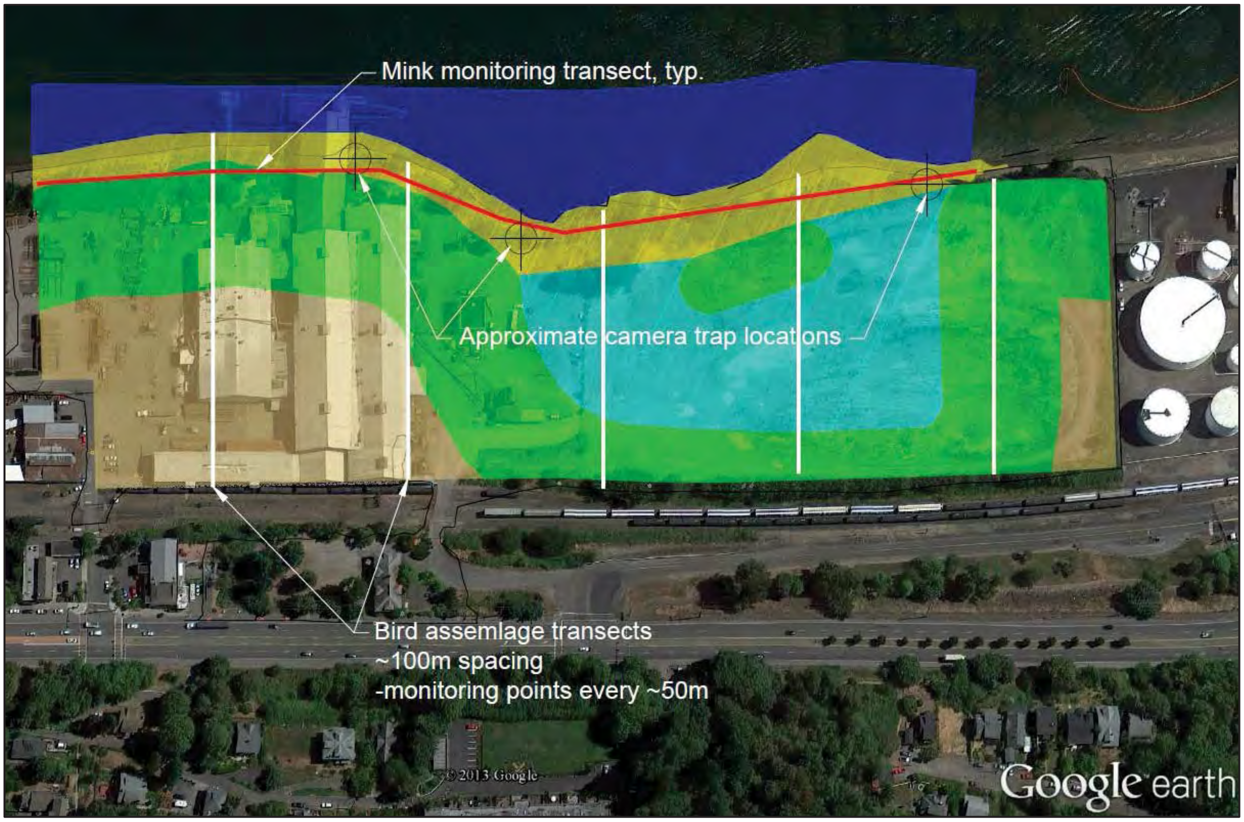

**Figure 1. Monitoring scheme, typ.**

## 4. REPORTING

During the monitoring period, field data will be recorded in field notebooks and entered into a project-specific database. This data will be used as the basis for future comparisons with post-project monitoring data. At the conclusion of the pre-construction monitoring program a pre-construction summary memo, including all data collected, will be will be presented to the Trustees. The memo will include the duration of monitoring, the methods used in monitoring, a narrative discussion of the data, and graphical or statistical presentation of monitoring data, and monitoring locations depicted graphically and with geographic coordinates, as appropriate (Table 3). The report would also include photos as applicable. Data will be presented in a manner that facilitates appropriate comparisons with future post-construction monitoring data.

**Table 3. Data reporting**

| Monitoring Parameter | Data Tabulated | Future Comparisons with Post-Project Monitoring Data |
|---|---|---|
| Bird Assemblages | • Species richness<br>• Number of individuals per species<br>• Frequency of use | • Graphical or statistical comparisons of species richness, individuals |
| Bald eagle | • Presence/absence (by date)<br>• Categorical behavior<br>• Time of use<br>• Habitat elements used<br>• Frequency of use | • Graphical or statistical comparison of presence/absence |
| Mink study | • Individual camera passes<br>• Presence of juveniles<br>• Individual ID (if possible)<br>• Scat and tracks, if present | • Tabular presentation/graphical or statistical comparison of number of camera passes, juvenile presence, and individuals identified to the extent possible<br>• Map of scat and track locations |

# LINNTON MILL RESTORATION SITE

# PRE-CONSTRUCTION BASELINE MONITORING REPORT

PREPARED FOR:

**LINNTON WATER CREDITS LLC**
337 17TH STREET, SUITE 200
OAKLAND, CA. 94612

PREPARED BY:

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JANUARY 19, 2016

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

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# 1 PROJECT OVERVIEW

Linnton Water Credits, LLC (Applicant) plans to implement a habitat restoration action in the lower Willamette River/Portland Harbor for the purpose of offsetting Natural Resource Damage (NRD) liabilities. Additionally, the applicant will seek to develop the site as a mitigation bank under other applicable mitigation programs. The proposed Project will provide valuable habitat credits in the form of discounted service acre-years (DSAYs) from within Portland Harbor for the Portland Harbor NRDA process. It is also anticipated that the site will offer mitigation credits to offset impacts from Portland Harbor remediation activities and other in-water projects with unavoidable aquatic impacts.

The Linnton Mill Restoration Site Project ("Project") involves transforming an existing industrial parcel along the Willamette River into a habitat site that includes new Off-Channel habitat, enhanced Shallow Water and Active Channel Margin (ACM) habitats, and new/restored Riparian and Upland forested habitat. The Project is located on the west bank of the Willamette River between approximately River Miles (RM) 4.7 and 5.0 (Attachment 1; Sheet 1). The Project is in portions of Section 2, Township 1N, Range 1W, W.M.

A 10-year monitoring program will be implemented to ensure that the site provides the intended habitat functions. This monitoring program includes a pre-construction Baseline Monitoring Plan to gather data on the wildlife use of the site prior to construction of the habitat, in order to compare the results against post-construction use. The Baseline Monitoring Plan involved data collection on existing quality and quantity of shoreline habitat, as well as site usage by bald eagle, mink, and general bird assemblages. The purpose of this report is to document the results of the Baseline Monitoring Plan.

# 2 BASELINE MONITORING PLAN

Per the pre-construction monitoring program approved by the Portland Harbor Trustees, the Baseline Monitoring Plan included biological surveys for bird assemblages, mink, and bald eagle. Lamprey monitoring is also part of the Baseline Monitoring Plan, but will be conducted by USFWS and is not discussed further in this document.

**Table 1. Pre-construction monitoring required through the Stewardship Program**

| Monitoring Question | Monitoring Attribute | Monitoring Technique | Sampling Frequency/Timing |
|---|---|---|---|
| ***Lamprey:***<br>How does the project affect lamprey and their habitat? | Occupancy, colonization of site, size/life/health history of colonizers on site, habitat characteristics | Electroshocking; sampling of physical habitat | Pre-construction baseline, Years 1-5, 10, 15, 20 |
| ***Habitat Restored:***<br>How much mink and bald eagle habitat was restored along the shorelines? | Length of shoreline and amount of shallow water and riparian habitat | Topographic survey; topographic maps | Pre-construction baseline, as built, and Year 10 |
| ***Bird Assemblages:***<br>What birds are using the site? Has bird assemblage changed, and if so, are changes indicative of expected habitats? | Relative abundance/ diversity/species<br>Habitat usage | Bird surveys: point counts along 300-meter transects | Three times (approximately monthly) within each habitat type during breeding season/ Pre-construction baseline, and Years 1, 3, 5, and 10. |
| ***Bald Eagle Use:***<br>Are bald eagles using the site? If so, how often and for what activities? | Bald eagle presence/absence at the site; frequency of site use, behavior and habitat elements used | Site surveys for eagle use and behavior during the breeding season; habitat metrics (acreage of potential foraging habitat restored) | Weekly from mid-December through August/Pre-construction baseline, and Years 3, 5, 7, and 10. |
| ***Mink Use:***<br>Are mink using the newly restored habitat? Has mink abundance at the site increased? | Presence/absence; abundance<br>Type and location of habitat usage | Scent stations with remote cameras, transect surveys, maps showing mink use locations | Twice monthly for 3 months of the spring-summer to include mid-April through mid-July at a minimum; Pre-construction baseline, and Years 3,5,7, and 10 |

## 2.1 MONITORING METHODS

### 2.1.1 Existing Shoreline Habitat

A topographic survey was conducted of the Linnton Mill site during the pre-development site work. The survey provides one-foot contours over the entire property. A topographic map is included in Attachment 1 (Figure 1). For visual clarity, contour lines are presented in 5-ft increments in steeply-sloped areas, and 2-ft increments in flatter areas. To depict the existing shoreline habitat to be restored, the topographic map was overlaid with the mapped pre-construction extent of riparian, ACM, and shallow water habitat types (Attachment 1: Figure 2). The pre-construction shoreline length and acreage of all habitat types were calculated. During the as-built survey, the new extents of the same habitats will be mapped and depicted in an identical layout.

### 2.1.2 Bird Assemblages

Assemblages of bird species using the site were surveyed three times during the April-June breeding season. Monitoring occurred on 4/7/15, 5/4/15, and 6/10/15. Monitoring consisted of point surveys along transects, with each point survey occurring for a minimum of 5 minutes and consisting of bird counts, including species and numbers of each bird observed, as well as qualitative observations of habitat use. Any birds flushed or observed while walking between point survey locations were also recorded.

Five monitoring transects, running perpendicular to the Willamette River, were established in approximately the locations depicted in the Baseline Monitoring Plan, spaced approximately 100 m apart. Point surveys occurred beginning at a randomly-selected point (between 0 and 50 m from the transect starting point) and spaced at a maximum of 50 m along transects thereafter. This resulted in two to three point surveys on each transect, depending on transect length. Once established, point surveys occurred at the same locations for all three monitoring events.

Species occurrences, relative abundance, species richness and information such as percent native/non-native and sensitive species presence are reported in Section 5. Transect and point survey locations were recorded using sub-meter GPS and are presented in Attachment 1 (Figure 3). Transects that passed near the buildings took special note of bird use and colonization of the buildings, including observations of birds entering and exiting the buildings. Point counts were recorded on data sheets, which are included as Attachment 2.

### 2.1.3 Bald Eagle

Bald eagle surveys were conducted weekly from 12/4/14 through 8/21/15. At the beginning of the monitoring period, a survey location was established from an unobtrusive location that allowed observation of the entire site, to the extent possible. This survey point was located generally in the center of the property, approximately 340 ft upstream of the main building an approximately 400 ft landward of the river (Attachment 1: Figure 3).

Each survey consisted of two hours of observations of bald eagle use of the site, approximately alternating between the two hours after dawn and the two hours before dusk. Sixteen dusk surveys and 20 dawn surveys were conducted. One of the 36 surveys was ended early due to the operation of loud equipment/machinery at the Linnton site, which was assumed to prevent bald eagle use at the site. Surveyors recorded bald eagle presence/absence, abundance, behavior, habitat element use, and time of use on data sheets. Data sheets are present in Attachment 3.

### 2.1.4 Mink Use

Mink use of the site was surveyed twice monthly for three months, totaling seven surveys from 4/7/15 through 7/7/15. Sampling included searching for and collecting scat and footprint data along a shoreline transect (Attachment 1: Figure 3). Additionally, camera trap/scent stations were installed and maintained from 4/7/15 through 7/7/15. Three camera traps with corresponding scent lure stations (comprised of a scent wick coated in mink gland lure) were set up along the shoreline as near to the locations described in the Baseline Monitoring Plan as feasible. One motion-sensing trail camera (Model: Browning Strike Force/Dark Ops Game Camera) was used at each of the three camera trap/scent stations. These cameras capture 10 megapixel photographs at a minimum of a 70-foot flash range to ensure high quality photographs and accurate species identification in both light and dark conditions. Cameras were programmed to a 6-image burst setting at a 30 second interval. Therefore, when the motion sensor on the camera was triggered, the camera captured six images at approximately 0.5 second intervals. If continuous or prolonged movement was detected, a 30 second delay occurred between the 6-image bursts. This 6-image burst photo setting allowed for clear and consistent identification of the source of motion that triggered the camera, whether it was a large animal (i.e., dogs, humans), small animal (i.e., birds, rodents), or vegetation moving in the wind.

Cameras had to be fastened and locked to permanent structures (i.e., piling) or vegetation/trees to prevent theft. In addition, the scent lures had to be fastened to fixed objects to prevent wildlife from consuming and/or moving the scent lures. Final camera trap/scent stations were established in areas where cameras and scent stations could be securely positioned with unobstructed, wide angle views of the scent lure. These locations were recorded with sub-meter GPS and are depicted in Attachment 1 (Figure 3). The cameras took several thousand photos. Photos were downloaded biweekly from the cameras and saved on a server during each of the seven surveys. During each biweekly visit, the scent wick was also replaced with a new wick and fresh mink scent.

During the next to last site visit (6/25/15), Camera 1 showed clear evidence of human tampering and vandalism. This coincided with an obvious increase in human activity captured by this camera, and there was reason to believe that Camera 1 would be stolen or destroyed had it been left in place any longer. Thus, Camera 1 was removed on 6/25/15, approximately two weeks prior to Cameras 2 and 3, which remained until 7/7/15.

# 3 MONITORING QUESTIONS

The Portland Harbor NRDA Monitoring and Stewardship Framework (Framework; Portland Harbor Trustees 2014) established monitoring questions to help frame the pre-construction monitoring activities. The following questions related to birds, bald eagles, and mink form the basis for pre-construction monitoring at the site, and the Baseline Monitoring Plan attempted to answer these questions:

- How much mink and bald eagle habitat was restored along the shorelines?
- What birds are using the site? Do changes in the bird assemblage, diversity and abundance at the site indicate that habitat quantity and quality have improved?
- Are bald eagles using the site? If so, how often and for what activities?
- Are mink using the newly restored habitat? Has mink abundance at the site increased?

# 4 PERFORMANCE STANDARDS

This document only describes baseline habitat use as observed during the implementation of the Baseline Monitoring Plan. Further, these parameters (habitat restored, bird assemblage, bald eagle, and mink) are only surveyed for documentation purposes—they will not be compared to performance standards or trigger contingency actions by the results.

# 5 RESULTS

## 5.1 EXISTING SHORELINE HABITAT

As no habitat has yet been restored, there results constitute the baseline data. Approximately 1,900 linear ft of existing shoreline is present at the Linnton Mill site, all of which is degraded with anthropogenic debris (riprap, concrete blocks, concrete seawall), pile stubs, overwater structures, over-steepened banks, and invasive species. Approximately 8.75 acre of riparian habitat, 1.81 acres of ACM habitat, and 4.81 acre of shallow water habitat are present within the portion of the site to be restored. Habitat quality within each habitat type is discussed below. Habitat restoration maps are included in Attachment 1.

### *Riparian Habitat*

The 8.75 acres within the riparian habitat zone includes 6.93 acres of unvegetated/paved/building areas, 1.74 acres of invasive vegetation, and 0.09 acre of forested habitat. Unvegetated habitat consists of cleared, former dredge sand handling areas, as well as the industrial building and paved areas. Invasive vegetation on the bank slope consists almost entirely of Himalayan blackberry. The bank is over-steepened, and consists of large riprap and concrete boulders down to the toe of the slope, near OHW. Above the top of the bank, invasive vegetation consists of Scotch broom and various upland forbs. Forested vegetation consists of a small number of scattered cottonwood trees at and near the shoreline. The riparian habitat is almost entirely degraded and provides very low quality habitat.

### *ACM Habitat*

The 1.81 acres of ACM habitat is predominantly degraded by anthropogenic structure. Overwater coverage encompasses 0.14 acre, piles/pile stubs encompass 0.64 acre, and riprap encompasses 0.49 acre. Of the remaining 0.54 acre, 0.41 acre is unvegetated and 0.13 acre is vegetated with invasive species. Overall, the ACM habitat is largely degraded and provides little habitat function. The ACM habitat includes several transient beach logs, which provide some structural habitat function but are not permanent.

### *Shallow Water Habitat*

The 4.81 acres of shallow water habitat is entirely degraded by anthropogenic development, either directly by piles or overwater coverage or by the adjacent shoreline being affected. The shallow water habitat includes 0.22 acre of overwater coverage, and 0.84 acre either directly encumbered with piles/pile stubs or with piles/pile stubs in the adjacent shoreline. An additional 3.75 acres is degraded by riprap habitat in the adjacent shoreline.

**Table 2. Riparian, ACM, and Shallow Water habitat**

| Habitat Zone | Habitat Type | Acres |
|---|---|---|
| Riparian | Unvegetated/building/paved | 6.93 |
| | Invasive | 1.74 |
| | Forested | 0.09 |
| | **Total** | **8.75** |
| ACM | Piles/pile stubs | 0.64 |
| | Overwater coverage | 0.14 |
| | Riprap | 0.49 |
| | Unvegetated | 0.41 |
| | Invasive | 0.13 |
| | **Total** | **1.81** |
| Shallow Water | Overwater coverage | 0.22 |
| | Piles | 0.84 |
| | Riprap | 3.75 |
| | **Total** | **4.81** |

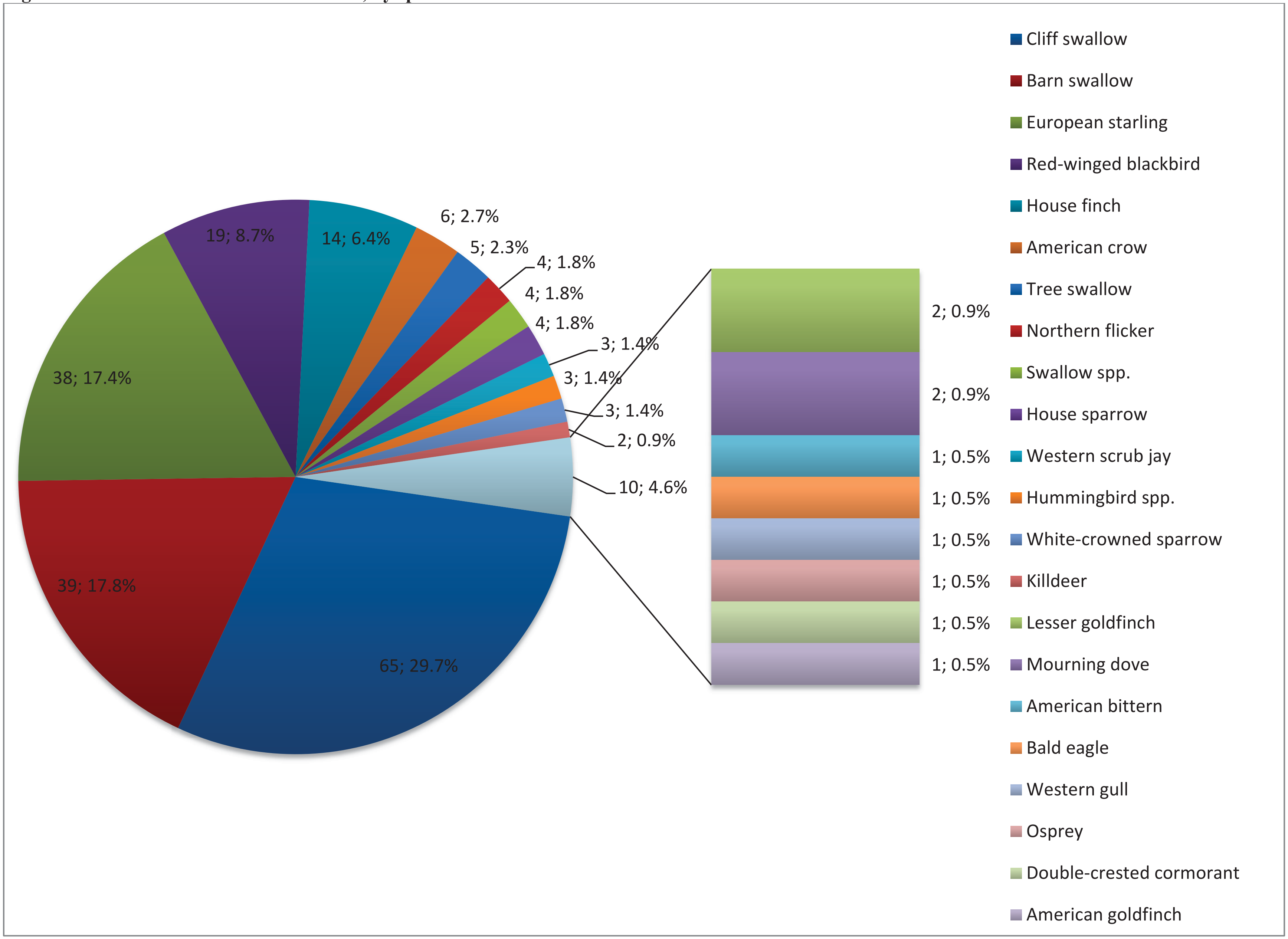
## 5.2 BIRD ASSEMBLAGES

Three bird assemblage surveys were conducted during spring nesting season. Over the course of the three surveys, a total of 22 species were observed. Small passerine bird species were most abundant, primarily barn and cliff swallows. House finch and European starlings were also common. Other species common to urban riverfront areas were also regularly observed, including American crow, Western scrub jay, red-winged blackbird, and Western gull (Table 3; Figure 1). Two of the 22 species observed were non-native species: European starling, and house sparrow. Of the 219 total species sightings, 42 (19%) were of these two non-native species. Data sheets are present in Attachment 2.

**Table 3. Birds observed by species, date, and number.**

| Species (Latin) | Species (common) | Native? | 4/7/15 | 5/14/15 | 6/10/15 | Sum |
|---|---|---|---|---|---|---|
| *Agelaius phoeniceus* | Red-winged blackbird | Yes | 6 | 7 | 6 | 19 |
| *Aphelocoma californica* | Western scrub jay | Yes | 1 | 1 | 1 | 3 |
| *Botaurus lentiginosus* | American bittern | Yes | 1 | | | 1 |
| *Carpodacus mexicanus* | House finch | Yes | 7 | 4 | 3 | 14 |
| *Charadrius vociferus* | Killdeer | Yes | | 2 | | 2 |
| *Colaptes auratus* | Northern flicker | Yes | 1 | 1 | 2 | 4 |
| *Corvus brachyrhynchos* | American crow | Yes | 3 | 1 | 2 | 6 |
| *Haliaeetus leucocephalus* | Bald eagle | Yes | | 1 | | 1 |
| Hirundinidae fam. | Swallow spp. | Yes | 4 | | | 4 |
| *Hirundo rustica* | Barn swallow | Yes | | 24+ | 15 | 39+ |
| *Larus occidentalis* | Western gull | Yes | 1 | | | 1 |
| *Pandion haliaetus* | Osprey | Yes | | 1 | | 1 |
| *Passer domesticus* | House sparrow | No | 2 | 2 | | 4 |
| *Petrochelidon pyrrhonota* | Cliff swallow | Yes | | | 65+ | 65+ |
| *Phalacrocorax auritus* | Double-crested cormorant | Yes | 1 | | | 1 |
| *Spinus psaltria* | Lesser goldfinch | Yes | 2 | | | 2 |
| *Spinus tristis* | American goldfinch | Yes | | 1 | | 1 |
| *Sturnus vulgaris* | European starling | No | 16 | 16 | 6 | 38 |
| *Tachycineta bicolor* | Tree swallow | Yes | | 5 | | 5 |
| Trochilidae fam. | Hummingbird spp. | Yes | 1 | 1 | 1 | 3 |
| *Zenaida macroura* | Mourning dove | Yes | | 2 | | 2 |
| *Zonotrichia leucophrys* | White-crowned sparrow | Yes | 1 | 2 | | 3 |
| | | | | | **Total** | 219 |

Figure 1. Absolute and relative abundance, by species



Observed bird behavior can be generalized into four categories: entering/exiting buildings (apparently building nests), perching, ground foraging/bathing, or flying over or past the site (Table 4 and Table 5). Perches included vegetation, mill-related structures (e.g. buildings, piles), and power lines or poles. The most common use of the site was by small passerine species such as swallows and sparrows. These species were observed entering and exiting the buildings on site, presumably for nest-building. Use by these species increased from April through June. European starling was also very commonly sighted, typically perching on trees or structures and apparently building nests in the loading dock. House finch was also observed potentially engaged in nest-building. Several other species were observed on site in low numbers, and whose behavior was limited to foraging or perching. These included American crow, house sparrow, killdeer, and mourning dove. River-associated species such as bald eagle and double-crested cormorant were only observed flying over the site.

**Table 4. Summary of behaviors by species**

| Species | Behavior |
|---|---|
| American bittern | In shallow puddle near edge of site |
| American crow | Perching/vocalizing from top of conveyor |
| | Perched on corner shoreline tree |
| | Flying over warehouse, circling |
| American goldfinch | Flying over site |
| Bald eagle | Flying over site |
| Barn swallow | Flying in/out of warehouse; warehouse likely heavily used by nesting BASW; dozens of BASW heard vocalizing from inside warehouse |
| | Flying in/out of shed attached to warehouse |
| | Flying over site |
| | Flew into conveyor building |
| | On ground and flying overhead |
| Cliff swallow | Perched on powerlines, flying in/out of warehouse |
| | Flying over warehouse |
| | Flying over field |
| | Flying overhead |
| Double-crested cormorant | Flying along shoreline |
| European starling | Perched on roof peak of warehouse |
| | Top of powerline pole, vocalizing |
| | Perch on conveyor support poles |
| | Female carrying nesting material into loading dock |
| | Flying from mill to shoreline tree |
| | Flock flying over site |
| | Foraging on ground |
| | Flying over site |
| | Foraging on ground |
| | In trees next to tracks |
| | In trees, perched on powerlines |

| | |
|---|---|
| House finch | Entered window vent of warehouse |
| | Warehouse roof, perching, potentially collecting nesting material/plucking at veg from the gutter |
| | Pair perched on shrub |
| | Perched on telephone poles |
| | Perched on powerline and steel structure |
| House sparrow | Top of powerline pole |
| | Male vocalizing from warehouse roof |
| Hummingbird spp. | Perched on willow, vocalizing |
| | Flew from shrub toward Arco plant |
| Killdeer | Walking/flying around site |
| Lesser goldfinch | Flying along shoreline |
| Mourning dove | Foraging on ground |
| | Flying to shoreline tree |
| Northern flicker | Male vocalizing on shoreline tree |
| | Perched in shrubs along shoreline |
| | Flushed from ground and flew to tree near road; another flushed from shrub near shoreline |
| Osprey | Flying over river |
| Red-winged blackbird | Perching/vocalizing from shoreline trees |
| | Flying over, perching in trees and shrubs |
| | Flying to shoreline shrubs |
| Swallow spp. | Flying over site/mill |
| Tree swallow | Flying over site |
| Western gull | Perched on dolphin |
| Western scrub jay | Flying from mill to blackberry along roadside |
| | Perched on electrical wires |
| | Juvenile; perched on powerline |
| White-crowned sparrow | Vocalizing from shrubs |

**Table 5. Observed behavior, by species.**

| Nest-building | Perching (perch type)* | Foraging/bathing | Fly-over |
|---|---|---|---|
| Barn swallow | American crow (s, v) | American bittern | American crow |
| Cliff swallow | Cliff swallow (pl) | Barn swallow | American goldfinch |
| European starling | European starling (s, pp, v, pl) | European starling | Bald eagle |
| House finch | House finch (s, v, pp, pl) | Killdeer | Barn swallow |
| | House sparrow (pp, s) | Mourning dove | Cliff swallow |
| | Hummingbird (v) | | Double-crested cormorant |
| | Mourning dove (v) | | European starling |
| | Northern flicker (v) | | Lesser goldfinch |
| | Red-winged blackbird (v) | | Osprey |
| | Western gull (s) | | Swallow spp. |
| | Western scrub jay (v, pl) | | Tree swallow |
| | White-crowned sparrow (v) | | |

*s=structure
v=vegetation
pp=power pole
pl=power line

## 5.3 BALD EAGLE

Bald eagle surveys revealed that bald eagles use the site for perching and flying over the site in transit to other areas. No nests were observed on the Linnton site. As mentioned above, 36 surveys were conducted. Of the 36 surveys, 24 surveys included no observations of bald eagle. Surveys with no sightings occurred almost twice as often in the post-dawn (18) surveys than as in the pre-dusk surveys (8). The 12 surveys that did observe bald eagles included 20 sightings, including fly-overs and perching on site.

**Table 6. Sightings by dawn vs. dusk**

| Dawn vs. Dusk | Dawn | Dusk |
|---|---|---|
| Sightings | 5 | 15 |
| No-sighting surveys | 16 | 8 |

The only observed use of habitat on the site during the monitoring periods was perching on the riverward corner of the warehouse building[1] (Figure 2). This was observed on 10 occasions in nine surveys. Perching typically consisted of resting or preening activities. On one occasion, two bald eagles were perched at this point, with one remaining for the majority of the survey period, and the other flying away, then returning, then flying away again. On another occasion, an eagle was observed apparently foraging from the perch, as it was observed flying to perch, then minutes later swooping to the shoreline, then flying over the site with food items to the forested hillside to the west. Perching on the building occurred more frequently in the pre-dusk (seven) than the post-dawn (four), but perching made up 80% of all post-dawn sightings and 47% of pre-dusk sightings.

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[1] After the conclusion of one of the monitoring periods, a bald eagle was observed perching on a pile.

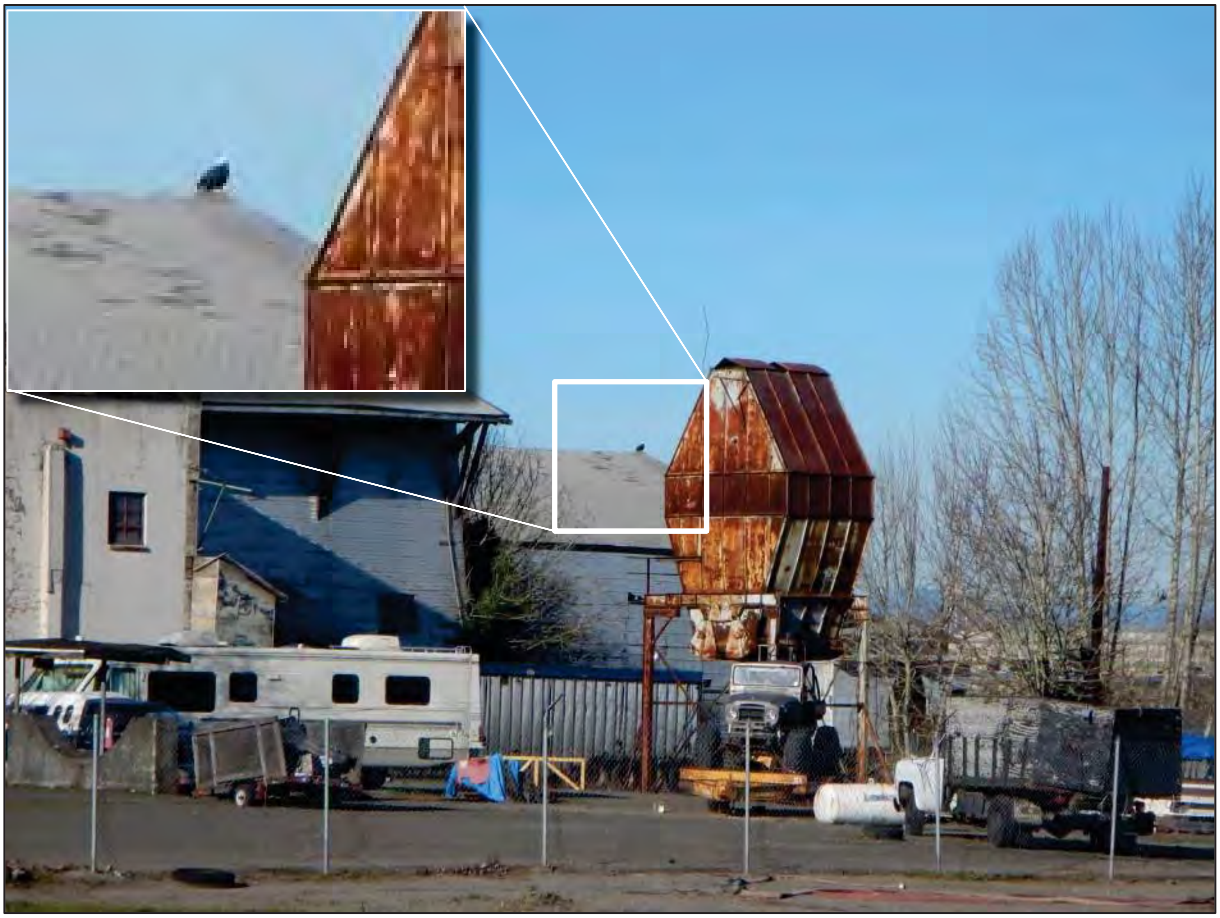


Figure 2. Bald eagle perch.

Four surveys only observed bald eagles flying by or over the site, without perching on site. Fly-overs were only observed in pre-dusk surveys. On many occasions eagles were observed flying overhead in the direction of the forested hillside to the southwest, including once with food. No nests were observed offsite in this area.

**Table 7. Behavior by dawn vs. dusk**

| Behavior by dawn vs. dusk | Dawn number | Dusk number |
|---|---|---|
| Fly-overs | 0 | 7 |
| Perching | 4 | 7 |
| Non-visual observation | 1 | 0 |
| Foraging | 0 | 1 |

When taking into account all of the instances in which bald eagles were observed flying over, past, to, or from the site (including both perching and fly-bys), bald eagles flew parallel to shore along the river seven times and to/from the adjacent wooded hill eight times. Data are summarized in Table 8, and data sheets are included as Attachment 3.

Table 8. Summary of all bald eagle surveys/sightings.

| Date | Dawn/ Dusk | Time start | Time end | Behavior | Habitat used | Notes |
|---|---|---|---|---|---|---|
| 12/4/2014 | Dusk | 1541 | 1547 | P, FL | Easternmost roof peak | Resting; flew south into timbered hillside to perch in tree |
| 12/10/2014 | Dusk | 1440 | 1459 | P, FL | Easternmost roof peak | Resting; flew upstream along river |
| 12/18/2015 | Dusk | 1419 | 1444 | P, FL | Easternmost roof peak | Perched upon start of survey; resting; flew upstream along river |
|  |  | 1419 | 1612 | P, FL | Easternmost roof peak | Perched upon start of survey; resting; flew south into timbered hillside |
|  |  | 1459 | 1530 | P, FL | Easternmost roof peak | Resting; flew upstream along river |
|  |  | 1609 | 1609 | FL | None | Flew E to W, to forested hillside |
| 12/23/2014 | Dawn | 0907 | 1012 | P, FL | Easternmost roof peak | Flew in from NE, perched through end of survey |
| 12/31/2014 | Dawn | No eagles observed |  |  |  |  |
| 1/8/2015 | Dawn | No eagles observed |  |  |  | Very dense fog |
| 1/15/2015 | Dusk | 1643 | 1643 | FL | None | Flew along shoreline, then over site to the W up the hill |
|  |  | 1645 | 1650 | P, FL | Easternmost roof peak | Perched, swooped to river, apparently foraging |
|  |  | 1655 | 1656 | FL | None | Same indiv. as above; flew from river to forested hillside with food item |
| 1/22/2015 | Dawn | No eagles observed |  |  |  |  |
| 1/27/2015 | Dusk | No eagles observed |  |  |  |  |
| 2/2/2015 | Dusk | 1702 | 1702 | FL | None | Flew over NW corner of site |
|  |  | 1702 | 1702 | FL | None | Flew over NW corner of site |
|  |  | 1710 | 1710 | FL | None | Flew over S corner of site |
| 2/13/2015 | Dawn | No eagles observed |  |  |  | Very dense fog |
| 2/17/2015 | Dusk | 1700 | 1700 | FL | None | Flew across site along river |
| 2/24/2015 | Dawn | No eagles observed |  |  |  |  |
| 3/5/2015 | Dawn | No eagles observed |  |  |  |  |
| 3/11/2015 | Dusk | 1857 | 1857 | FL | None | Flew over site |
| 3/18/2015 | Dawn | No eagles observed |  |  |  |  |
| 3/26/2015 | Dawn | No eagles observed |  |  |  |  |
| 4/1/2015 | Dusk | No eagles observed |  |  |  |  |
| 4/7/2015 | Dawn | No eagles observed |  |  |  |  |
| 4/16/2015 | Dawn | No eagles observed |  |  |  |  |
| 4/20/2015 | Dawn | No eagles observed |  |  |  |  |
| 4/29/2015 | Dusk | No eagles observed |  |  |  |  |
| 5/7/2015 | Dawn | 0638 | 0646 | P, FL | Easternmost roof peak | Preening |
| 5/14/2015 | Dusk | No eagles observed |  |  |  |  |
| 5/20/2015 | Dawn | 0608 | 0610 | P, FL | Easternmost roof peak | Resting; flew toward forested hill to SE |
|  |  | 0709 | 0709 | O | Heard vocalizations |  |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | very close, could not visually identify | |
| 5/28/2015 | Dusk | No eagles observed | | | | |
| 6/2/2015 | Dawn | 0641 | 0648 | P, FL | Easternmost roof peak | Flew across river |
| 6/10/2015 | Dusk | 1900 | 1910 | P, FL | Easternmost roof peak | |
| 6/18/2015 | Dawn | No eagles observed | | | | |
| 6/30/2015 | Dusk | No eagles observed | | | | Heavy equipment use on site interfered with survey |
| 7/7/2015 | Dawn | No eagles observed during survey period | | | | Eagles observed perched on warehouse and piles after survey period |
| 7/15/2015 | Dusk | No eagles observed | | | | |
| 7/23/2015 | Dawn | No eagles observed | | | | |
| 7/30/2015 | Dawn | No eagles observed | | | | |
| 8/5/2015 | Dusk | No eagles observed | | | | |
| 8/13/2015 | Dawn | No eagles observed | | | | |
| 8/21/2015 | Dawn | No eagles observed | | | | |

## 5.4 MINK

### *Transects*

A biologist conducted mink surveys along the shoreline transect determined in the Baseline Monitoring Plan. This transect was surveyed seven times, approximately twice a month from early April through early July. Surveys examined the nearshore area along the transect, including all accessible portions of the area 50 ft waterward of the transect. No mink sign was observed. Small mammal tracks were observed throughout the shoreline on every survey. However, these tracks were identified as raccoon and house cat, respectively (Attachment 5; Photographs 1 and 2). The camera traps demonstrated that these species visited the site on an almost nightly basis, as discussed below. Transect datasheets are presented in Attachment 4.

### *Camera Traps*

Camera traps and scent stations were set up in three locations, as discussed above. Photographs were downloaded from the cameras, and the scent stations were refreshed on the days of transect surveys. No mink were observed in the photographs. On one occasion, a small mammal was photographed crossing in front of Camera 3 that, in the grainy photos, had a similar body shape to mink. Upon close inspection, this was determined to be a squirrel (Attachment 5: Photographs 3-5). The most common species observed in the camera traps were house cats, as multiple cats live at the Linnton site. Raccoons were also captured on camera on an almost daily basis. Other wildlife species observed in photographs include nutria, coyote, squirrel, Canada goose, and scrub jay. Humans and domestic dogs were also observed on multiple occasions. Sample photographs are presented in Attachment 5.

# 6 DISCUSSION

## 6.1 EXISTING SHORELINE HABITAT

The Linnton Mill site includes several acres of riparian, ACM, and shallow water habitat, over an extensive, contiguous shoreline. The habitats are highly degraded.

The riparian habitat consists almost entirely of unvegetated/paved/buildings, over-steepened riprapped shoreline, and invasive species. Himalayan blackberry has formed a dense thicket on the riverbank over existing riprap, which is the dominant substrate. Scattered native trees and shrubs are present, but constitute a small minority of vegetation. Though this zone provides some habitat function, anthropogenic debris and non-native vegetation severely limit the value of the habitat. Its low value as bald eagle habitat and mink habitat was evident from the monitoring data for these species: bald eagles were only observed perching on the building rather than on trees, and mink were not observed at all. Though riprap likely provides cover for small mammals such as mink, riprap also severely limits riparian habitat function in other ways.

The ACM habitat is dominated by riprap and pile stubs. Some large woody debris is present in the upper beach, but consists of transient beach logs. Riprap and concrete debris in the upper ACM provides some cover habitat, but native boulder habitat is completely lacking. The limited adjacent riparian habitat provides limited function to the nearshore habitat for juvenile salmonids. Overall, the ACM habitat is highly degraded by the presence of anthropogenic structure and debris and the lack of adjacent high quality riparian habitat

Shallow water habitat is also impaired by hundreds of piles and pile stubs, as well as highly degraded adjacent shoreline habitat. The piles/stubs limit light penetration and contribute to potential water quality issues through potential leaching of creosote.

Though these habitats are highly degraded, they constitute a large block of habitat (15.37 acres) over a long, contiguous shoreline length (1,900 linear ft). This quantity of habitat will allow the project to restore a significant block of riverfront habitat. The numerous structural habitat pieces that will be installed along the shoreline will also contribute to a highly-functioning restored shoreline habitat for a variety of species.

## 6.2 BIRD ASSEMBLAGES

Results from the bird assemblage surveys indicate that although twenty-two (22) species were observed in association with the site, only eight (8) of these species were observed utilizing the buildings and other manmade structures. Of those eight species, six species—including barn swallow, cliff swallow, European starling, house finch, American crow, and house sparrow—are typically associated with human development and high levels of habitat disturbance. In fact, cliff swallows and barn swallows so often rely on manmade structures for nesting that their ranges have expanded in concert with development. Cliff swallows and barn swallows were both observed utilizing the Linnton mill site buildings for nesting during the bird assemblage surveys. These two species alone comprised approximately 48% (104 of 219) of all bird sightings on the site.

In addition, European starling and house sparrow were also commonly observed during bird assemblage surveys. These species are invasive, thrive in highly developed areas, and outcompete and displace native birds. Observations of invasive bird species comprised 19% (42 of 219) of all bird sightings.

Other species that were not observed utilizing manmade structures were either observed flying over or utilizing the vegetation on the southern portion of the site. All species observed are common to western Oregon either as year-round or migratory residents. Six species are typical of waterfront or wet areas – bald eagle, osprey, double-crested cormorant, Western gull, red-winged blackbird, and American bittern. Observations of these water-oriented species comprised 11% (24 of 219) of all observations.

Overall, the assemblage of birds observed on site is typical of a highly developed, low habitat quality waterfront area. The incidence of invasive and manmade structure-oriented species was high at nearly 70% of all birds observed over the three surveys. The proportion of water-oriented species observed during the surveys was relatively low at 11%. It is expected that restoration of the Linnton mill site will result in long-term increases in bird diversity and abundance at the site, will reduce the number of invasive and nuisance species, and will attract a greater proportion of water-oriented birds through the creation of high quality, off-channel habitat and riparian forested areas.

### 6.3 BALD EAGLE

Based on observations, eagles use the site for perching and occasional foraging, though no nesting occurs on the site. When observed perching on site, eagles only perched on the overwater warehouse building and were never observed perching on trees or shrubs along the shoreline.

Bald eagle use of the site is higher during the pre-dusk hours than the post-dawn hours, and post-dawn activity tended to be more sedentary as bald eagles were always observed perching.

Based on the direction of eagle flight, the hillside southwest of the Linnton site appears to be regularly used by eagles and may include nesting sites, though no nests were observed. Baseline surveys suggest that the Linnton Mill site serves as a foraging and resting site along the river, and as a transition site between river foraging and upland use, possibly including nesting. Riverfront industrial development is listed as one of the activities that have negatively impacted bald eagles in past decades (USFWS 2012), and removal of these uses at the site would have a positive effect on bald eagles. Though site restoration would remove a preferred perching site (the warehouse), it is likely that the conversion of the site to an off-channel habitat with forested riparian and upland habitat will generate increased bald eagle use and additional perching opportunities as proposed forested habitat matures.

### 6.4 MINK

Though no mink or mink sign was observed during monitoring, the monitoring did demonstrate extensive human, raccoon, and domestic cat presence. It is possible that the presence of these species is discouraging mink use of the site. Further, the existing lack of shoreline habitat diversity and natural features may not be preferred by mink. Site restoration, including the construction of a protected side channel, enhancement of native vegetation, installation of habitat structures, and reduction of human activity, will likely be more conducive to mink use.

### 6.5 DATA MANAGEMENT

Existing shoreline habitat maps are presented in .pdf form and included in Attachment 1. Survey data are stored in the form of computer-aided drafting (CAD) files (.dwg) on the Grette Associates server.

Bird assemblage data are presented in graphic form in Section 5.2 above. The data sheets are included in Attachment 2, and tabular data are stored on the Grette Associates server. These data will be transferred to the Portland Harbor Trustees in a separate transmittal. Tabular data are in the form of a spreadsheet (.xls file), and include species list, occurrence by day, and behavior of each occurrence.

Bald eagle data are presented in graphical form in Section 5.3. The data sheets are included in Attachment 3, and tabular data are stored on the Grette Associates server. These data will be transferred to the Portland Harbor Trustees in a separate transmittal. Tabular data are in the form of a spreadsheet (.xls file), and include occurrence by day, elapsed time of individual observations, and behavior and location of each occurrence.

Mink data sheets are included in Attachment 4. As no mink were observed in the camera traps nor were any tracks or scat observed, no tabular data are presented.

# 7 REFERENCES

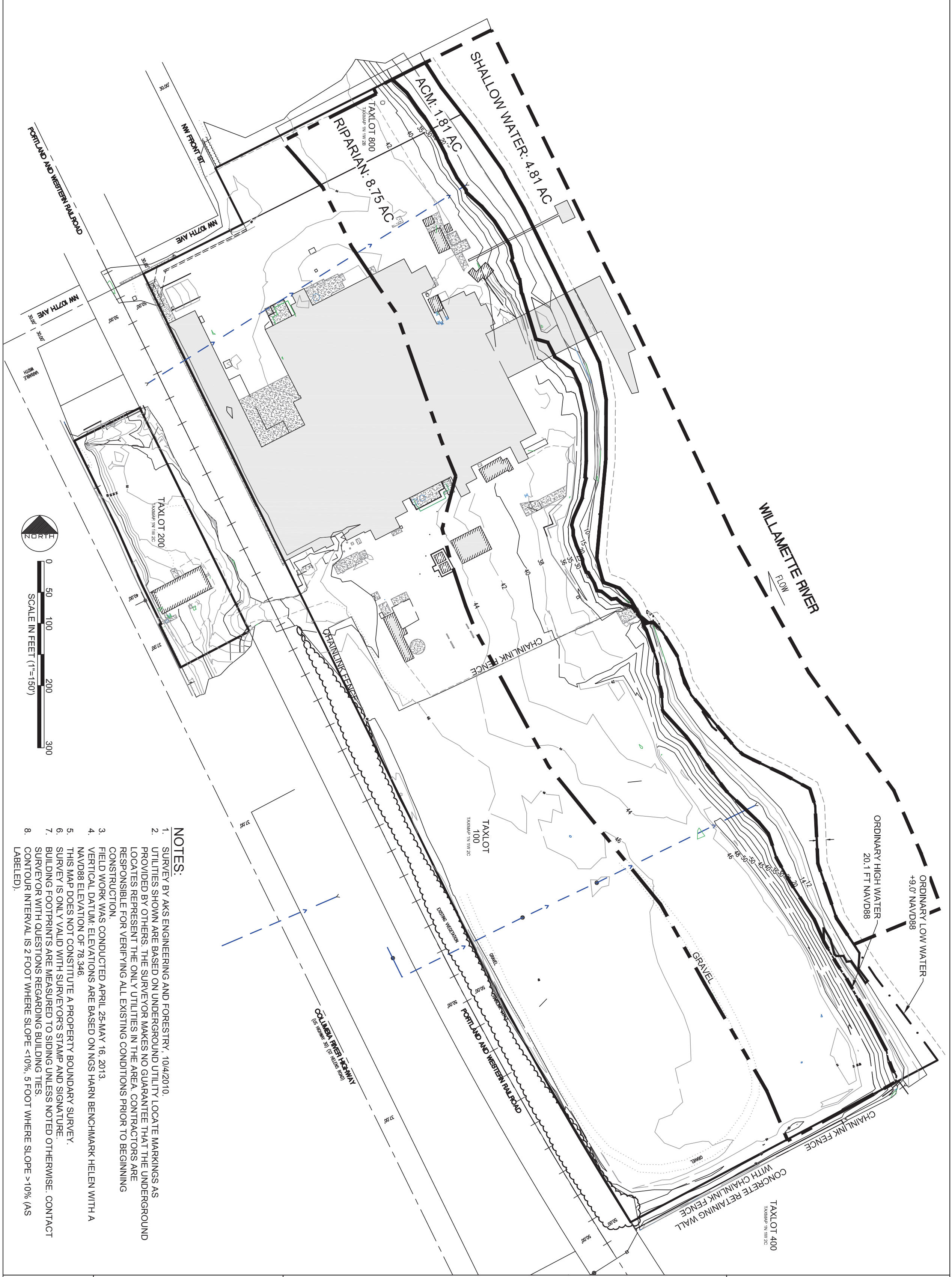
Portland Harbor Trustees. 2014. Portland Harbor NRDA Monitoring and Stewardship Framework. May 15, 2015.

U.S. Fish and Wildlife Service (USFWS). 2012. Species Fact Sheet: Bald Eagle (*Haliaeetus leucocephalus*). Web page. URL: http://www.fws.gov/oregonfwo/Species/Data/BaldEagle/. Last updated October 24, 2012.

# LINNTON MILL RESTORATION SITE

# SITE-SPECIFIC PERFORMANCE PLAN

## Attachment 1: Maps



NOTES:

1. SURVEY BY AKS ENGINEERING AND FORESTRY, 10/4/2010.
2. UTILITIES SHOWN ARE BASED ON UNDERGROUND UTILITY LOCATE MARKINGS AS PROVIDED BY OTHERS. THE SURVEYOR MAKES NO GUARANTEE THAT THE UNDERGROUND LOCATES REPRESENT THE ONLY UTILITIES IN THE AREA. CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION.
3. FIELD WORK WAS CONDUCTED APRIL 25-MAY 16, 2013.
4. VERTICAL DATUM: ELEVATIONS ARE BASED ON NGS HARN BENCHMARK HELEN WITH A NAVD88 ELEVATION OF 78.346.
5. THIS MAP DOES NOT CONSTITUTE A PROPERTY BOUNDARY SURVEY.
6. SURVEY IS ONLY VALID WITH SURVEYOR'S STAMP AND SIGNATURE.
7. BUILDING FOOTPRINTS ARE MEASURED TO SIDING UNLESS NOTED OTHERWISE. CONTACT SURVEYOR WITH QUESTIONS REGARDING BUILDING TIES.
8. CONTOUR INTERVAL IS 2 FOOT WHERE SLOPE <10%, 5 FOOT WHERE SLOPE >10% (AS LABELED).

SHEET: 1
OF: 3

DATE: 1/12/16

# TOPOGRAPHIC SURVEY

# LINNTON MILL RESTORATION SITE

APPLICANT/OWNER:
LINNTON WATER CREDITS, LLC
337 17TH STREET SUITE 101
OAKLAND, CA 94612

AUTHORIZED AGENT:
GLENN GRETTE; GRETTE ASSOCIATES
151 S. WORTHEN ST. SUITE 101
WENATCHEE, WA 98801

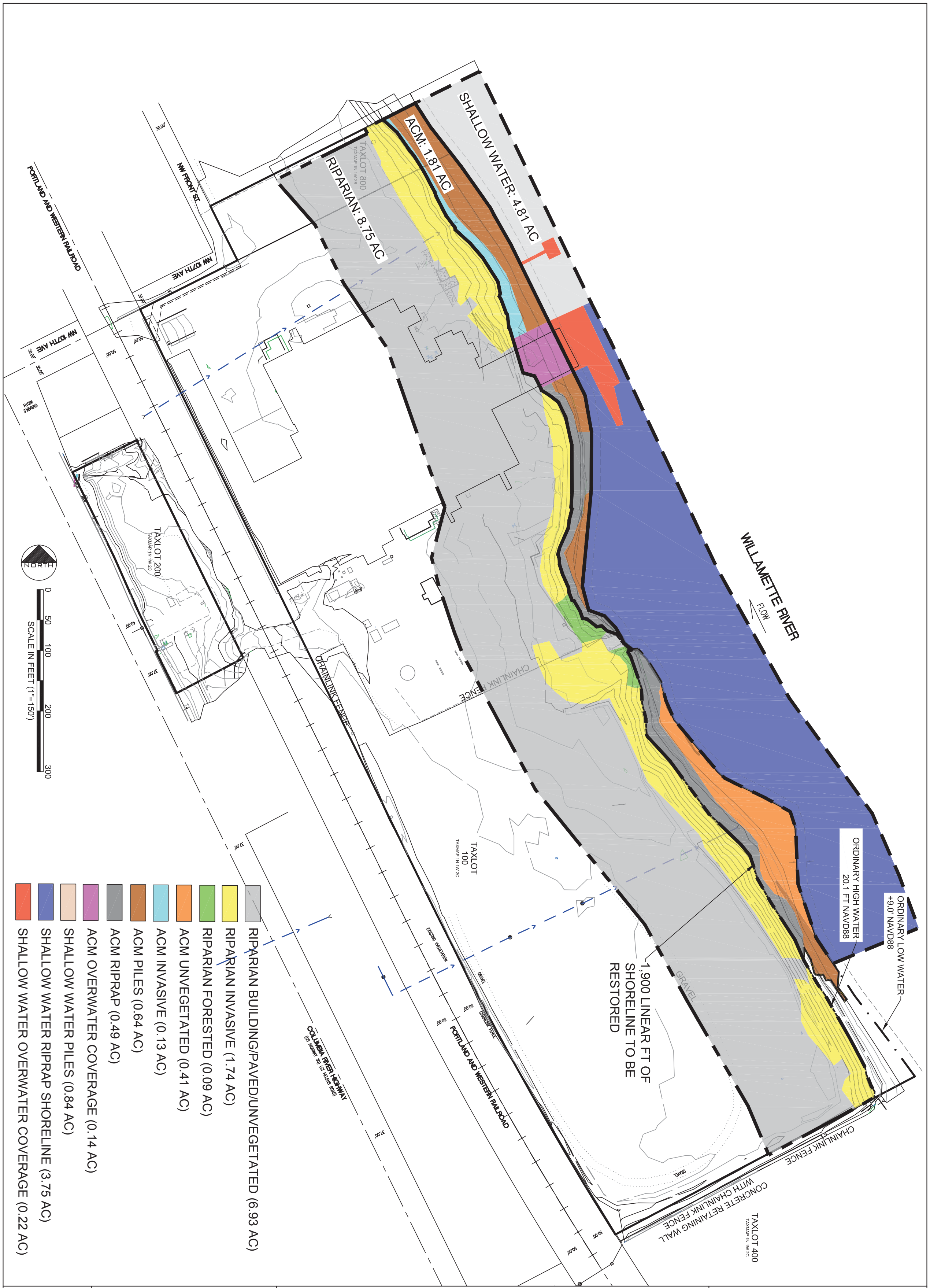
SITE ADDRESS:
10504 ST HELENS RD
PORTLAND, OR 97231

DRAWING SCALE:
1"=150'

DATUMS:
H: OR ST PLANE N
V: NAVD 1988

WATERWAYS CONSULTING INC.

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS
151 South Worthen, Suite 101
WENATCHEE, WA 98801
(509) 663-6300 | www.gretteassociates.com



SHEET: 2
OF: 3

## HABITAT MAP

DATE: 1/12/16

## LINNTON MILL RESTORATION SITE

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SHEET: 3
OF: 3
DATE: 1/12/16

## MONITORING SUMMARY

## LINNTON MILL RESTORATION SITE

APPLICANT/OWNER:
LINNTON WATER CREDITS, LLC
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# LINNTON MILL RESTORATION SITE

# SITE-SPECIFIC PERFORMANCE PLAN

## Attachment 2: Bird Assemblage Data Sheets

SITE:

Bird Assemblage Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 4/07/15
Time: 0845-1045
Tide:
Staff: M. Ireland
Weather: 45F, drizzle
Datasheet ___ of ___

| Species | Count | Habitat Use | Notes |
|---|---|---|---|
| House finch | 3 | Entered window vent of warehouse | Transect 1 |
| House finch | 2 | Warehouse roof, perching, potentially collecting nesting material/plucking at veg from the gutter | Transect 1 |
| House sparrow | 2 | Top of powerline pole | Transect 1 |
| Double-crested cormorant | 1 | Flying along shoreline | Transect 1 |
| European starling | 1 | Perched on roof peak of warehouse | Transect 1 |
| European starling | 1 | Top of powerline pole, vocalizing | Transect 1 |
| Swallow spp. | 4 | Flying over site/mill | Transect 2 |
| Western gull | 1 | Perched on dolphin | Transect 2 |
| European starling | 2 | Perch on conveyor support poles | Transect 2 |
| European starling | 1 | Female carrying nesting material into loading dock | Transect 2 |
| Red-winged blackbird | 2 | Perching/Vocalizing from shoreline trees | Transect 2 |
| Western scrub jay | 1 | Flying from mill to blackberry along roadside | Transect 3 |
| American crow | 1 | Perching/Vocalizing from top of conveyor | Transect 3 |
| Lesser goldfinch | 2 | Flying along shoreline | Transect 3 |
| European starling | 3 | Flying from mill to shoreline tree | Transect 3 |
| Red-winged blackbird | 4 | Vocalizing from shoreline shrubs/trees | Transect 4 |
| House finch | 2 | Pair perched on shrub | Transect 4 |
| Northern flicker | 1 | Male vocalizing on shoreline tree | Transect 4 |
| White-crowned sparrow | 1 | Vocalizing from shrubs | Transect 4 |
| American bittern | 1 | In shallow puddle near edge of site | Transect 5 |
| American crow | 2 | Perched on corner shoreline tree | Transect 5 |
| European starling | 8 | Flock flying over site | Transect 5 |
| Hummingbird spp. | 1 | Perched on tree | Transect 5 |
|  |  |  |  |
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|  |  |  |  |

**Notes:**

SITE:

Bird Assemblage Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 5/14/15
Time: 1500-1640
Tide:
Staff: M. Ireland
Weather: Partly sunny, 67F
Datasheet ___ of ___

| Species | Count | Habitat Use | Notes |
|---|---|---|---|
| Barn swallow | 10+ | Flying in/out of warehouse; warehouse likely heavily used by nesting BASW; dozens of BASW heard vocalizing from inside warehouse | Transect 1 |
| European starling | 1 | Foraging on ground | Transect 1 |
| House sparrow | 2 | Male vocalizing from warehouse roof | Transect 1 |
| House finch | 4 | Perched on telephone poles | Transect 1 |
| Barn swallow | 6 | Flying in/out of shed attached to warehouse | Transect 2 |
| European starling | 2 | Flying over site | Transect 2 |
| Western scrub jay | 1 | Perched on electrical wires | Transect 2 |
| Mourning dove | 1 | Foraging on ground | Transect 3 |
| European starling | 6 | Perched in trees along tracks | Transect 3 |
| Tree swallow | 3 | Flying over site | Transect 3 |
| Osprey | 1 | Flying over river | Transect 3 |
| Northern flicker | 1 | Perched in shrubs along shoreline | Transect 3 |
| White-crowned sparrow | 2 | Vocalizing from shoreline shrubs | Transect 3 |
| Bald eagle | 1 | Flying over site | Transect 3 |
| European starling | 4 | Foraging on ground | Transect 3 |
| Red-winged blackbird | 2 | Vocalizing from shrubs | Transect 4 |
| Killdeer | 2 | Walking/Flying around site | Transect 4 |
| American goldfinch | 1 | Flying over site | Transect 4 |
| European starling | 3 | In trees next to tracks | Transect 5 |
| Red-winged blackbird | 5 | Flying over, perching in trees and shrubs | Transect 5 |
| Barn swallow | 8 | Flying over site | Transect 5 |
| Tree swallow | 2 | Flying over site | Transect 5 |
| American crow | 1 | Perched in shoreline tree | Transect 5 |
| Mourning dove | 1 | Flying to shoreline tree | Transect 5 |
| Hummingbird spp. | 1 | Perched on willow, vocalizing (same location as survey on 4/7) | Transect 5 |
|  |  |  |  |

**Notes:**

SITE:

Bird Assemblage Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 6/10/15
Time: 1750-1900
Tide:
Staff: M. Ireland
Weather: Sunny, 78F
Datasheet ___ of ___

| Species | Count | Habitat Use | Notes |
|---|---|---|---|
| Cliff swallow | 40+ | Perched on powerlines, flying in/out of warehouse | Transect 1 |
| House finch | 3 | Perched on powerline and steel structure | Transect 1 |
| American crow | 2 | Flying over warehouse, circling | Transect 2 |
| Cliff swallow | 10+ | Flying over warehouse | Transect 2 |
| Barn swallow | 8 | Flew into conveyor building | Transect 2 |
| Western scrub jay | 1 | Juvenile; Perched on powerline | Transect 2 |
| European starling | 4 | In trees, perched on powerlines | Transect 2 |
| Barn swallow | 7 | On ground and flying overhead | Transect 3 |
| Cliff swallow | 8 | Flying over field | Transect 3 |
| Red-winged blackbird | 2 | Flying to shoreline shrubs | Transect 3 |
| Red-winged blackbird | 4 | Flying over field | Transect 4 |
| Cliff swallow | 7 | Flying over field | Transect 4 |
| Northern flicker | 2 | Flushed from ground and flew to tree near road; another flushed from shrub near shoreline | Transect 5 |
| Hummingbird spp. | 1 | Flew from shrub toward Arco plant | Transect 5 |
| Cliff swallow | ** | Flying overhead | Transect 5 |
| Barn swallow | ** | Flying overhead | Transect 5 |
| European starling | 2 | Flying overhead | Transect 5 |
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**Notes:**

# LINNTON MILL RESTORATION SITE

# SITE-SPECIFIC PERFORMANCE PLAN

## Attachment 3: Bald Eagle Survey Data Sheets

Client: Linnton

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 12/4/14 Time: 2:00pm - 4:30pm Datasheet 1 of 1

Staff: Wallin Weather: overcast & raining w/ heavy rain at times

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3:41 | [✓ FL] | FC | NM | [✓ P] | O | 3:41 pm | 3:47 pm | mill roof - observed | perched on gable of pier, |
| 2 | | FL | FC | NM | P | O | | | @ 3:47 pm eagle flew | from gable and headed |
| 3 | | FL | FC | NM | P | O | | | south into timbered | hillside west of tank farm, |
| 4 | | FL | FC | NM | P | O | | | perched in fir (no | nest observed in tree). |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** Vantage point was determined based on existing conditions that allowed observations of the entire site, except for the most northwestern portion. The old mill obstructs this area, however, this area mostly consists of low lying veg. that likely isn't suitable for eagles. GPS position of vantage point was recorded

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

- Two mallards (one drake - one hen) foraging in ponded area between vantage point & tankfarm

Client: Lantar

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 12/10/14 Time: 2:00 pm - 4:10 pm Datasheet 1 of 1

Staff: Walton Weather: Rain - heavy rain @ times

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2:40 pm | [✓ FL] | FC | NM | [✓ P] | O | 2:40pm | 2:59 pm | perched on peak of roof | over pier, appears to be |
| 2 | | FL | FC | NM | P | O | | | resting - not watching | water: Flew off @ 2:59 pm |
| 3 | | FL | FC | NM | P | O | | | and headed upstream | along the river. |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** 7 geese feeding along paved area between survey point and tank farm

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Sunset @ 4:30pm

Client: Linnton

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 12/18/14
Time: 2:19 pm - 4:23 pm
Datasheet 1 of 1
Staff: Walker
Weather: overcast w/ light rain @ times

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2:19 pm | [✓ FL] | FC | NM | [✓ P] | O | 2:19 pm ⊛ | 2:44 pm | most eastern portion of roof peak - over pier | ⊛ Both B1 & B2 were perched upon arrival of survey |
| 2 | 2:19 pm | [✓ FL] | FC | NM | [✓ P] | O | 2:19 pm ⊛ | 4:12 pm | most eastern portion of roof peak - over pier | Both appear to be resting |
| 3 | 2:59 pm | [✓ FL] | FC | NM | [✓ P] | O | 2:59 pm | 3:30 pm | most eastern portion of roof peak - over pier | Flew in from the north (down stream) appears to be resting |
| 4 | 4:09 pm | [✓ FL] | FC | NM | P | O | 4:09 pm | 4:09 pm | flew over site from east | to west & into forested hillside |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** B1 flew off @ 2:44pm and headed upstream over the river until out of sight. B3 flew off @ 3:30pm and headed upstream over the river until out of sight.
B2 flew off @ 4:12pm and headed S/SW into forested hillside.

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Sunrise 7:49 am

Client: Canton

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Bald Eagle Survey Data Form

Survey Date: 12/23/14 Time: 8:05 am – 10:12 am Datasheet 1 of ___

Staff: Walker Weather: Overcast w/light rain @ times & high fog

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 9:07 am | [✓ FL] | FC | NM | [✓ P] | O | 9:07 am | 10:12 am (plus) ⊛ | Flew in from NE and perched on mill peak over pier. | appears to be resting. ⊛ eagle remained perched on roof beyond end of survey period |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** river valley is clear of fog - top of forest hillside to the west is socked in. Visibility in the valley is (+)1 mile.

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: [illegible]

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 12/31/14 Time: 7:44 am - 9:44am Datasheet 1 of 1
Staff: Wallin Weather: Clear

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | |
| 2 | | FL | FC | NM | P | O | | | |
| 3 | | FL | FC | NM | P | O | | | |
| 4 | | FL | FC | NM | P | O | No bald eagles observed on 12/31/14 | | |
| 5 | | FL | FC | NM | P | O | | | |
| 6 | | FL | FC | NM | P | O | | | |
| 7 | | FL | FC | NM | P | O | | | |
| 8 | | FL | FC | NM | P | O | | | |
| 9 | | FL | FC | NM | P | O | | | |
| 10 | | FL | FC | NM | P | O | | | |
| 11 | | FL | FC | NM | P | O | | | |
| 12 | | FL | FC | NM | P | O | | | |
| 13 | | FL | FC | NM | P | O | | | |
| 14 | | FL | FC | NM | P | O | | | |
| 15 | | FL | FC | NM | P | O | | | |
| 16 | | FL | FC | NM | P | O | | | |
| 17 | | FL | FC | NM | P | O | | | |
| 18 | | FL | FC | NM | P | O | | | |

**Notes:** Red tailed hawk perched on old power pole along the shoreline (approx 1hr).

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mitigation Site

Grette Associates^LLC
ENVIRONMENTAL CONSULTANTS

Bald Eagle Survey Data Form

Survey Date: 01/08/15 Time: 0800 - 1015 Datasheet ___ of ___
Staff: MM Weather: Thick fog, ~35°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | No eagles observed |
| 2 | | FL | FC | NM | P | O | | | |
| 3 | | FL | FC | NM | P | O | | | |
| 4 | | FL | FC | NM | P | O | | | |
| 5 | | FL | FC | NM | P | O | | | |
| 6 | | FL | FC | NM | P | O | | | |
| 7 | | FL | FC | NM | P | O | | | |
| 8 | | FL | FC | NM | P | O | | | |
| 9 | | FL | FC | NM | P | O | | | |
| 10 | | FL | FC | NM | P | O | | | |
| 11 | | FL | FC | NM | P | O | | | |
| 12 | | FL | FC | NM | P | O | | | |
| 13 | | FL | FC | NM | P | O | | | |
| 14 | | FL | FC | NM | P | O | | | |
| 15 | | FL | FC | NM | P | O | | | |
| 16 | | FL | FC | NM | P | O | | | |
| 17 | | FL | FC | NM | P | O | | | |
| 18 | | FL | FC | NM | P | O | | | |

**Notes:** No Eagles observed; very heavy fog

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton

Bald Eagle Survey Data Form

**Grette Associates** LLC
ENVIRONMENTAL CONSULTANTS

Survey Date:________01/15/14__ Time: 1500 – 1700

Datasheet ___ of ___

Staff:____MM______________ Weather: Overcast, 40°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1643 | [✓ FL] | FC | NM | P | O | 1643 | 1643 | flew along shoreline then over the site to the west up the hill | |
| 2 | 1645 | [✓ FL] | FC | NM | [✓ P] | O | 1645 | 1650 | perched on roof of waterward building, flew off roof and swooped down to river/shoreline - foraging | |
| 3 | 1655 same eagle | FL | [✓ FC] | NM | P | O | 1655 | 1656 | Food carrying from river over site & up the hill to the forested area | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** Approximately 30 cormorants on shoreline trees from ~1600 - 1650. Cormorants were flushed by the bald eagle

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Bald Eagle Survey Data Form

Survey Date: 01/22/15
Time: 0750 - 1000
Datasheet ___ of ___
Staff: MM
Weather: overcast, ~45°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | | No eagles observed |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** RTHA perched on shoreline tree 0750-0800
RTHA perched on mill conveyor pipe @ 0830-0835

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Bald Eagle Survey Data Form

Survey Date: 01/27/15 Time: 1455 – 1720 Datasheet ___ of ___

Staff: MM Weather: overcast, foggy ~45°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | | |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** No eagles observed

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Clinton

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 2/2/15
Time: 3:30 pm - 5:30 pm
Datasheet 1 of 1
Staff: CW
Weather: mostly clear

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5:02 pm | [✓ FL] | FC | NM | P | O | — | — | none | B1 & B2 flew over |
| 2 | 5:02 pm | [✓ FL] | FC | NM | P | O | — | — | none | NW corner of site |
| 3 | 5:10 pm | [✓ FL] | FC | NM | P | O | — | — | none | flew over south |
| 4 | | FL | FC | NM | P | O | | | | end of site. |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

Notes:

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 02/13/15 Time: 0730 – 0935 Datasheet ___ of ___

Staff: MI Weather: Dense fog, ~48°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | | FL | FC | NM | P | O | | | | |
| 20 | | FL | FC | NM | P | O | | | | |
| 21 | | FL | FC | NM | P | O | | | | |
| 22 | | FL | FC | NM | P | O | | | | |
| 23 | | FL | FC | NM | P | O | | | | |
| 24 | | FL | FC | NM | P | O | | | | |
| 25 | | FL | FC | NM | P | O | | | | |
| 26 | | FL | FC | NM | P | O | | | | |
| 27 | | FL | FC | NM | P | O | | | | |
| 28 | | FL | FC | NM | P | O | | | | |
| 29 | | FL | FC | NM | P | O | | | | |
| 30 | | FL | FC | NM | P | O | | | | |
| 31 | | FL | FC | NM | P | O | | | | |
| 32 | | FL | FC | NM | P | O | | | | |
| 33 | | FL | FC | NM | P | O | | | | |
| 34 | | FL | FC | NM | P | O | | | | |
| 35 | | FL | FC | NM | P | O | | | | |
| 36 | | FL | FC | NM | P | O | | | | |

**Notes:** No eagles observed; very dense fog throughout survey

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: [illegible]

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

## Bald Eagle Survey Data Form

Survey Date: 2/17/15 Time: 3:45 pm – 5:55 pm Datasheet 1 of 1
Staff: Wallin Weather: Clear

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5:00 pm | [✓ FL] | FC | NM | P | O | — | — | flew across site along river (no stopping) |
| 2 | | FL | FC | NM | P | O | | | |
| 3 | | FL | FC | NM | P | O | | | |
| 4 | | FL | FC | NM | P | O | | | |
| 5 | | FL | FC | NM | P | O | | | |
| 6 | | FL | FC | NM | P | O | | | |
| 7 | | FL | FC | NM | P | O | | | |
| 8 | | FL | FC | NM | P | O | | | |
| 9 | | FL | FC | NM | P | O | | | |
| 10 | | FL | FC | NM | P | O | | | |
| 11 | | FL | FC | NM | P | O | | | |
| 12 | | FL | FC | NM | P | O | | | |
| 13 | | FL | FC | NM | P | O | | | |
| 14 | | FL | FC | NM | P | O | | | |
| 15 | | FL | FC | NM | P | O | | | |
| 16 | | FL | FC | NM | P | O | | | |
| 17 | | FL | FC | NM | P | O | | | |
| 18 | | FL | FC | NM | P | O | | | |

**Notes:**

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Bald Eagle Survey Data Form

Survey Date: 2/24/15 Time: 0705– Datasheet ___ of ___

Staff: MI Weather: 39°-43°, clear, sunny

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | | |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** No eagles observed

western Scrubjays, European starlings

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: [illegible] Mill

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Bald Eagle Survey Data Form

Survey Date: 3/5/15
Time: 6:35 am
Datasheet 1 of 1
Staff: [illegible]
Weather: Clear

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | |
| 2 | | FL | FC | NM | P | O | | | |
| 3 | | FL | FC | NM | P | O | | | |
| 4 | | FL | FC | NM | P | O | | | |
| 5 | | FL | FC | NM | P | O | | | |
| 6 | | FL | FC | NM | P | O | | | |
| 7 | | FL | FC | NM | P | O | | | |
| 8 | | FL | FC | NM | P | O | | | |
| 9 | | FL | FC | NM | P | O | | | |
| 10 | | FL | FC | NM | P | O | | | |
| 11 | | FL | FC | NM | P | O | | | |
| 12 | | FL | FC | NM | P | O | | | |
| 13 | | FL | FC | NM | P | O | | | |
| 14 | | FL | FC | NM | P | O | | | |
| 15 | | FL | FC | NM | P | O | | | |
| 16 | | FL | FC | NM | P | O | | | |
| 17 | | FL | FC | NM | P | O | | | |
| 18 | | FL | FC | NM | P | O | | | |

**Notes:** No eagles observed.

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 3/11/15
Time: 1705-1915
Datasheet ___ of ___
Staff: MI
Weather: Cloudy, 55°

| Bird # | Time | Behavior Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1857 | [✓ FL] | FC | NM | P | O | 1857 | 1857 | None, fly over | |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:**

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 3/18/15 Time: 0715-0920 Datasheet ___ of ___

Staff: MF Weather: Cloudy 48°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | | FL | FC | NM | P | O | | | | |
| 20 | | FL | FC | NM | P | O | | | | |
| 21 | | FL | FC | NM | P | O | | | | |
| 22 | | FL | FC | NM | P | O | | | | |
| 23 | | FL | FC | NM | P | O | | | | |
| 24 | | FL | FC | NM | P | O | | | | |
| 25 | | FL | FC | NM | P | O | | | | |
| 26 | | FL | FC | NM | P | O | | | | |
| 27 | | FL | FC | NM | P | O | | | | |
| 28 | | FL | FC | NM | P | O | | | | |
| 29 | | FL | FC | NM | P | O | | | | |
| 30 | | FL | FC | NM | P | O | | | | |
| 31 | | FL | FC | NM | P | O | | | | |
| 32 | | FL | FC | NM | P | O | | | | |
| 33 | | FL | FC | NM | P | O | | | | |
| 34 | | FL | FC | NM | P | O | | | | |
| 35 | | FL | FC | NM | P | O | | | | |
| 36 | | FL | FC | NM | P | O | | | | |

**Notes:** No eagles observed

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Chevron

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Bald Eagle Survey Data Form

Survey Date: 3/26/15 Time: 6:51 am Datasheet 1 of 1
Staff: Walker Weather: Heavy fog

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 19 | | FL | FC | NM | P | O | | | |
| 20 | | FL | FC | NM | P | O | | | |
| 21 | | FL | FC | NM | P | O | | | |
| 22 | | FL | FC | NM | P | O | | | |
| 23 | | FL | FC | NM | P | O | | | |
| 24 | | FL | FC | NM | P | O | | | |
| 25 | | FL | FC | NM | P | O | | | |
| 26 | | FL | FC | NM | P | O | | | |
| 27 | | FL | FC | NM | P | O | | | |
| 28 | | FL | FC | NM | P | O | | | |
| 29 | | FL | FC | NM | P | O | | | |
| 30 | | FL | FC | NM | P | O | | | |
| 31 | | FL | FC | NM | P | O | | | |
| 32 | | FL | FC | NM | P | O | | | |
| 33 | | FL | FC | NM | P | O | | | |
| 34 | | FL | FC | NM | P | O | | | |
| 35 | | FL | FC | NM | P | O | | | |
| 36 | | FL | FC | NM | P | O | | | |

**Notes:** Visibility is approx. 100 yards
No eagles observed.

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 4/1/15 Time: 1730-1930 Datasheet ___ of ___
Staff: MI Weather: Intermittent Rain ~52°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 19 | | FL | FC | NM | P | O | | | |
| 20 | | FL | FC | NM | P | O | | | |
| 21 | | FL | FC | NM | P | O | | | |
| 22 | | FL | FC | NM | P | O | | | |
| 23 | | FL | FC | NM | P | O | | | |
| 24 | | FL | FC | NM | P | O | | | |
| 25 | | FL | FC | NM | P | O | | | |
| 26 | | FL | FC | NM | P | O | | | |
| 27 | | FL | FC | NM | P | O | | | |
| 28 | | FL | FC | NM | P | O | | | |
| 29 | | FL | FC | NM | P | O | | | |
| 30 | | FL | FC | NM | P | O | | | |
| 31 | | FL | FC | NM | P | O | | | |
| 32 | | FL | FC | NM | P | O | | | |
| 33 | | FL | FC | NM | P | O | | | |
| 34 | | FL | FC | NM | P | O | | | |
| 35 | | FL | FC | NM | P | O | | | |
| 36 | | FL | FC | NM | P | O | | | |

**Notes:** No eagles observed

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 04/07/15 Time: 0630 - 0830 Datasheet ___ of ___

Staff: MI Weather: Cloudy, light drizzle, ~45°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | | |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** No eagles observed

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linden

Bald Eagle Survey Data Form

Grette Associates^LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 4/16/15 Time: 6:02 pm - 7:02 pm Datasheet ___ of ___

Staff: Wallin Weather: Clear

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | | |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | No Eagles | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** 1 osprey flew across site @ 6:47pm

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Bald Eagle Survey Data Form

Survey Date: 04/20/15 Time: 0600 - 0815 Datasheet ___ of ___
Staff: MI Weather: Clear, sunny, 45-50°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0750 | [✓ FL] | FC | NM | P | O | 0750 | 0750 | None, flew from river | over mill |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:**

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Bald Eagle Survey Data Form

Survey Date: 4/29/15 Time: 1815 - 2020 Datasheet ___ of ___
Staff: MI Weather: Partly cloudy, 60-65°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | | |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** No Eagles Observed

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

## Bald Eagle Survey Data Form

Survey Date: 05/07/15 Time: 0545 - 0800 Datasheet ___ of ___
Staff: MI Weather: Sunny, 48-55°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | 0638 | FL | FC | NM | [✓ P] | O | 0638 | 0646 | Top of pier building | preening |
| 20 | | FL | FC | NM | P | O | | | | |
| 21 | | FL | FC | NM | P | O | | | | |
| 22 | | FL | FC | NM | P | O | | | | |
| 23 | | FL | FC | NM | P | O | | | | |
| 24 | | FL | FC | NM | P | O | | | | |
| 25 | | FL | FC | NM | P | O | | | | |
| 26 | | FL | FC | NM | P | O | | | | |
| 27 | | FL | FC | NM | P | O | | | | |
| 28 | | FL | FC | NM | P | O | | | | |
| 29 | | FL | FC | NM | P | O | | | | |
| 30 | | FL | FC | NM | P | O | | | | |
| 31 | | FL | FC | NM | P | O | | | | |
| 32 | | FL | FC | NM | P | O | | | | |
| 33 | | FL | FC | NM | P | O | | | | |
| 34 | | FL | FC | NM | P | O | | | | |
| 35 | | FL | FC | NM | P | O | | | | |
| 36 | | FL | FC | NM | P | O | | | | |

**Notes:** Ken Leahy Construction on site doing some excavation along SE fenceline (4) Apollo Environmental

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched,
O = other (explain in notes)

Client: Linnton Mill Site

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 5/14/15 Time: 1820 – 2020 Datasheet ___ of ___
Staff: MI Weather: Partly Cloudy, 65°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | |
| 2 | | FL | FC | NM | P | O | | | |
| 3 | | FL | FC | NM | P | O | | | |
| 4 | | FL | FC | NM | P | O | | | |
| 5 | | FL | FC | NM | P | O | | | |
| 6 | | FL | FC | NM | P | O | | | |
| 7 | | FL | FC | NM | P | O | | | |
| 8 | | FL | FC | NM | P | O | | | |
| 9 | | FL | FC | NM | P | O | | | |
| 10 | | FL | FC | NM | P | O | | | |
| 11 | | FL | FC | NM | P | O | | | |
| 12 | | FL | FC | NM | P | O | | | |
| 13 | | FL | FC | NM | P | O | | | |
| 14 | | FL | FC | NM | P | O | | | |
| 15 | | FL | FC | NM | P | O | | | |
| 16 | | FL | FC | NM | P | O | | | |
| 17 | | FL | FC | NM | P | O | | | |
| 18 | | FL | FC | NM | P | O | | | |

Notes: No eagles observed

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Bald Eagle Survey Data Form

**Grette Associates**LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 5/20/15 Time: 0535 – 0735 Datasheet ___ of ___

Staff: MI Weather: Overcast, 50°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | 0608 | FL | FC | NM | [✓ P] | O | 0608 | 0610 | Roof of warehouse | Perched on roof then flew towards forested upland area |
| 20 | 0709 | FL | FC | NM | P | [✓ O] | 0709 | 0709 | Heard vocalizations. possibly<br>could not visually identify | upslope/off site but sounded very close |
| 21 | | FL | FC | NM | P | O | | | | |
| 22 | | FL | FC | NM | P | O | | | | |
| 23 | | FL | FC | NM | P | O | | | | |
| 24 | | FL | FC | NM | P | O | | | | |
| 25 | | FL | FC | NM | P | O | | | | |
| 26 | | FL | FC | NM | P | O | | | | |
| 27 | | FL | FC | NM | P | O | | | | |
| 28 | | FL | FC | NM | P | O | | | | |
| 29 | | FL | FC | NM | P | O | | | | |
| 30 | | FL | FC | NM | P | O | | | | |
| 31 | | FL | FC | NM | P | O | | | | |
| 32 | | FL | FC | NM | P | O | | | | |
| 33 | | FL | FC | NM | P | O | | | | |
| 34 | | FL | FC | NM | P | O | | | | |
| 35 | | FL | FC | NM | P | O | | | | |
| 36 | | FL | FC | NM | P | O | | | | |

Notes:

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Bald Eagle Survey Data Form

Survey Date: 5/28/15 Time: 1840-2045 Datasheet ___ of ___

Staff: MI Weather: Sunny, ~75° to ~68°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | | |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** No eagles observed

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Bald Eagle Survey Data Form

Survey Date: 6/2/15 Time: 0520-0725 Datasheet ___ of ___

Staff: MI Weather: Cloudy, light rain, 55°

| Bird # | Time | Behavior Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | 0641 | FL | FC | NM | [✓ P] | O | 0641 | 0648 | Top of warehouse | Perched then flew across river |
| 20 | | FL | FC | NM | P | O | | | | |
| 21 | | FL | FC | NM | P | O | | | | |
| 22 | | FL | FC | NM | P | O | | | | |
| 23 | | FL | FC | NM | P | O | | | | |
| 24 | | FL | FC | NM | P | O | | | | |
| 25 | | FL | FC | NM | P | O | | | | |
| 26 | | FL | FC | NM | P | O | | | | |
| 27 | | FL | FC | NM | P | O | | | | |
| 28 | | FL | FC | NM | P | O | | | | |
| 29 | | FL | FC | NM | P | O | | | | |
| 30 | | FL | FC | NM | P | O | | | | |
| 31 | | FL | FC | NM | P | O | | | | |
| 32 | | FL | FC | NM | P | O | | | | |
| 33 | | FL | FC | NM | P | O | | | | |
| 34 | | FL | FC | NM | P | O | | | | |
| 35 | | FL | FC | NM | P | O | | | | |
| 36 | | FL | FC | NM | P | O | | | | |

**Notes:**

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Bald Eagle Survey Data Form

Survey Date: 6/10/15
Time: 1900-2100
Datasheet ___ of ___
Staff: MI
Weather: Sunny, 75°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1900 | FL | FC | NM | [✓ P] | O | 1900 | 1910 | Perched on warehouse roof | |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:**

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Bald Eagle Survey Data Form

Survey Date: 6/18/15 Time: 0520 - 0730 Datasheet ___ of ___

Staff: MI Weather: Sunny 60-65°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | | FL | FC | NM | P | O | | | | |
| 20 | | FL | FC | NM | P | O | | | | |
| 21 | | FL | FC | NM | P | O | | | | |
| 22 | | FL | FC | NM | P | O | | | | |
| 23 | | FL | FC | NM | P | O | | | | |
| 24 | | FL | FC | NM | P | O | | | | |
| 25 | | FL | FC | NM | P | O | | | | |
| 26 | | FL | FC | NM | P | O | | | | |
| 27 | | FL | FC | NM | P | O | | | | |
| 28 | | FL | FC | NM | P | O | | | | |
| 29 | | FL | FC | NM | P | O | | | | |
| 30 | | FL | FC | NM | P | O | | | | |
| 31 | | FL | FC | NM | P | O | | | | |
| 32 | | FL | FC | NM | P | O | | | | |
| 33 | | FL | FC | NM | P | O | | | | |
| 34 | | FL | FC | NM | P | O | | | | |
| 35 | | FL | FC | NM | P | O | | | | |
| 36 | | FL | FC | NM | P | O | | | | |

**Notes:** No eagles observed

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 6/30/15 Time: 7:00 pm

Staff: C Wallin Weather: Clear & hot

Datasheet 1 of 1

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | | |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** Canceled survey @ 8:30pm because the caretaker of the site was on a dozer moving things for no apparent reason. Very loud and likely deterred any eagle from using the site. Began operation dozer @ 7.45pm.

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Bald Eagle Survey Data Form

Gretté Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 7/7/15 Time: 0515-0715

Staff: MI Weather: Partly cloudy, 55° - 60°

Datasheet ___ of ___

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | | |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** No eagles observed

Eagle activity observed on site following the survey between 0740 & 0750 - perched on shoreline pile & pair perched on warehouse roof vocalizing

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Lihwtan

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 7/15/15 Time: 6:55pm Datasheet 1 of 1
Staff: Walsh Weather: clear ± 80°F

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | | FL | FC | NM | P | O | | | | |
| 20 | | FL | FC | NM | P | O | | | | |
| 21 | | FL | FC | NM | P | O | | | | |
| 22 | | FL | FC | NM | P | O | | | | |
| 23 | | FL | FC | NM | P | O | | | | |
| 24 | | FL | FC | NM | P | O | | | | |
| 25 | | FL | FC | NM | P | O | | | | |
| 26 | | FL | FC | NM | P | O | | | | |
| 27 | | FL | FC | NM | P | O | | | | |
| 28 | | FL | FC | NM | P | O | | | | |
| 29 | | FL | FC | NM | P | O | | | | |
| 30 | | FL | FC | NM | P | O | | | | |
| 31 | | FL | FC | NM | P | O | | | | |
| 32 | | FL | FC | NM | P | O | | | | |
| 33 | | FL | FC | NM | P | O | | | | |
| 34 | | FL | FC | NM | P | O | | | | |
| 35 | | FL | FC | NM | P | O | | | | |
| 36 | | FL | FC | NM | P | O | | | | |

**Notes:**
4 osprey FL above the site from start of survey to 7:15pm Ospreys returned @ 7:45pm til 8:00pm

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 7/23/15 Time: 0550 - 0800 Datasheet ___ of ___

Staff: MI Weather: Partly cloudy, 55-60°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | | |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** No eagles observed

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Linnton Mill Site

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Bald Eagle Survey Data Form

Survey Date: 7/30/15 Time: 0605-0815 Datasheet ___ of ___

Staff: MI Weather: Sunny, 70°-78°

| Bird # | Time | Behavior Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | | |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

Notes: No eagles observed

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: LinntonMillSite

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 8/5/15 Time: 1830 - 2045 Datasheet ___ of ___

Staff: MI Weather: Sunny 65 - 72°

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | |
| 2 | | FL | FC | NM | P | O | | | |
| 3 | | FL | FC | NM | P | O | | | |
| 4 | | FL | FC | NM | P | O | | | |
| 5 | | FL | FC | NM | P | O | | | |
| 6 | | FL | FC | NM | P | O | | | |
| 7 | | FL | FC | NM | P | O | | | |
| 8 | | FL | FC | NM | P | O | | | |
| 9 | | FL | FC | NM | P | O | | | |
| 10 | | FL | FC | NM | P | O | | | |
| 11 | | FL | FC | NM | P | O | | | |
| 12 | | FL | FC | NM | P | O | | | |
| 13 | | FL | FC | NM | P | O | | | |
| 14 | | FL | FC | NM | P | O | | | |
| 15 | | FL | FC | NM | P | O | | | |
| 16 | | FL | FC | NM | P | O | | | |
| 17 | | FL | FC | NM | P | O | | | |
| 18 | | FL | FC | NM | P | O | | | |

**Notes:** No eagles observed. No vocalizations or visual observations of site use

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Client: Center

Bald Eagle Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 8/13/15 Time: 0600

Staff: Walter Weather: Clear

Datasheet 1 of 1

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | FL | FC | NM | P | O | | | | |
| 2 | | FL | FC | NM | P | O | | | | |
| 3 | | FL | FC | NM | P | O | | | | |
| 4 | | FL | FC | NM | P | O | | | | |
| 5 | | FL | FC | NM | P | O | | | | |
| 6 | | FL | FC | NM | P | O | | | | |
| 7 | | FL | FC | NM | P | O | | | | |
| 8 | | FL | FC | NM | P | O | | | | |
| 9 | | FL | FC | NM | P | O | | | | |
| 10 | | FL | FC | NM | P | O | | | | |
| 11 | | FL | FC | NM | P | O | | | | |
| 12 | | FL | FC | NM | P | O | | | | |
| 13 | | FL | FC | NM | P | O | | | | |
| 14 | | FL | FC | NM | P | O | | | | |
| 15 | | FL | FC | NM | P | O | | | | |
| 16 | | FL | FC | NM | P | O | | | | |
| 17 | | FL | FC | NM | P | O | | | | |
| 18 | | FL | FC | NM | P | O | | | | |

**Notes:** No eagles observed @ the site.

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

Grette Associates^LLC
ENVIRONMENTAL CONSULTANTS

Client: ____________________

Bald Eagle Survey Data Form

Survey Date: 9/21/15 Time: 6:00 am

Staff: Walker Weather: partly cloudy

Datasheet ___ of ___

| Bird # | Time | Behavior<br>Circle all that apply | | | | | Time of Use | Habitats Used | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 19 | | FL | FC | NM | P | O | | | |
| 20 | | FL | FC | NM | P | O | | | |
| 21 | | FL | FC | NM | P | O | | | |
| 22 | | FL | FC | NM | P | O | | | |
| 23 | | FL | FC | NM | P | O | | | |
| 24 | | FL | FC | NM | P | O | | | |
| 25 | | FL | FC | NM | P | O | | | |
| 26 | | FL | FC | NM | P | O | | | |
| 27 | | FL | FC | NM | P | O | | | |
| 28 | | FL | FC | NM | P | O | | | |
| 29 | | FL | FC | NM | P | O | | | |
| 30 | | FL | FC | NM | P | O | | | |
| 31 | | FL | FC | NM | P | O | | | |
| 32 | | FL | FC | NM | P | O | | | |
| 33 | | FL | FC | NM | P | O | | | |
| 34 | | FL | FC | NM | P | O | | | |
| 35 | | FL | FC | NM | P | O | | | |
| 36 | | FL | FC | NM | P | O | | | |

**Notes:**

no eagles.

**Data Codes**

**Behavior (circle all that apply):**

FL = flying, FC = food carrying, NM = carrying nesting material, P = perched, O = other (explain in notes)

# LINNTON MILL RESTORATION SITE

# SITE-SPECIFIC PERFORMANCE PLAN

## Attachment 4: Mink Transect Data Sheets

SITE:

Mink Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

includes downloading pics
& refreshing scent

Survey Date: 4/7/15
Staff: MI

Time: 1045-1300
Weather: 48°, drizzle

Tide: outgoing
Datasheet ___ of ___

| Observation Number | Approx. Location (also show in map below) | Sign of Use (tracks, scat, dens, photo capture) | Notes |
|---|---|---|---|
| 1 | Beneath pier | potential tracks beneath pier w/in 50ft of scent station | see photos, Could be cat tracks as cats were seen/heard on shoreline prior to survey |
| 2 | Near Cam 3 (before setup) | possible tracks in sand | tracks along shoreline (not under Pier) obscured by rain |
| | | | |
| | | | |
| | | | |
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Notes:

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

SITE:

Mink Survey Data Form

Survey Date: 4/20/15
Staff: MI
Time: 0830 - 1030
Weather: Sunny, 55° - 65°
Tide: Low
Datasheet ___ of ___

| Observation Number | Approx. Location (also show in map below) | Sign of Use (tracks, scat, dens, photo capture) | Notes |
|---|---|---|---|
| | | | No apparent tracks, no scat or signs of dens. |
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**Notes:**

SITE:

Mink Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 5/14/15
Staff: MI

Time: 1645-1800
Weather: Partly Cloudy 65°

Tide: outgoing
Datasheet ___ of ___

| Observation Number | Approx. Location (also show in map below) | Sign of Use (tracks, scat, dens, photo capture) | Notes |
|---|---|---|---|
| | | | No tracks, scat, or other indications of mink observed. |
| | | | Cats/racoons observed on shoreline during survey |
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Notes:

SITE:

Mink Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 5/28/15
Staff: MI

Time: 1735-1845
Weather: Sunny, ~78°

Tide:
Datasheet ___ of ___

| Observation Number | Approx. Location (also show in map below) | Sign of Use (tracks, scat, dens, photo capture) | Notes |
|---|---|---|---|
| | | | No indication of mink tracks, dens, scat, or trail cam photos. Tracks primarily racoon & cat. Nutria observed @ trail cam |
| | | | 3. Coyotes also present. |
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Notes:

SITE: Linnton Mill Site

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Mink Survey Data Form

Survey Date: 6/10/15
Staff: MI

Time: 1600-1730
Weather: Sunny, 78°

Tide: Low
Datasheet ___ of ___

| Observation Number | Approx. Location (also show in map below) | Sign of Use (tracks, scat, dens, photo capture) | Notes |
|---|---|---|---|
| | | | No signs of mink. No scat, tracks, or dens |
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**Notes:**

SITE: Linnton Mill Site

Mink Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 6/25/15
Staff: MI
Time: 1745-1850
Weather: Sunny, 85°
Tide: Very low
Datasheet ___ of ___

| Observation Number | Approx. Location (also show in map below) | Sign of Use (tracks, scat, dens, photo capture) | Notes |
|---|---|---|---|
| | | | No mink tracks, scat, or dens observed. Primarily canada goose, dog, cat, & racoon tracks. Trail camera 3 captured potential mink activity on 6/18/15 @ ~1000. No other signs of mink activity observed |
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Notes:

SITE: Linnton Mill Site

Mink Survey Data Form

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

Survey Date: 7/7/15
Staff: MI

Time: 0730 - 0815
Weather: Cloudy ~60°

Tide:
Datasheet ___ of ___

| Observation Number | Approx. Location (also show in map below) | Sign of Use (tracks, scat, dens, photo capture) | Notes |
|---|---|---|---|
| | | | No signs of mink - no scat, tracks, dens observed. Lots of racoon, cat, & beaver |
| | | | tracks observed along shoreline |
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**Notes:** Bald Eagle perched on shoreline pile @ 0740 → flew to warehouse roof - Vocalizing from roof
2nd bald eagle perched next to first one on warehouse @ 0742; Pair vocalizing

# LINNTON MILL RESTORATION SITE

# SITE-SPECIFIC PERFORMANCE PLAN

## Attachment 5: Photographs

Photograph 1. Raccoon track observed on the mink transect.

Photograph 2. Domestic cat track observed on the mink transect.

Photograph 3. Squirrel on Camera 3.

Photograph 4. Squirrel on Camera 3.

Photograph 5. Squirrel on Camera 3.

Photograph 6. Scrub jay on Camera 3.

**Photograph 7. Coyote on Camera 1.**

**Photograph 8. Coyote on Camera 2.**

Photograph 9. Coyote on Camera 3.

Photograph 10. Nutria on Camera 3.

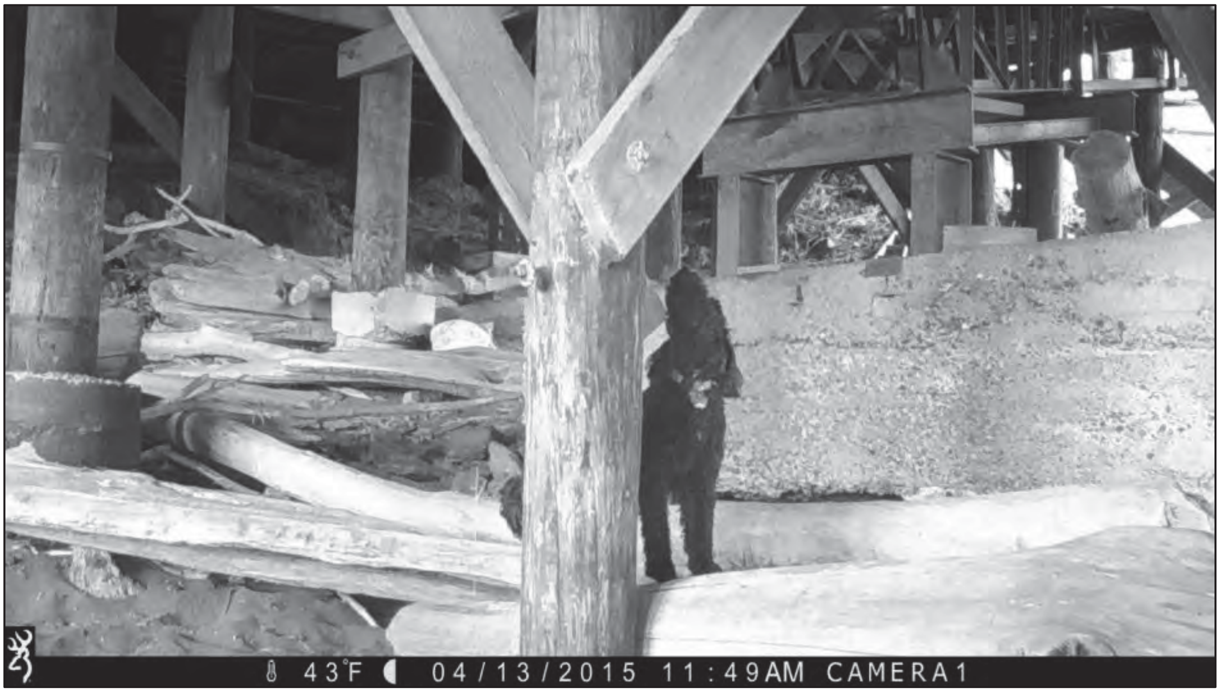
Photograph 11. Raccoons on Camera 1.

Photograph 12. Raccoon on Camera 3.

Photograph 13. Canada goose on Camera 3.

Photograph 14. Domestic cat on Camera 1.

Photograph 15. Domestic cat on Camera 1.



Photograph 16. Domestic dog on Camera 1.

Photograph 17. Domestic dog on Camera 3.

# LINNTON MILL RESTORATION SITE

# EXHIBIT B: SITE-SPECIFIC PERFORMANCE PLAN

## Attachment 3: Linnton Mill Restoration Project – Bird and Bat Protection Guidance (Memorandum from S. Barnes, 4/21/17)

Oregon
Kate Brown, Governor

Department of Fish and Wildlife
West Region
17330 SE Evelyn Street
Clackamas, OR 97015
Phone: 971-673-6000
Fax: 971-673-6070

April 21, 2017

RestorCap
Attn: Andy Gregg
337 17th Street – Suite 200
Oakland, CA 94612

**Re: Linnton Mill Restoration Project – Bird and Bat Protection Guidance**

Bird and bat activity has been confirmed at the Linnton Mill Restoration Project site (Project). All non-game birds, with the exception of European starling, English house sparrow, and Eurasian collared-dove, are classified as "Protected Wildlife" by Oregon Administrative Rule 635-044-0430. Oregon's 15 species of bats, 10 of which have the potential to occur in the Project area, are also classified as "Protected Wildlife". It is unlawful for any person to take (kill or obtain possession or control of), capture, hold, release or have in possession, either dead or alive, whole or in part, any Protected Wildlife. In addition, migratory birds and their active nests (i.e., eggs or dependent young present in nest) are protected from "take" by the Federal Migratory Bird Treaty Act (MBTA).

The Oregon Department of Fish and Wildlife (ODFW) has determined that Project implementation, including demolition of existing structures and removal of vegetation, has the potential to negatively impact birds and bats. To avoid direct "take" of birds, active bird nests, and bats, ODFW recommends the following:

1. **Schedule demolition of existing structures, vegetation removal/trimming, grading of vegetated areas, and other disturbances to bird nesting and bat roosting habitats outside the primary bird nesting season, outside the bat hibernation period, and outside the bat pupping season to the extent practicable. This timeframe (work window) is September 1 through October 31.**

NOTE: In the event an active bird nest is encountered, or eggs or birds are injured or killed, contact the local U.S. Fish and Wildlife Service (USFWS) Migratory Bird Permit Office (503-872-2715) for guidance. In the event flightless or hibernating bats are encountered, or bats are injured or killed, contact ODFW for guidance.

2. **If demolition and other Project activities would not occur within the recommended work window (September 1 through October 31), implement the following:**
    a. Contact the USFWS Migratory Bird Permit Office (503-872-2715) for guidance on how to avoid "take" of migratory birds and their active nests.

b. Coordinate with ODFW to implement USFWS recommended bird conservation measures including, but not limited to, 1) applying seasonal restrictions, 2) employing exclusion devices, deterrents, and hazing methods, 3) removing nest material and inactive nests, 4) searching for active bird nests immediately prior to Project activities using a qualified biologist with avian experience, and 5) implementing avoidance techniques such as establishment of a nest protection buffer zone around an active nest until it becomes inactive as determined through monitoring.

c. Employ exclusion devices to prevent / minimize use of suitable habitat (natural or structures) by bats for pupping or hibernation. Inspect suitable habitat for presence of bats immediately prior to Project activities. Inspection should be conducted by a qualified biologist with bat experience. Establish a protection buffer zone around bat maternity sites or hibernacula until unoccupied.

NOTE: In the event an active bird nest is encountered, or eggs or birds are injured or killed, contact the local U.S. Fish and Wildlife Service (USFWS) Migratory Bird Permit Office (503-872-2715) for guidance. In the event flightless or hibernating bats are encountered, or bats are injured or killed, contact ODFW for guidance.

Addition information:

- USFWS Conservation Measures: Avoiding and Minimizing Impacts to Birds
- USFWS Nationwide Standard Conservation Measures
- Avoiding Impacts on Nesting Birds: Best Management Practices – Vegetation and Construction Projects (City of Portland 2016)
- ODFW's Living with Wildlife - Bats
- Guidelines on Acceptable Management Practices for Bat Control Activities in Structures (WNSCRWG 2015)

If you have questions regarding the guidance and recommendations above or need additional information guidance, please contact me at susan.p.barnes@state.or.us or (971) 673-6010.

Sincerely,

Susan Barnes

Susan Barnes
Regional Conservation Biologist
West Region

Cc: Portland Harbor Trustee Council's Restoration Committee
Jay Dirkse, Grette Associates LLC

# Exhibit C. Basis of Design Report (Waterways Consulting)

WATERWAYS CONSULTING, INC.

Ecological Restoration Design ~ Civil Engineering ~ Natural Resource Management

# BASIS OF DESIGN MEMORANDUM – 100% DESIGN

*To:* Rob Marinai, RestorCap

*From:* Waterways Consulting, Inc.

*Date:* December 20, 2016

*Re:* Linnton Mill Site Habitat Restoration

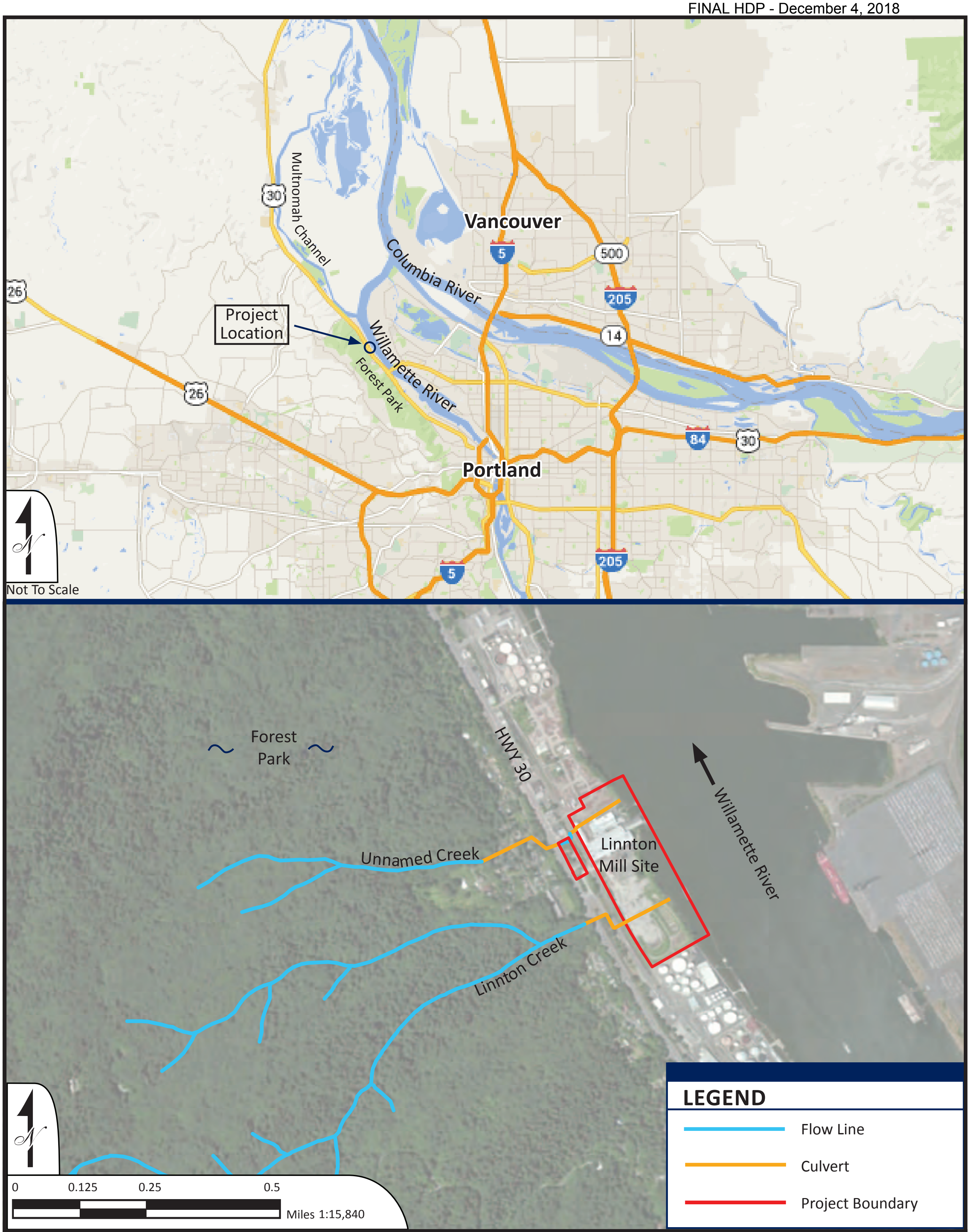
## Introduction

Over the past three years, Restorcap has been working with the Linnton Plywood Association, the Portland Harbor Trustee Council and the Linnton Neighborhood Association to implement a floodplain reconnection and habitat restoration project at the unused Linnton Plywood Mill (Figure 1). The purpose and need of the project is to implement a habitat restoration action in the Lower Willamette River/Portland Harbor for the purpose of offsetting Natural Resource Damage (NRD) liabilities. Additionally, the applicant will seek to develop the site as a mitigation bank under other applicable mitigation programs.

The Linnton Plywood site is located at River Mile 4.8 of the Willamette River along the west bank of the river, encompassing approximately 2,000 feet of river frontage (Figure 2). The proposed project is a mitigation banking project that will convert the property to natural habitat and wetlands that include the following project elements:

- Demolition and recycling of the existing structures,
- Daylighting of the portion of Linnton Creek that flows through the property,
- Replacement and rerouting of a severely degraded culvert that conveys an unnamed creek, located at the northern boundary of the site (referred to as the North Tributary),
- Excavation of historic fill in the central and southern portion of the property to create off-channel open water and riparian habitat that would be directly connected to the Willamette River,
- Balance of material cut from the floodplain reconnection area to create a mosaic of riparian and upland habitats in the northern portion of the property, and
- Creation of a publicly accessible pathway along the northern boundary of the property to connect the Linnton commercial center to the Willamette River and provide for future connections to the City of Portland’s proposed Willamette Greenway Trail.

The area surrounding the Linnton Mill Site is highly developed and industrialized with few natural shoreline or riparian habitat features. Juvenile salmonids and other aquatic organisms rely on shallow water habitats for rearing, foraging, and refuge. The created off-channel habitat would provide critical refuge and foraging opportunities for juvenile salmonids at all water levels, including a cold water refuge from Linnton Creek during low water conditions. The proposed restoration project would also provide riparian habitat for a range of other species, including shore birds, raptors, and small mammals.



Location Map

LiNNTON MiLL SiTe HABiTAT ReSTORATiON

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OCTOBeR 2014

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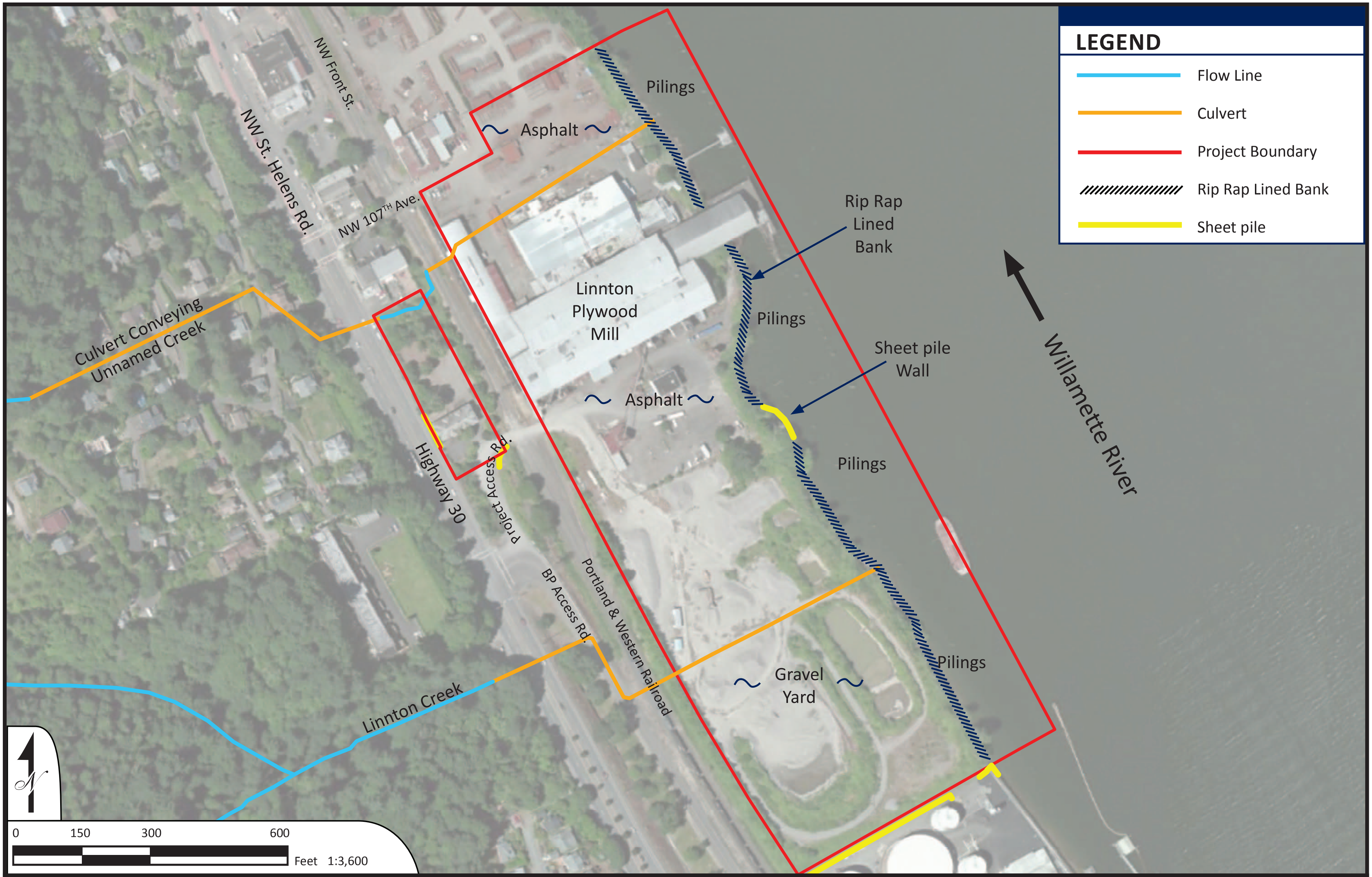
CONSULTING, INC.
Santa Cruz, CA | watways.com | Portland, OR

FIGURE
1



**FIGURE**

**2**

**Existing Conditions**

LiNNTON MiLL SiTe HABiTAT ReSTORATiON

BASiS OF deSiGN RePORT
OCTOBeR 2014

WATERWAYS CONSULTING, INC.
Santa Cruz, CA | watways.com | Portland, OR

The proposed project will also include the removal of shoreline debris, wood pilings, piling stubs, over-water structures, and shoreline armoring as well as re-contouring of the over-steepened bank. These proposed treatments will improve habitat along the mainstem of the Willamette by eliminating creosote releases from treated timber pilings and other deleterious shoreline debris, prevent shoreline erosion, and remove invasive shoreline vegetation. Overall, the proposed project will provide significant habitat functions for aquatic and terrestrial organisms, including listed salmonids, in a highly developed and industrialized area of the Willamette River, where natural shoreline and shallow water habitats are scarce.

The proposed project is currently in the planning and design phase and has received preliminary approval from the Portland Harbor Trustee Council and is strongly supported by the Linnton Neighborhood. The project will be maintained as a natural feature in perpetuity with construction proposed for spring and summer of 2017.

This Basis of Design Report provides a detailed description of the project, outlines the expected project benefits, identifies the design criteria and approach, and discusses the expected approach to project construction including construction timing, phasing, dewatering, and erosion control. Engineering drawings for the project have been developed to the 100% level of design and are included as Appendix A.

## Project Setting

### General Site Description

The Linnton Mill Site is a highly developed industrial site that encompasses approximately 26 acres and over 1,800 linear feet of the western bank of the Lower Willamette River, including aquatic nearshore, active channel margin, riparian bank, and upland habitats. The site is located in the City of Portland's Heavy Industrial Zone within the Portland Harbor between approximately River Mile (RM) 4.7 to 5.0 on the Willamette River (Figure 1). The site includes extensive shoreline and in-water pilings, overwater structures, shoreline armoring, a sheet pile wall, small isolated patches of riparian vegetation, and highly developed industrial upland that was historically used for plywood production and a sand and gravel storage and sorting operation. The vicinity of the site is dominated by industrial uses along the shoreline with forested and residential areas on the west side of Highway 30. Few natural shoreline features exist in the vicinity of the site. Two perennial tributaries cross the project area in culvert pipes (Figure 2). The larger tributary crosses the southern end of the project area and is referred to as Linnton Creek. A smaller unnamed tributary crosses the site at the north end and is being referred to as the North Tributary.

Elevations at the site range from below sea level along the bed of the Willamette River to 50 feet NAVD88 along the western margin of the project area. Elevations along the top of bank of the Willamette River range from 40 to 45 feet NAVD88. Much of the site consists of a relatively flat terrace that slopes toward the Willamette River with elevations ranging from 40 to 50 feet NAVD88. A geotechnical evaluation of the site conducted by Geotechnics, LLC (Appendix C) identified a layer of imported fill that ranged from 10 feet thick at the west edge of the site to 25 feet along the banks of the Willamette River. Below the fill, natural alluvial material consisting of 10 to 15 feet of silt on top of greater than 40 feet of sandy alluvium. Below the alluvium is Columbia River Basalt that ranges from +0 feet NAVD88 to -40 feet NAVDD at the current bankline of the Willamette River.

Much of the lower Willamette, including the site, is included within the Portland Harbor Superfund area. The Linnton Mill Site is within the Area of Potential Concern (AOPC) 7. Superfund issues identified at/near the site include elevated levels of polycyclic aromatic hydrocarbons (PAHs). However, no known contamination requiring remediation exists on the Linnton Mill Site[1]. The landowner has a "No Further Action" letter from Oregon Department of Environmental Quality (ODEQ) for the property.

Shoreline vegetation along the margin of the site, nearest to the Willamette River, consists primarily of invasive Himalayan blackberry (*Rubus armeniacus*) and reed canarygrass (*Phalaris arundinacea*), with small patches of riparian vegetation including native trees and shrubs consisting primarily of red alder (*alnus rubra*) and black cottonwood (*Populus trichocarpa*). Shoreline vegetation typically extends down as low as approximately +13 ft elevation, at or slightly below the toe of the bank slope. Approximately 1,200 linear feet of the Linnton Mill Site shoreline bank is armored with rip rap and sheet pile, while the remaining 600 linear feet is unarmored but over-steepened and dominated by reed canarygrass. The substrate at the toe of the bank consist of sand and silty sand. From the top of the bank landward, vegetation is sparse, consisting only of weedy species.

The Willamette River provides habitat for fish and other aquatic organisms, but habitat elements such as vegetation, off-channel areas, and channel complexity are extremely limited due to industrialization of the riverfront from industries that relied on access to the River, dredging of the River for navigation, filling of historic off-channel areas, bank stabilization efforts, and protection from flooding. Adult salmon and steelhead use this area as a migratory corridor on their way to upstream spawning areas. Juvenile salmon and steelhead may rear in this areas as well as migrate through it, but it is not considered to be high quality rearing habitat due to the loss of key habitat elements. Listed salmonids and their critical habitat are present in the vicinity of the project area; these include Chinook salmon (*Oncorhynchus tshawytscha*) - Lower Columbia River ESU and Upper Willamette River ESU, coho salmon (*O. kisutch*) – Lower Columbia River ESU, and steelhead trout (*O. mykiss*) – Lower Columbia River DPS and Upper Willamette River DPS.

## *Hydrology*

### WILLAMETTE RIVER

Although the hydrology at the site is dominated by the Willamette River, much of the site occurs both above Ordinary High Water (OHW) and above the 100 year base flood elevation determined by FEMA. Based on a U.S. Army Corps of Engineers (Corps) study, OHW was determined to be 16.6 feet NGVD1929 (20.1 feet NAVD88). The 100-year flood elevation determined by FEMA is 30.4 feet NAVD88. The water

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[1] A small, isolated contaminate plume has been identified in the far south-eastern portion of site that originated from the neighboring British Petroleum (BP) property. The source of contaminates has been addressed and BP is in the process of designing and implementing a clean-up effort involving in-situ remediation. The clean-up process is expected to be complete prior to habitat restoration efforts commencing at the site although several monitoring wells will be maintained on the property for up to two to three years to satisfy Oregon DEQ requirements. The proposed habitat restoration efforts were developed to avoid any site re-grading in the plume area and groundwater modeling by BP confirmed no expected future impacts to restored habitats.

surface elevation for the 1996 flood, which was the largest flood in the modern era on the Willamette River, was estimated to be 32.5 feet NAVD88.

The 100 year base flood elevation and ordinary high water represent instantaneous events that happen infrequently. To understand the frequency with which various flow depths occur, the long-term gage record for the Willamette River at the Morrison Bridge was used (USGS Gage ID 14211720) to generate river stage exceedance probabilities for the project area. This gage is located at River Mile 12.8 and consists of 15 minute stage data from October 1988 to August 2013 (over 590,000 stage measurements). Although the gage site is located 8 miles upstream of the project area, water surface slope along the lower river is almost negligible allowing for a direct correlation between the data collected at the Morrison Bridge and water surface elevations at the project site. The data was converted to NAVD88 and exceedance probabilities were calculated separately for three time periods, which represent different hydrologic regimes: November to March (high flow on the Willamette), April to July (high flow on the Columbia), and August to October (tidally dominated conditions).

Table 1 summarizes the results and represents the frequency that the water surface elevation in the Willamette River is at the specified elevation. For example, in the April to July timeframe the Willamette River reaches an elevation of 14.4 feet, 20% of the time. It also implies that 80% of the time it is below that elevation from April to July.

**Table 1: Willamette at Portland Exceedance Probabilities**

| Frequency of Inundation | Elevations in NAVD 88 (feet) | | |
|---|---|---|---|
| | Nov-Mar | Apr-Jul | Aug-Oct. |
| 1% | 19.5 | 21.6 | 11.4 |
| 5% | 15.7 | 18.3 | 10.5 |
| 10% | 14.1 | 16.1 | 10.0 |
| 15% | 13.2 | 15.1 | 9.6 |
| 20% | 12.6 | 14.4 | 9.3 |
| 25% | 12.1 | 13.8 | 9.1 |
| 30% | 11.7 | 13.2 | 8.8 |
| 40% | 11.0 | 12.4 | 8.4 |
| 45% | 10.7 | 11.9 | 8.2 |
| 50% | 10.4 | 11.6 | 8.0 |
| 55% | 10.2 | 11.2 | 7.8 |
| 60% | 9.9 | 10.9 | 7.7 |
| 65% | 9.7 | 10.5 | 7.5 |
| 70% | 9.4 | 10.2 | 7.3 |
| 75% | 9.1 | 9.8 | 7.1 |
| 80% | 8.8 | 9.4 | 6.9 |
| 85% | 8.5 | 8.9 | 6.7 |
| 90% | 8.1 | 8.3 | 6.7 |
| 95% | 7.6 | 7.5 | 6.0 |
| 99% | 6.8 | 6.4 | 5.4 |

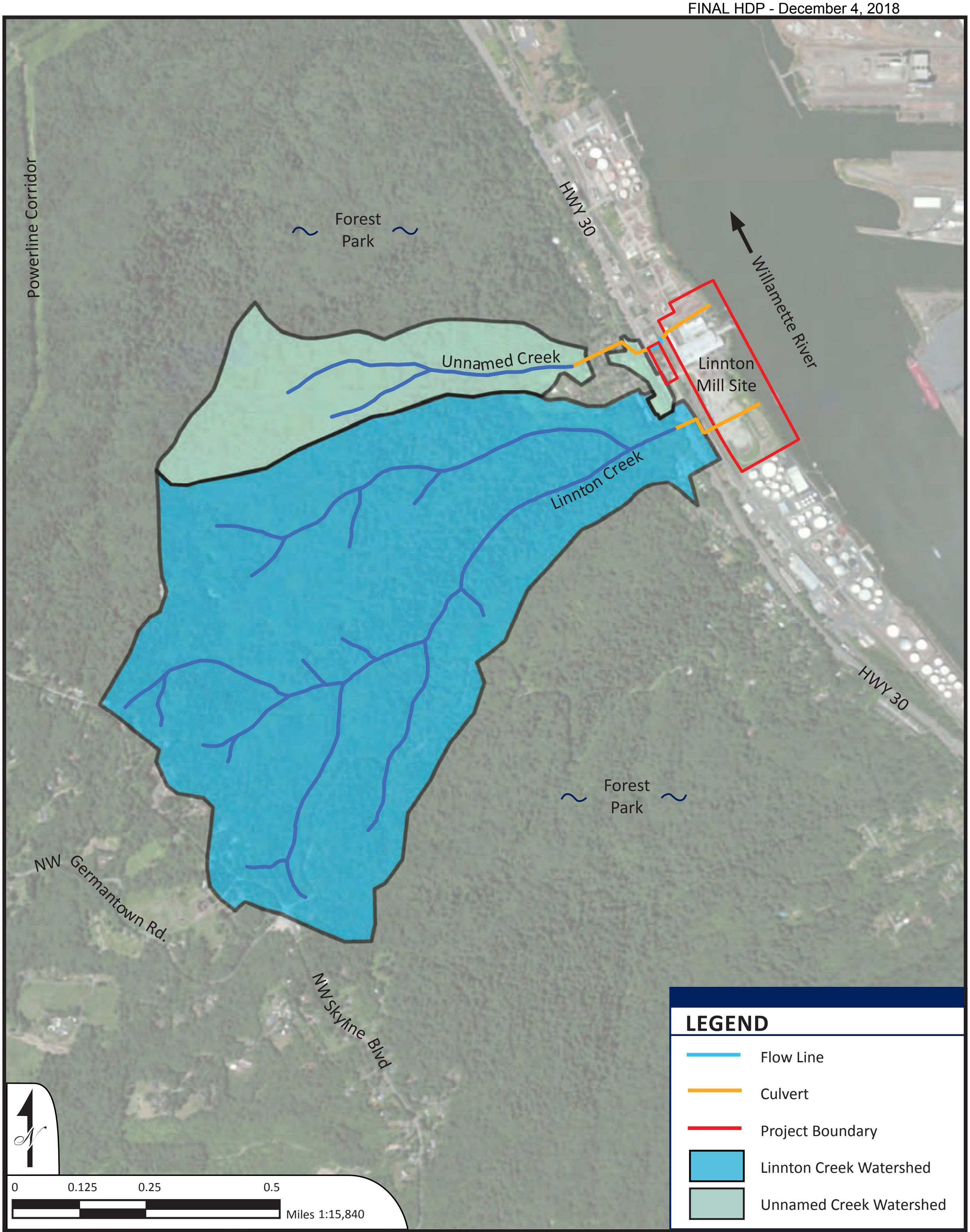
## TRIBUTARIES

Linnton Creek and the North Tributary are both currently conveyed through the project site via culverts (Figure 2). The proposed project seeks to daylight Linnton Creek into the floodplain reconnection area and reroute the North Tributary culvert to the north of the proposed fill area with a new outfall to the Willamette River. Although daylighting of the North Tributary was considered, it was determined to be infeasible due to the fixed elevation of the culvert when it is conveyed under the railroad, which results in an inability to convey the flow at the surface through the north end of the project area. Consideration was also given to the idea of rerouting flow to the south and daylighting it to Linnton Creek. This alternative was rejected due to the presence of existing infrastructure between the two existing culverts that includes the BP access road, the railroad, and City of Portland sewer and existing stormwater infrastructure.

To inform the design process, the hydrologic contributions to each of the culverts under existing conditions were determined. The contributing watersheds for both Linnton Creek and the North Tributary were delineated using multiple sources of information to determine the amount of runoff contributing to the culverts from upstream of the project area. The portions of the watersheds located in undeveloped areas were delineated using LiDAR-based contour data obtained from the City of Portland. For the developed portions of the watersheds, a combination of Portland Maps and field observations were used to determine what stormwater infrastructure contributed to flow in these two watersheds. Figure 3 shows the results of this delineation effort. The North Tributary watershed is divided into two separate polygons due to the presence of stormwater infrastructure in the neighborhood to the west of St. Helens Road (Highway 30) that connects to a combined sewer system that intercepts stormwater runoff and conveys it to the sewer system. Flow from the hillside to the west is conveyed through the neighborhood via a series of culverts.

Following the delineation of the contributing watershed areas, peak flow hydrology was modeled for the two watersheds using Autodesk Storm and Sanitary Analysis 2013 software. The Natural Resource Conservation Service (NRCS) Technical Report-55 (TR-55) was selected as the most appropriate runoff modeling method to convert precipitation into runoff assuming a Type 1A 24-hour unit hydrograph. Design storm 24-hour rainfall depths were taken from Appendix C of the City of Portland Stormwater Management Manual (January 2014). The NRCS soils survey website was used to determine the hydrologic soils groups for the watersheds to determine curve numbers for each land use type (see Appendix B). The following assumptions were made for this analysis:

- All soils were classified as hydrologic soil group C. The soil survey showed one small area of group B soil within the Linnton Creek watershed, but this area was deemed to be too small relative to the overall watershed size to warrant delineation as a distinct unit.
- A curve number of 70 was selected for the two larger delineated watersheds based on a classification of the area as forested with good ground cover. Impervious areas within these watersheds contributed to less than 1% of the total area, so they were considered negligible for this analysis.
- A curve number of 83 was selected for the small watershed contributing to the North Tributary based on a classification of the area as residential with 38% impervious cover.
- The time of concentration for each watershed was set to 5 minutes to provide a conservative estimate of the peak runoff flow.



Watershed Areas

LINNTON MILL SITE HABITAT RESTORATION

BASIS OF DESIGN REPORT
OCTOBER 2014

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FIGURE
3

Table 2 summarizes the results of this analysis for the 2, 10, 25, and 100 year event return intervals.

Table 2: Peak Discharge Estimates

| Return Interval (years) | Estimated Discharge (in cfs) | |
|---|---|---|
| | Linnton Creek | North Tributary |
| 2 | 12.0 | 2.8 |
| 10 | 62.7 | 14.4 |
| 25 | 93.6 | 21.4 |
| 100 | 127.0 | 29.0 |

### *Geomorphic Setting*

The lower Willamette River of today looks much different than it did historically. The historic river was much wider, shallower, and more complex. Debris, log jams, and a complex mosaic of vegetation, floodplain wetlands, meander scars, and vegetated bars and islands typified conditions historically on the lower river. The confluence of the lower Willamette and the Columbia River was likely a mosaic of primary channels, sloughs, alcoves, and backwaters and the actual confluence of these two large rivers was indeterminate and shifting in response to high flow conditions and delivery of sediment.

Those historic conditions were ultimately a hindrance to the development of a modern city with an industrial economy. Consequently, beginning in the late 1800's and continuing to the modern era, the lower Willamette River was converted from a complex river with a mosaic of habitat types and broad floodplain forests to a highly confined channel dominated by open water, armored banks, and adjacent industrial land uses. The bed of the river was also dredged and deepened to facilitate navigation and natural obstructions, such as large wood jams, are removed.

Off-channel wetlands, open water, and floodplain forests were removed, filled, drained and leveed. At the Linnton Mill site, as much as 20 feet of fill was likely placed at the site to create level ground, fill wetlands, and limit risk from flooding. The tributary channels entering the site from the adjacent Tualatin Hills were culverted.

Peak flow hydrology and associated water surface elevations on the Willamette have also been modified significantly by flood control activities in both the Willamette River and Columbia River watersheds. In 1970, the Columbia Basin flood control management system was finally completed, resulting in significant reductions in water surface elevations of the Columbia River during the spring snowmelt runoff peaks. Because the lower Willamette is in the backwater of the Columbia River, management of the Columbia system had a significant impact on the lower Willamette. This, combined with dredging of the lower Willamette, significantly lowered the base level of the lower Willamette and likely caused beach and bank erosion. Evidence of these impacts at the Linnton Mill site can be observed at the base of the pilings that support the over-water structures. The concrete foundation of many of the pile footings are suspended in the air, several feet above the current beach elevation.

## Design Approach

### *Habitat Types and Associated Inundation Frequencies*

Dredging and straightening of the Willamette River, combined with filling of historic floodplains have resulted in the presence of relatively flat terraces along the margins of the River that are outside of the 100-year floodplain. These terraces are often characterized by oversteepened and eroding banks that have been protected in the past by placement of debris, riprap or industrial rubble. Within the project area some native riparian vegetation has recolonized the banks and terraces, although much of the existing bank consists of non-native vegetation such as scotch broom, thistle, blackberry, and other invasive species. Historic infrastructure such as concrete walls, sheet pile walls, and piers and pilings are common.

To restore wetland and riparian habitat on these existing terraces requires the removal of considerable quantities of fill and recountouring of excavated areas to achieve the desired suite of habitat types. The types of habitats that are desired at the site are dictated by their frequency of inundation from the Willamette River which ultimately is defined by elevation.

The hydrology of the Willamette River can be separated seasonally into three distinct, but overlapping, hydrologic regimes. From November to March the dominant influence is rainfall and rain-on-snow driven high flows from the Willamette River Watershed and its tributaries. From April to July flow from the Willamette River is still a significant hydrologic influence on the lower Willamette but the stage of the river is often dictated by backwater effects from snowmelt-driven peak flow conditions on the Columbia River. From August through October the dominant influence on stage is the semi-diurnal influence of the tide, although it is important to note that the tidal regime has an effect on stage throughout the year.

In the case of the Linnton Plywood site, the proposed grading work and associated revegetation plan has been developed to create habitat types based on their frequency and duration of inundation (see Appendix A - 100% Engineering Drawings). Furthermore, to meet the requirements of the NRD process, designation of these habitat types must conform to those identified and defined by the Habitat Equivalency Analysis (HEA) model, which establishes the basis for crediting of the proposed action. The following is a summary of the desired habitat types based on inundation frequencies and expected zones of vegetation along with the equivalent habitat types from the HEA model.

- Alcove/Slough/Open Water: This area will be inundated a majority of the time, except during at low tide during the drier times of the year (August – October). Classified as ***Aquatic/Off-Channel Habitat*** in the HEA model.
- Secondary Channel/Alcove: This area encompasses the high flow channel and the agent area that is graded to a low slope condition. The primary purpose of this zone is to provide off channel habitat for salmonids and other aquatic species encompassing a range of inundation frequencies. Classified as ***Aquatic/Off-Channel Habitat*** in the HEA model.
- Shrub/Scrub Habitat: This area constitutes a habitat the will support vegetation but occurs below the Ordinary High Water (OHW) line designated in the HEA model. It will support a range of species tolerant to periodic inundation even during the growing season. Classified as ***Aquatic/Off-Channel Habitat*** in the HEA model.

- Forested Riparian: This area will eventually consist of a mature forest with a mix of conifer and deciduous species and only be inundated along the margins of the habitat type for short periods of time, typically outside of the growing season. Classified as ***Riparian Habitat*** in the HEA model.
- Forested Upland: This habitat type will never be inundated and will consist of mix of deciduous and coniferous trees and shrubs. Classified as ***Upland Habitat*** in the HEA Model.
- Willamette Shoreline: This area incorporates habitat improvements along the existing shoreline of the Willamette River below OHW. Combines ***Shallow Water Habitat*** and ***Active Channel Margin Habitat*** within the HEA Model.

To identify the appropriate elevations for these habitat types a variety of methods were used that included the following:

- Compilation and evaluation of a long-term stage record for the Willamette River,
- Reference site data compiled for floodplain wetland habitats on the Lower Columbia River by the Lower Columbia Estuary Partnership (Borde et. al., 2010), and
- Recent elevation data collected at the site.

To better define the range of elevations for the preferred habitats that would be created at the Linnton Mill site a reference site was identified that was studied in detail by the Batelle Marine Science Lab for the Lower Columbia Estuary Partnership (Borde et. al., 2010). In the report, entitled Lower Columbia River and Estuary Restoration Reference Site Study, the researchers intensively monitored 43 reference sites from the Columbia River mouth to Bonneville Dam. The site closest to our project area, known as Sauvie Slough (or Willow Bar), is located on the eastern side of Sauvie Island on the mainstem Columbia River downstream of the confluence with the Willamette. Although the site is located approximately 10 river miles from the project area it represents the best source of information to correlate water surface elevations with wetland habitats. Detailed information defining the thalweg and bank elevations of existing tidal channels and lower and upper bounds of marsh and riparian wetland habitats are provided for the Sauvie Slough site.

With the elevation ranges for the desired habitat types defined by the reference site and inundation frequencies determined, per Table 1, the grading plan was developed. The selected elevation ranges and their rationale for selection are as follows:

- Open Water: A base elevation of 5 feet NAVD88 was selected for this habitat type. This elevation is based on the exceedance probability data that suggests a base elevation of 5 feet would create open water habitat that is inundated from the Willamette River most of the time (>95% during the tidally-dominated low flow period from August to October). An elevation of 5 feet represents complete inundation from November through July.
- High Flow Channel/Alcove/Mud Flat: A base elevation of 9.5 feet NAVD88 was selected for this habitat type. This is based primarily on achieving inundation of the high flow channel 75% of the time through July, thereby providing connectivity through the site and providing off-channel refuge areas for both adult and juvenile salmonids. Areas adjacent to the high flow channel, up to an elevation of 13 feet, will be seasonally wet and consist of a mix of open water, mudflat, and herbaceous vegetation. Although the project will not directly plant this area, it is likely that vegetation will establish, over time, at the higher portions of the habitat zone. Herbaceous and sedge communities were identified at the Sauvie Slough site from a low elevation of 9.3 feet up to 11.5 feet with shrub communities existing above 12.6 feet to OHW.

- Shrub/Scrub Habitat: The elevation range selected for these two habitat type would encompass from 13 feet to 20.1 feet NAVD88. This was based on a survey of the existing vegetation line along the Willamette River adjacent to the site suggesting that mature trees and shrubs should grow throughout this habitat type. Herbaceous and sedge communities were identified at the Sauvie Slough site from a low elevation of 9.3 feet up to 11.5 feet with shrub communities existing above 12.6 feet to OHW.
- Forested Riparian: The elevation range selected for this habitat type extends from OHW out to a 200 foot buffer as defined by the HEA model. Portions of this habitat type would be inundated along its lowest margin during high flow conditions but otherwise stay relatively dry.
- Forested Upland: This habitat type would occur in areas above OHW outside of the 200 foot buffer.

A tabular summary of the expected frequency of inundation of these different habitat types are provided in Table 3 and are shown in Figure 4. Table 4 summarizes the number of acres of each habitat type that will be created on site.

Table 4: Summary of acreages of each habitat type proposed within the project area

| HEA Habitat Type | Site Specific Habitat Type | Total acres |
|---|---|---|
| Aquatic / Off-Channel Habitat | Slough/Open Water | 0.53 |
| | High Flow Channel/Alcove | 1.78 |
| | Shrub/Scrub | 2.03 |
| Riparian Habitat | Forested Riparian | 9.29 |
| Upland Habitat | Forested Upland | 4.86 |
| Shallow Water and Active Channel Margin Habitat | Willamette Shoreline | 7.76 |

## *Cut and Fill Balancing*

Although one of the primary objectives of the project is to maximize the quantity and quality of acreage on the site that is inundated by the Willamette River, doing so requires excavation of a significant amount of sediment that was historically placed on the site as fill. Consequently, the selected design approach balances the desire to maximize habitat below the designated Ordinary High Water elevation of 20.1 feet NAVD88 with the practical need to balance the material cut from the site with an equivalent amount of fill elsewhere on the site.

**Frequency of Inundation for Alcove/Slough/Open Water Habitat: Base Elevation 5 feet**

| Frequency of Inundation | Elevations in NAVD 88 (ft.) | | |
|---|---|---|---|
| | Nov-Mar | Apr-Jul | Aug-Oct. |
| 1% | 19.5 | 21.6 | 11.4 |
| 5% | 15.7 | 18.3 | 10.5 |
| 10% | 14.1 | 16.1 | 10.0 |
| 15% | 13.2 | 15.1 | 9.6 |
| 20% | 12.6 | 14.4 | 9.3 |
| 25% | 12.1 | 13.8 | 9.1 |
| 30% | 11.7 | 13.2 | 8.8 |
| 40% | 11.0 | 12.4 | 8.4 |
| 45% | 10.7 | 11.9 | 8.2 |
| 50% | 10.4 | 11.6 | 8.0 |
| 55% | 10.2 | 11.2 | 7.8 |
| 60% | 9.9 | 10.9 | 7.7 |
| 65% | 9.7 | 10.5 | 7.5 |
| 70% | 9.4 | 10.2 | 7.3 |
| 75% | 9.1 | 9.8 | 7.1 |
| 80% | 8.8 | 9.4 | 6.9 |
| 85% | 8.5 | 8.9 | 6.7 |
| 90% | 8.1 | 8.3 | 6.4 |
| 95% | 7.6 | 7.5 | 6.0 |
| 99% | 6.8 | 6.4 | 5.4 |

**Frequency of Inundation for High Flow Channel/Alcove/Mud Flat: Base Elevation 9.5 feet**

| Frequency of Inundation | Elevations in NAVD 88 (ft.) | | |
|---|---|---|---|
| | Nov-Mar | Apr-Jul | Aug-Oct. |
| 1% | 19.5 | 21.6 | 11.4 |
| 5% | 15.7 | 18.3 | 10.5 |
| 10% | 14.1 | 16.1 | 10.0 |
| 15% | 13.2 | 15.1 | 9.6 |
| 20% | 12.6 | 14.4 | 9.3 |
| 25% | 12.1 | 13.8 | 9.1 |
| 30% | 11.7 | 13.2 | 8.8 |
| 40% | 11.0 | 12.4 | 8.4 |
| 45% | 10.7 | 11.9 | 8.2 |
| 50% | 10.4 | 11.6 | 8.0 |
| 55% | 10.2 | 11.2 | 7.8 |
| 60% | 9.9 | 10.9 | 7.7 |
| 65% | 9.7 | 10.5 | 7.5 |
| 70% | 9.4 | 10.2 | 7.3 |
| 75% | 9.1 | 9.8 | 7.1 |
| 80% | 8.8 | 9.4 | 6.9 |
| 85% | 8.5 | 8.9 | 6.7 |
| 90% | 8.1 | 8.3 | 6.4 |
| 95% | 7.6 | 7.5 | 6.0 |
| 99% | 6.8 | 6.4 | 5.4 |

**Frequency of Inundation for Scrub/Shrub Habitat Elevation Range: 13 feet to 20.1 feet**

| Frequency of Inundation | Elevations in NAVD 88 (ft.) | | |
|---|---|---|---|
| | Nov-Mar | Apr-Jul | Aug-Oct. |
| 1% | 19.5 | 21.6 | 11.4 |
| 5% | 15.7 | 18.3 | 10.5 |
| 10% | 14.1 | 16.1 | 10.0 |
| 15% | 13.2 | 15.1 | 9.6 |
| 20% | 12.6 | 14.4 | 9.3 |
| 25% | 12.1 | 13.8 | 9.1 |
| 30% | 11.7 | 13.2 | 8.8 |
| 40% | 11.0 | 12.4 | 8.4 |
| 45% | 10.7 | 11.9 | 8.2 |
| 50% | 10.4 | 11.6 | 8.0 |
| 55% | 10.2 | 11.2 | 7.8 |
| 60% | 9.9 | 10.9 | 7.7 |
| 65% | 9.7 | 10.5 | 7.5 |
| 70% | 9.4 | 10.2 | 7.3 |
| 75% | 9.1 | 9.8 | 7.1 |
| 80% | 8.8 | 9.4 | 6.9 |
| 85% | 8.5 | 8.9 | 6.7 |
| 90% | 8.1 | 8.3 | 6.4 |
| 95% | 7.6 | 7.5 | 6.0 |
| 99% | 6.8 | 6.4 | 5.4 |

**Frequency of Inundation for Forested Riparian Habitat Elevation Range: 20.1 feet to 30.4 feet**

| Frequency of Inundation | Elevations in NAVD 88 (ft.) | | |
|---|---|---|---|
| | Nov-Mar | Apr-Jul | Aug-Oct. |
| 1% | 19.5 | 21.6 | 11.4 |
| 5% | 15.7 | 18.3 | 10.5 |
| 10% | 14.1 | 16.1 | 10.0 |
| 15% | 13.2 | 15.1 | 9.6 |
| 20% | 12.6 | 14.4 | 9.3 |
| 25% | 12.1 | 13.8 | 9.1 |
| 30% | 11.7 | 13.2 | 8.8 |
| 40% | 11.0 | 12.4 | 8.4 |
| 45% | 10.7 | 11.9 | 8.2 |
| 50% | 10.4 | 11.6 | 8.0 |
| 55% | 10.2 | 11.2 | 7.8 |
| 60% | 9.9 | 10.9 | 7.7 |
| 65% | 9.7 | 10.5 | 7.5 |
| 70% | 9.4 | 10.2 | 7.3 |
| 75% | 9.1 | 9.8 | 7.1 |
| 80% | 8.8 | 9.4 | 6.9 |
| 85% | 8.5 | 8.9 | 6.7 |
| 90% | 8.1 | 8.3 | 6.4 |
| 95% | 7.6 | 7.5 | 6.0 |
| 99% | 6.8 | 6.4 | 5.4 |

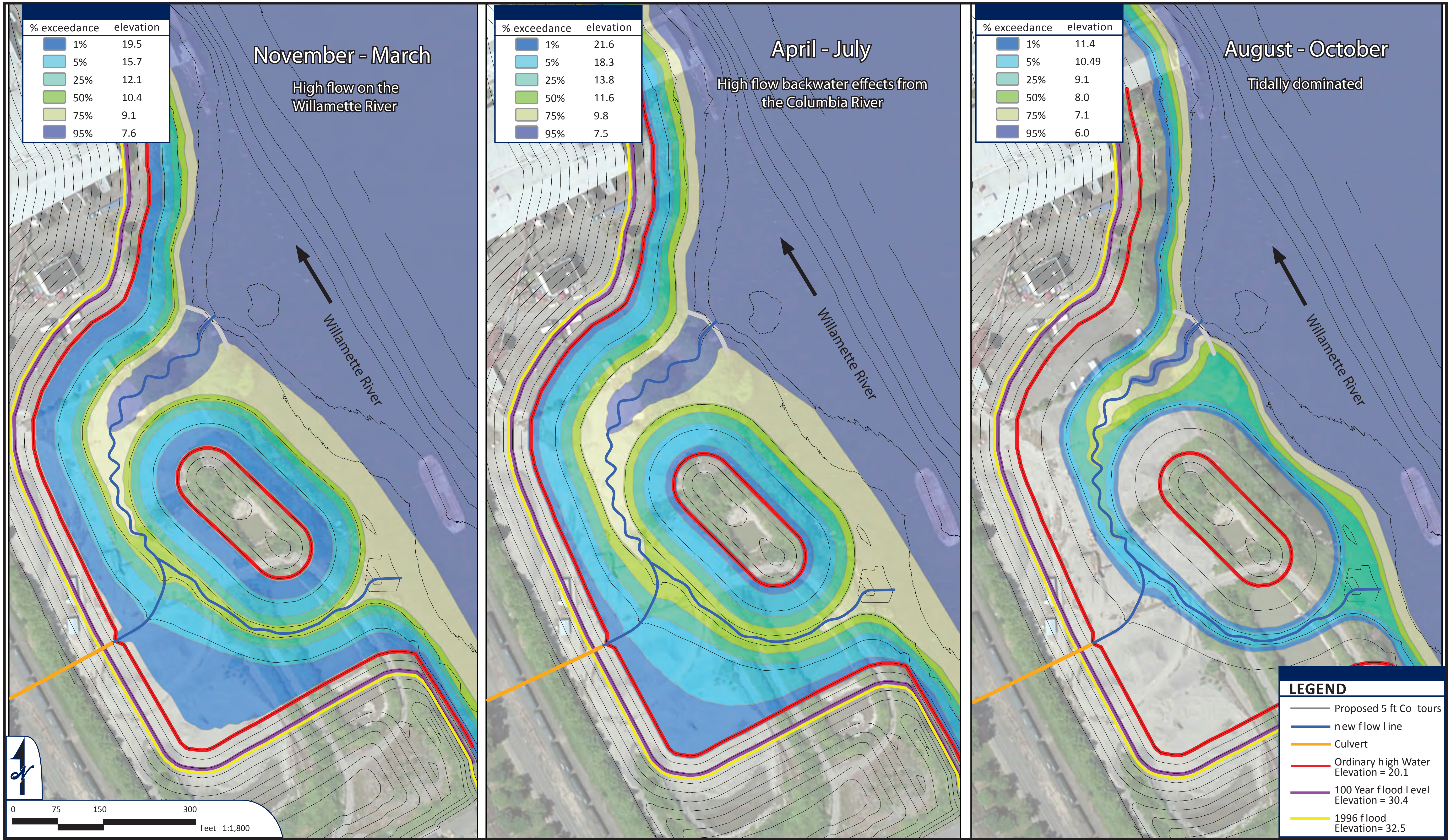
Frequency of Inundation for Target
Habitat Types

LINN TON MILL SITE HABITAT
RESTORATION

BASIS OF DESIGN REPORT
OCTOBER 2014

WATERWAYS
CONSULTING, INC.
Santa Cruz, CA | watways.com | Portland, OR

TABLE
3



expected frequency of inundation at the linnton mill Site under proposed conditions
based on historic stage data for the Willamette River at Portland (USgS gage 14211720)
All elevations Shown in feet nAVd 88

linntOn mill Site hAbitAt ReStORAtiOn

bASiS Of deSign RePORt
OCtObeR 2014

WATERWAYS CONSULTING, INC.
Santa Cruz, CA watways.com Portland, OR

FIGURE
4

| Table 5: Cut and Fill Quantities | |
|---|---|
| | Material Quantity (in cubic yards) |
| Permanent Cut | 326,147 |
| Permanent Fill | |
| • North Fill Area | 315,209 |
| • South Fill Area | 10,938 |
| Cut within OHW | 3,945 |
| Cut within 100-year Flood | 10,336 |
| Cut within 1996 Flood | 12,234 |

The balanced cut and fill approach still allows for the creation of the preferred habitat types while limiting the environmental impacts associated with the hauling and disposal of the excess sediment. In addition, valuable forested riparian and upland habitats that will be protected in perpetuity are still created in areas where the fill is being placed. The cut and fill quantities being proposed at the site are summarized in Table 5 along with the estimated amount of cut that is expected to occur within the existing Ordinary High Water, within the FEMA delineated 100-year floodplain, and within the City of Portland delineated 1996 flood elevation. The material cut from the main area of excavation will be placed within two fill areas, shown on Sheets C5 and C6 of the Phase 2 Engineering Drawings (Appendix A).

## *North Culvert Design*

The existing 24” diameter culvert traversing the northern portion of the project area conveys creek flow from a drainage originating in Forest Park (Figure 3). The existing culvert is constructed of reinforced concrete pipe for approximately 600 feet before transitioning to a 36 inch diameter corrugated metal pipe for approximately 10 feet before discharging along the bank of the Willamette River. A video inspection of the inlet and outlet of this culvert, conducted in March of 2014 revealed several deficiencies in the culvert including a section of partially crushed pipe (on the adjacent railroad property), separated and offset joints, two horizontal changes in alignment, and a portion of the pipe partially filled with coarse gravels and cobbles. Because of these deficiencies and the potential for additional pipe damage due to settlement associated with the proposed fill, it was decided that the portion of the existing culvert within the project area would be abandoned in place and a new conveyance network would be designed to convey flow to the Willamette River approximately 130 feet to the north (see Appendix A – Sheet C7 of the Phase 2 100% Engineering Drawings).

The new culvert will be constructed of two sections of 24 inch diameter HDPE pipe to match the diameter of the upstream culvert. The slope on each section of the culvert will be 2.4% which will result in a culvert capacity of approximately 35 cubic feet per second and flushing velocity of approximately 11.1 feet per second (assuming a Manning’s Roughness Coefficient of 0.013). Per the City of Portland 2007 Sewer and Drainage Facilities Design Manual, culverts are required to be sized to convey the 25 year storm event without surcharging the inlet. Based on the results of the hydrologic analysis for this watershed, the proposed culvert will exceed City capacity requirements (Table 2; estimated peak discharge of 21.4 cfs for the 25 year event). An 48 inch diameter manhole will be placed at each of the horizontal deflections to facilitate future maintenance of the culvert. The river bank in the vicinity of the new outfall to the Willamette River will be graded to a slope of 3H:1V to keep the slope stable. Sheet C7 of the Phase 2 100% design (Appendix A) shows the plan and profile of the proposed culvert realignment.

The North Tributary culvert will outfall to the Willamette River through a cantilevered outfall given existing conditions and site constraints. To protect the bank of the Willamette River and the adjacent beach when flows on the Willamette River are low a boulder plunge pool was integrated into the design to provide energy dissipation and prevent scour and erosion. The energy dissipater consist of large rock and was sized using the Soil Conservation Service (NRCS) technical publication titled, “Design Note #6: Riprap Lined Plunge Pool for Cantilever Outlet” (1986). Dimensions for the proposed plunge pool are shown on sheet C10 of the Phase 2 100% design set (Appendix A).

### LINNTON CREEK CHANNEL DESIGN

Linnton Creek is currently conveyed through the project site through a 60 inch diameter corrugated metal pipe that discharges directly into the Willamette River. The proposed project includes removal of the downstream 400 feet of the culvert and daylighting of the creek through the restored off-channel wetlands. A plan and profile of this channel is presented on Sheet C8 of the Phase 2 100% design (Appendix A). Daylighting of Linnton Creek into the off-channel wetlands has a variety of benefits that include providing a source of cold perennial water, a year-round source of flowing water to the off-channel area even during low flow conditions on the Willamette, and a source of coarse sediment to an area that will primarily consist of backwater mudflats.

Daylighting of the lower 400 feet of Linnton Creek presented a number of design issues. First and foremost of these issues is the fact the culvert daylights at an elevation of 24.2 feet NAVD88 whereas the bottom elevation of the off channel area where the daylighting occurs ranges from 6 feet NAVD88 within the off-channel wetland to approximately 10 feet NAVD88 at the outlet of the culvert. A related issue is the fact that the native bed material along the proposed realigned portion of Linnton Creek is expected to consist of silty sands, which will be prone to erosion from Linnton Creek when the stage of the Willamette River is low (see Appendix C – Geotechnical Report). Based on the expected frequencies of inundation from the Willamette River (Table 1) the new alignment of Linnton Creek will only be fully inundated 10% of the time from August to October, 60% of the time from November to March and 70% of the time from April to July. Consequently, it is important to minimize the potential for erosion along the realigned Linnton Creek channel through integration of coarse bed substrate along the channel, energy dissipation at the culvert outlet, and grade control elements.

At the transition between the old channel and the new daylighted portion, the outfall will be cantilevered and require energy dissipation. A boulder plunge pool, similar to what is proposed at the North Culvert outfall, is proposed for the new Linnton Creek outfall. The energy dissipater was sized using the Soil Conservation Service (NRCS) technical publication titled, “Design Note #6: Riprap Lined Plunge Pool for Cantilever Outlet” (1986). The dimensions and required rock sizing for the plunge pool is shown on sheet C10 of the Phase 2 100% design set (Appendix A). The steep upstream portion of the realigned channel is lined with engineered streambed material (ESM) to prevent channel migration and/or incision. In the lower channel reach, buried grade control structures are integrated into the design to prevent incision and excessive lateral migration into the adjacent slopes. In addition, a portion of the existing sheet pile wall at the outlet of the channel is retained to limit the potential for head cuts to migrate up the channel when flows are high on Linnton Creek and low on the Willamette. Although the frequency of such an event is very low, if it did occur in the absence of grade control there is a high likelihood that it would result in significant erosion and channel downcutting through the entire off-channel area.

## *North Fill Area and the Existing Concrete and Asphalt*

Much of the material removed from the southern portion of the property to create the off-channel wetland habitat will be placed at the north end of the property, outside of the 100-year and 1996 flood elevations, in an area referred to as the North Fill Area (see Appendix A – Phase 2 100% Engineering Drawings Sheet C5). The proposed fill embankment will have a maximum height of 50 feet, with elevations varying from 45 feet at the base to 95 feet on top (NAVD88 datum). Proposed sideslope inclinations of 3H:1V are proposed on all sides of the fill to conform with the requirements of the geotechnical report. On the riverward side the embankment toe will be set back approximately 40 feet from the top of the riverbank slope. The North Fill Area will ultimately be planted with native riparian and upland vegetation and protected, in perpetuity, as a natural area.

Under existing conditions (Figure 2), the area proposed for the fill is occupied by the Linnton Mill, which is underlain by a concrete slab, and adjacent asphalt surfaces. The site has already been investigated for contaminants by the Oregon Department of Environmental Quality as has been designated for No Further Action (NFA). To preserve the NFA and limit environmental impacts associated with removal, off-haul and disposal of such a large amount of concrete, the current design proposes to leave much of the existing concrete slab in place. The proposed fill would be placed on top of the concrete slab. A geotechnical review of the proposed design found that retaining the slab will not have a deleterious effect on the stability of the fill prism (see Appendix C – Geotechnical Report). It was also determined that the interruption of groundwater flow through the fill, due to the presence of an impermeable concrete slab, would not be significant, nor warrant the inclusion of a drainage system.

## *Demolition and Pile Removal*

Conversion of the Linnton Mill site from industrial to a site with a variety of natural habitats will require a significant amount of demolition. Most of the demolition will consist of removing the existing structures, located at the north end of the property, with much of the material being recycled including the steel, aluminum, and timber beams. In addition to the structures all the existing asphalt and concrete outside of the North Fill Area sawcut line will be removed, non-serviced utilities, existing riprap along the banks of the Willamette south of the pier, shoreline structures, and a portion of the sheet pile wall.

The project is also proposing to remove all in-water and shoreline timber pilings. Although the specific number of timber pilings present along the shoreline of the Willamette River is not definitively known, a preliminary estimate counted between 700 and 800 piles. The piles will be removed completely, where feasible, in the water and along the beach and shoreline. Piles in the water that cannot be fully extracted will be cut at the mud line to limit disturbance to the bed sediments of the Willamette River.

During demolition an unspecified number of below ground pipes and conduit will likely be encountered. This infrastructure will be demolished to a minimum of three feet below finished grade. Any pipes or conduit that are retained on site but not removed completely will be filled with low strength concrete or sand and abandoned in place. Prior to demolition or abandonment of these structures on-site engineers will coordinate with appropriate water, sewer, gas, and electric utilities to ensure that none of the infrastructure to be removed is currently active or necessary.

### *Public Access Elements*

Although much of the site will be protected as a natural area and will limit public access to achieve that goal, the proximity of the site to the commercial center of the Linnton neighborhood and its adjacency to an existing Willamette Greenway easement, prompted the inclusion of a public access corridor. The corridor would occur at the north end of the property and consist of a corridor ranging from 80 to 100 feet wide from NW Front Street near the Linnton core to the bank of the Willamette River (see Appendix A – Phase 2 100% Engineering Drawings Sheets C13). The corridor would be approximately 300 feet long with an access point and at NW Front Street and views of the River and the St. Johns Bridge.

A low berm will be constructed to the north of a pervious asphalt walkway to enhance the aesthetics of the site and limit views to the industrial properties directly to the north. The corridor will be planted with native vegetation that is representative of the species proposed for the natural area and will include both riparian and upland species. Although a direct connection to the existing Willamette Greenway easement will not be included in the design, due to the fact that the easement has not been developed with a trail, the design will consider the location of the easement to facilitate a future connection. Access to the south and the larger natural area will be restricted with a fence to protect the natural area.

### *Construction Phasing and Dewatering*

Other than the demolition work and the work associated with the Linnton Creek and North Tributary culverts, much of the project consists of mass grading. The excavation work at the south end of the project will ultimately, and immediately, open up the site to inundation from the Willamette River. Material removed from the south end of the project will be placed at the north end in a fill that is approximately 50 feet deep. Consequently, existing utility work, specifically realignment of the North Tributary culvert, will need to be completed before excavation begins.

The challenges of balancing cut and fill on site, the presence of inundation from the Willamette River at finished grade elevations, and the perennial nature of the two tributaries entering the site, dictates the need for a carefully considered construction staging and dewatering approach that protects against erosion before best management practices can be implemented and limits impacts to water quality.

The Erosion and Sediment Control Plans designed for the DEQ 1200-C permit provides an overview of the proposed construction phasing and dewatering plan. Additional specifics on the sampling and treatment of water from the dewatering actions with be made available once a contractor has been selected for construction of Phase 2 components. The highlights of the construction phasing and sequencing approach are as follows:

1. Demolition of all above ground structures. This can occur at any point in the year once construction-related erosion control and associated BMP’s are in place.
2. Construct the North Tributary culvert realignment. This work will need to occur between July 1 and October 31, based on guidance provided by Oregon Department of Fish and Wildlife. Dewatering of the tributary flow will occur via a pump system with the flow diverted to the existing culvert downstream of the start of the realignment that will be retained until the North Tributary culvert realignment is completed.

3. While the North Tributary culvert is being realigned, excavation can commence on the south portion of the project site down to elevation of the Linnton Creek culvert (24.2 feet NAVD88). The excavated material can be stockpiled temporarily until the North Tributary culvert realignment is complete and the existing culvert is abandoned.
4. Linnton Creek will be temporarily dewatered and discharged directly to the Willamette River.
5. The Linnton Creek culvert can be cut off and demolished and excavation work can commence below 24.2 feet NAVD88.
6. Excavation can commence down to the finished grade elevation with temporary berms retained to elevation 15 feet NAVD88 at both ends of the proposed side channel. An elevation of 15 feet NAVD88 was selected because it is higher than the maximum stage observed historically on the Willamette River during the August to October timeframe.
7. A dewatering system will need to be in place once groundwater is reached. This water will be pumped through into a testing and treatment systems before being discharged to the Willamette River near the new North Tributary outfall.
8. Erosion control measures will be implemented throughout the majority of excavation area while the berms separating the site from the Willamette River are in place, including construction of the daylighted Linnton Creek portion of the project.
9. Bank reshaping, pile removal, and removal of the berms will be completed last and will be timed to coincide with low tide conditions on the Willamette River.
10. The public access portion of the project will be completed following final grading.
11. Permanent seeding and revegetation will be the final portion of the project following all other work.

# APPENDIX A

## 100% ENGINEERING DRAWINGS

## LINNTON MILL SITE

## HABITAT RESTORATION PROJECT

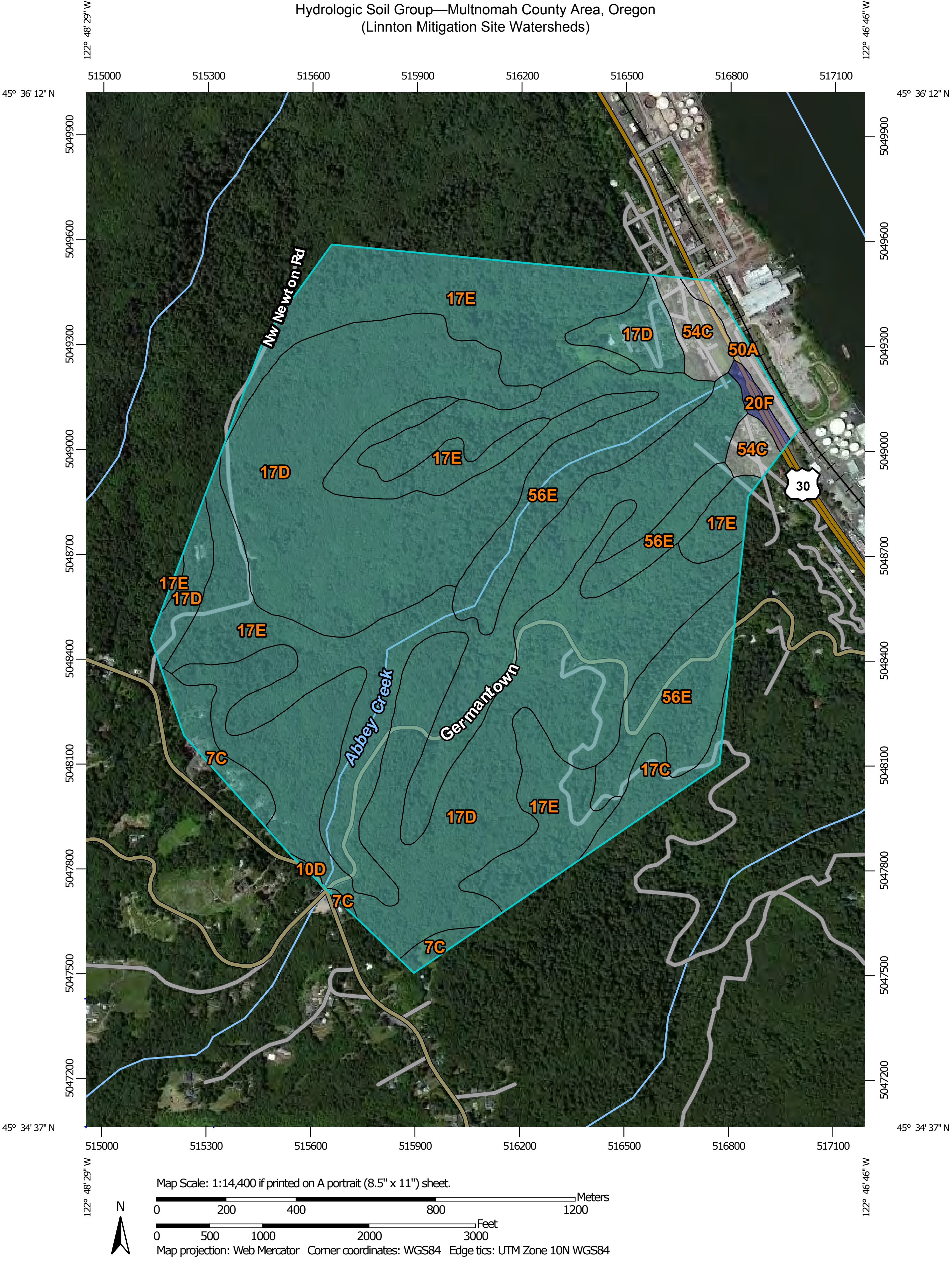
[Please Refer to Exhibit A of the Linnton Mill Restoration Site Restoration Plan]

# APPENDIX B

# NRCS SOIL SURVEY REPORT

# LINNTON MILL SITE

# Hydrologic Soil Group—Multnomah County Area, Oregon
(Linnton Mitigation Site Watersheds)



Map Scale: 1:14,400 if printed on A portrait (8.5" x 11") sheet.

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

Hydrologic Soil Group—Multnomah County Area, Oregon
(Linnton Mitigation Site Watersheds)

## MAP LEGEND

**Area of Interest (AOI)**

- ▭ Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

- 🟪 A
- 🟩 A/D
- 🟦 B
- 🟫 B/D
- 🟦 C
- 🟨 C/D
- 🟥 D
- ⬜ Not rated or not available

**Soil Rating Lines**

- 〰 A
- 〰 A/D
- 〰 B
- 〰 B/D
- 〰 C
- 〰 C/D
- 〰 D
- 〰 Not rated or not available

**Soil Rating Points**

- ■ A
- ■ A/D
- ■ B
- ■ B/D
- ■ C
- ■ C/D
- ■ D
- □ Not rated or not available

**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.

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: Multnomah County Area, Oregon
Survey Area Data: Version 11, Dec 4, 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.

# Hydrologic Soil Group

| Hydrologic Soil Group— Summary by Map Unit — Multnomah County Area, Oregon (OR051) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 7C | Cascade silt loam, 8 to 15 percent slopes | C | 12.5 | 1.9% |
| 10D | Cornelius silt loam, 15 to 30 percent slopes | C | 0.4 | 0.1% |
| 17C | Goble silt loam, 3 to 15 percent slopes | C | 9.9 | 1.5% |
| 17D | Goble silt loam, 15 to 30 percent slopes | C | 296.9 | 45.3% |
| 17E | Goble silt loam, 30 to 60 percent slopes | C | 222.8 | 34.0% |
| 20F | Haplumbrepts, very steep | B | 3.1 | 0.5% |
| 50A | Urban land, 0 to 3 percent slopes | | 5.9 | 0.9% |
| 54C | Urban land-Quatama complex, 8 to 15 percent slopes | | 14.0 | 2.1% |
| 56E | Wauld very gravelly loam, 30 to 70 percent slopes | C | 89.5 | 13.7% |
| **Totals for Area of Interest** | | | **654.9** | **100.0%** |

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* *None Specified*

*Tie-break Rule:* Higher

# APPENDIX C

# GEOTECHNICAL ENGINEERING REPORT

# LINNTON MILL SITE

GEOTECHNICS LLC
7629 SE Harrison Street | Portland, OR 97215 | 503-774-1619

# GEOTECHNICAL ENGINEERING REPORT
# LINNTON PLYWOOD RESTORATION PROJECT
# PORTLAND, OREGON

PREPARED FOR
**RESTORCAP**

**GEOTECHNICS PROJECT NO. 13-016-2**

**SEPTEMBER 17, 2014**

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# GEOTECHNICAL ENGINEERING REPORT
# LINNTON PLYWOOD RESTORATION PROJECT
# PORTLAND, OREGON

## INTRODUCTION AND PROJECT DESCRIPTION

Geotechnics LLC is pleased to submit this geotechnical report to support design and construction of the Linnton Plywood site restoration project. The project involves the complete removal of existing structures and extensive grading to create natural habitat on a 22-acre property adjacent to the Willamette River. A key element of the project is the daylighting of Linnton Creek through the site. The creek is currently passing through a culvert under 20 to 30 feet of fill soils. No new structures are planned for the site.

The site location is indicated on attached Figure 1 and Figure 2 is a site plan showing existing site features. Figures 3 through 5 are cross-sections illustrating the relationship between existing and proposed grades in several locations. The project is a balanced cut-fill with the majority of filling in the northern portion to create a large berm in the location of the existing mill structures. A smaller berm will be created near the south property line. The cutting will occur in the south-middle portion and is associated with the daylighting of Linnton Creek. Maximum fill thickness is approximately 50 feet and maximum cut thickness is approximately 38 feet.

The project includes a separate, approximately 2-acre, parcel to the west of the railroad tracks and at a higher elevation. This area will receive fill to raise the grade and will likely be sold as commercial property fronting on Highway 30. This property is referred to herein as Tax Lot 200.

Graded slope inclinations, including for Tax Lot 200, will not exceed 3H:1V. Slope inclinations below Elevation 20 feet are inclined 8H:1V (within the backwater channel and Linnton Creek outfall area).

All buildings will be demolished and building materials removed from the site. A portion of the flatwork will remain in-place under the north fill embankment. A culvert on the north portion of the site will be relocated. Slope rip-rap will be removed where site grades are altered.

The only proposed non-grading work includes a pedestrian access pathway leading to a river overlook at the north end of the project. The pathway surface will be pervious asphalt or concrete and the overlook will consist of a low-height gabion wall and a few benches. The riverbank slope in this area will be flattened to 3H:1V.

The following report provides our geological and geotechnical assessment of the site as well as our geotechnical engineering recommendations. Our work was completed in general accordance with our contract with RestorCap dated June 25, 2014.

## SCOPE OF SERVICES

The purpose of our services is to evaluate soil and groundwater conditions as a basis for developing geotechnical design and construction recommendations. We completed the following specific services:

- Reviewed existing available subsurface soil and groundwater information, geologic maps, aerial photographs, geotechnical reports, and other information pertinent to the site.
- Performed a geologic reconnaissance to observe existing surficial slope, soil, ground, and surface water conditions at the site.
- Explored subsurface soil and groundwater conditions at the site by drilling six borings and completing two cone penetrometer tests.
- Obtained samples at representative intervals from the borings, observed and monitored groundwater conditions, perform Standard Penetration Testing, and maintained detailed logs. Performed laboratory tests on selected soil samples.
- Performed geotechnical evaluations and analyses and prepared the design recommendations presented in this geotechnical report.

## SITE CONDITIONS

### REGIONAL GEOLOGIC AND TECTONIC SETTING

The project is located along the west bank of the Willamette River, a tributary of the Columbia River that flows through the Portland Basin. The Portland basin is a pull apart basin located at the north end of the larger Willamette Valley. The Willamette Valley was formed by the active convergence between the Juan de Fuca and the North American lithospheric plates. Bordering the Willamette Valley are the Coast Range to the west and the Cascade Range to the east.

The Willamette Valley is characterized by broad alluvial plains separated by low-lying hills. In the northern Willamette Valley, the oldest rocks are basalts, including the middle Miocene Columbia River Basalts, as well as others. These are overlain in some places by Pliocene non-marine sedimentary rocks including shales, mudstones, sandstones, and conglomerates of the Sandy River Mudstone, the Troutdale Formation, and equivalent rocks.

The surface of most of the Willamette Valley is veneered with Pleistocene sedimentary deposits, catastrophic flood deposits, and Holocene sand and gravel. In the latest Pleistocene, a series of great floods released from glacially dammed lakes in Western Montana swept through the Columbia River Gorge and into the Willamette Valley, the last of which occurred about 12,700 years ago. Alluvial sands, silts and gravels were later deposited over these flood deposits by typical alluvial erosion and flooding. In some areas, the Pleistocene deposits have been completely eroded away and these Recent alluvial deposits directly overlie the basement basalt.

Regional stresses have also produced pervasive northwest-southeast faulting in the Portland region. Two large Quaternary faults are mapped as inferred faults in the near vicinity of the site. The East Bank Fault is approximately ¾-mile to the east and the Portland Hills Fault is less than ¼-mile to the west of the site. Both faults are considered potentially active (USGS, 2006).

### SITE HISTORY

The site has a long history beginning in the early 1900's when it was used by the former Clark & Wilson Lumber Company. Sanborn maps from 1924 show that the original sawmill covered the entire property, with the majority of buildings on the south portion of the site. A fire reportedly destroyed these south-side buildings in 1947 (DEQ, 2013). Linnton Plywood Association (LPA) operated on the north portion of the site between 1951 and 2001.

Several phases of filling have occurred. The majority of the fill is old, pre-dating or coinciding with the original site development in the early 1900's. Several other filling phases occurred including filling of the southern portion of the site in the early 1980's as documented in CH2M Hill reports (1981). Additional grading on the southern portion was performed in about 1995 related to a sand dredging operation (MNWR, 1995). The settling ponds from this operation are visible in aerial photos dated 2011 (EDR, 2013) but are no longer there, so filling of these ponds was completed during the last few years. It appears that very little of the fill at this site, if any, was placed as controlled structural fill. Geotechnical borings by Shaw (2011) and CH2M Hill (1974 and 1981) show that new and old fill soils contain significant quantities of organic material and debris. Wood shavings and buried lumber have been encountered in significant quantities, both in borings and test pits excavated at the site. Bark dust piles are shown in historical drawings and these may have been incorporated into the fill.

## GEOLOGIC MAPPING

The site geology has been mapped by the Department of Geology and Mineral Industries (DOGAMI) publication O-90 (Madin, 1990) as Quaternary Alluvium overlying Columbia River Basalt (CRB). These alluvial soils are silts and sands deposited along the margins of the Willamette River channel. Isopach mapping included in O-90 indicates a thickening of these deposits towards the east, reaching over 150 feet in thickness on the east side of the river. We also reviewed a more recent geologic map, Geology of the Linnton Quadrangle, DOGAMI publication O-08-06 (Madin et al., 2008). This publication includes two maps, one for surficial geology and one for bedrock geology. The surficial unit indicated for this site is Artificial Fill and the bedrock unit is Columbia River Basalt, specifically the Sentinel Bluffs Member.

## SURFACE CONDITIONS

The east site is relatively flat with a minor downward gradient towards the riverbank. This is largely a man-made surface with fill soils covering the entire property as described below. The riverbank fill slopes are varying in inclination from about 2.5H:1V to locally as steep as 1H:1V. Riverbank slopes contain armoring consisting of small and large stones and in some areas abundant concrete debris.

Vegetation on the site is minimal. The south portion contains grasses and a few small shrubs. The riverbank areas contain abundant blackberries and a few other shrubs and some small trees.

Two culverts carry surface water through the site. The larger, south end culvert carries Linnton Creek and will be removed across the majority of the site. This pipe is 60-inch CMP, becoming 72-inch near its outfall at the riverbank (approximate Elev. 17 feet). Three manholes exist along this pipe. The smaller, north-end culvert, is 24-inch RCP and transports a small unnamed creek and other stormwater.

As shown on Figure 2, the north portion of the property contains the large plywood mill plus a few smaller buildings to the south and northeast of the mill. The ground surface surrounding the mill is predominantly asphalt and the slab within the building is concrete.

Numerous old timber piles extend along the entire length of the waterfront, cut and broken off at various elevations. Some piles also support the eastern portion of the Mill structure and a connected deck that extends out over the beach and river. We understand these piles will all be removed or cut-off at mud-line. If cut-off, these pile remnants will add to the slope stability of the site although this effect was not incorporated into our evaluations below.

Tax Lot 200 includes the old Linnton Plywood office building. This site slopes downward from west to east with about 12 feet of elevation drop between Highway 30 and the railroad tracks (see Profile B-B', Figure 3). Most of this elevation change is at the west-side, with an approximately 2H:1V slope downward from the highway.

## SUBSURFACE CONDITIONS

We completed field explorations between August 4 and August 12, 2014 consisting of six borings to depths ranging from 48 to 69½ feet below ground surface (bgs) and two cone penetrometer tests (CPT) to depths of 55 and 67 feet bgs. The borings were completed using a truck mounted drill rig. One boring (B-1) was drilled on Tax Lot 200 and the other five were completed on the main site. Boring and CPT locations are shown on Figure 2.

Appendix A summarizes our boring methods and presents our boring logs. Appendix B summarizes the CPT soundings and includes plots of CPT data collected. Note that CPT's were conducted within 10 feet of borings for direct comparison of interpreted and observed subsurface conditions. Boring B-2 is paired with CPT-1 and B-3 is paired with CPT-2.

Selected laboratory tests were completed and these are provided in Appendix C.

Each of our borings and CPT's was continued to refusal on basalt bedrock. Findings were in general agreement with the geologic mapping described above. The encountered soil units are described separately below. These observations are supplemented with borings completed by others (see Appendix F). Datums referenced on borings by Geotechnics and Shaw are NAVD-88. Borings by CH2M Hill and URS used City of Portland datum and we made appropriate adjustments when correlating with our field data (e.g. water levels and stratigraphic contacts). Reference Figures 3 through 5 for profiles illustrating soil unit thickness and relationship, groundwater level, and proposed cuts and fills.

### *Fill*

All borings by all consultants encountered artificial fill soil to some depth. Fill soils are highly variable. Others have described fill soils as:

- *'sands and sandy silts with intermediate lenses of gray silts over silty sand with organic material – soft and highly compressible'* (CH2M 1974);
- '*brown silt with green and orange-brown mottling and fine wood chips*' (CH2M, April 1981);
- *'brown to gray silt, gravelly silt, sandy silt, and silty sand, containing local zones of debris, including wood chips, concrete blocks, boulders to 3-feet maximum dimension, logs and wood debris to 3 feet long, broken bricks, glass, wire, reinforcing bars, and miscellaneous other materials'* (CH2M, August 1981);
- *'sands with various amounts of silts and clay, lean clays, and locally contains deleterious materials such as bricks, asphalt, concrete and woody debris'* (Shaw, 2011). Shaw also noted that much of this fill was placed as hydraulic fill.

From our own borings, we found similar variability with soils ranging from clay to gravel and abundant wood encountered in three of the borings (B-2, B-4, and B-6). Blow counts ranged from very low to very high, but these soils should be considered highly compressible due to the lack of compaction and high organic content. The wood is compressible and also subject to further decomposition.

Fill thickness increases towards the river and also varies from north to south. The thickest fill appears to be roughly coincident with the Linnton Creek culvert, with thickness on the order of 40 feet or more.

### Alluvium

Soils interpreted as recent alluvium were encountered beneath the fill and extend to the bedrock contact. These floodplain deposits are primarily low plasticity silt but also silty sand. Sands are fine grained and micaceous. In all our borings and in most borings by others, silt dominates the upper portion of the unit and silty sand the lower portion. On our profiles, we have indicated the approximate contact between these subunits although the transition is gradational.

The thickness of alluvial soils varied from 15 to 55 feet in our borings, with an average thickness of 39 feet. The silty portion exhibited SPT blow counts from 2 to 14 bpf (average 7 bpf) and moisture contents from 29 to 50 percent (average 38%). The sandy alluvium exhibited SPT blow counts from 8 to 28 bpf (average 14 bpf) and moisture contents from 22 to 42 percent (average 31%).

Based on interpretation of consolidation tests by others and on CPT data correlations, alluvial soils appear to be overconsolidated, with an O.C. ratio of 4 or more. These soils are expected to exhibit low to moderate shear strength and moderate compressibility.

### Columbia River Basalt

All of our borings and CPT's experienced refusal on basalt bedrock. The transition from overlying alluvium was abrupt, with very little weathering of the rock. Samples recovered consisted of angular fragments of dark gray basalt. The contact varies from approximately Elev. 0 feet at the west property line to about -30 feet at the river's edge. As noted earlier, the geologic map suggests this contact keeps dropping across to the east side of the river.

### Groundwater

Due to the mud rotary methods used during drilling we could not directly observe groundwater levels in the machine borings. However, we did perform dissipation tests within our CPT soundings and also installed vibrating wire piezometers in two borings. Thus, four of our six exploration locations have associated August groundwater levels. The following levels were recorded:

| **Boring** | **Date** | **Water Depth (ft)** | **Water Elev. (ft)** |
|---|---|---|---|
| B-2 (CPT-1 dissipation) | 08-12-14 | 24.7 | **17.3** |
| B-3 (CPT-2 dissipation) | 08-12-14 | 21.3 | **22.7** |
| B-4 (piezo) | 08-12-14 | 30.4 | **11.6** |
| B-5 (piezo) | 08-12-14 | 27.7 | **15.8** |

URS has completed extensive explorations including borings, geoprobes, and well installations, both on the BP property and on the south portion of the subject property. We have reviewed a recent report, *Annual Groundwater Monitoring Report, BP Bulk Terminal 22T.*.(URS, 2013). Their data includes numerous and frequent ground water level readings spanning several years. Generally, their shallow groundwater contours at the south end of the site show an eastward sloping groundwater table, sloping from about Elev. 30 feet (adjusted to NAVD-88) near the west property line to about 18 feet near the top of riverbank, a drop of about 12 feet. This variation from west to east agrees fairly will with our findings at the north end of the site, comparing B-3 (west) to B-4 (east), showing a difference of 11 feet from west to east.

The URS data also shows that seasonal fluctuations in recorded groundwater levels are not extreme, generally in the range of 2 to 4 feet. The data does show groundwater response to tidal changes in the Willamette River, especially in the deeper sandier deposits.

CH2M Hill also reported groundwater levels in piezometers installed on the south half of the site. These levels are in general agreement with the Geotechnics and URS data and are shown in Appendix F on the CH2M Hill boring logs.

## EVALUATION

### LIQUEFACTION

Liquefaction is a phenomenon caused by a rapid increase in pore water pressure that reduces the effective stress between soil particles, resulting in the sudden loss of shear strength in the soil. Granular soils, which rely on interparticle friction for strength, are susceptible to liquefaction until the excess pore pressures can dissipate. Sand boils and flows observed at the ground surface after an earthquake are the result of excess pore pressures dissipating upwards, carrying soil particles with the draining water. In general, loose, saturated sand soils with low silt and clay contents are the most susceptible to liquefaction. Silty soils with low plasticity are moderately susceptible to liquefaction under relatively higher levels of ground shaking.

In accordance with discussions with Doug Morgan at the City of Portland and consistent with prior work by URS at the neighboring property, seismic effects will be evaluated based on the 2% in 50-year event (2,475 year recurrence interval), scaled by two-thirds. To obtain the site specific ground motion parameters for this site, we consulted the results of the 2002 USGS probabilistic seismic hazard assessments (USGS, 2014). The resulting peak ground acceleration (PGA) is 0.28g and the moment magnitude is 6.8.

Our calculations were performed with the computer software, CLiq (GeoLogismiki, 2007) and the methods of Youd and Idriss (2001). The method compares the cyclic shear stress required to initiate liquefaction (CRR) and the cyclic shear stress initiated by a design earthquake (CSR). The analyses were conducted using resistance data obtained from CPT-1 and CPT-2. The results of our analyses are included in Appendix D.

Our analyses indicate that the large majority of the soils below the water table are likely to liquefy during the design seismic event. Results of liquefaction are discussed below.

### Liquefaction-Induced Ground Settlement

Some ground surface settlement can be anticipated during the design seismic event. We performed calculations to estimate post-earthquake soil settlement at the ground surface, again assisted by the computer software, CLiq (GeoLogismiki, 2007). Liquefaction-induced ground settlements for the design seismic event were calculated based on the methods of Zhang et al. (2002).

We found that strain values within liquefiable layers ranged from 3 to 5 percent. Anticipated accumulated strains over all liquefiable zones total 14 inches for CPT-1 and 11 inches for CPT-2. Based on these results, the site variability, and the analysis method, a realistic range of anticipated settlement would be 3 to 20 inches.

Mitigation of seismically-induced ground settlement is not warranted. Differential settlement across the site and neighboring sites would be very minimal. Further, the proposed grading will actually decrease the hazard. With time, soils will compress as discussed below in the section *Embankment Settlement*, yielding these soils less susceptible to volume change under seismic loading.

### Liquefaction-Induced Lateral Spreading

Since near surface soils are susceptible to liquefaction and adjacent to a free face (the Willamette River bank), liquefaction-induced lateral spreading can be anticipated at the site during the design event.

Using the same ground motion parameters as above (PGA and moment magnitude), we performed a preliminary estimates of the magnitude of lateral spread to be anticipated at the site. Using procedures presented by Zhang et al. (2004), we estimate a total possible lateral movement of 10.6 to 13.4 feet. These procedures are quite crude, so this is an order-of-magnitude estimate. But generally, significant movement can be expected under the design event.

For comparison, Shaw (2011) performed analyses using less severe ground motions (10% in 50 years) and calculated anticipated displacement of approximately 6 feet. For the neighboring site with similar soil and groundwater conditions, URS calculated lateral spread of their seawall design (URS, 2006). URS input design ground motions equivalent to the motions used herein (2% in 50 years, scaled by 2/3) and performed FLAC analyses. They found that source motions characteristic of nearby faulting similar to the Portland Hills Fault would create the greatest displacements. Using these nearby source motions, URS calculated permanent lateral displacements of the site ranging from 6.2 to 12.7 feet, depending on the characteristics of the input ground motions. The entire site was expected to displace a similar amount and thus their seawall was not designed to resist the movement.

Mitigation of potential lateral movement due to severe earthquakes is not commonly performed, even for structures with much higher costs and consequences of movement. In this case, the cost of mitigation greatly exceeds the cost of the minor repair and re-grading necessary due to lateral spread. Further, the proposed project should not significantly increase the lateral spread hazard at the site.

## SLOPE STABILITY

We completed quantitative slope stability analyses along Profiles A-A', C-C', E-E', and F-F', Figures 3 through 5. Our analyses were completed with the computer program SLIDE 6.0 from Rocscience Inc. We utilized Spencer's method which evaluates both force and moment equilibrium. Slope stability results are presented as a factor of safety (FS) against sliding. A FS of 1.0 reflects a condition where the resisting and driving forces are equal and a failure could occur from any changes in these forces. A greater FS presents a more stable slope and a lower FS a less stable slope.

The cross sectional geometries for our analyses were based on a 2010 topographic survey by AKS Engineering (using NAVD-88 Datum), an offshore bathymetric survey completed in 2014, proposed contours from the 50%-Design drawing set (Waterways, 2014) , and the results of explorations. Soil properties used in the analyses were based on our laboratory testing, laboratory testing by others, and our experience with soils similar to those at the site. The following soil properties were used in our analyses.

**Soil Parameters Used for Slope Stability Analysis**

| Soil Description | Total Unit Weight (pcf) | Friction Angle (degrees) | Cohesion (psf) |
|---|---|---|---|
| Proposed Fill | 120 | 33 | 0 |
| Existing Fill | 110 | 32 | 0 |
| Alluvium – Silty | 110 | 30 | 0 |
| Alluvium – Sandy | 115 | 34 | 0 |
| Basalt Bedrock | 140 | 40 | 500 |

The above values are similar to those used by URS at the neighboring site for similar soils (URS, 2006 and 2007) and lower (more conservative) than those used at the subject site by Shaw (2011).

Groundwater levels used in the analyses shown below are the ordinary high water level (Elev. 20.1 feet) projected across the section and rising towards the west. This groundwater elevation was selected as the most critical after running analyses using various levels of groundwater and drawdown.

As mentioned in the section above, modeled ground motions are equivalent to 2/3 of the 2% in 50-year event (2,475 year recurrence interval). For pseudostatic analyses of slope stability problems, a seismic coefficient is assigned as one half of the PGA, in this case one-half of 0.28g results in a seismic coefficient of 0.14g. No vertical seismic coefficient was assigned which is typical for this type of analysis.

Acceptable factors of safety vary depending on the quality of the input data and the practitioner's confidence in this data. Input data includes topography, soil stratigraphy, groundwater levels, soil strength parameters, and loading conditions such as level of seismic shaking. Additionally, selection of an acceptable FS should consider the consequences of slope failure. Sometimes, remediating a site to a high FS is not economically justified and the potential consequences can be accepted. Typically, for new construction such as a new embankment slope, practitioners consider a minimum FS of approximately 1.5 for long-term static conditions and 1.1 to 1.2 for transient conditions such as seismic loading. For this project, our criteria will be a minimum FS of 1.5 for static conditions and 1.1 for seismic conditions.

Several cases were evaluated and are presented in the table below.

**Results of Slope Stability Analysis**

| Figure | Description | Factor of Safety* | Criterion | Assessment |
|---|---|---|---|---|
| E1 | A-A', Static | 1.69 | ≥1.5 | OK |
| E2 | A-A', Seismic | 1.10 | ≥1.1 | OK |
| E3 | C-C', Static | 1.77 | ≥1.5 | OK |
| E4 | C-C', Seismic | 1.14 | ≥1.1 | OK |
| E5 | E-E', Static, through new embankment | 1.87 | ≥1.5 | OK |
| E6 | E-E', Seismic, through new embankment | 1.15 | ≥1.1 | OK |
| E7 | E-E', Static, through existing bank | 0.86 | ≥1.5 | No Grading |
| E8 | E-E', Seismic, through existing bank | 0.65 | ≥1.1 | No Grading |
| E9 | F-F', Static | 1.82 | ≥1.5 | OK |
| E10 | F-F', Seismic | 1.26 | ≥1.1 | OK |

*The above FS are shown to the 0.01 decimal place, as output by the software. These are shown to illustrate relative changes in the FS from changes in modeling only. These FS are not absolute and should not be considered accurate to the degree implied.

Graphical outputs from these analyses are included in Appendix E.

The analysis results indicate that proposed new slopes will have acceptable factors of safety for both static and seismic conditions. In some cases, as in Section C-C', a steeper slope will be graded to a flatter and more stable configuration. All areas of 3H:1V slopes that are not shown in these analyzed sections we consider stable by inspection based on the results presented. This includes new slopes at the north-end pedestrian overlook which will be flattened to 3H:1V.

The analyses also show that some of the existing riverfront slopes do not have adequate factors of safety (see Figures E7 and E8 on Section E-E'). However, the proposed project will not weaken the stability of these existing slopes and these slopes will remain undisturbed by the project. Based on our evaluations, we believe all slopes to be altered by grading or loading will result in acceptable levels of stability.

A previous memorandum (Geotechnics, 2014) had demonstrated that leaving concrete and asphalt in place, as proposed, will not result in unstable conditions. We have repeated these analyses using the higher levels of shaking described herein (seismic coefficient increased from 0.10g to 0.14g). Our analyses indicate an acceptable seismic FS of 1.13. We analyzed the potential for groundwater buildup and concluded that the embankment will drain adequately without constructing subsurface drainage improvements.

## EMBANKMENT SETTLEMENT

Site grading will result in two major fill embankments, one at the north end to 50-ft thickness and one at the south end to 25-ft thickness. Compressible soils include the native alluvial soils and the existing fill soils. Consolidation of compressible soils as well as deterioration of organics within the fill will result in site settlement. A portion of this settlement will occur during construction but some will occur over several years.

### *Total Settlement*

We have performed settlement analyses using classic consolidation theory to estimate settlement under the center of each embankment. These were modeled as an infinitely long and infinitely wide load and using an estimated unit weight of proposed fill equal to 125 pcf. This results in load increase of 6,250 psf for the north embankment and 3,125 psf for the south embankment. We applied the increased load to all levels of soil, shallow and deep.

Our analyses utilized estimated soil parameters resulting from our own exploration program as well as from lab testing and borings by others. Our CPT correlations provided an indication of the compressibility of the native alluvial deposits. The analyses result in settlement estimates having a wide range, due mainly to the variability of the fill and the difficulty in estimating its properties. Somewhat surprisingly, we found the alluvium to be over-consolidated and only moderately compressible. The majority of settlement will be due to compression of fill soils. We estimated the fill to be approximately 10 times more compressible than the sandy alluvium and approximately 3 times more compressible than the silty alluvium.

From our analyses, we estimate the deep, central portion of the north embankment will settle approximately 12 to 36 inches. Of this amount, approximately 3 to 5 inches will be due to compression of alluvium and the remainder due to fill soil compression.

We estimate the deep, central portion of the south embankment will settle approximately 6 to 20 inches. Of this amount, approximately 1½ to 3 inches will be due to compression of alluvium and the remainder due to fill soil compression.

Although significant settlement is anticipated, monitoring of settlement at the center of embankments is probably not warranted. Since no structures are proposed, the impacts of such settlement should be negligible.

### *Edge Settlement*

Because the proposed graded slopes have a relatively shallow inclination of 3H:1V, the settlement at the slope toe will be a small fraction of the amount beneath the center. Nonetheless, we analyzed settlements at the toe of the fill and beyond for two specific property line issues:

1) The west toe of the north-side embankment slope adjacent to the railroad tracks. This evaluation was performed to assess potential settlement under the railroad spur that is located just beyond the property line. See Profile B-B'.
2) The south toe of the south-side embankment at the BP property line. This evaluation was performed to assess potential settlement near BP's cylindrical storage tanks. See Profile F-F'.

We used Boussinesq's equations and charts to evaluate the stress increase at various points within the soils beyond the embankment. Then, using the resulting Influence Factors, we again used classic consolidation theory to estimate settlements. Our results are shown on the tables below. Locations of points A through F are shown on the respective profiles, Figures 3 and 5.

**Estimated Settlement – West Toe of North Embankment, B-B'**

| Toe of Fill | | | 20' Beyond Toe of Fill, at Prop. Line | | |
|---|---|---|---|---|---|
| **Point** | **Material** | **Settlement** | **Point** | **Material** | **Settlement** |
| A | Existing Fill | 0.06" | D | Existing Fill | 0" |
| B | Silty Alluvium | 0.05" | E | Silty Alluvium | 0" |
| C | Sandy Alluvium | 0.13" | F | Sandy Alluvium | 0.04" |
| | **TOTAL:** | **0.24"** | | **TOTAL:** | **0.04"** |

**Estimated Settlement – South Toe of South Embankment, F-F'**

| At Property Line | | | 30' Beyond Prop. Line, on BP Property | | |
|---|---|---|---|---|---|
| **Point** | **Material** | **Settlement** | **Point** | **Material** | **Settlement** |
| A | Existing Fill | 1.40" | D | Existing Fill | 0.16" |
| B | Silty Alluvium | 0.20" | E | Silty Alluvium | 0.05" |
| C | Sandy Alluvium | 0.14" | F | Sandy Alluvium | 0.04" |
| | **TOTAL:** | **1.74"** | | **TOTAL:** | **0.25"** |

As with earlier analyses at the center of the embankments, we should consider a range of possible values due to input data uncertainty. We suggest doubling the above values as a worst-case scenario.

So, our analyses confirmed our expectation that very minor or negligible settlement is likely to result in the vicinity of off-site features such as railways and above-ground storage tanks. However, if concern remains, surface settlement monuments could be established near the base of these fill embankments. These monuments would be surveyed during and following construction.

Based on the results, we believe the north embankment toe could safely be moved 10 feet to the west, closer to the railroad tracks. Anticipated settlement at the property line would be about 0.14".

## CONCLUSIONS AND RECOMMENDATIONS SUMMARY

Based on our explorations, testing, and analyses, it is our opinion that the proposed project is feasible from a geotechnical perspective. We offer the following summary of conclusions:

- As designed with 3H:1V side slopes, proposed embankments are stable for static and seismic conditions. In areas of proposed grading along the riverbank, stability will be improved. In areas where no grading is proposed, stability of existing slopes will not be decreased.
- Fill material and compaction requirements will be different for Tax Lot 200 than for the remainder of the site. For the 2-acre future building lot, a higher standard will be applied to ensure the material is placed as controlled structural fill, suitable for future building construction using shallow foundations.
- Significant material export should be anticipated. Although the majority of the site will never contain structures and "structural fill" is not necessary, we will still recommend limits to

material type and size. The woody deposits and other organics encountered should not be reused as fill in new embankments.

- Significant construction dewatering will be required to grade the lower slopes and establish the new stream channel for Linnton Creek.

## RECOMMENDATIONS

### SITE PREPARATION

As noted, a portion of the asphalt and concrete surfacing under the future north embankment will remain in place. All other existing asphalt surfacing, concrete surfacing, and concrete debris should be removed from the site for disposal. Alternatively, if it can be separated from other debris, the concrete can be stockpiled and processed for use as fill as described below in the section *Fill Materials*.

Existing site vegetation including roots should be removed from all areas to be graded. Stripping depths will vary depending on vegetation type but are expected to vary from 0 to 6 inches. Greater stripping depths may be required to remove localized zones of soft or organic soil.

### WET WEATHER EARTHWORK

Trafficability of the on-site soils, where exposed, will generally be difficult during the wet season of the year (typically early October through late May) or when the moisture content is more than about 3 percent above optimum. Wet weather procedures may include a number of measures to reduce soil disturbance. Smooth-edge buckets can be used for excavating site soils to reduce the disturbance to the excavated subgrade. Tracked equipment can be used to reduce disturbance to the subgrade where granular haul roads cannot be built. Construction access and staging can be planned to reduce traffic over subgrade areas.

Haul roads will likely be needed during persistent wet weather. They should consist of imported crushed rock compacted to a dense state. The initial lift of fill over the exposed native soil subgrade should be placed in a single lift of at least 12 inches thick and compacted without vibration using a smooth-drum roller to reduce potential disturbance of the subgrade. Additional rock may be needed to protect the subgrade and support construction equipment, depending on traffic.

### EXCAVATION

We anticipate the contractor will encounter abundant debris and wood that may require special handling and sorting prior to either exporting or crushing for re-use on site. During excavation, the contractor should be prepared to pick-through or screen materials as necessary based on the guidelines presented in the section below, *Fill Materials*.

We anticipate that conventional earthmoving equipment in proper working condition should be capable of making most of the excavations required. However, in some areas, large concrete slabs may be encountered. Special equipment may be required to either break these materials on site, or to remove them intact from the site. The concrete may contain rebar or other materials in some places that could require additional effort to remove. The earthwork contractor is responsible to provide equipment and procedures to perform the necessary excavations through these heterogeneous fills as described in the exploration logs and text of this report.

## EXCAVATION STABILITY

Trench excavation will be required on the north end for the culvert relocation. Trench depth will approach 20 feet in some locations. All trench excavations should be made in accordance with applicable Occupational Safety and Health Administration (OSHA) and state regulations. On-site soils are generally OSHA Type C soils and we recommend that excavations deeper than 4 feet be shored or laid back at an inclination of 1½H:1V or flatter.

Shoring for trenches less than about 8 feet deep that are above the effects of seeping groundwater should be possible with a conventional box system. Moderate to slight sloughing should be expected outside the box.

While this report describes certain approaches to excavation and shoring, the contractor is responsible for selecting and designing the specific methods, monitoring the excavations for safety, and providing shoring required to protect personnel and adjacent structural elements. Shoring deeper than 8 feet should be designed by a registered engineer before installation. Further, the shoring design engineer should be provided with a copy of this report.

Precautions should be taken during removal of the shoring materials to minimize disturbance of the pipe, underlying bedding materials, and trench sidewalls. The open excavation behind a trench box should be backfilled immediately after the trench box has been moved. Heavy construction equipment, construction materials, excavated soil, and vehicular traffic should not be allowed within a distance from the edge of the excavation equal to the depth of the excavation, unless the shoring system has been designed for the additional lateral pressure.

## FILL MATERIALS - EAST SIDE

Because there are no structures proposed, our typical "Structural Fill" recommendations would be unnecessarily restrictive. However, to retain the integrity and stability of constructed embankments, we recommend controlled placement and compaction of <u>non-organic</u> soils. Organic soils and fine woody deposits such as wood chips and decomposed wood could be stockpiled for export or re-use as topsoil or mulch in landscaping.

Embankment fill soils should be free of debris, roots, organic matter, man-made contaminants, particles with greatest dimension exceeding <u>12 inches</u>, and other deleterious materials. The on-site soils can be used as structural fill provided the material meets these general requirements. Based on our borings and those by others, anticipated average fill will be sandy silt, with average component proportions of approximately 60% silt, 30% sand, and 10% gravel.

Recycled concrete and asphalt can be placed as fill soil provided the greatest dimension does not exceed 12 inches. All other debris including metal, plastic, glass, timber, etc. should be removed and exported from the site. Organics are inappropriate for use in fill and this includes intact lumber as well as fine, decomposed woody deposits. During excavation and transport of fill through the site, the contractor should be expected to pick-out and stockpile the debris for removal, or with large concrete, break or crush it to acceptable size. Boulders larger than 12 inches could potentially be re-used on-site in construction of the plunge-pool dissipation structures at the two culvert outlets.

<u>Trench Bedding and Backfill:</u> A new culvert pipe, 24-inch diameter HDPE, will be placed in a deep trench on the north portion of the site and will daylight at the riverbank. Pipe bedding material, placement, compaction, and shaping should be in accordance with City of Portland Specifications. In

general, pipe bedding should meet the requirements for ¾"- minus crushed aggregate as defined in the City of Portland *Standard Construction Specifications* (2010). Controlled Low Strength Material (CLSM) can also be used for pipe bedding. Pipe bedding and fill in the pipe zone should meet the pipe manufacturer's recommendations.

Above the pipe zone, trench backfill should consist of west-side structural fill (4-inch minus) as described below, and compacted to the standards presented below for the east-side (90% of Standard Proctor). CLSM can also be used as trench backfill.

## FILL PLACEMENT AND COMPACTION - EAST SIDE

While compaction should be required, compaction testing is not justified or recommended. Density testing is often unreliable and difficult to implement with highly variable soils containing particles as large as 12 inches in diameter. We instead recommend the observational method to confirm compaction is being regularly implemented.

Fill material should be placed and compacted in lifts to the equivalent of 90 percent of maximum dry density, as determined by ASTM D698 (Standard Proctor). Fill should also be placed and compacted in accordance with the following:

- Place all fill and backfill on a prepared subgrade that consists of firm, inorganic native soils or approved fill. When placed on sloping ground, the slope should be keyed and benched such that soils are placed on a level surface.
- Place all fill or backfill in uniform horizontal lifts with a thickness appropriate for the material type and compaction equipment. Unless otherwise directed by the geotechnical engineer, maximum thickness of loose lifts shall be 18 inches.
- Use appropriate operating procedures to attain uniform coverage of the area being compacted.
- Place fill at a moisture content within about 5 percent of optimum. Moisture condition fill soil as necessary before compacting.
- Do not place, spread or compact fill soils during unfavorable weather conditions. Disturbed lifts should be removed or properly recompacted prior to placement of subsequent lifts of fill soils.
- Do not place fill and backfill until site stripping has been completed and the appropriate approvals have been obtained.

Observation of fill compaction should be carried out by Geotechnics LLC on a part time basis to verify the appropriate compaction effort is being achieved. Appropriate compaction effort is approximately equivalent to 90% of Standard Proctor, or generally described as dense and unyielding. The compaction should be accomplished in accordance with a performance specification to be developed by the geotechnical engineer and depending on the materials and equipment used. For example, it might require a 4,500 pound wheel load not leaving more than ½-inch of deformation in a single pass. It is possible that the materials proposed by the contractor cannot be compacted to the satisfaction of the engineer using the contractor's proposed methods and equipment. In such case, the material, methods, or equipment will have to be modified. In the event of disputes, field compaction testing could be performed.

Part-time observation by the geotechnical engineer should amount to approximately 50 percent of the time compaction is taking place. This could be modified as the project progresses depending on the performance and perceived reliability of the grading contractor. Concurrent with compaction observations, Geotechnics personnel will confirm appropriate removal of organics and debris as per the previous report section.

### FILL MATERIALS - WEST SIDE

Fill placed on the Lot 200 Parcel should be structural fill for future possible development as a building site. Structural fill should be well-graded, free of debris, roots, organic matter, man-made contaminants, particles with greatest dimension exceeding 4 inches, and other deleterious materials. The suitability of soil for use as structural fill will depend on the gradation and moisture content of the soil. As the amount of fines in the soil matrix increases, the soil becomes increasingly more sensitive to small changes in moisture content and achieving the required degree of compaction becomes more difficult.

The on-site soils can be used as structural fill provided the material meets the above general requirements. A Geotechnics representative should evaluate on-site materials prior to use as fill at the site.

### FILL PLACEMENT AND COMPACTION - WEST SIDE

Structural fill material should be placed and compacted in thin lifts to a minimum of 95 percent of maximum dry density, as determined by ASTM D1557 (Modified Proctor). Fill should also be placed and compacted in accordance with the following:

- Place all fill and backfill on a prepared subgrade that consists of firm, inorganic native soils or approved structural fill. When placed on sloping ground, the slope should be keyed and benched such that soils are placed on a level surface.
- Place all fill or backfill in uniform horizontal lifts with a thickness appropriate for the material type and compaction equipment. Unless otherwise directed by the geotechnical engineer, maximum thickness of loose lifts shall be 8 inches.
- Use appropriate operating procedures to attain uniform coverage of the area being compacted.
- Place fill at a moisture content within about 3 percent of optimum as determined in accordance with ASTM Test Method D1557. Moisture condition fill soil to achieve a uniform moisture content within the specified range before compacting.
- Do not place, spread or compact fill soils during unfavorable weather conditions. Disturbed lifts should be removed or properly recompacted prior to placement of subsequent lifts of fill soils.
- Do not place fill and backfill until tests and evaluation of the underlying materials have been made and the appropriate approvals have been obtained.
- During structural fill placement and compaction, a sufficient number of in-place density tests should be completed by Geotechnics LLC to verify that the specified degree of compaction is being achieved.

### DEWATERING

For the daylighting of Linnton Creek, cuts to approximately Elevation 5 feet will be required, with groundwater levels expected in the vicinity of Elev. 15 to 25 feet. So, the groundwater level may need to be lowered as much as 20 feet, depending on the season. The 50% design plans show a requirement to perform all excavation below Elev. 20 feet during the low-flow season on the Willamette River. This will allow river-cutoff berms to be constructed to only Elev. 15 feet. But, the groundwater levels only have a partial correlation to river level and may still be quite high during the dry season. So regardless of the season, we anticipate the need for a well or wellpoint dewatering system to allow grading to occur in the dry.

The design, implementation, and permitting of dewatering systems should be the responsibility of the contractor. The contract documents should include a requirement for a submitted dewatering plan to include design details and calculations for review by the geotechnical engineer.

Soils in the south portion of the site are highly variable. Most of the dewatered soils will be native deposits but some will be fill. Native deposits at these elevations are likely low permeability silty alluvium, so a wellpoint system might be effective. For design of dewatering systems, the contractor should consult the exploration logs and laboratory test results presented in Appendices A, B, C, and F.

## CONSTRUCTION SUPPORT

Satisfactory foundation and earthwork performance depends to a large degree on quality of construction. Sufficient monitoring of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. Subsurface conditions observed during construction should be compared with those encountered during the exploration program. Recognition of changed conditions often requires experience; therefore, the project geotechnical engineer or their representative should visit the site with sufficient frequency to detect whether subsurface conditions differ significantly from those anticipated. In particular, we recommend that site stripping and fill placement be observed periodically by Geotechnics. Compaction of structural backfill on Lot 200 should be tested to confirm that the specified compaction is met. Geotechnics should also review the final contract documents to verify that the recommendations presented herein have been interpreted as intended.

## LIMITATIONS

We have prepared this report for the exclusive use of Restorcap and the design team for this project. Our report is intended to provide our opinion of geotechnical parameters for design and construction of the proposed project based on exploration locations that are believed to be representative of site conditions. However, conditions can vary significantly between exploration locations and our conclusions should not be construed as a warranty or guarantee of subsurface conditions or future site performance. If soil conditions are encountered during construction that differ from those described herein, we should be notified immediately to assess the implications and provide any necessary design supplements or modifications. If the scope of proposed construction changes from that described herein, our recommendations should also be reviewed.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. No warranty, expressed or implied, should be understood.

We appreciate the opportunity to submit this report to you. Please contact us if you have any questions or need additional information.

Sincerely,

REGISTERED PROFESSIONAL ENGINEER
19463
OREGON
SEPT. 16, 1997
ANDRÉ DAVID MARÉ
EXPIRES: 12/31/14

André D. Maré, P.E., G.E.
Geotechnical Engineer

Document ID: LinntonR1

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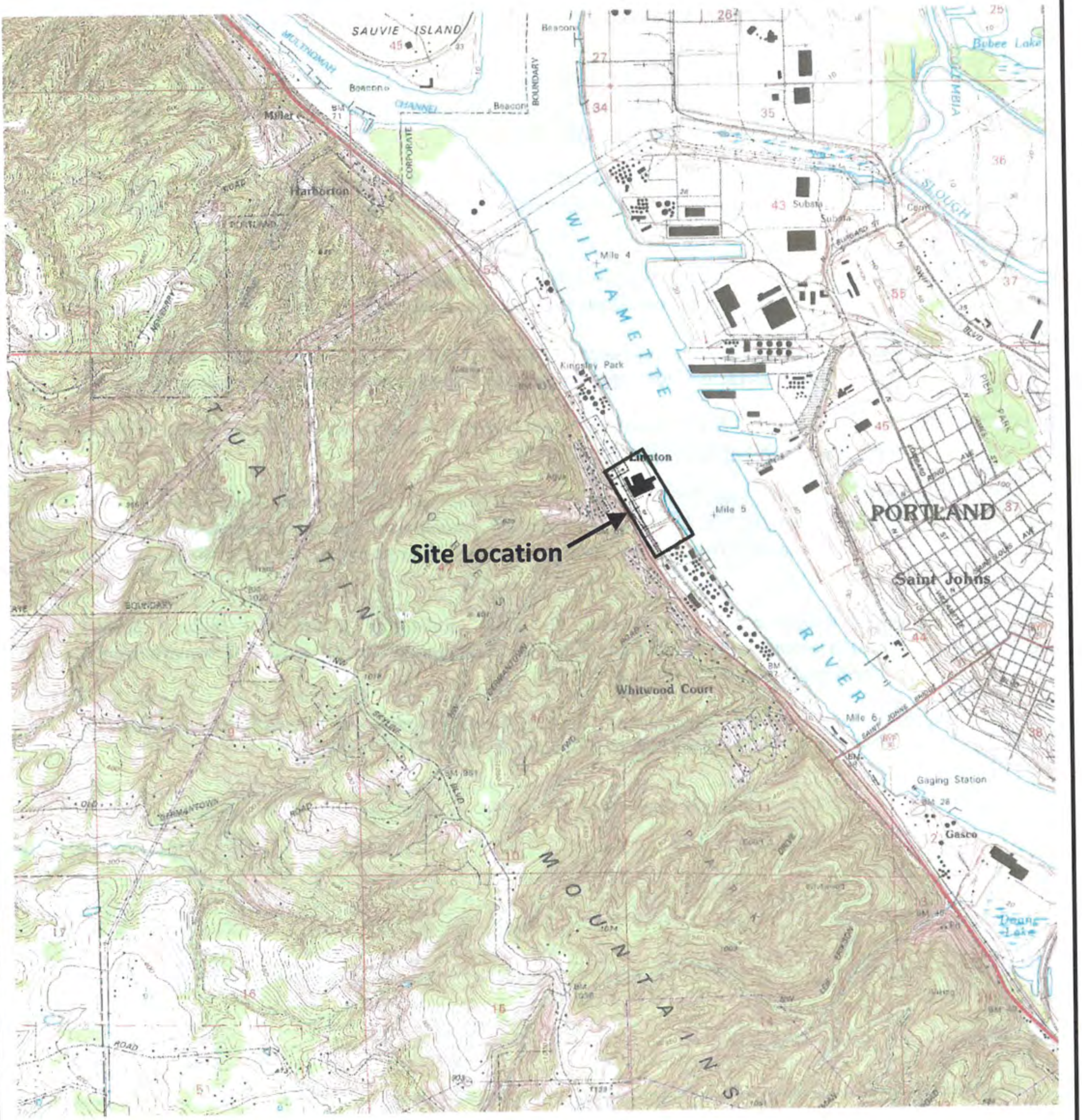


N

NOT TO SCALE

Base Map from USGS Linnton 7.5 Minute Quadrangle.

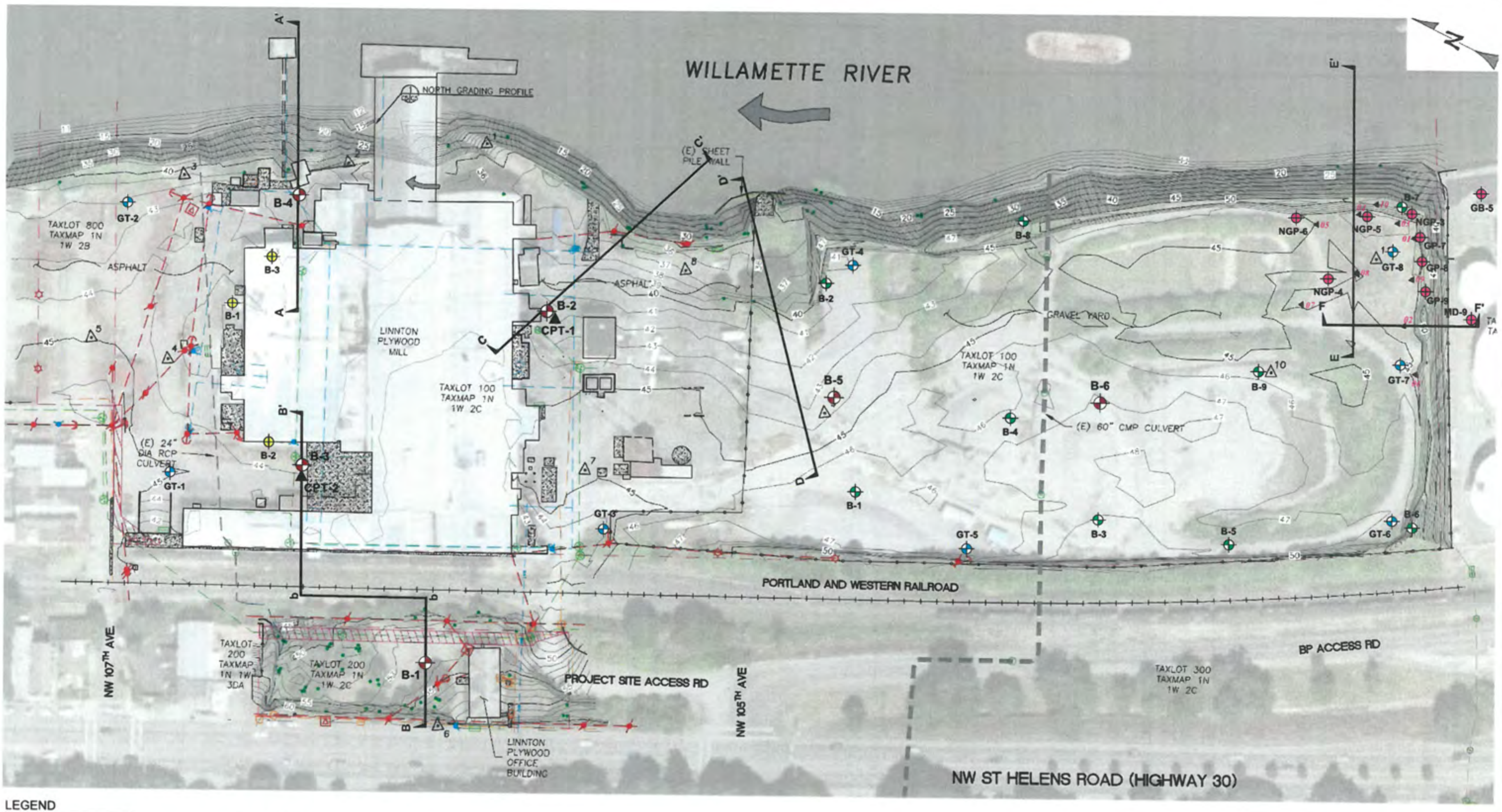
VICINITY MAP

Linnton Plywood Restoration
Portland, Oregon

GEOTECHNICS LLC

Project No. 13-016-2

Figure 1



LEGEND

B-6 Boring

CPT-2 Cone Penetrometer Test

A A' Cross Section

Borings by Others:

GT-8 Shaw Environmental, 2011

B-9 CH2M Hill, 1981

B-3 CH2M Hill, 1974

◄ 07 URS, LPMW Series Wells (LPMW-07)

NGP-6 URS, 2003-04

120 0 120

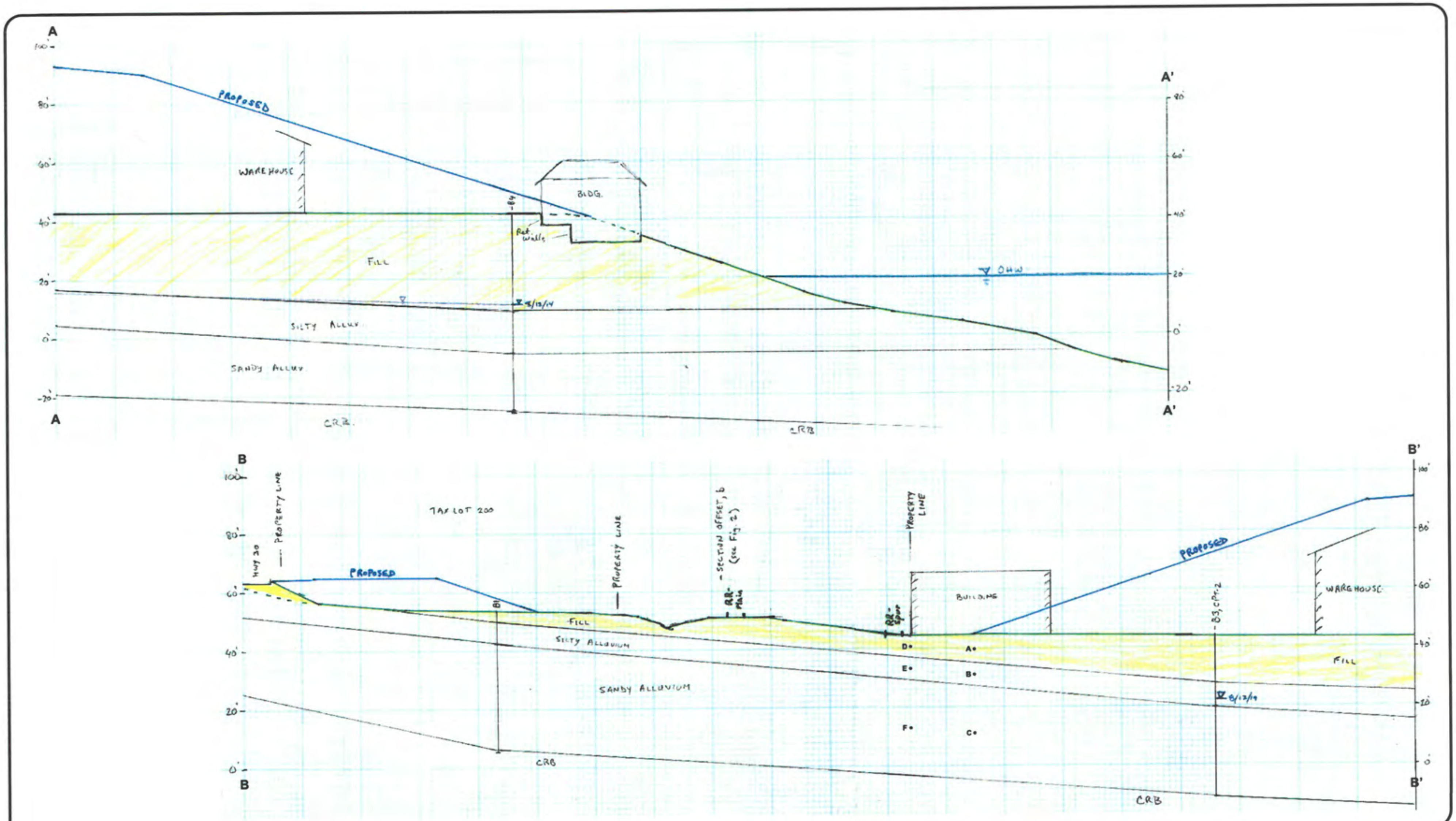
APPROXIMATE SCALE IN FEET

GEOTECHNICS LLC

SITE AND EXPLORATION PLAN
Linnton Plywood Restoration
Portland, Oregon

Project No. 13-016-2

Figure 2



30 0 30
APPROXIMATE SCALE IN FEET
NO VERTICAL EXAGGERATION

BASED ON NAVD-88

ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE

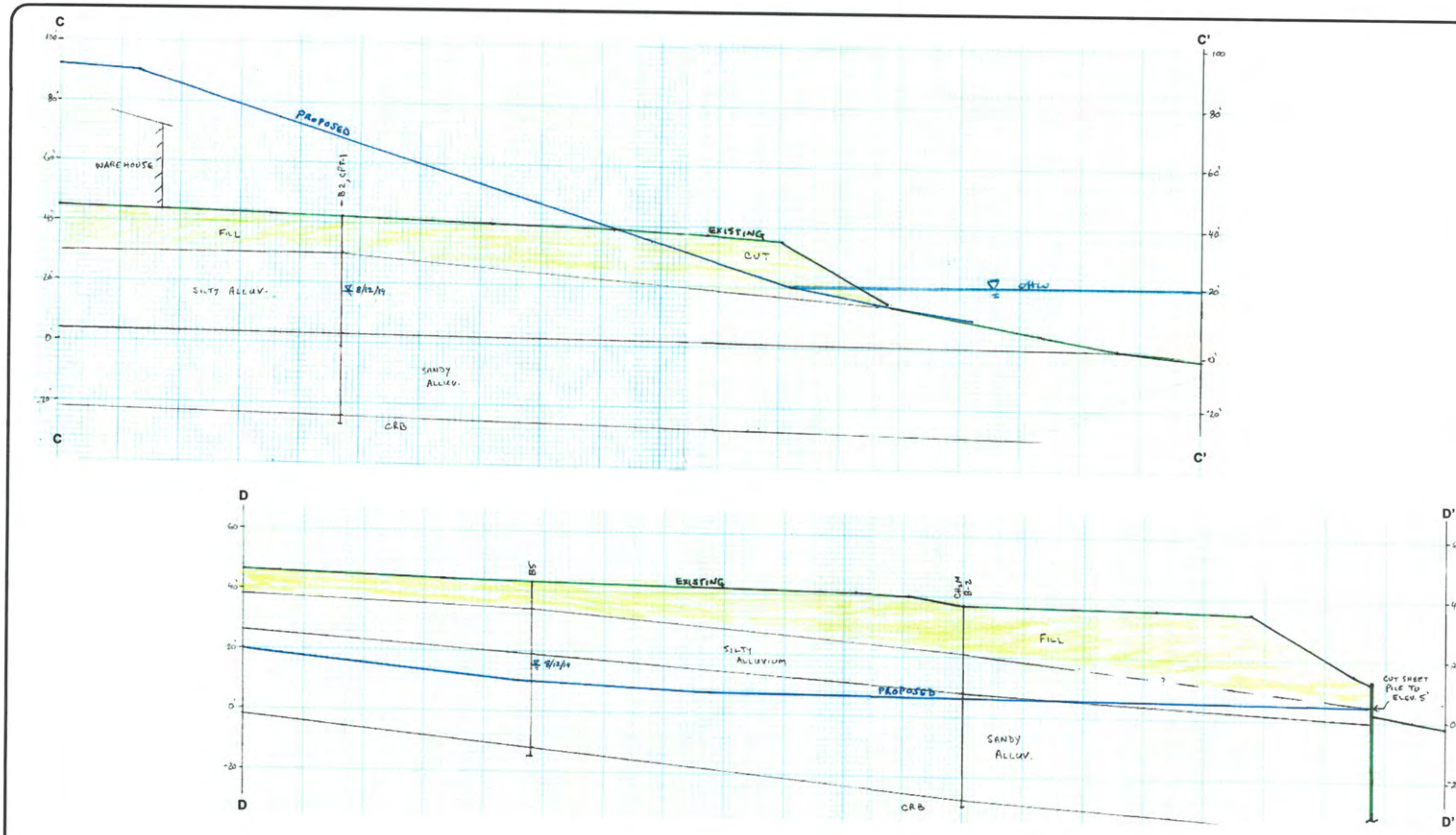
GEOTECHNICS LLC

## PROFILES A-A' AND B-B'

Linnton Plywood Restoration
Portland, Oregon

Project No. 13-016-2

Figure 3



BASED ON NAVD-88

ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE

30 0 30

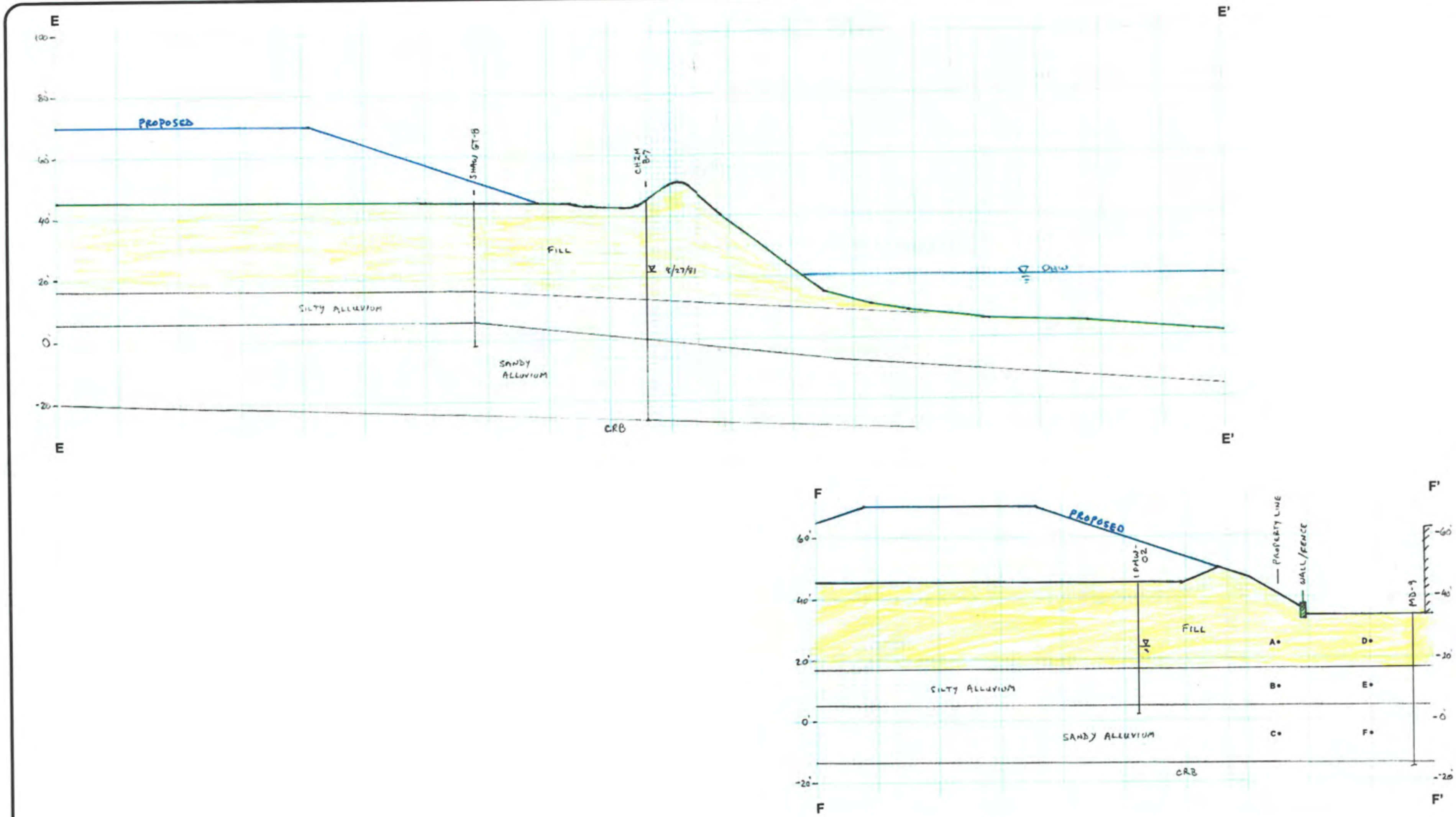
APPROXIMATE SCALE IN FEET
NO VERTICAL EXAGGERATION

GEOTECHNICS LLC

PROFILES C-C' AND D-D'
Linnton Plywood Restoration
Portland, Oregon

Project No. 13-016-2

Figure 4



30 0 30
APPROXIMATE SCALE IN FEET
NO VERTICAL EXAGGERATION

BASED ON NAVD-88

ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE

GEOTECHNICS LLC

## PROFILES E-E' AND F-F'

Linnton Plywood Restoration
Portland, Oregon

Project No. 13-016-2

Figure 5

# Appendix A

## FIELD EXPLORATIONS - DRILLING

# APPENDIX A

## FIELD EXPLORATIONS - DRILLING

We completed six rotary drilled borings from August 4 to August 6, 2014. The borings were drilled by Hard Core Drilling, Inc. of Dundee, Oregon, using a CME 75 truck mounted drill rig and mud rotary methods to advance a tricone bit. The locations of the explorations are shown in the report on Figure 2.

The borings were coordinated by a geotechnical engineer who located the borings, classified the various soil units encountered, obtained representative soil samples for geotechnical testing, observed and recorded groundwater conditions, and maintained detailed logs of the explorations.

Soil samples were obtained from the drilled borings using one of the following methods:

1. Standard Penetration Tests (SPT) were completed in general conformance with ASTM Test Method D1586, "Standard Method for Penetration Test and Split-Barrel Sampling of Soils". The sampler was driven with a 140-pound auto-trip hammer falling 30 inches. Recorded blows for each 6 inches of sample penetration are shown on the boring logs. The N-value, or number of blows required to drive the sampler the final 12 inches was used in our analyses. Disturbed samples were obtained from the split barrel for subsequent classification and index testing.

2. Shelby tubes were pushed in intervals which exhibited soft, cohesive soil conditions. These are 3-inch outside diameter, 30-inch long, thin-walled tubes which are hydraulically pushed into the soil mass a distance of about 24 inches. The Shelby tube sampling was performed in general accordance with ASTM D1587. Once the soil sample was obtained, the sample tube was capped, sealed, and transported in an upright position.

Materials encountered in the explorations were classified in the field in general accordance with ASTM Standard Practice D2488, "Standard Practice for the Classification of Soils (Visual-Manual Procedure)". Soil classifications and sampling intervals are shown in the exploration logs in this appendix. A legend to the terms and symbols used on the logs is presented on the following page.

## RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N-VALUE

| COHESIONLESS SOILS | | | COHESIVE SOILS | | |
|---|---|---|---|---|---|
| Density | N (blows/ft) | Approximate Relative Density (%) | Consistency | N (blows/ft) | Approximate Undrained Shear Strength (psf) |
| Very Loose | 0 to 4 | 0 - 15 | Very Soft | 0 to 2 | <250 |
| Loose | 4 to 10 | 15 - 35 | Soft | 2 to 4 | 250 - 500 |
| Medium Dense | 10 to 30 | 35 - 65 | Medium Stiff | 4 to 8 | 500 - 1000 |
| Dense | 30 to 50 | 65 - 85 | Stiff | 8 to 15 | 1000 - 2000 |
| Very Dense | over 50 | 85 - 100 | Very Stiff | 15 to 30 | 2000 - 4000 |
| | | | Hard | over 30 | >4000 |

## UNIFIED SOIL CLASSIFICATION SYSTEM

| MAJOR DIVISIONS | | | GROUP DESCRIPTIONS | |
|---|---|---|---|---|
| **Coarse Grained Soils**<br>More than 50% Retained on No. 200 Sieve Size | **Gravel and Gravelly Soils**<br>More than 50% of Coarse Fraction Retained on No. 4 Sieve | Clean Gravel (little or no fines) | GW | Well-graded GRAVEL |
| | | | GP | Poorly-graded GRAVEL |
| | | Gravel with Fines (appreciable amount of fines) | GM | Silty GRAVEL |
| | | | GC | Clayey GRAVEL |
| | **Sand and Sandy Soils**<br>50% or More of Coarse Fraction Passing No. 4 Sieve | Clean Sand (little or no fines) | SW | Well-graded SAND |
| | | | SP | Poorly-graded SAND |
| | | Sand with Fines (appreciable amount of fines) | SM | Silty SAND |
| | | | SC | Clayey SAND |
| **Fine Grained Soils**<br>50% or More Passing No. 200 Sieve Size | **Silt and Clay** | Liquid Limit Less than 50% | ML | SILT |
| | | | CL | Lean CLAY |
| | | | OL | Organic SILTor CLAY |
| | **Silt and Clay** | Liquid Limit 50% or More | MH | Elastic SILT |
| | | | CH | Fat CLAY |
| | | | OH | Organic SILTor CLAY |
| **Highly Organic Soils** | | | PT | PEAT |

## COMPONENT DEFINITIONS

| COMPONENT | SIZE RANGE |
|---|---|
| Boulders | Larger than 12 in |
| Cobbles | 3 in to 12 in |
| Gravel | 3 in to #4 (5 mm) |
| Coarse Gravel | 3 in to ¾ in |
| Fine Gravel | ¾ in to #4 (5 mm) |
| Sand | #4 (5 mm) to #200 (0.075 mm) |
| Coarse Sand | #4 (5 mm) to #10 (2 mm) |
| Medium Sand | #10 (2 mm) to #40 (0.4 mm) |
| Fine Sand | #40 (0.4 mm) to #200 (0.075 mm) |
| Silt and Clay | Smaller than #200 (0.075 mm) |

## ABBREVIATIONS

Laboratory Tests:

| | |
|---|---|
| AL | Atterberg Limits |
| PL | Plastic Limit |
| LL | Liquid Limit |
| %F | Fines Content |
| GSD | Grain Size Distribution |
| DD | Dry Density |
| MD | Moisture/Density Relationship |
| -S | Standard Proctor (ASTM D-698) |
| -M | Modified Proctor (ASTM D-1557) |
| SG | Specific Gravity |
| CBR | California Bearing Ratio |
| RM | Resilient Modulus |
| K | Permeability |
| CN | Consolidation |
| DS | Direct Shear |
| TX | Triaxial Shear |
| -UU | Unconsolidated Undrained |
| -CU | Consolidated Undrained |

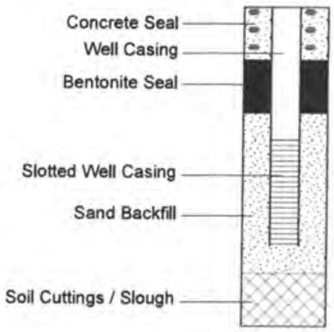
Field Tests:

| | |
|---|---|
| PP | Pocket Penetrometer |
| TV | Torvane |

Sample Type:

| | |
|---|---|
| SPT | Standard Penetration Test (2.0" OD) |
| D&M | Ring Sampler (3.25" OD) |
| C-MOD | California Modified Sampler (3.0" OD) |
| SH | Thin-Walled Shelby Tube (3.0" OD) |
| GRAB | Disturbed Sample collected from auger cuttings or test pit |

## WELL DETAIL



## NOTES

Soil descriptions are based on the general approach presented in ASTM D-2488 (Visual-Manual Procedure). Where laboratory data are available, soil classifications are in accordance with ASTM D-2487.

Solid lines between soil unit descriptions indicate change in interpreted geologic unit. Dashed lines indicate stratigraphic change within the geologic unit.

Blowcount (N) is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted) per ASTM D-1586. See exploration log for hammer weight and drop.

Please also refer to the discussion in the report for a general description of subsurface conditions.

GEOTECHNICS LLC

KEY TO LOG SYMBOLS AND TERMS

**DRILLING COMPANY:** Hard Core Drilling
**DRILLING METHOD:** Mud Rotary, 5" tricone bit
**DRILLING EQUIPMENT:** CME 75
**BORING LOCATION:** See Figure 2

**SURFACE ELEVATION:** 53.5 Feet
**DATE STARTED:** 8/4/14
**DATE COMPLETED:** 8/4/14
**LOGGED BY:** ADM

| SAMPLE ID | SAMPLE TYPE | SAMPLE | MOISTURE CONTENT (%) | BLOWS / 6" | DEPTH (FT) | GRAPHIC SYMBOL | MATERIAL DESCRIPTION | OTHER TESTS & NOTES |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Gray gravelly, Silty SAND (SM), moist, medium dense. | |
| | | | | | 1 | | | |
| | | | | | 2 | | (FILL) | |
| | | | | | 3 | | | |
| | | | | | 4 | | Gray, mottled reddish brown, SILT with Sand (ML), moist, medium stiff to stiff. | |
| | | | | | 5 | | (RECENT ALLUVIUM) | |
| S-1 | SPT | ◧ | 33.4 | 3-4-4 | 6 | | | |
| | | | | | 7 | | | |
| | | | | | 8 | | Becomes gray Sandy SILT (ML) | |
| | | | | | 9 | | | |
| | | | | | 10 | | | |
| S-2 | SPT | ◧ | 27.6 | 3-5-4 | 11 | | Gray, fine Silty Sand (SM), moist, loose. 30% - 45% fines. Micaceous. | |
| | | | | | 12 | | | |
| | | | | | 13 | | | |
| | | | | | 14 | | | |
| | | | | | 15 | | | |
| S-3 | SPT | ◧ | 26.9 | 4-4-5 | 16 | | | %F = 40.1 |
| | | | | | 17 | | | |
| | | | | | 18 | | | |
| | | | | | 19 | | Silt content decreases, 15% - 25 % fines. Becomes medium dense. | |
| | | | | | 20 | | | |
| S-4 | SPT | ◧ | 21.8 | 4-7-8 | 21 | | | |
| | | | | | 22 | | | |
| | | | | | 23 | | | |
| | | | | | 24 | | | |
| | | | | | 25 | | | |
| S-5 | SPT | ◧ | 32.1 | 6-6-6 | 26 | | Grayish brown Sandy SILT (ML), moist, stiff. | |
| | | | | | 27 | | | |
| | | | | | 28 | | Gray, fine Silty Sand (SM), moist, medium dense. Micaceous. | |
| | | | | | 29 | | | |

**NOTES:**

## BORING B-1

Linnton Plywood Restoration
Portland, Oregon

**DRILLING COMPANY:** Hard Core Drilling
**DRILLING METHOD:** Mud Rotary, 5" tricone bit
**DRILLING EQUIPMENT:** CME 75
**BORING LOCATION:** See Figure 2

**SURFACE ELEVATION:** 53.5 Feet
**DATE STARTED:** 8/4/14
**DATE COMPLETED:** 8/4/14
**LOGGED BY:** ADM

| SAMPLE ID | SAMPLE TYPE | SAMPLE | MOISTURE CONTENT (%) | BLOWS / 6" | DEPTH (FT) | GRAPHIC SYMBOL | MATERIAL DESCRIPTION | OTHER TESTS & NOTES |
|---|---|---|---|---|---|---|---|---|
| S-6 | SPT | ▮ | 24.5 | 6-7-8 | 31 | | (RECENT ALLUVIUM) | |
| | | | | | 32 | | | |
| | | | | | 33 | | Brownish gray Sandy SILT (ML), very moist, stiff. | |
| | | | | | 34 | | | |
| | | | | | 35 | | | |
| S-7 | SPT | ▮ | 35.9 | 7-7-5 | 36 | | | |
| | | | | | 37 | | | |
| | | | | | 38 | | Gray, poorly-graded SAND with Silt (SP-SM), moist, medium dense. Fine grained, micaceous. | |
| | | | | | 39 | | | |
| | | | | | 40 | | | |
| S-8 | SPT | ▮ | 27.4 | 10-9-11 | 41 | | | |
| | | | | | 42 | | | |
| | | | | | 43 | | | |
| | | | | | 44 | | | |
| | | | | | 45 | | | |
| S-9 | SPT | ▮ | 35.5 | 6-6-6 | 46 | | | |
| | | | | | 47 | | | Driller comment - harder, slower drilling below 47.5 feet. |
| S-10 | SPT | — | | 50/0" | 48 | | Dark gray BASALT fragments (cuttings). | No sample recovery. |
| | | | | | 49 | | Total Depth = 48.0 feet.<br>Refusal on hard rock.<br>Groundwater level not determined. | |
| | | | | | 50 | | | |
| | | | | | 51 | | | |
| | | | | | 52 | | | |
| | | | | | 53 | | | |
| | | | | | 54 | | | |
| | | | | | 55 | | | |
| | | | | | 56 | | | |
| | | | | | 57 | | | |
| | | | | | 58 | | | |
| | | | | | 59 | | | |

**NOTES:**

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BORING B-1
Linnton Plywood Restoration
Portland, Oregon

GEOTECHNICS LLC

**DRILLING COMPANY:** Hard Core Drilling
**DRILLING METHOD:** Mud Rotary, 5" tricone bit
**DRILLING EQUIPMENT:** CME 75
**BORING LOCATION:** See Figure 2

**SURFACE ELEVATION:** 42.0 Feet
**DATE STARTED:** 8/4/14
**DATE COMPLETED:** 8/4/14
**LOGGED BY:** ADM

| SAMPLE ID | SAMPLE TYPE | SAMPLE | MOISTURE CONTENT (%) | BLOWS / 6" | DEPTH (FT) | GRAPHIC SYMBOL | MATERIAL DESCRIPTION | OTHER TESTS & NOTES |
|---|---|---|---|---|---|---|---|---|
| | | | | | 0 | | 5 inches asphalt over 20 inches gravel base course. | |
| | | | | | 2 | | Wood shavings and chips with pea gravel and gray Sandy SILT, very moist.<br>(FILL) | |
| | | | | | 5 | | Wood in cuttings. | |
| S-1 | SPT | | | 5-11-8 | | | | |
| S-2 | SPT | | 40.6 | 2-3-4 | 10 | | Bluish gray CLAY mixed with wood shavings, very moist, high plasticity. | |
| | | | | | 12 | | Gray SILT (ML), very moist, soft.<br>(RECENT ALLUVIUM) | Contact based on cuttings and driller comments |
| S-3 | SPT | | 44.1 | 1-2-2 | | | | AL, %F = 98.3 |
| S-4 | SPT | | 41.7 | 1-1-2 | 20 | | Becomes very soft. | |
| | | | | | 22 | | Grayish brown SILT with Sand (ML), very moist, medium stiff. Low plasticity. | |
| S-5 | SPT | | 42.6 | 1-3-4 | | | | AL, %F = 83.4 |
| S-6 | SH | | 32.7 | P | | | | |
| S-7 | SPT | | | 7-5-7 | | | | No sample recovery |

**NOTES:**

BORING B-2

GEOTECHNICS LLC

Linnton Plywood Restoration
Portland, Oregon

**DRILLING COMPANY:** Hard Core Drilling
**DRILLING METHOD:** Mud Rotary, 5" tricone bit
**DRILLING EQUIPMENT:** CME 75
**BORING LOCATION:** See Figure 2

**SURFACE ELEVATION:** 42.0 Feet
**DATE STARTED:** 8/4/14
**DATE COMPLETED:** 8/4/14
**LOGGED BY:** ADM

| SAMPLE ID | SAMPLE TYPE | SAMPLE | MOISTURE CONTENT (%) | BLOWS / 6" | DEPTH (FT) | GRAPHIC SYMBOL | MATERIAL DESCRIPTION | OTHER TESTS & NOTES |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Brown Sandy SILT (ML), very moist, stiff. 30% to 50% fine sand. | |
| | | | | | 31 | | | |
| | | | | | 32 | | (RECENT ALLUVIUM) | |
| | | | | | 33 | | | |
| | | | | | 34 | | | |
| | | | | | 35 | | | |
| S-8 | SPT | | 35.3 | 3-5-7 | | | | %F = 58.2 |
| | | | | | 36 | | | |
| | | | | | 37 | | | |
| | | | | | 38 | | | |
| | | | | | 39 | | | |
| | | | | | 40 | | | |
| S-9 | SPT | | 37.3 | 5-5-7 | | | | |
| | | | | | 41 | | | |
| | | | | | 42 | | Brownish gray, poorly-graded SAND with Silt (SP-SM), moist, medium dense. Micaceous, fine grained. | |
| | | | | | 43 | | | |
| | | | | | 44 | | | |
| | | | | | 45 | | | |
| S-10 | SPT | | 32.2 | 6-7-10 | | | | |
| | | | | | 46 | | | |
| | | | | | 47 | | | |
| | | | | | 48 | | | |
| | | | | | 49 | | | |
| | | | | | 50 | | | |
| S-11 | SPT | | 31.5 | 11-8-10 | | | | |
| | | | | | 51 | | | |
| | | | | | 52 | | | |
| | | | | | 53 | | | |
| | | | | | | | Grayish brown Silty SAND, moist, medium dense. 15% - 20% fines. | |
| | | | | | 54 | | | |
| | | | | | 55 | | | |
| S-12 | SPT | | 31.5 | 11-8-9 | | | | |
| | | | | | 56 | | | |
| | | | | | 57 | | | |
| | | | | | 58 | | Brownish gray, poorly-graded SAND with Silt (SP-SM), moist, medium dense to dense. | |
| | | | | | 59 | | | |

**NOTES:**

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BORING B-2

GEOTECHNICS LLC

Linnton Plywood Restoration
Portland, Oregon

Project Number 13-016-2

**DRILLING COMPANY:** Hard Core Drilling
**DRILLING METHOD:** Mud Rotary, 5" tricone bit
**DRILLING EQUIPMENT:** CME 75
**BORING LOCATION:** See Figure 2

**SURFACE ELEVATION:** 42.0 Feet
**DATE STARTED:** 8/4/14
**DATE COMPLETED:** 8/4/14
**LOGGED BY:** ADM

| SAMPLE ID | SAMPLE TYPE | SAMPLE | MOISTURE CONTENT (%) | BLOWS / 6" | DEPTH (FT) | GRAPHIC SYMBOL | MATERIAL DESCRIPTION | OTHER TESTS & NOTES |
|---|---|---|---|---|---|---|---|---|
| S-13 | SPT | ■ | 27.2 | 15-15-13 | 61 | | (RECENT ALLUVIUM) | |
| | | | | | 62 | | | |
| | | | | | 63 | | | |
| | | | | | 64 | | | |
| | | | | | 65 | | | |
| | | | | | 66 | | | |
| | | | | | 67 | | | |
| | | | | | 68 | | Dark gray BASALT fragments in reddish brown silty sand matrix.<br>(COLUMBIA RIVER BASALT) | |
| S-14 | SPT | ■ | 10.2 | 35-48-50/5" | 69 | | | |
| | | | | | 70 | | | |
| | | | | | 71 | | Total Depth = 69.4 feet.<br>Refusal on hard rock.<br>Groundwater from CPT-1 dissipation:<br>Probe Depth Depth Elev.<br>30.68' 24.4' 17.6'<br>55.28' 25.0' 17.0' | |
| | | | | | 72 | | | |
| | | | | | 73 | | | |
| | | | | | 74 | | | |
| | | | | | 75 | | | |
| | | | | | 76 | | | |
| | | | | | 77 | | | |
| | | | | | 78 | | | |
| | | | | | 79 | | | |
| | | | | | 80 | | | |
| | | | | | 81 | | | |
| | | | | | 82 | | | |
| | | | | | 83 | | | |
| | | | | | 84 | | | |
| | | | | | 85 | | | |
| | | | | | 86 | | | |
| | | | | | 87 | | | |
| | | | | | 88 | | | |
| | | | | | 89 | | | |

**NOTES:**

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## BORING B-2

Linnton Plywood Restoration
Portland, Oregon

GEOTECHNICS LLC

Project Number 13-016-2

**DRILLING COMPANY:** Hard Core Drilling
**DRILLING METHOD:** Mud Rotary, 5" tricone bit
**DRILLING EQUIPMENT:** CME 75
**BORING LOCATION:** See Figure 2

**SURFACE ELEVATION:** 44.0 Feet
**DATE STARTED:** 8/5/14
**DATE COMPLETED:** 8/5/14
**LOGGED BY:** ADM

| SAMPLE ID | SAMPLE TYPE | SAMPLE | MOISTURE CONTENT (%) | BLOWS / 6" | DEPTH (FT) | GRAPHIC SYMBOL | MATERIAL DESCRIPTION | OTHER TESTS & NOTES |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 4.5 inches asphalt over 7.5 inches gravel base rock. | |
| | | | | | 1<br>2<br>3<br>4<br>5 | | Dark gray, mottled dark brown SILT (ML), moist, medium stiff. Minor fine gravel and few wood fibers.<br>(FILL) | |
| S-1 | SPT | | 45.4 | 2-4-2 | 6<br>7 | | | |
| | | | | | 8<br>9<br>10 | | Gray, 1" to 2" diameter rounded Gravel (GP). | At 8 ft, driller lost mud circulation. |
| S-2 | SPT | | 11.7 | 4-5-6 | 11<br>12<br>13<br>14<br>15 | | Gray mottled brownish red, poorly-graded SAND (SP), moist, medium dense. Medium to coarse sand with some fine gravel. | Abundant wood in drill cuttings. |
| S-3 | SPT | | 40.4 | 4-2-4 | 16<br>17<br>18<br>19<br>20 | | Gray SILT with Sand (ML), very moist, soft to medium stiff.<br>(RECENT ALLUVIUM) | |
| S-4 | SPT | | 41.3 | 3-3-2 | 21<br>22<br>23 | | | AL, %F = 76.6 |
| | | | | | 24 | | Gray, fine Silty SAND (SM), moist, loose to medium dense. Micaceous. | |
| S-5 | SH | | | P | 25<br>26 | | | No recovery of Shelby tube sample |
| S-6 | SPT | | 30.7 | 6-5-4 | 27<br>28 | | | %F = 35.2 |
| | | | | | 29 | | Light brown SILT (ML) interbedded with Silty fine Sand (SM), very moist, medium stiff. | |

**NOTES:**

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## BORING B-3

Linnton Plywood Restoration
Portland, Oregon

GEOTECHNICS LLC

Project Number 13-016-2

**DRILLING COMPANY:** Hard Core Drilling
**DRILLING METHOD:** Mud Rotary, 5" tricone bit
**DRILLING EQUIPMENT:** CME 75
**BORING LOCATION:** See Figure 2

**SURFACE ELEVATION:** 44.0 Feet
**DATE STARTED:** 8/5/14
**DATE COMPLETED:** 8/5/14
**LOGGED BY:** ADM

| SAMPLE ID | SAMPLE TYPE | MOISTURE CONTENT (%) | BLOWS / 6" | DEPTH (FT) | MATERIAL DESCRIPTION | OTHER TESTS & NOTES |
|---|---|---|---|---|---|---|
| S-7 | SPT | | 5-2-3 | 31 | (RECENT ALLUVIUM) | |
| | | | | 32 | | |
| | | | | 33 | Grayish brown fine Silty SAND (SM), moist, medium dense. Micaceous. | |
| | | | | 34 | | |
| | | | | 35 | | |
| S-8 | SPT | 31.7<br>38.5 | 5-6-3 | 36 | Brown SILT with Sand (ML), very moist, medium stiff. | |
| | | | | 37 | | |
| | | | | 38 | Grayish brown Silty SAND (SM), moist, medium dense. 20% - 30% fines. Micaceous. | |
| | | | | 39 | | |
| | | | | 40 | | |
| S-9 | SPT | 32.9 | 5-5-8 | 41 | | %F = 28.8 |
| | | | | 42 | | |
| | | | | 43 | Becomes reddish brown. | |
| | | | | 44 | | |
| | | | | 45 | | |
| S-10 | SPT | 35.6 | 8-10-12 | 46 | | |
| | | | | 47 | | |
| | | | | 48 | Becomes gray. | |
| | | | | 49 | | |
| | | | | 50 | | |
| S-11 | SPT | 42.2 | 6-4-5 | 51 | | |
| | | | | 52 | | |
| | | | | 53 | | |
| | | | | 54 | | Driller notes hard drilling at 55 ft. |
| S-12 | SPT | | 50/1" | 55 | Hard, gray BASALT fragments. | |
| | | | | 56 | Total Depth = 55.1 feet.<br>Refusal on hard rock.<br>Groundwater from CPT-2 dissipation: | |
| | | | | 57 | | |
| | | | | 58 | | |
| | | | | 59 | | |

| Probe Depth | Depth | Elev. |
|---|---|---|
| 28.54' | 20.8' | 23.2' |
| 40.03' | 21.8' | 22.2' |

**NOTES:**

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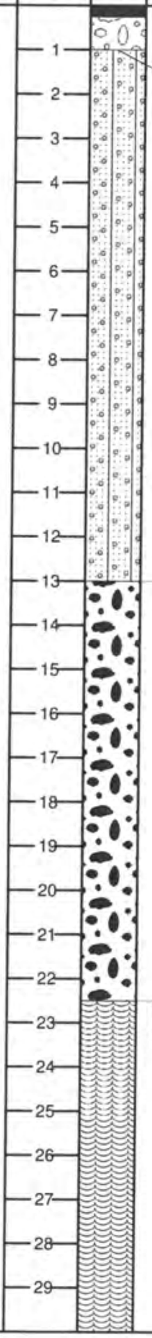
GEOTECHNICS LLC

BORING B-3
Linnton Plywood Restoration
Portland, Oregon

Project Number 13-016-2

**DRILLING COMPANY:** Hard Core Drilling
**DRILLING METHOD:** Mud Rotary, 5" tricone bit
**DRILLING EQUIPMENT:** CME 75
**BORING LOCATION:** See Figure 2

**SURFACE ELEVATION:** 42.0 Feet
**DATE STARTED:** 8/5/14
**DATE COMPLETED:** 8/5/14
**LOGGED BY:** ADM



| SAMPLE ID | SAMPLE TYPE | SAMPLE | MOISTURE CONTENT (%) | BLOWS / 6" | DEPTH (FT) | MATERIAL DESCRIPTION | OTHER TESTS & NOTES |
|---|---|---|---|---|---|---|---|
| | | | | | 0-1 | 3 inches asphalt over approx. 9 inches gravel base rock. | |
| | | | | | 1-13 | Gray speckled brownish red, Silty SAND (SM), moist, loose to medium dense. Fine to medium grained. Scattered wood - 5% - 10%.<br>(FILL) | Wood chips in drill cuttings. |
| S-1 | SPT | ▮ | 21.0 | 3-4-5 | 5-6.5 | | |
| | | | | | 10 | Becomes fine to coarse grained, with some gravel to 1" diameter - rounded and angular, approx 15% gravel. No wood. | |
| S-2 | SPT | ▮ | 16.7 | 4-4-7 | 10-11.5 | | |
| | | | | | 13-22.5 | Brownish gray, poorly-graded GRAVEL (GP). 1/8" - 1.5" angular gravel with minor wood. | At 13', driller loses mud circulation. |
| S-3 | SPT | ▮ | | 12-16-7 | 15.5-17 | | Wood lodged in sampler tip |
| S-4 | SPT | ▮ | | 8-7-8 | 20-21.5 | | |
| | | | | | 22.5-30 | Wood - Dark brownish red, partially decomposed lumber. Some gravel. | |
| S-5 | SPT | ▮ | | 6-5-7 | 25-26.5 | | |

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**NOTES:**

BORING B-4

GEOTECHNICS LLC

Linnton Plywood Restoration
Portland, Oregon

Project Number 13-016-2

| | | | |
|---|---|---|---|
| **DRILLING COMPANY:** | Hard Core Drilling | **SURFACE ELEVATION:** | 42.0 Feet |
| **DRILLING METHOD:** | Mud Rotary, 5" tricone bit | **DATE STARTED:** | 8/5/14 |
| **DRILLING EQUIPMENT:** | CME 75 | **DATE COMPLETED:** | 8/5/14 |
| **BORING LOCATION:** | See Figure 2 | **LOGGED BY:** | ADM |

| SAMPLE ID | SAMPLE TYPE | SAMPLE | MOISTURE CONTENT (%) | BLOWS / 6" | DEPTH (FT) | GRAPHIC SYMBOL | MATERIAL DESCRIPTION | OTHER TESTS & NOTES |
|---|---|---|---|---|---|---|---|---|
| S-6 | SPT | | | 2-3-4 | 31 | | (FILL) | No sample recovery<br>Wood in sampler tip |
| | | | | | 32 | | | |
| | | | | | 33 | | | |
| | | | | | 34 | | Bluish gray SILT (ML), very moist, medium stiff. Low plasticity. | |
| | | | | | 35 | | (RECENT ALLUVIUM) | |
| S-7 | SPT | | 50.4 | 2-3-4 | 36 | | | |
| | | | | | 37 | | | |
| | | | | | 38 | | | |
| | | | | | 39 | | | |
| | | | | | 40 | | Becomes light brown. | |
| S-8 | SPT | | 45.9 | 2-3-2 | 41 | | | AL, %F = 99.5 |
| | | | | | 42 | | Becomes grayish brown SILT with Sand (ML). 15% - 25% fine sand. | |
| | | | | | 43 | | | |
| | | | | | 44 | | | |
| | | | | | 45 | | | |
| S-9 | SPT | | 33.0<br>41.4 | 5-2-3 | 46 | | Becomes light brown SILT (ML). <10% fine sand. | |
| | | | | | 47 | | | |
| | | | | | 48 | | Grayish brown, fine Silty SAND (SM), very moist, medium dense. 30% - 50% fines. Micaceous. | |
| | | | | | 49 | | | |
| | | | | | 50 | | | |
| S-10 | SPT | | 29.8 | 5-5-5 | 51 | | | |
| | | | | | 52 | | | |
| | | | | | 53 | | | |
| | | | | | 54 | | | |
| | | | | | 55 | | | |
| S-11 | SPT | | 33.5 | 6-7-4 | 56 | | | |
| | | | | | 57 | | | |
| | | | | | 58 | | Grayish brown Sandy SILT, very moist, stiff. 30% - 50% fine sand. | |
| | | | | | 59 | | | |

**NOTES:**

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BORING B-4

Linnton Plywood Restoration
Portland, Oregon

GEOTECHNICS LLC

Project Number 13-016-2

**DRILLING COMPANY:** Hard Core Drilling
**DRILLING METHOD:** Mud Rotary, 5" tricone bit
**DRILLING EQUIPMENT:** CME 75
**BORING LOCATION:** See Figure 2

**SURFACE ELEVATION:** 42.0 Feet
**DATE STARTED:** 8/5/14
**DATE COMPLETED:** 8/5/14
**LOGGED BY:** ADM

| SAMPLE ID | SAMPLE TYPE | SAMPLE | MOISTURE CONTENT (%) | BLOWS / 6" | DEPTH (FT) | GRAPHIC SYMBOL | MATERIAL DESCRIPTION | OTHER TESTS & NOTES |
|---|---|---|---|---|---|---|---|---|
| S-12 | SPT | ■ | 38.2 | 5-6-6 | 61 | | (RECENT ALLUVIUM) | |
| | | | | | 62 | | | |
| | | | | | 63 | | | |
| | | | | | 64 | | | |
| | | | | | 65 | | | |
| | | | | | 66 | | | |
| S-13 | SPT | ■ | 28.8 | 50/3.5" | 67 | | Dark gray, angular BASALT fragments to 1.5" with minor gray clay. | |
| | | | | | 68 | | | |
| | | | | | 69 | | Total Depth = 67.8 feet.<br>Refusal on hard rock.<br>Vibrating wire piezometer installed at 44.8' | |
| | | | | | 70 | | | |
| | | | | | 71 | | Groundwater Depth and (Elev.):<br>08/06/14: 31.36' (10.64')<br>08/07/14: 31.44' (10.56')<br>08/12/14: 30.40' (11.60') | |
| | | | | | 72 | | | |
| | | | | | 73 | | | |
| | | | | | 74 | | | |
| | | | | | 75 | | | |
| | | | | | 76 | | | |
| | | | | | 77 | | | |
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| | | | | | 79 | | | |
| | | | | | 80 | | | |
| | | | | | 81 | | | |
| | | | | | 82 | | | |
| | | | | | 83 | | | |
| | | | | | 84 | | | |
| | | | | | 85 | | | |
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| | | | | | 88 | | | |
| | | | | | 89 | | | |

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**NOTES:**

GEOTECHNICS LLC

BORING B-4
Linnton Plywood Restoration
Portland, Oregon

Project Number 13-016-2

Figure A4

| | | | |
|---|---|---|---|
| **DRILLING COMPANY:** | Hard Core Drilling | **SURFACE ELEVATION:** | 43.5 Feet |
| **DRILLING METHOD:** | Mud Rotary, 5" tricone bit | **DATE STARTED:** | 8/6/14 |
| **DRILLING EQUIPMENT:** | CME 75 | **DATE COMPLETED:** | 8/6/14 |
| **BORING LOCATION:** | See Figure 2 | **LOGGED BY:** | ADM |

| SAMPLE ID | SAMPLE TYPE | SAMPLE | MOISTURE CONTENT (%) | BLOWS / 6" | DEPTH (FT) | GRAPHIC SYMBOL | MATERIAL DESCRIPTION | OTHER TESTS & NOTES |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Gray Sandy SILT (ML), moist, soft.<br>(FILL) | |
| | | | | | | | Dark gray Clayey SAND with Gravel (SC), moist, loose to medium dense. Angular gravel to 1" diameter. | Contact based on drill-rig response and driller comments. |
| S-1 | SPT | | 34.4 | 12-6-4 | | | | |
| | | | | | | | Yellowish brown grading to gray, SILT (ML), very moist, stiff.<br>(RECENT ALLUVIUM) | |
| S-2 | SPT | | 37.6 | 3-5-5 | | | | |
| | | | | | | | Becomes light brown | |
| S-3 | SPT | | 37.9 | 2-4-5 | | | | |
| S-4 | SH | | | P | | | | |
| | | | | | | | Gray Sandy SILT (ML), very moist, stiff. Non-plastic. 20% - 40% fine sand. | |
| S-5 | SPT | | 28.9 | 6-6-8 | | | | %F = 79.7 |
| | | | | | | | Gray, fine Silty SAND (SM), moist, loose to medium dense. 15% - 25% fines. Micaceous. | |
| | | | | | | | Brownish gray, Sandy SILT (ML), very moist, medium stiff. Non-plastic. | |
| S-6 | SPT | | 29.8<br>34.9 | 5-4-4 | | | | |
| | | | | | | | Gray Silty SAND (SM), very moist, loose. Fine to medium grained, micaceous. 15% to 40% fine sand. | |

Depth (ft): 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

**NOTES:**

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## BORING B-5

GEOTECHNICS LLC

Linnton Plywood Restoration
Portland, Oregon

| | | | |
|---|---|---|---|
| **DRILLING COMPANY:** | Hard Core Drilling | **SURFACE ELEVATION:** | 43.5 Feet |
| **DRILLING METHOD:** | Mud Rotary, 5" tricone bit | **DATE STARTED:** | 8/6/14 |
| **DRILLING EQUIPMENT:** | CME 75 | **DATE COMPLETED:** | 8/6/14 |
| **BORING LOCATION:** | See Figure 2 | **LOGGED BY:** | ADM |

| SAMPLE ID | SAMPLE TYPE | SAMPLE | MOISTURE CONTENT (%) | BLOWS / 6" | DEPTH (FT) | GRAPHIC SYMBOL | MATERIAL DESCRIPTION | OTHER TESTS & NOTES |
|---|---|---|---|---|---|---|---|---|
| S-7 | SPT | | 31.7 | 4-5-3 | | | (RECENT ALLUVIUM) | |
| | | | | | 31 | | | |
| | | | | | 32 | | | |
| | | | | | 33 | | | |
| | | | | | 34 | | | |
| | | | | | 35 | | Becomes reddish and grayish brown, fine Silty SAND (SM), micaceous. | |
| S-8 | SPT | | 30.2 | 9-9-9 | | | | |
| | | | | | 36 | | | |
| | | | | | 37 | | | |
| | | | | | 38 | | | |
| | | | | | 39 | | | |
| | | | | | 40 | | | |
| S-9 | SPT | | 28.3 | 7-8-8 | | | | %F = 24.5 |
| | | | | | 41 | | | |
| | | | | | 42 | | | |
| | | | | | 43 | | | |
| | | | | | 44 | | | |
| | | | | | 45 | | | |
| S-10 | SPT | | 36.3 | 5-3-5 | | | | |
| | | | | | 46 | | | |
| | | | | | 47 | | Groundwater Depth and (Elev.):<br>08/07/14: 27.86' (15.64')<br>08/12/14: 27.73' (15.77') | |
| | | | | | 48 | | | |
| | | | | | 49 | | | |
| | | | | | 50 | | | |
| S-11 | SPT | | 31.4 | 7-9-11 | | | | |
| | | | | | 51 | | | |
| | | | | | 52 | | | |
| | | | | | 53 | | | |
| | | | | | 54 | | | |
| | | | | | 55 | | Angular BASALT fragments in matrix of dark grayish brown mottled reddish brown clay. | |
| S-12 | SPT | | 24.2 | 11-5-8 | | | | Contact based on drill-rig response. |
| | | | | | 56 | | (COLUMBIA RIVER BASALT) | |
| | | | | | 57 | | | |
| S-13 | SPT | | | 50/3" | 58 | | Total Depth = 58.3 feet.<br>Refusal on hard rock.<br>Vibrating wire piezometer installed at 44.6'<br>(see above for GW level readings) | rock in sampler tip |
| | | | | | 59 | | | |

**NOTES:**

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GEOTECHNICS LLC

BORING B-5

Linnton Plywood Restoration

Portland, Oregon

Project Number 13-016-2

Figure A5

**DRILLING COMPANY:** Hard Core Drilling
**DRILLING METHOD:** Mud Rotary, 5" tricone bit
**DRILLING EQUIPMENT:** CME 75
**BORING LOCATION:** See Figure 2

**SURFACE ELEVATION:** 47.0 Feet
**DATE STARTED:** 8/6/14
**DATE COMPLETED:** 8/6/14
**LOGGED BY:** ADM

| SAMPLE ID | SAMPLE TYPE | SAMPLE | MOISTURE CONTENT (%) | BLOWS / 6" | DEPTH (FT) | GRAPHIC SYMBOL | MATERIAL DESCRIPTION | OTHER TESTS & NOTES |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Brownish gray Silty SAND (SM), moist, loose to medium dense.<br>(FILL) | |
| | | | | | 1 | | | |
| | | | | | 2 | | | |
| | | | | | 3 | | | |
| | | | | | 4 | | | |
| | | | | | 5 | | Gray, fine to coarse Silty SAND with Gravel (SM), moist, medium dense. Sampler on large rock or debris. | Driller comment: Gravelly between 5 and 8 feet. |
| S-1 | SPT | ▮ | 20.8 | 50/4" | 6 | | | |
| | | | | | 7 | | | |
| | | | | | 8 | | Dark gray, medium to coarse, Silty SAND (SM), moist, loose. Some wood chips and organic odor. | |
| | | | | | 9 | | | |
| | | | | | 10 | | | |
| S-2 | SPT | ▮ | 35.9 | 2-2-2 | 11 | | Gray Sandy SILT (ML), moist, soft. Minor wood chips. | |
| | | | | | 12 | | | |
| | | | | | 13 | | | |
| | | | | | 14 | | | |
| | | | | | 15 | | Medium to dark gray, Sandy SILT with Gravel (ML), moist, stiff. 15% - 20% subrounded gravel to 1" diameter and scattered wood fragments. | |
| S-3 | SPT | ▮ | 22.5 | 7-11-12 | 16 | | | Wood in sampler tip. |
| | | | | | 17 | | | |
| | | | | | 18 | | | |
| | | | | | 19 | | Interbedded Silty SAND (SM) and partially decomposed wood, very moist, loose. | |
| | | | | | 20 | | | |
| S-4 | SPT | ▮ | 26.8 | 4-2-5 | 21 | | | |
| | | | | | 22 | | | |
| | | | | | 23 | | | |
| | | | | | 24 | | | |
| | | | | | 25 | | Becomes medium dense. | |
| S-5 | SPT | ▮ | 21.7 | 7-7-8 | 26 | | | Fresh wood in sampler tip. |
| | | | | | 27 | | | |
| | | | | | 28 | | Wood - Fresh and partially decomposed wood with minor gray silt and sand. | |
| | | | | | 29 | | | |

**NOTES:**

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GEOTECHNICS LLC

BORING B-6
Linnton Plywood Restoration
Portland, Oregon

Project Number 13-016-2

Figure A6

| | | | |
|---|---|---|---|
| **DRILLING COMPANY:** | Hard Core Drilling | **SURFACE ELEVATION:** | 47.0 Feet |
| **DRILLING METHOD:** | Mud Rotary, 5" tricone bit | **DATE STARTED:** | 8/6/14 |
| **DRILLING EQUIPMENT:** | CME 75 | **DATE COMPLETED:** | 8/6/14 |
| **BORING LOCATION:** | See Figure 2 | **LOGGED BY:** | ADM |

| SAMPLE ID | SAMPLE TYPE | SAMPLE | MOISTURE CONTENT (%) | BLOWS / 6" | DEPTH (FT) | GRAPHIC SYMBOL | MATERIAL DESCRIPTION | OTHER TESTS & NOTES |
|---|---|---|---|---|---|---|---|---|
| S-6 | SPT | | | 14-6-5 | 31 | | (FILL) | At 30', driller loses mud circulation. |
| | | | | | 32 | | | At 32.5', driller loses mud circulation. |
| | | | | | 33 | | | |
| | | | | | 34 | | | |
| | | | | | 35 | | | |
| S-7 | SPT | | 37.8 | 2-4-2 | 36 | | Gray SILT (ML), very moist, very soft. Low plasticity. | |
| | | | | | 37 | | | |
| | | | | | 38 | | (RECENT ALLUVIUM) | |
| | | | | | 39 | | | |
| | | | | | 40 | | | |
| S-8 | SPT | | 30.5 | 1-1-1 | 41 | | | AL, %F = 90.5 |
| | | | | | 42 | | | |
| | | | | | 43 | | | |
| | | | | | 44 | | | |
| | | | | | 45 | | Becomes soft. | |
| S-9 | SPT | | 30.8 | 0-1-3 | 46 | | | |
| | | | | | 47 | | | |
| | | | | | 48 | | | |
| | | | | | 49 | | | |
| | | | | | 50 | | | |
| S-10 | SPT | | 33.5 | 5-7-12 | 51 | | Angular BASALT fragments with minor clay. | Basalt fragment in sampler tip. |
| | | | | | 52 | | (COLUMBIA RIVER BASALT) | |
| S-11 | SPT | | 19.9 | 50/6" | 53 | | | |
| | | | | | 54 | | Total Depth = 53 feet.<br>Refusal on hard rock.<br>Groundwater level not determined. | |
| | | | | | 55 | | | |
| | | | | | 56 | | | |
| | | | | | 57 | | | |
| | | | | | 58 | | | |
| | | | | | 59 | | | |

NOTES:

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BORING B-6

GEOTECHNICS LLC

Linnton Plywood Restoration
Portland, Oregon

Project Number 13-016-2

# Appendix B

## FIELD EXPLORATIONS - CPT

# APPENDIX B
# FIELD EXPLORATIONS - CPT

Two Cone Penetrometer tests (CPT) were performed on August 12, 2014 by Oregon Geotechnical Explorations, Inc. of Keiser, Oregon. A piezometer-equipped cone tip was utilized (CPTu test), allowing pore pressures to be recorded. CPT-1 and CPT-2 were advanced to depths of 67 feet and 55 feet respectively, both refusing on bedrock. Locations of the CPT probes are shown on Figure 2.

The CPT consists of pushing a 35.6-mm-diameter instrumented cone into a soil deposit at a rate of 2 cm/sec. The resistance to continuous penetration encountered by the cone tip and adjacent friction sleeve exhibit high sensitivity to changes in soil type, providing data on soil behavior types and correlated parameters. Because it is measuring, through direct contact with the soil, the fundamental properties of tip resistance, frictional resistance, and pore pressure, many parameters can be estimated (with varying degrees of certainty), including relative density, drained/undrained shear strength parameters, Young's modulus, overconsolidation ratio, sensitivity, coefficient of consolidation, permeability, and others. Additional correlations are available with more direct application to design including pile capacity, footing settlement, and liquefaction assessment.

The prediction of soil composition is accomplished using correlation charts, which generally relate tip resistance and friction ratio (ratio of sleeve friction to tip resistance) to probable soil type. The simplified soil type classification presented by Lunne et al. (1997) has been used to classify soil behavior type (SBT), with the assistance of the software package CPeT-IT. A generally high level of reliability is attributed to this correlation system and its use is widespread. However, the CPT test, when used as a tool to define stratigraphy, should always be used in conjunction with one or more borings. As with all stratigraphic interpretation, the accuracy relies on the interpreter's experience and knowledge of local soil conditions. For this project, each CPT was associated with a very close-by boring, CPT-1 with B-2 and CPT-2 with B-3.

During CPT probing on August 12, dissipation testing was performed at two depths in each CPT. The findings are summarized below and on the corresponding boring logs.

| CPT (corresponding Boring) | Probe Depth (ft) | Water Depth (ft) | Water Elev. (ft) |
|---|---|---|---|
| CPT-1 (B-2) | 30.68 | 24.4 | 17.6 |
| CPT-1 (B-2) | 55.28 | 25.0 | 17.0 |
| CPT-2 (B-3) | 28.54 | 20.8 | 23.2 |
| CPT-2 (B-3) | 40.03 | 21.8 | 22.2 |

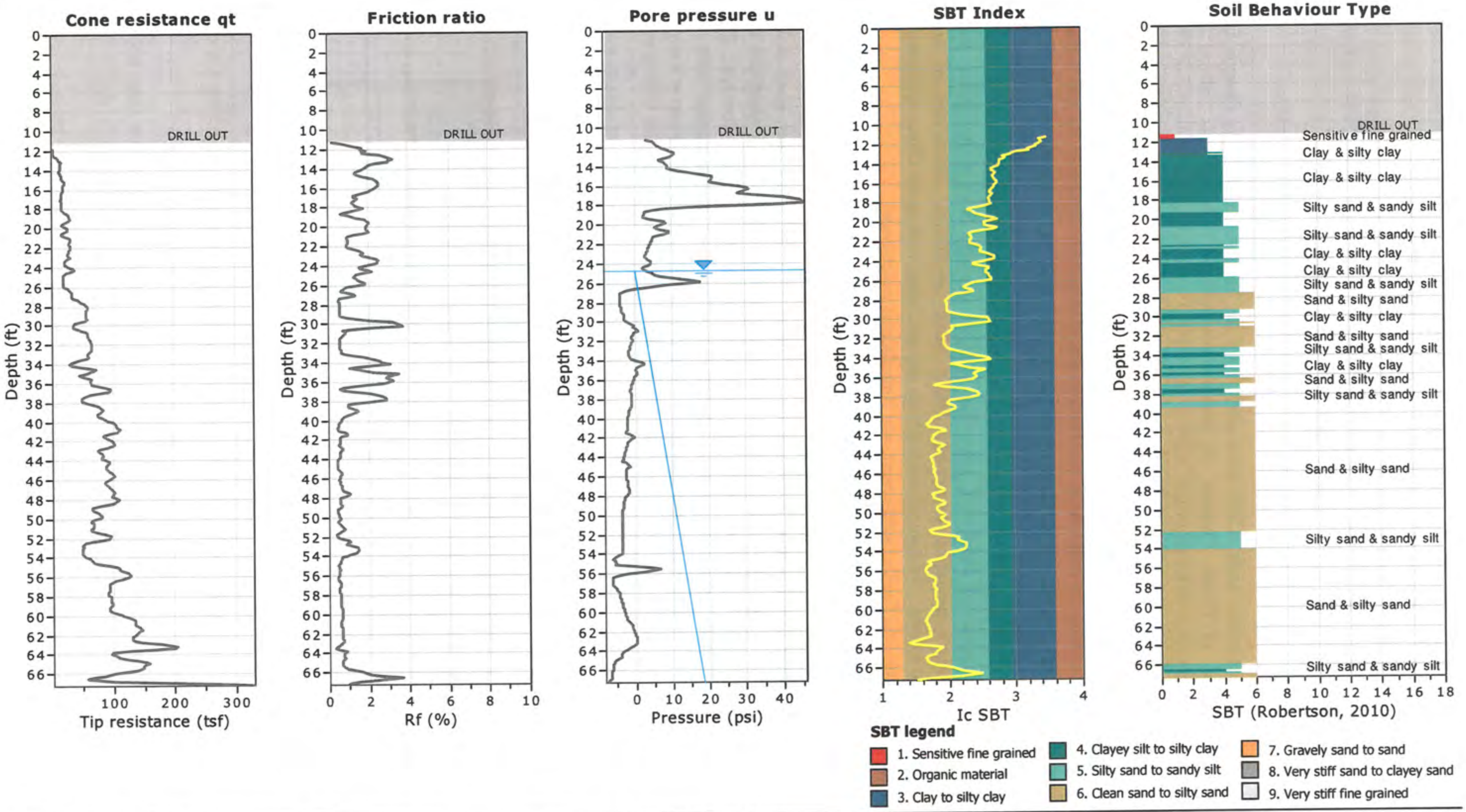
In both locations, the deeper probe indicated slightly deeper groundwater suggesting some "perching" of groundwater.

This appendix presents the results of the CPT sounding, including both raw data and interpreted parameters.

GEOTECHNICS LLC
7629 SE Harrison Street
Portland, Oregon 97215
www.GeotechnicsNW.com

**Project:** Linnton Plywood
**Location:** Portland, Oregon

**CPT: CPT-01**
Total depth: 67.26 ft, Date: 8/12/2014
Surface Elevation: 42.00 ft
Coords: X:0.00, Y:0.00
Cone Type: 10cm subtraction
Cone Operator: Oregon Geotechnical Explorations, Inc.



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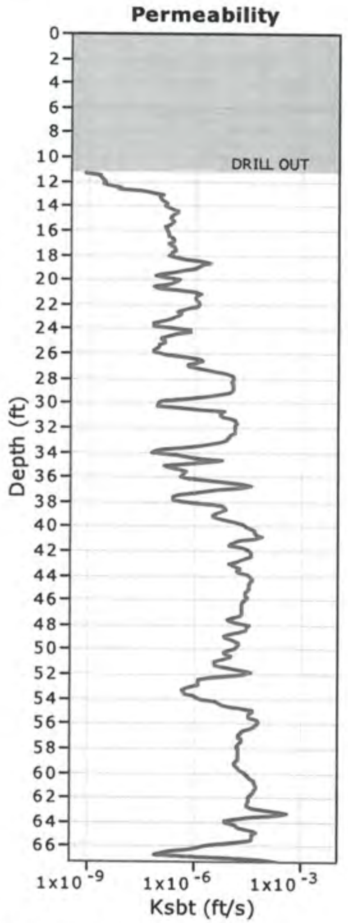
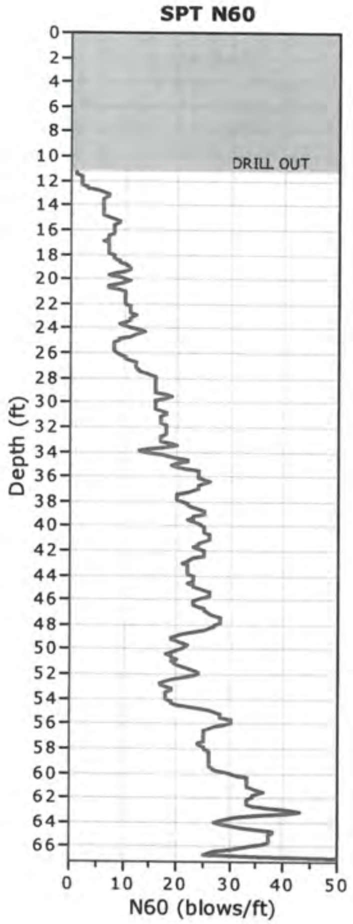
Project file: C:\Users\Andre\Documents\1Projects - Geotechnics LLC\13-016-1 Linnton Plywood Restoration\analysis\Linnton.cpt

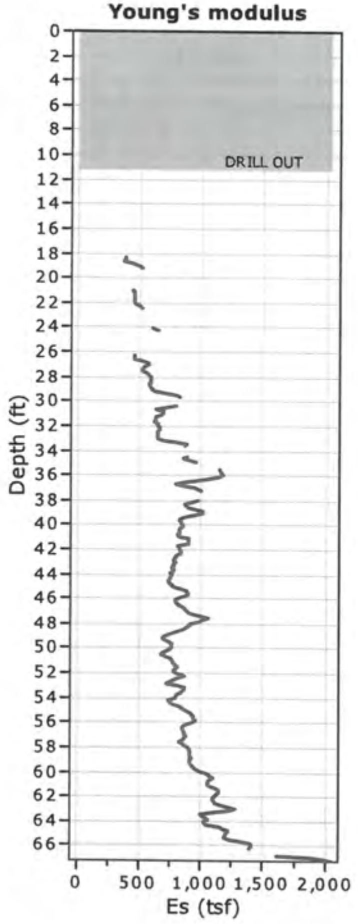
GEOTECHNICS LLC
7629 SE Harrison Street
Portland, Oregon 97215
www.GeotechnicsNW.com

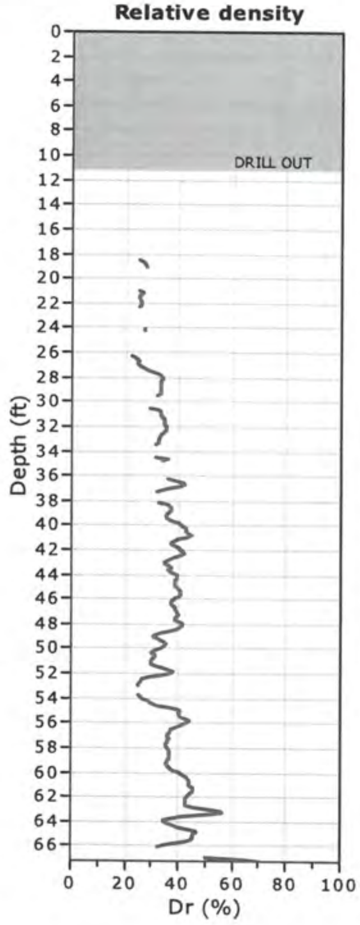
**Project:** Linnton Plywood
**Location:** Portland, Oregon

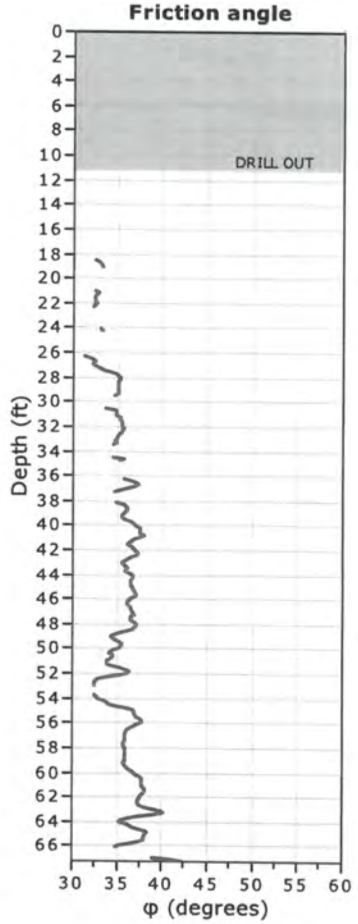
**CPT: CPT-01**
Total depth: 67.26 ft, Date: 8/12/2014
Surface Elevation: 42.00 ft
Coords: X:0.00, Y:0.00
Cone Type: 10cm subtraction
Cone Operator: Oregon Geotechnical Explorations, Inc.


Permeability


SPT N60


Young's modulus


Relative density


Friction angle

**Calculation parameters**
Permeability: Based on SBT$_n$
SPT N$_{60}$: Based on I$_c$ and q$_t$
Young's modulus: Based on variable alpha using I$_c$ (Robertson, 2009)

Relative desnisty constant, C$_{Dr}$: 350.0
Phi: Based on Kulhawy & Mayne (1990)
—●— User defined estimation data

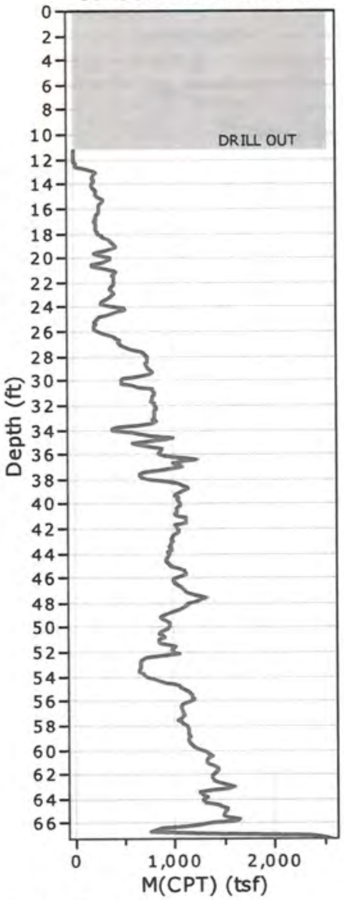
CPeT-IT v.1.7.6.42 - CPTU data presentation & interpretation software - Report created on: 9/17/2014, 8:01:35 PM
Project file: C:\Users\Andre\Documents\1Projects - Geotechnics LLC\13-016-1 Linnton Plywood Restoration\analysis\Linnton.cpt

GEOTECHNICS LLC
7629 SE Harrison Street
Portland, Oregon 97215
www.GeotechnicsNW.com

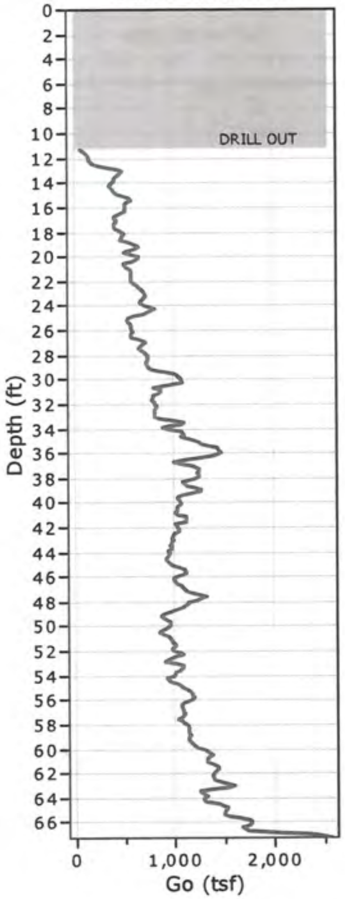
**Project:** **Linnton Plywood**
**Location:** **Portland, Oregon**

**CPT: CPT-01**
Total depth: 67.26 ft, Date: 8/12/2014
Surface Elevation: 42.00 ft
Coords: X:0.00, Y:0.00
Cone Type: 10cm subtraction
Cone Operator: Oregon Geotechnical Explorations, Inc.

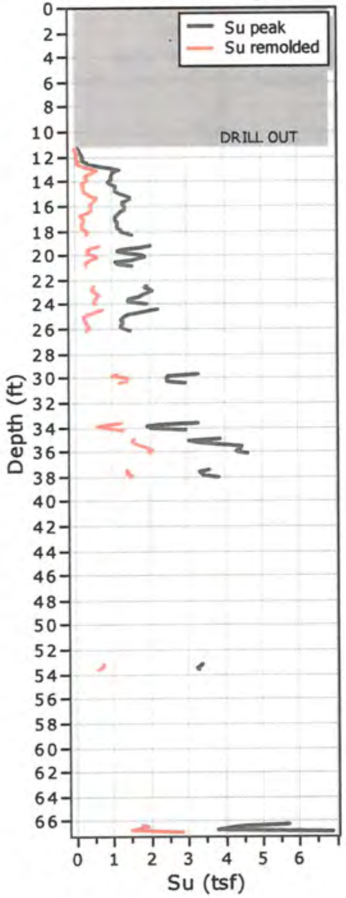
**Constrained Modulus**



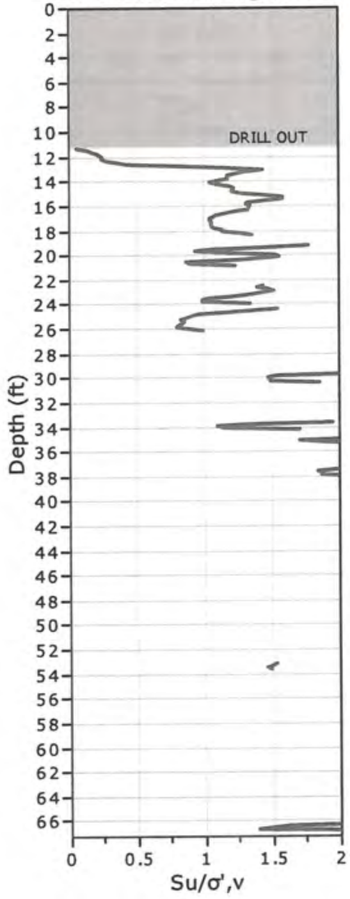
**Shear modulus**



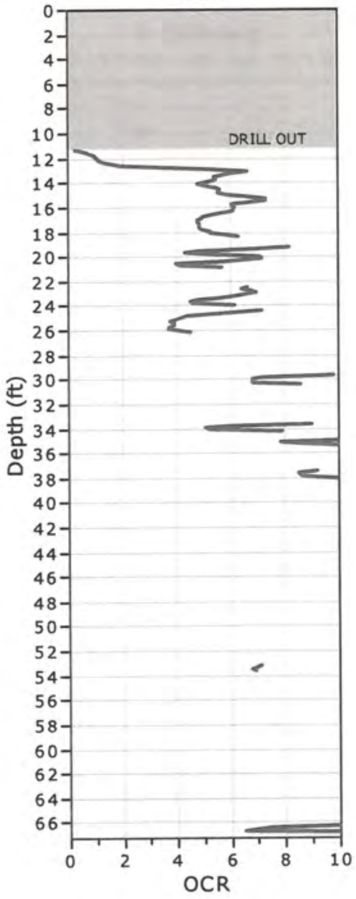
**Shear strength**



**Undrained strength ratio**



**OCR**



**Calculation parameters**

Constrained modulus: Based on variable *alpha* using $I_c$ and $Q_{tn}$ (Robertson, 2009)
Go: Based on variable *alpha* using $I_c$ (Robertson, 2009)
Undrained shear strength cone factor for clays, $N_{kt}$: 14

OCR factor for clays, $N_{kt}$: 0.33
● User defined estimation data

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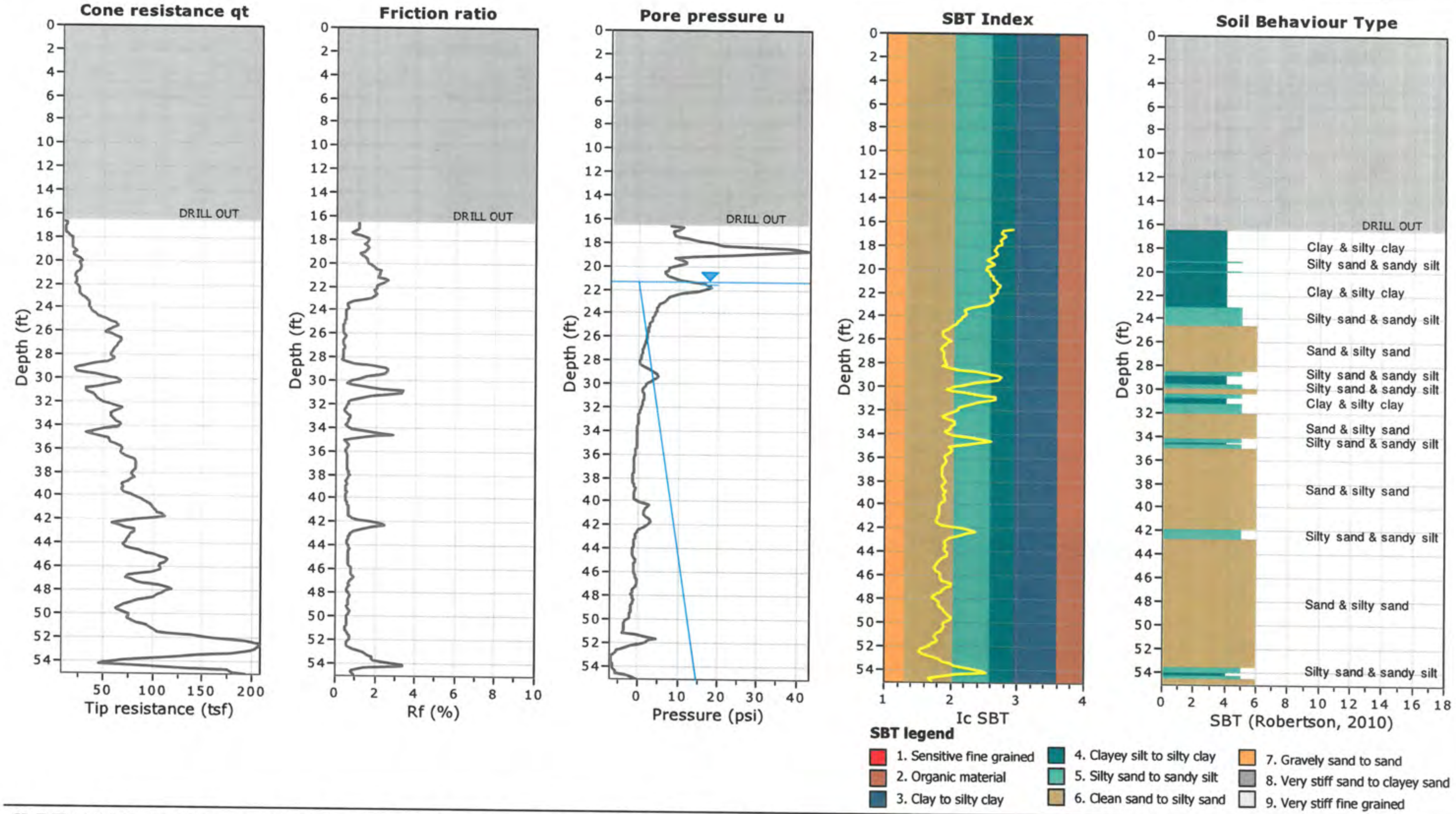
Project file: C:\Users\Andre\Documents\1Projects - Geotechnics LLC\13-016-1 Linnton Plywood Restoration\analysis\Linnton.cpt

GEOTECHNICS LLC

7629 SE Harrison Street
Portland, Oregon 97215
www.GeotechnicsNW.com

**Project:** **Linnton Plywood**
**Location:** **Portland, Oregon**

**CPT: CPT-02**
Total depth: 55.12 ft, Date: 8/12/2014
Surface Elevation: 44.00 ft
Coords: X:0.00, Y:0.00
Cone Type: 10cm subtraction
Cone Operator: Oregon Geotechnical Explorations, Inc.



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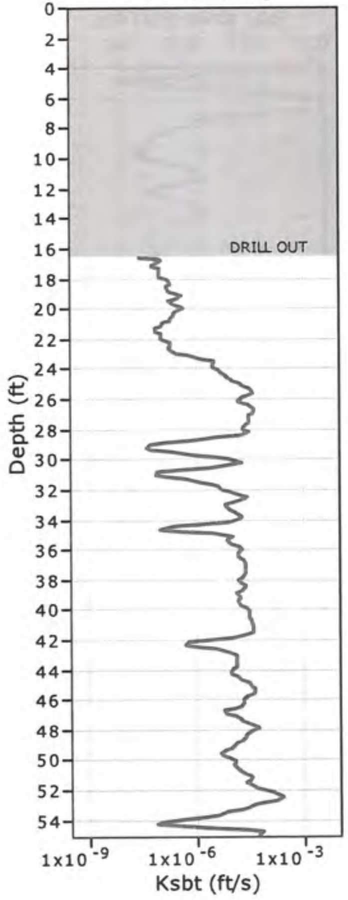
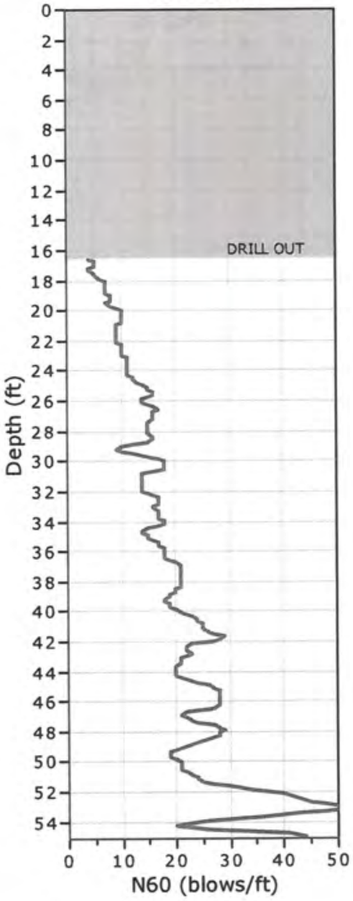
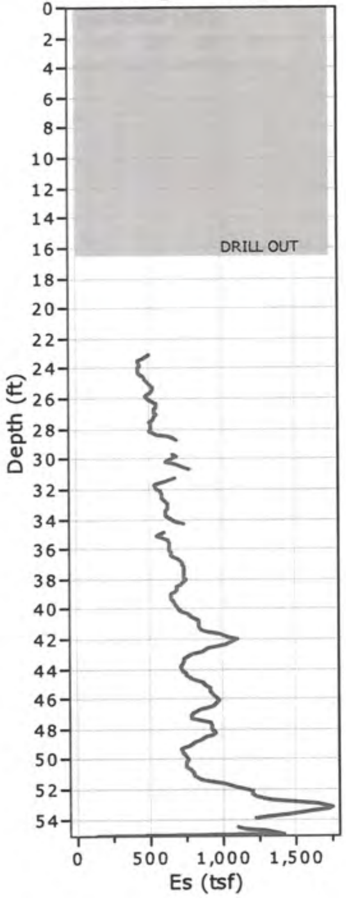
GEOTECHNICS LLC
7629 SE Harrison Street
Portland, Oregon 97215
www.GeotechnicsNW.com

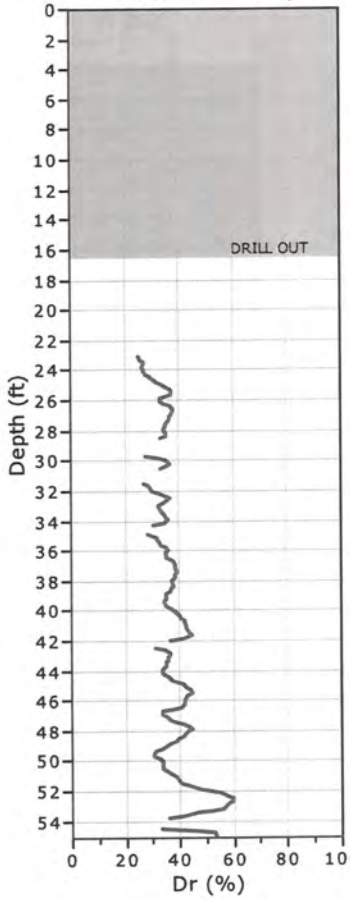
**Project:** Linnton Plywood
**Location:** Portland, Oregon

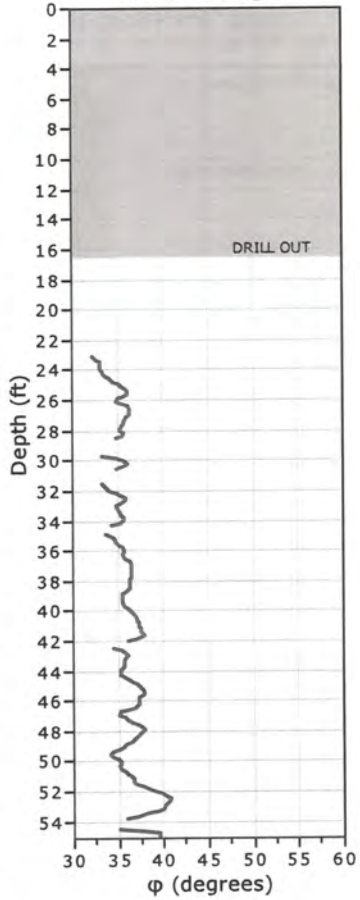
**CPT: CPT-02**
Total depth: 55.12 ft, Date: 8/12/2014
Surface Elevation: 44.00 ft
Coords: X:0.00, Y:0.00
Cone Type: 10cm subtraction
Cone Operator: Oregon Geotechnical Explorations, Inc.


**Permeability**


**SPT N60**


**Young's modulus**


**Relative density**


**Friction angle**

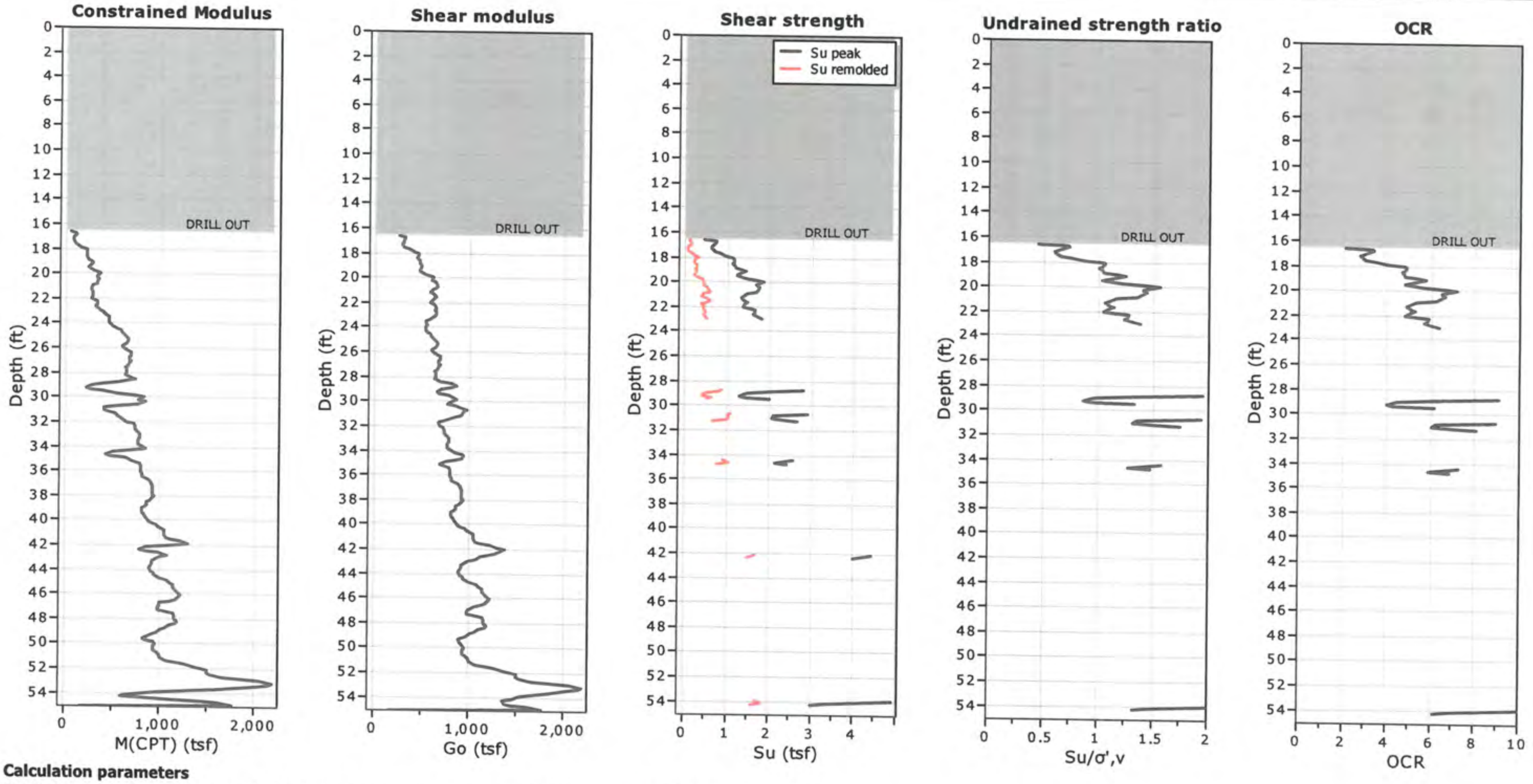
**Calculation parameters**
Permeability: Based on $SBT_n$
SPT $N_{60}$: Based on $I_c$ and $q_t$
Young's modulus: Based on variable alpha using $I_c$ (Robertson, 2009)

Relative desnisty constant, $C_{Dr}$: 350.0
Phi: Based on Kulhawy & Mayne (1990)
●— User defined estimation data

GEOTECHNICS LLC
7629 SE Harrison Street
Portland, Oregon 97215
www.GeotechnicsNW.com

**Project:** Linnton Plywood
**Location:** Portland, Oregon

**CPT: CPT-02**
Total depth: 55.12 ft, Date: 8/12/2014
Surface Elevation: 44.00 ft
Coords: X:0.00, Y:0.00
Cone Type: 10cm subtraction
Cone Operator: Oregon Geotechnical Explorations, Inc.



**Calculation parameters**

Constrained modulus: Based on variable *alpha* using $I_c$ and $Q_{tn}$ (Robertson, 2009)
Go: Based on variable *alpha* using $I_c$ (Robertson, 2009)
Undrained shear strength cone factor for clays, $N_{kt}$: 14

OCR factor for clays, $N_{kt}$: 0.33
●— User defined estimation data

CPeT-IT v.1.7.6.42 - CPTU data presentation & interpretation software - Report created on: 8/14/2014, 11:28:22 AM
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# Appendix C

## LABORATORY TESTING

# APPENDIX C
## LABORATORY TESTING

Soil samples obtained from the explorations were transported to our laboratory and evaluated to confirm or modify field classifications, as well as to evaluate engineering properties of the soils encountered. Representative samples were selected for laboratory testing. The tests were performed in general accordance with the test methods of ASTM International.

### *Visual Classifications*

Soil samples obtained from the explorations were visually classified in the field and in our geotechnical laboratory based on the Unified Soil Classification System (USCS) and ASTM classification methods. ASTM Test Method D2488 was used to classify soils using visual and manual methods. ASTM Test Method D2487 was used to classify soils based on laboratory test results.

### *Moisture Content*

Moisture contents of samples were obtained in general accordance with ASTM Test Method D2216. The results of the moisture content tests completed on samples from the explorations are presented on the exploration logs included in Appendix A.

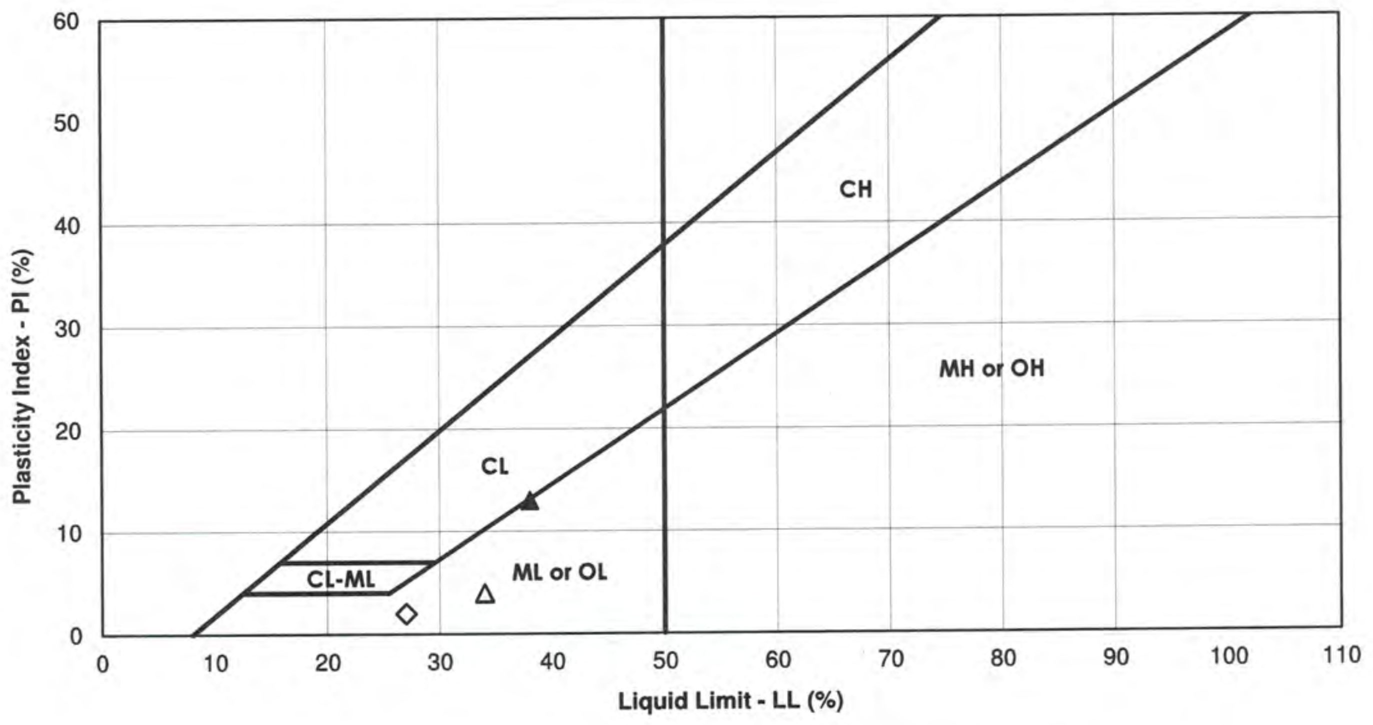
### *Fines Content*

Fines content testing was performed on eleven selected samples in general accordance with ASTM D1140. The percent passing the U.S. No. 200 sieve for each sample is shown below and on the boring logs in Appendix A.

| Sample Designation | Depth (ft) | Soil Description (USCS Class) | Moisture Content (%) | Fines Content (%) |
|---|---|---|---|---|
| B-1, S-3 | 15.0 - 16.5 | Silty SAND (SM) | 26.9 | 40.1 |
| B-2, S-3 | 15.0 - 16.5 | SILT (ML) | 44.1 | 98.3 |
| B-2, S-5 | 25.0 - 26.5 | SILT with Sand (ML) | 42.6 | 83.4 |
| B-2, S-8 | 35.0 - 36.5 | Sandy SILT (ML) | 35.3 | 58.2 |
| B-3, S-4 | 20.0 - 21.5 | SILT with Sand (ML) | 41.3 | 76.6 |
| B-3, S-6 | 26.0 - 27.5 | Silty SAND (SM) | 30.7 | 35.2 |
| B-3, S-9 | 40.0 - 41.5 | Silty SAND (SM) | 32.9 | 28.8 |
| B-4, S-8 | 40.0 - 41.5 | SILT (ML) | 45.9 | 99.5 |
| B-5, S-5 | 21.5 - 23.0 | SILT with Sand (ML) | 28.9 | 79.7 |
| B-5, S-9 | 40.0 - 41.5 | Silty SAND (SM) | 28.3 | 24.5 |
| B-6, S-8 | 40.0 - 41.5 | SILT (ML) | 30.5 | 90.5 |

### *Atterberg Limits*

Atterberg limits (liquid limit, plastic limit and plasticity index) of five fine-grained soil samples were obtained in general accordance with ASTM Test Method D 4318. The result of the Atterberg Limits tests are presented on Figure C1.



| Symbol | Sample | | Depth (ft) | Soil Description | % MC | LL | PL | PI | % Fines |
|---|---|---|---|---|---|---|---|---|---|
| ▲ | B-2 | S-3 | 15.0 - 16.5 | SILT (ML) | 44.1 | 38 | 25 | 13 | 98 |
| | B-2 | S-5 | 25.0 - 26.5 | SILT WITH SAND (ML) | 42.6 | Non-Plastic | | | 83 |
| | B-3 | S-4 | 20.0 - 21.5 | SILT WITH SAND (ML) | 41.3 | Non-Plastic | | | 77 |
| △ | B-4 | S-8 | 40.0 - 41.5 | SILT (ML) | 45.9 | 34 | 30 | 4 | 99 |
| ◇ | B-6 | S-8 | 40.0 - 41.5 | SILT (ML) | 30.5 | 27 | 25 | 2 | 91 |

Atterberg Limits determined in
accordance with ASTM D-4318

GEOTECHNICS LLC

# PLASTICITY CHART

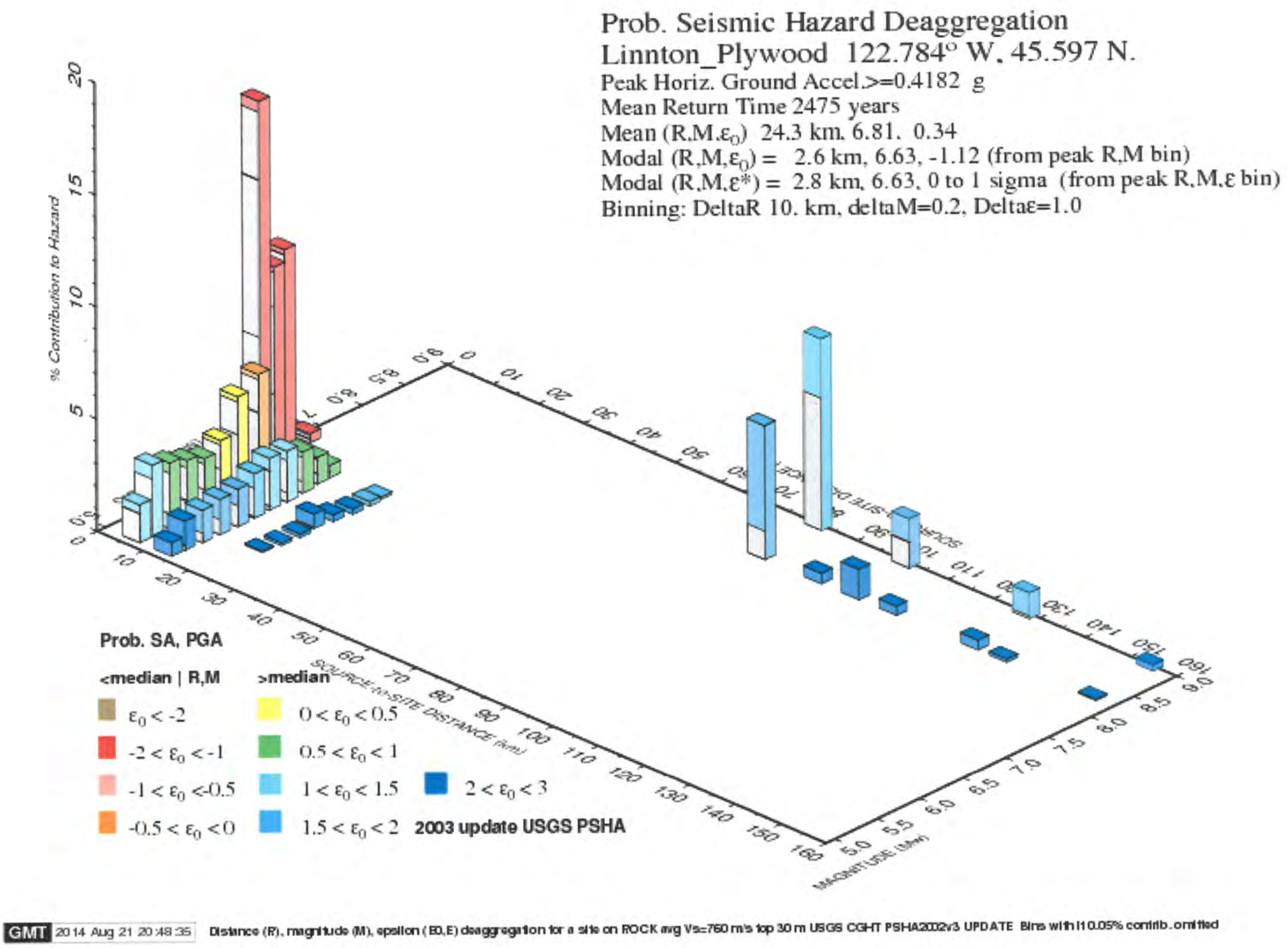
Linnton Plywood Restoration
Portland, Oregon

Project No. 13-016-2

Figure C1

# Appendix D

## LIQUEFACTION ANALYSIS



Prob. Seismic Hazard Deaggregation
Linnton_Plywood 122.784° W, 45.597 N.
Peak Horiz. Ground Accel.>=0.4182 g
Mean Return Time 2475 years
Mean (R,M,$\varepsilon_0$) 24.3 km, 6.81, 0.34
Modal (R,M,$\varepsilon_0$) = 2.6 km, 6.63, -1.12 (from peak R,M bin)
Modal (R,M,$\varepsilon^*$) = 2.8 km, 6.63, 0 to 1 sigma (from peak R,M,ε bin)
Binning: DeltaR 10. km, deltaM=0.2, Deltaε=1.0

GMT 2014 Aug 21 20:48:35 Distance (R), magnitude (M), epsilon (E0,E) deaggregation for a site on ROCK avg Vs=760 m/s top 30 m USGS CGHT PSHA2002v3 UPDATE Bins with lt 0.05% contrib. omitted

GEOTECHNICS LLC
7629 SE Harrison Street
Portland, Oregon 97215
www.GeotechnicsNW.com

## LIQUEFACTION ANALYSIS REPORT

**Project title : Linnton Plywood**

**Location : Portland, Oregon**

**CPT file : CPT-01**

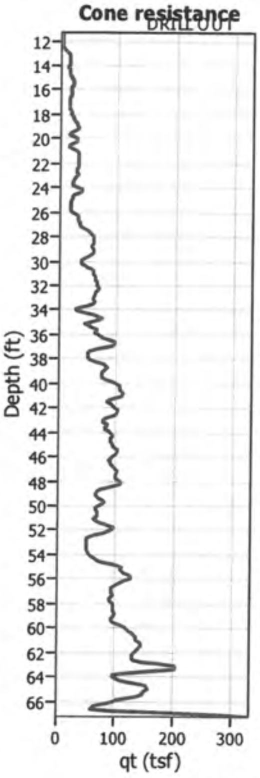
### Input parameters and analysis data

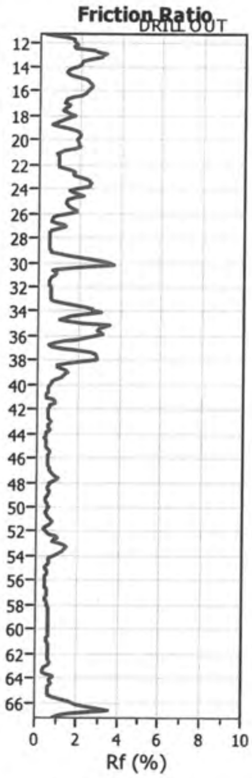
Analysis method: NCEER (1998)
Fines correction method: NCEER (1998)
Points to test: Based on Ic value
Earthquake magnitude $M_w$: 6.80
Peak ground acceleration: 0.28

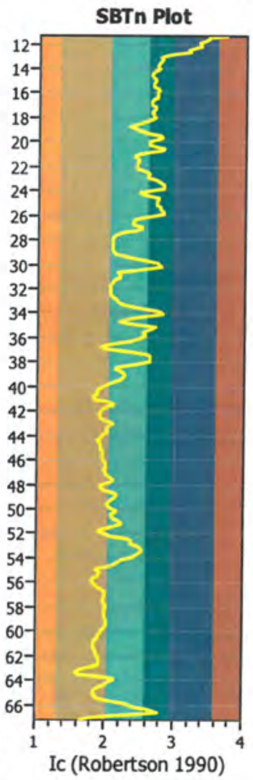
G.W.T. (in-situ): 24.70 ft
G.W.T. (earthq.): 20.00 ft
Average results interval: 3
Ic cut-off value: 2.60
Unit weight calculation: Based on SBT

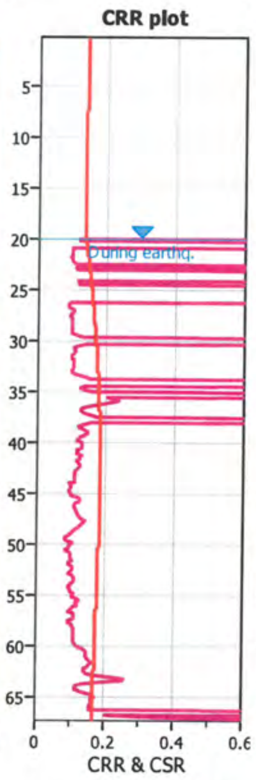
Use fill: No
Fill height: N/A
Fill weight: N/A
Trans. detect. applied: No
$K_\sigma$ applied: Yes

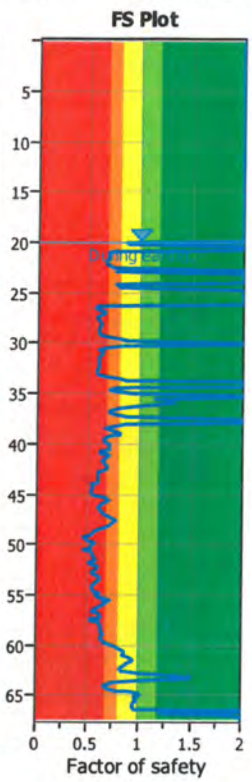
Clay like behavior applied: Sands only
Limit depth applied: No
Limit depth: N/A
MSF method: Method based

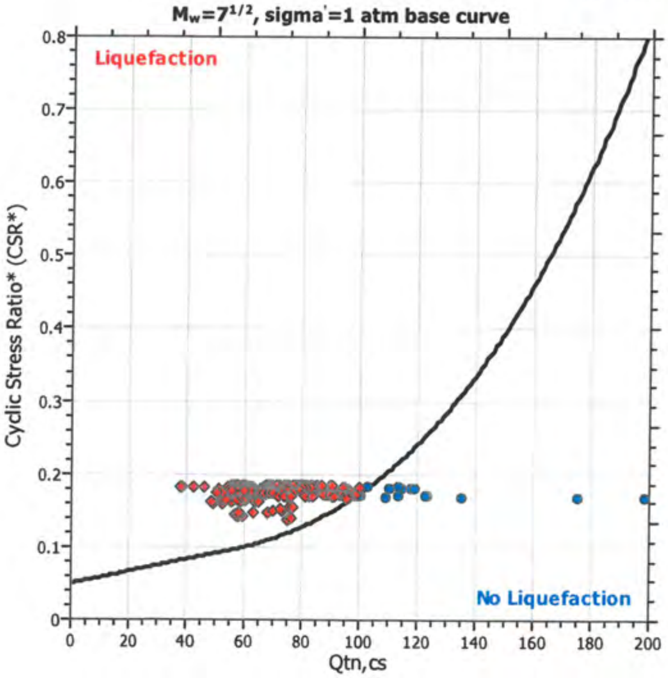


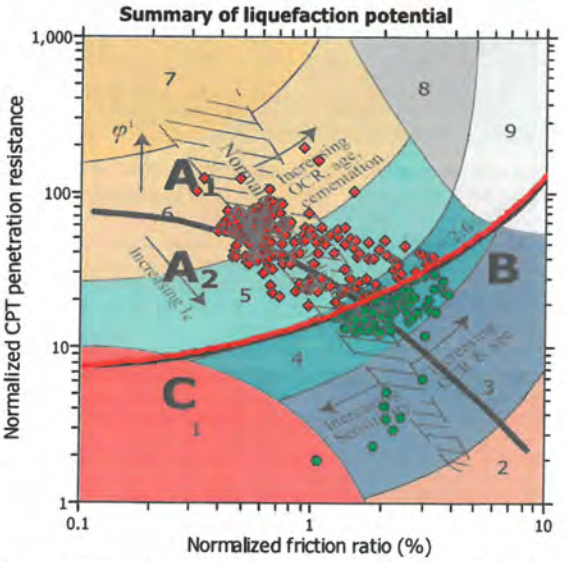






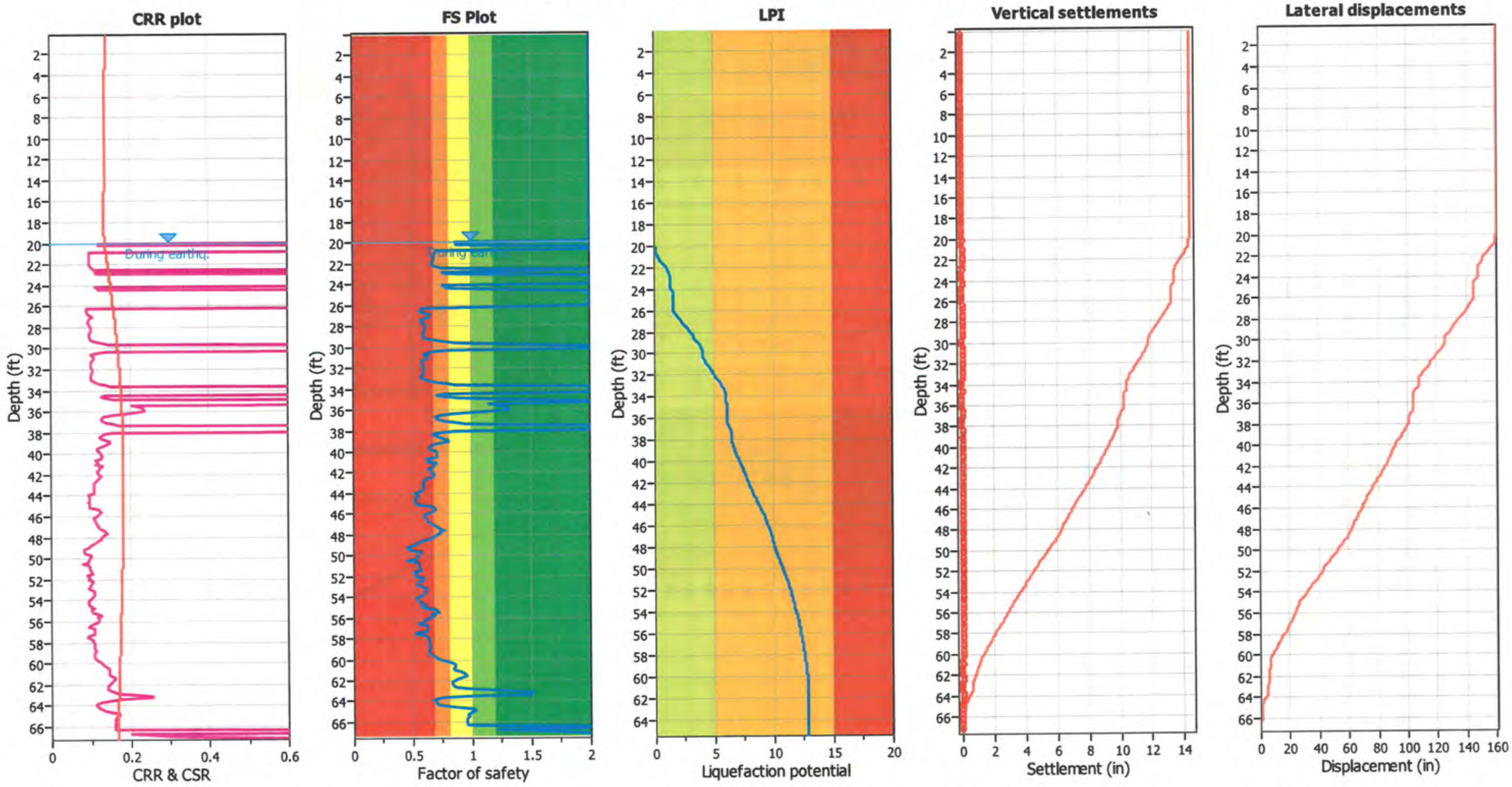






Zone $A_1$: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone $A_2$: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

# Liquefaction analysis overall plots



**Input parameters and analysis data**

| | | | | | |
|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | Depth to water table (erthq.): | 20.00 ft | Fill weight: | N/A |
| Fines correction method: | NCEER (1998) | Average results interval: | 3 | Transition detect. applied: | No |
| Points to test: | Based on Ic value | Ic cut-off value: | 2.60 | $K_\sigma$ applied: | Yes |
| Earthquake magnitude $M_w$: | 6.80 | Unit weight calculation: | Based on SBT | Clay like behavior applied: | Sands only |
| Peak ground acceleration: | 0.28 | Use fill: | No | Limit depth applied: | No |
| Depth to water table (insitu): | 24.70 ft | Fill height: | N/A | Limit depth: | N/A |

**F.S. color scheme**

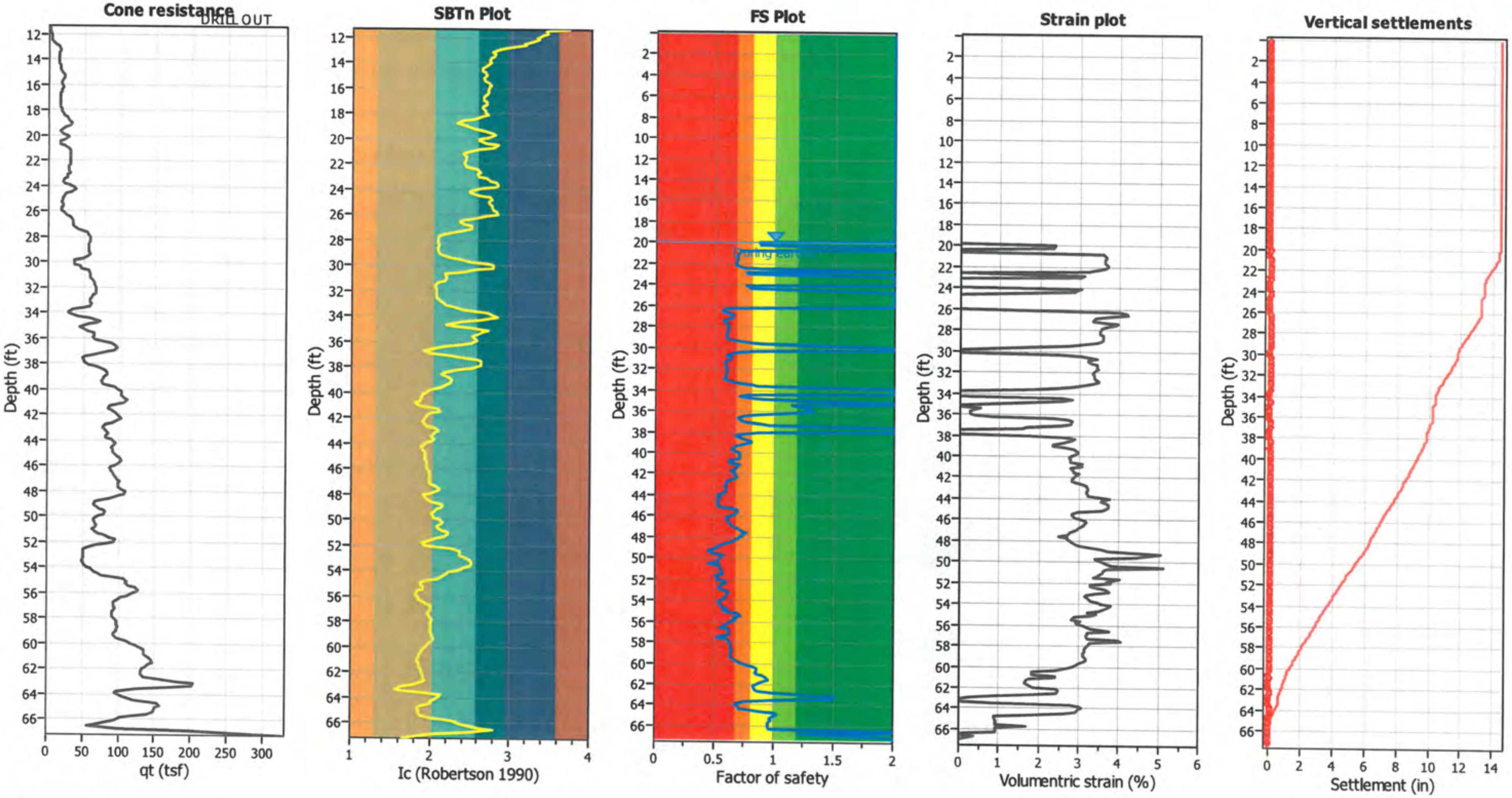
- 🟥 Almost certain it will liquefy
- 🟧 Very likely to liquefy
- 🟨 Liquefaction and no liq. are equally likely
- 🟩 Unlike to liquefy
- 🟩 Almost certain it will not liquefy

**LPI color scheme**

- 🟥 Very high risk
- 🟧 High risk
- 🟩 Low risk

CLiq v.1.7.6.34 - CPT Liquefaction Assessment Software - Report created on: 9/17/2014, 7:45:20 PM
Project file: C:\Users\Andre\Documents\1Projects - Geotechnics LLC\13-016-1 Linnton Plywood Restoration\analysis\Linnton.clq

## Estimation of post-earthquake settlements

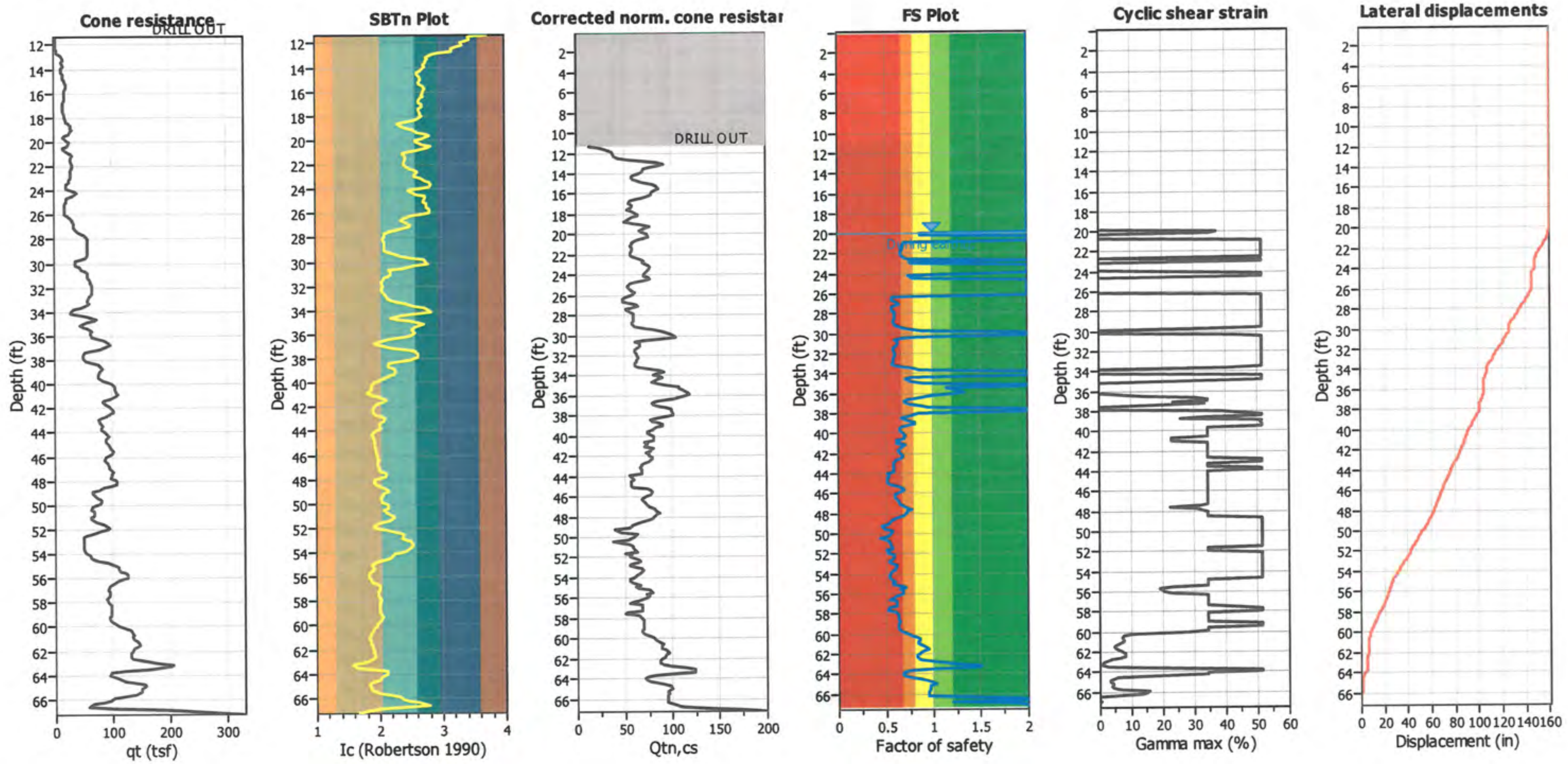


**Abbreviations**

| | |
|---|---|
| $q_t$: | Total cone resistance (cone resistance $q_c$ corrected for pore water effects) |
| $I_c$: | Soil Behaviour Type Index |
| FS: | Calculated Factor of Safety against liquefaction |
| Volumentric strain: | Post-liquefaction volumentric strain |

## Estimation of post-earthquake lateral Displacements

**Geometric parameters: Level ground (or gently sloping) with free face (L: 600.00 ft - H: 55.00 ft)**

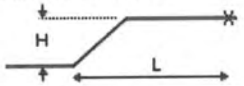


**Abbreviations**

$q_t$: Total cone resistance (cone resistance $q_c$ corrected for pore water effects)
$I_c$: Soil Behaviour Type Index
$Q_{tn,cs}$: Equivalent clean sand normalized CPT total cone resistance

F.S.: Factor of safety
$\gamma_{max}$: Maximum cyclic shear strain
LDI: Lateral displacement index

**Surface condition**



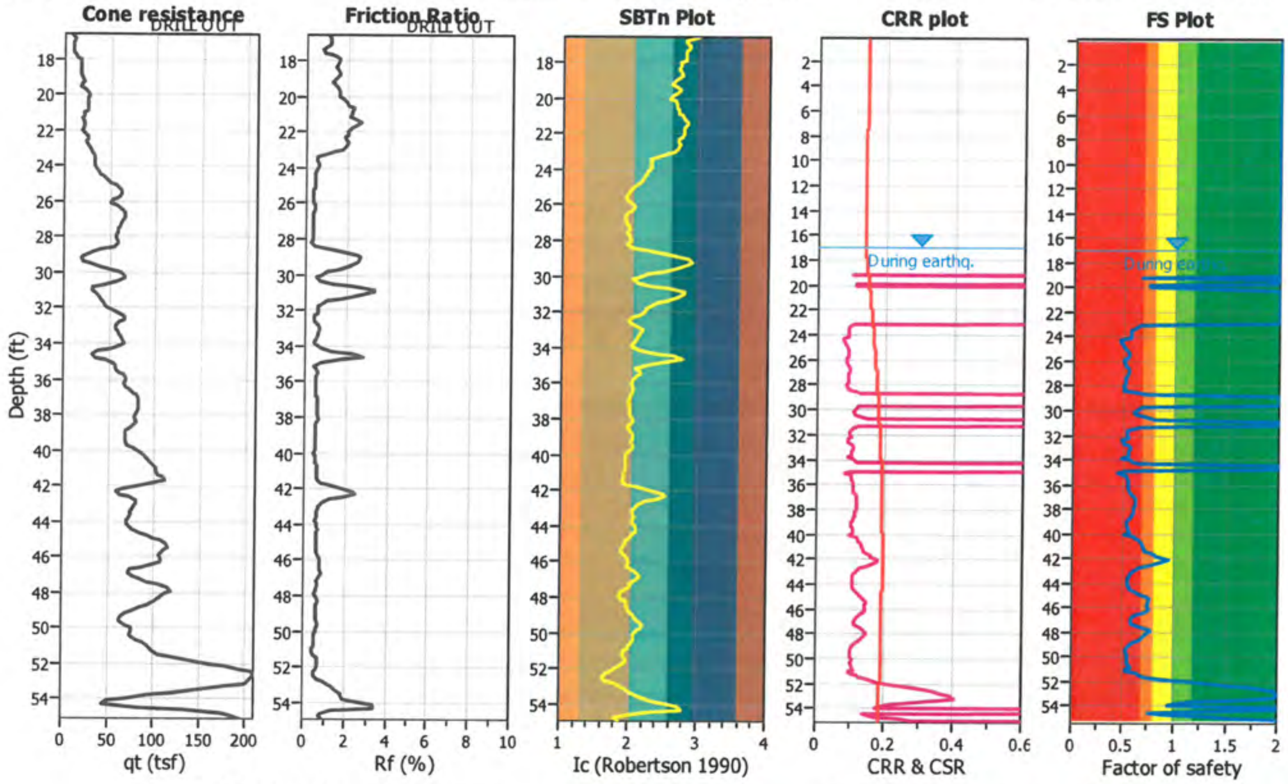
## LIQUEFACTION ANALYSIS REPORT

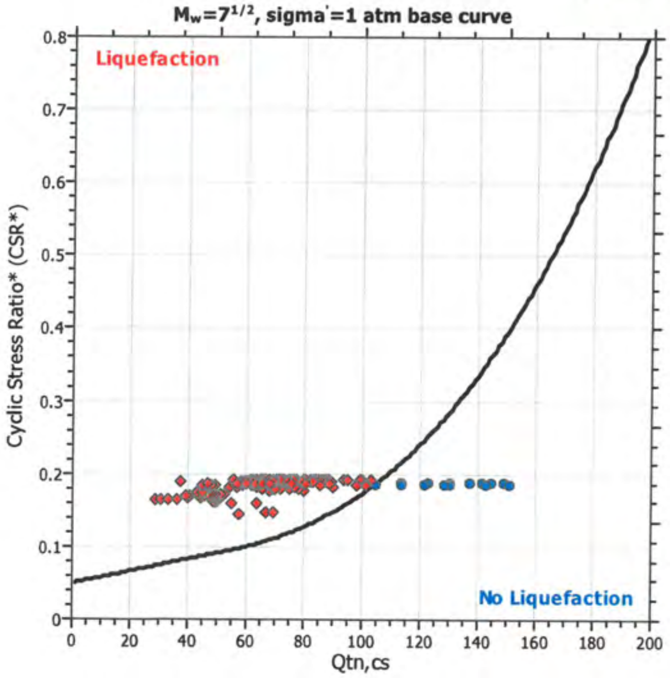
**Project title : Linnton Plywood** **Location : Portland, Oregon**

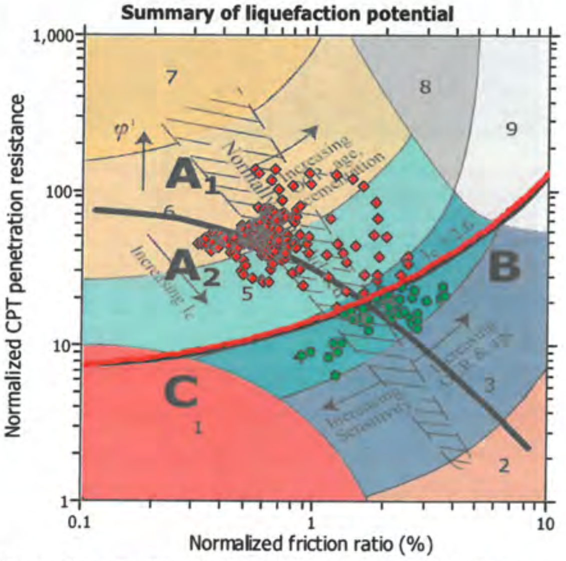
**CPT file : CPT-02**

### Input parameters and analysis data

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | G.W.T. (in-situ): | 21.30 ft | Use fill: | No | Clay like behavior applied: | Sands only |
| Fines correction method: | NCEER (1998) | G.W.T. (earthq.): | 17.00 ft | Fill height: | N/A | Limit depth applied: | No |
| Points to test: | Based on Ic value | Average results interval: | 3 | Fill weight: | N/A | Limit depth: | N/A |
| Earthquake magnitude $M_w$: | 6.80 | Ic cut-off value: | 2.60 | Trans. detect. applied: | No | MSF method: | Method based |
| Peak ground acceleration: | 0.28 | Unit weight calculation: | Based on SBT | $K_\sigma$ applied: | Yes | | |

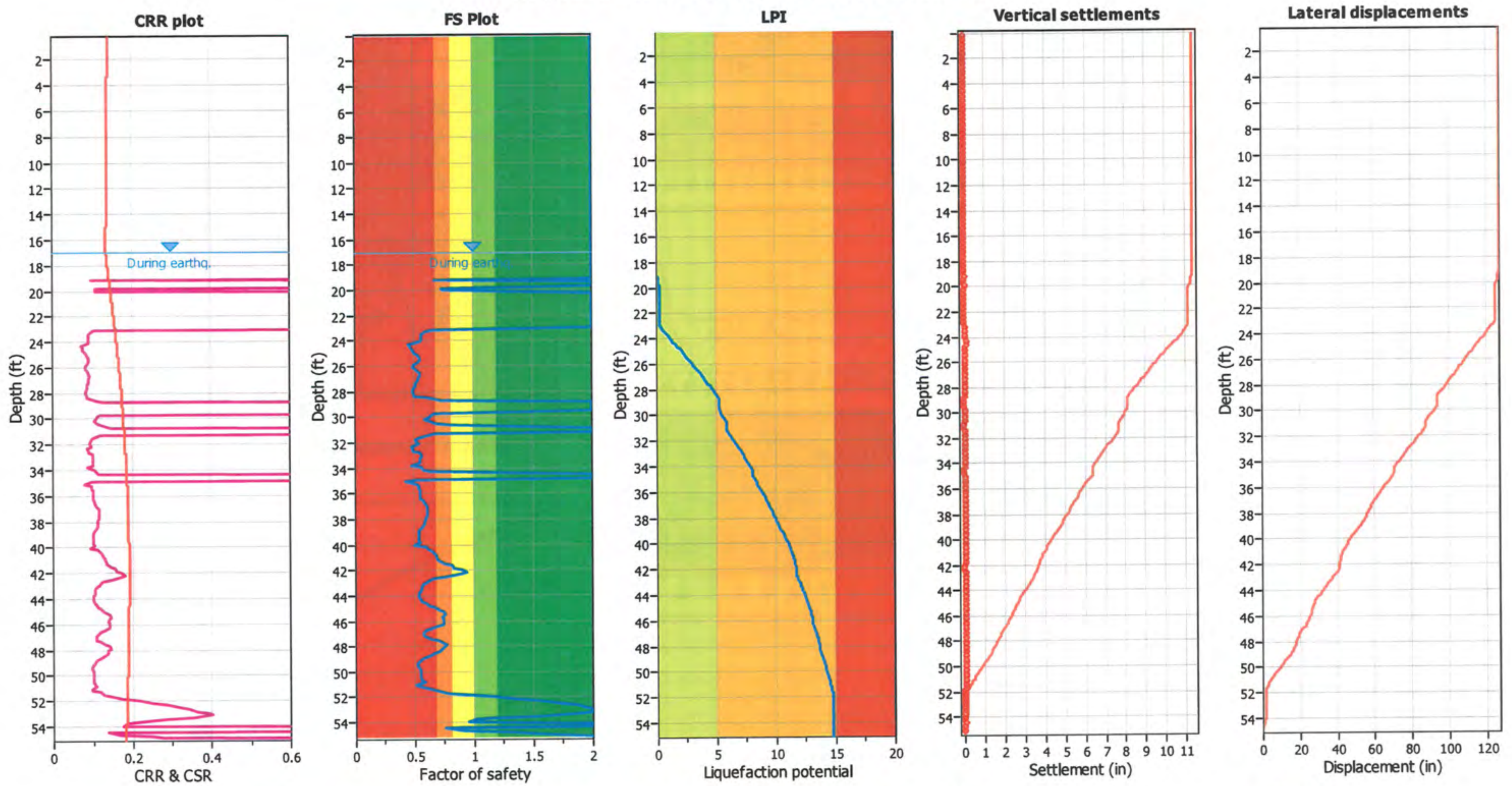






Zone $A_1$: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone $A_2$: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

## Liquefaction analysis overall plots



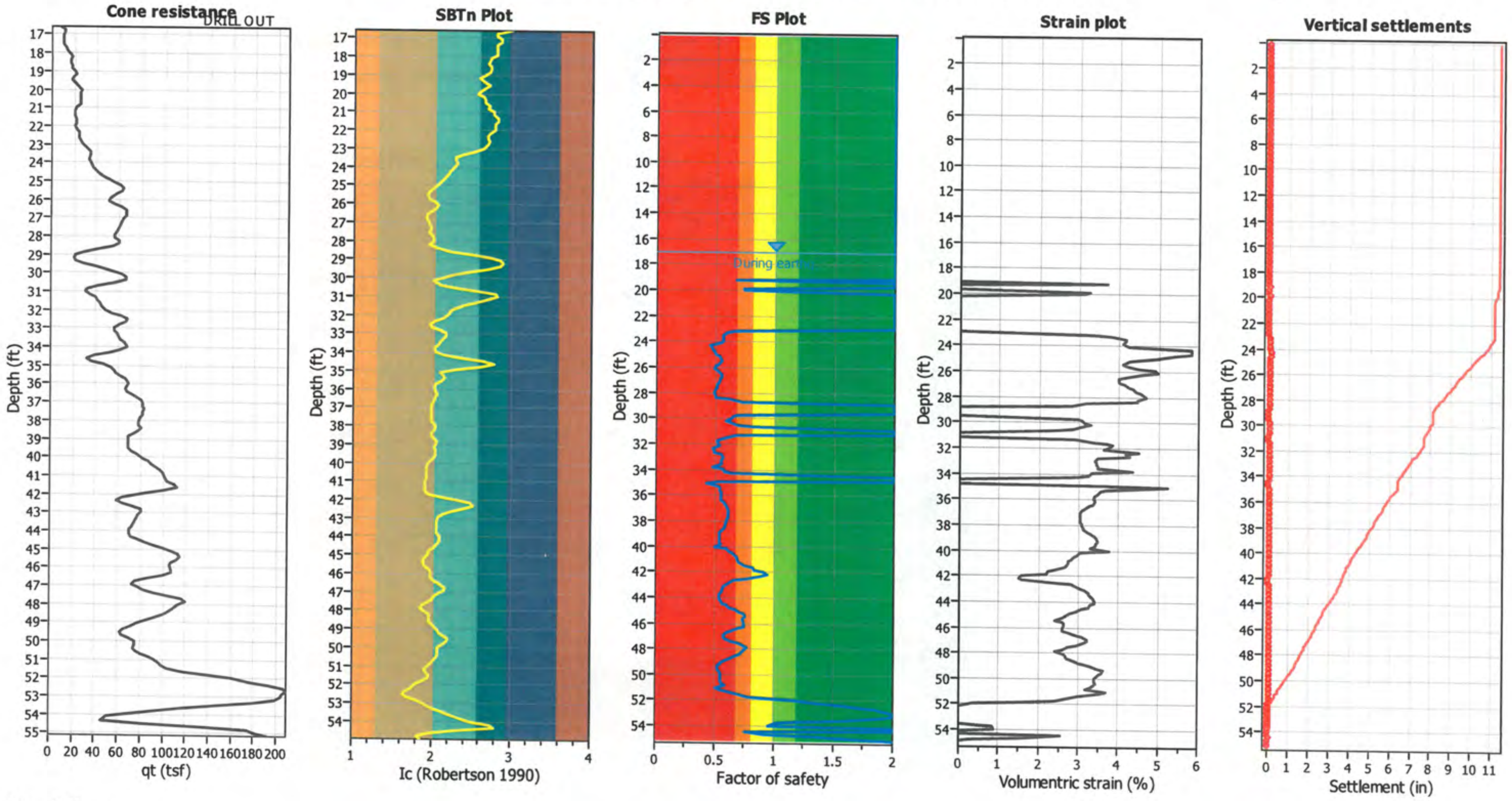
### Input parameters and analysis data

| | | | | | |
|---|---|---|---|---|---|
| Analysis method: | NCEER (1998) | Depth to water table (erthq.): | 17.00 ft | Fill weight: | N/A |
| Fines correction method: | NCEER (1998) | Average results interval: | 3 | Transition detect. applied: | No |
| Points to test: | Based on Ic value | Ic cut-off value: | 2.60 | $K_\sigma$ applied: | Yes |
| Earthquake magnitude $M_w$: | 6.80 | Unit weight calculation: | Based on SBT | Clay like behavior applied: | Sands only |
| Peak ground acceleration: | 0.28 | Use fill: | No | Limit depth applied: | No |
| Depth to water table (insitu): | 21.30 ft | Fill height: | N/A | Limit depth: | N/A |

**F.S. color scheme**
- 🟥 Almost certain it will liquefy
- 🟧 Very likely to liquefy
- 🟨 Liquefaction and no liq. are equally likely
- 🟩 Unlike to liquefy
- 🟩 Almost certain it will not liquefy

**LPI color scheme**
- 🟥 Very high risk
- 🟧 High risk
- 🟩 Low risk

## Estimation of post-earthquake settlements



**Abbreviations**

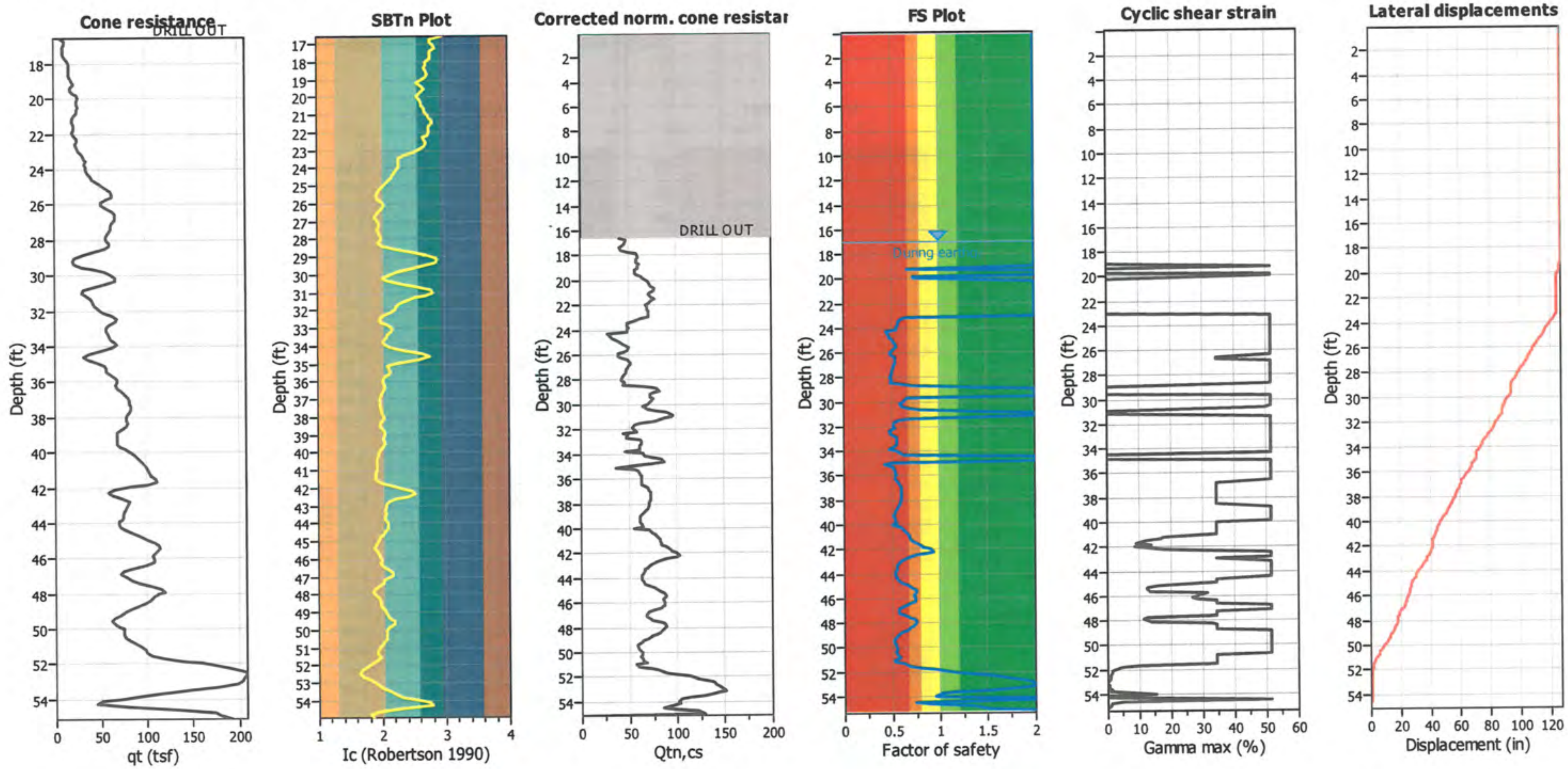
| | |
|---|---|
| $q_t$: | Total cone resistance (cone resistance $q_c$ corrected for pore water effects) |
| $I_c$: | Soil Behaviour Type Index |
| FS: | Calculated Factor of Safety against liquefaction |
| Volumentric strain: | Post-liquefaction volumentric strain |

This software is licensed to: GeotechnicsLLC

CPT name: CPT-02

# Estimation of post-earthquake lateral Displacements

**Geometric parameters: Level ground (or gently sloping) with free face (L: 600.00 ft - H: 55.00 ft)**

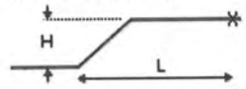


**Abbreviations**

$q_t$: Total cone resistance (cone resistance $q_c$ corrected for pore water effects)
$I_c$: Soil Behaviour Type Index
$Q_{tn,cs}$: Equivalent clean sand normalized CPT total cone resistance

F.S.: Factor of safety
$\gamma_{max}$: Maximum cyclic shear strain
LDI: Lateral displacement index

**Surface condition**



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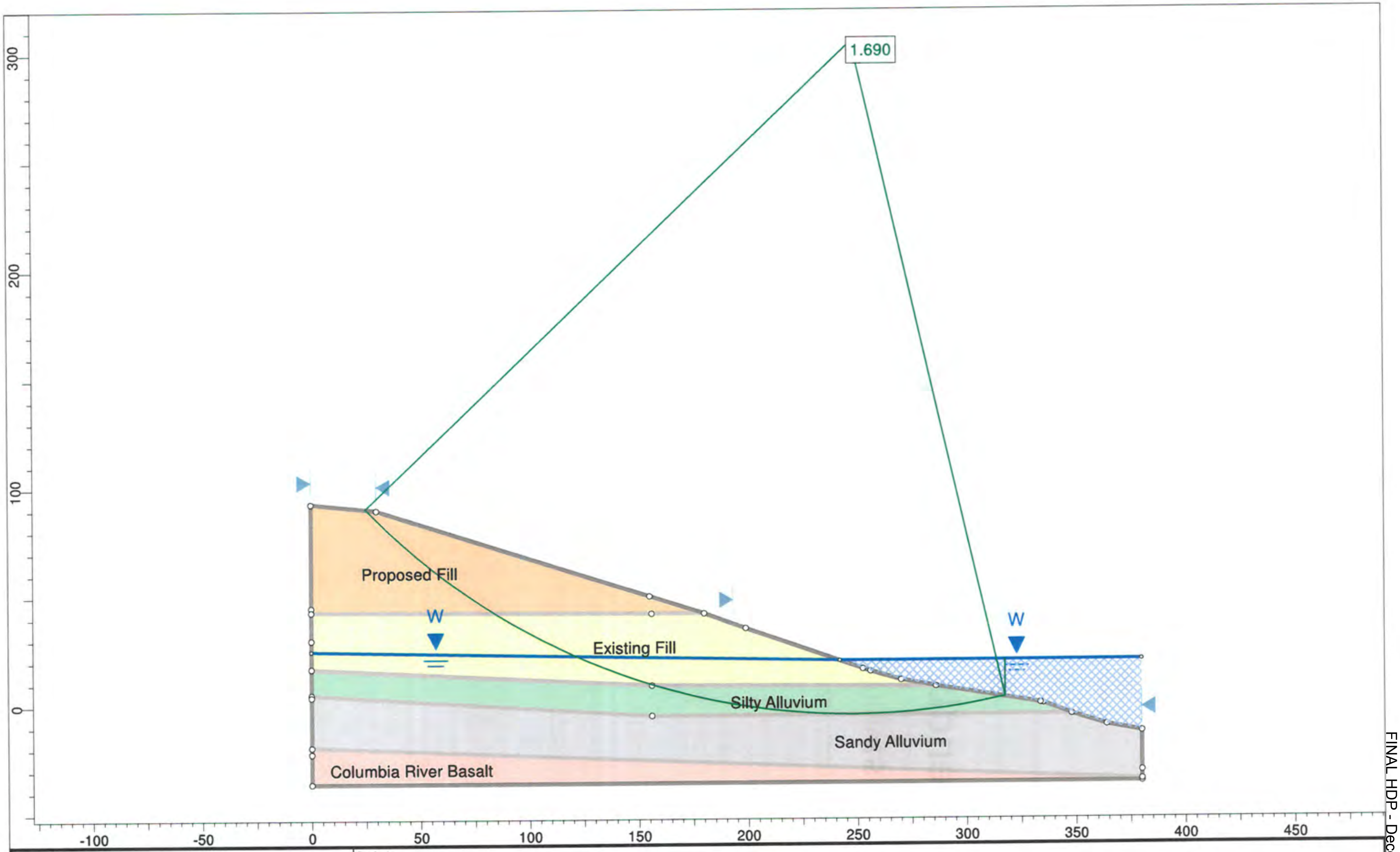
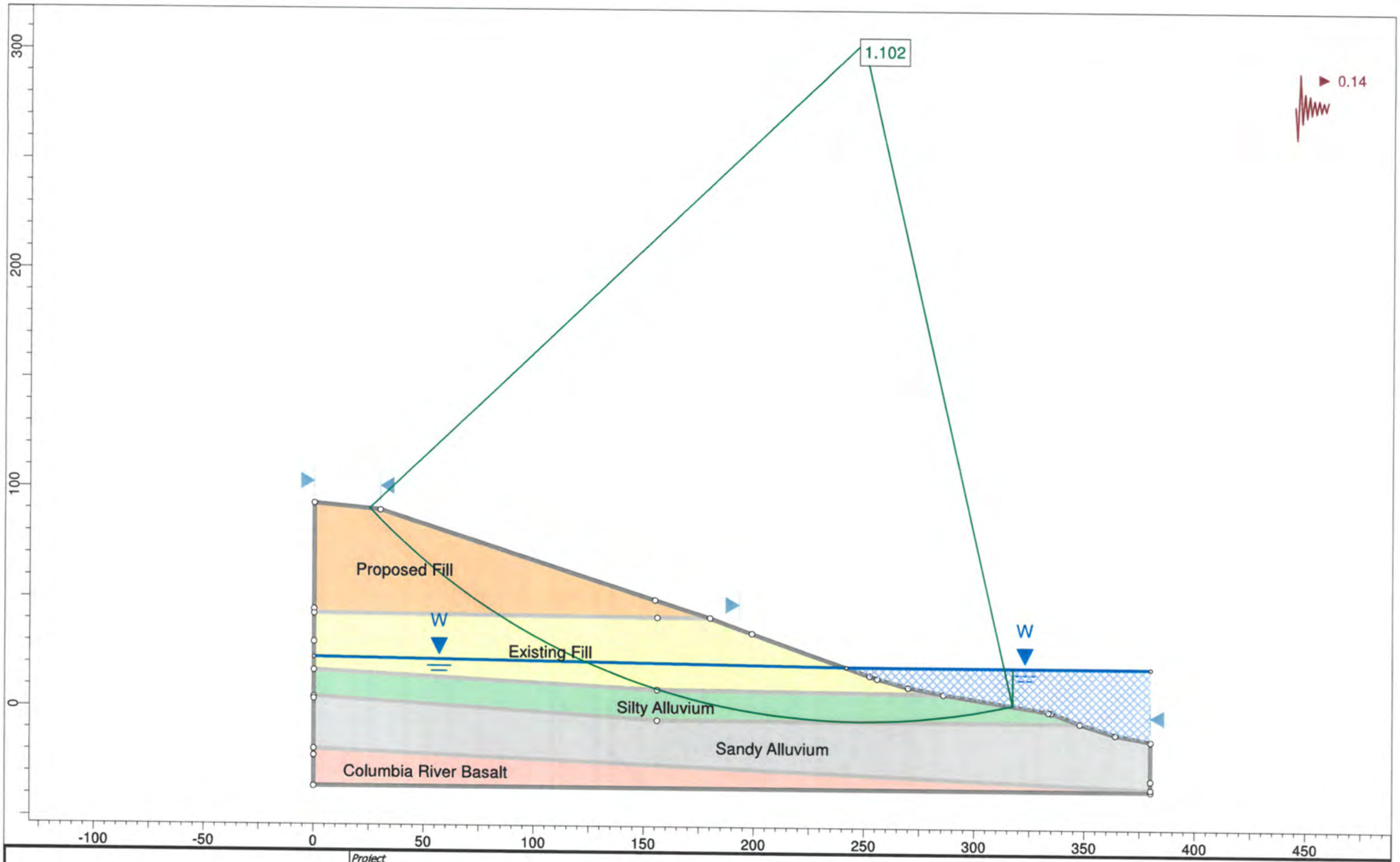
Project file: C:\Users\Andre\Documents\1Projects - Geotechnics LLC\13-016-1 Linnton Plywood Restoration\analysis\Linnton.clq

# Appendix E

## SLOPE STABILITY



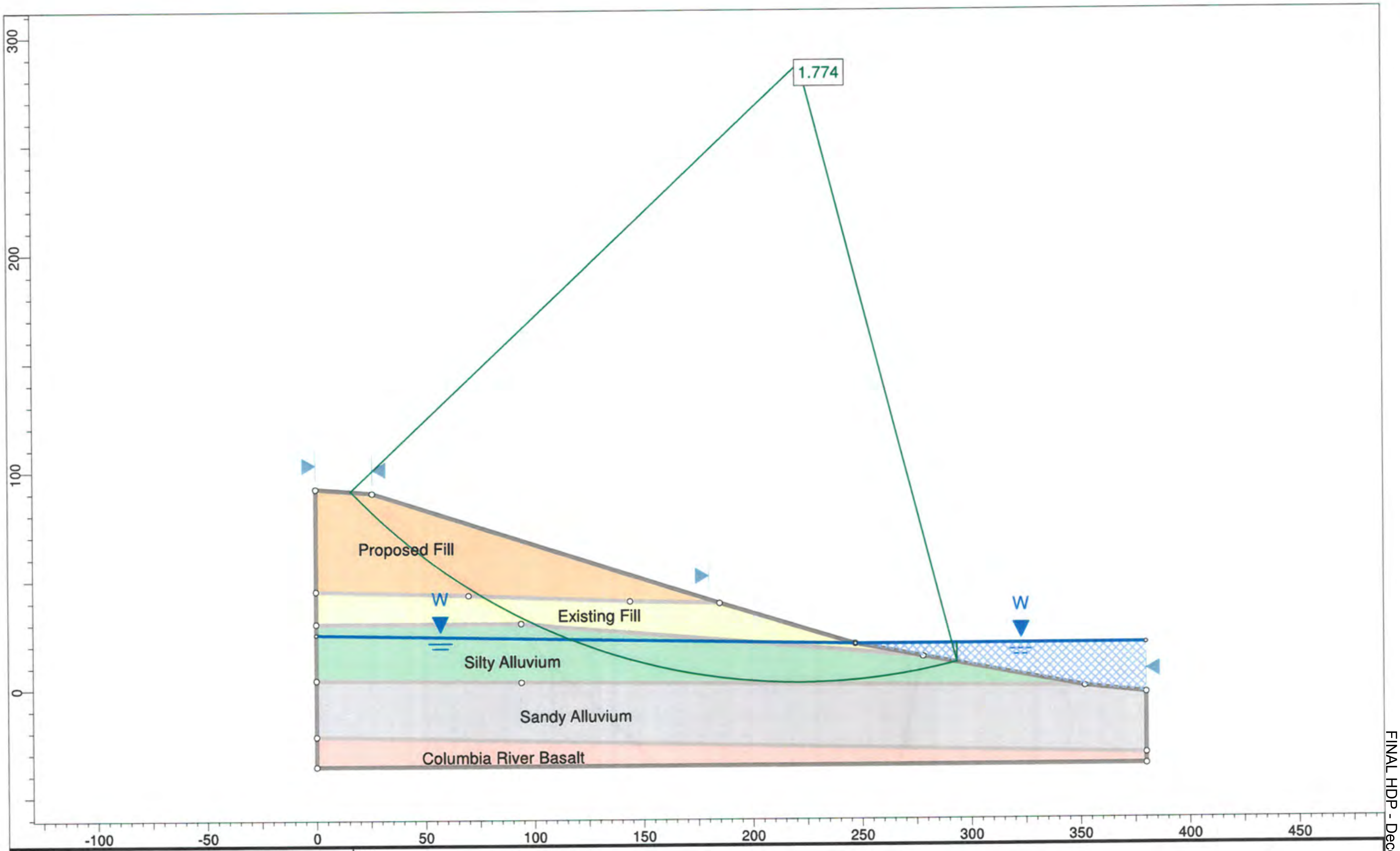
| | | | | |
|---|---|---|---|---|
| GEOTECHNICS LLC | *Project* | Linnton Plywood Restoration | | |
| | *Analysis Description* | A-A', high water, static | | |
| | *Drawn By* ADM | *Scale* 1:720 | *Company* | Geotechnics LLC |
| SLIDEINTERPRET 6.020 | *Date* 9/18/2014 | | *File Name* LinnA1.slim | Figure E1 |



GEOTECHNICS LLC

| | | | |
|---|---|---|---|
| Project | Linnton Plywood Restoration | | |
| Analysis Description | A-A', high water, seismic | | |
| Drawn By ADM | Scale 1:720 | Company Geotechnics LLC | |
| Date 9/18/2014 | | File Name LinnA2.slim | Figure E2 |

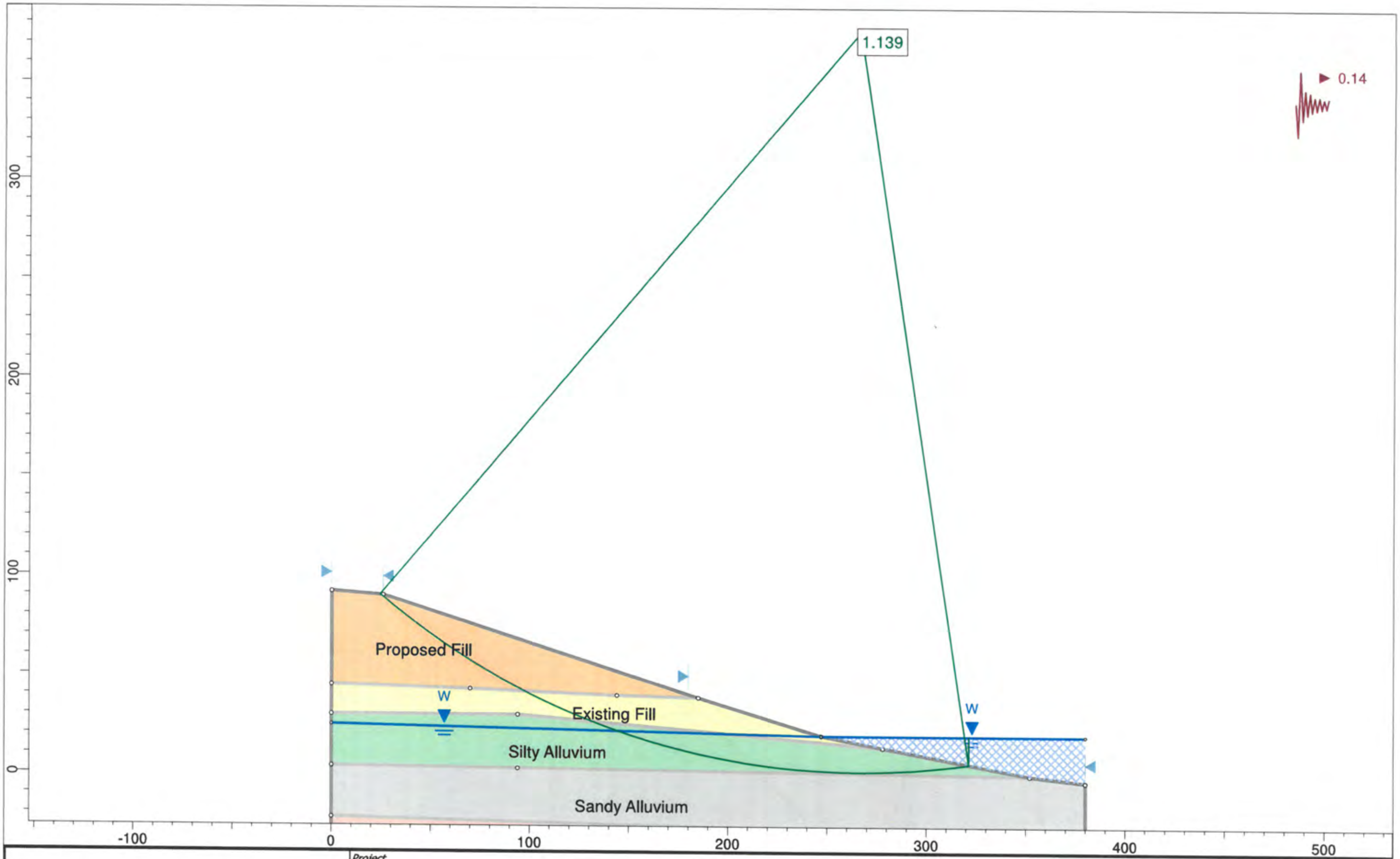
SLIDEINTERPRET 6.020



GEOTECHNICS LLC

| | | | |
|---|---|---|---|
| *Project* | Linnton Plywood Restoration | | |
| *Analysis Description* | C-C', high water, static | | |
| *Drawn By* | ADM | *Scale* | 1:720 |
| *Company* | Geotechnics LLC | | |
| *Date* | 9/18/2014 | *File Name* | LinnC1.slim |
| Figure E3 | | | |

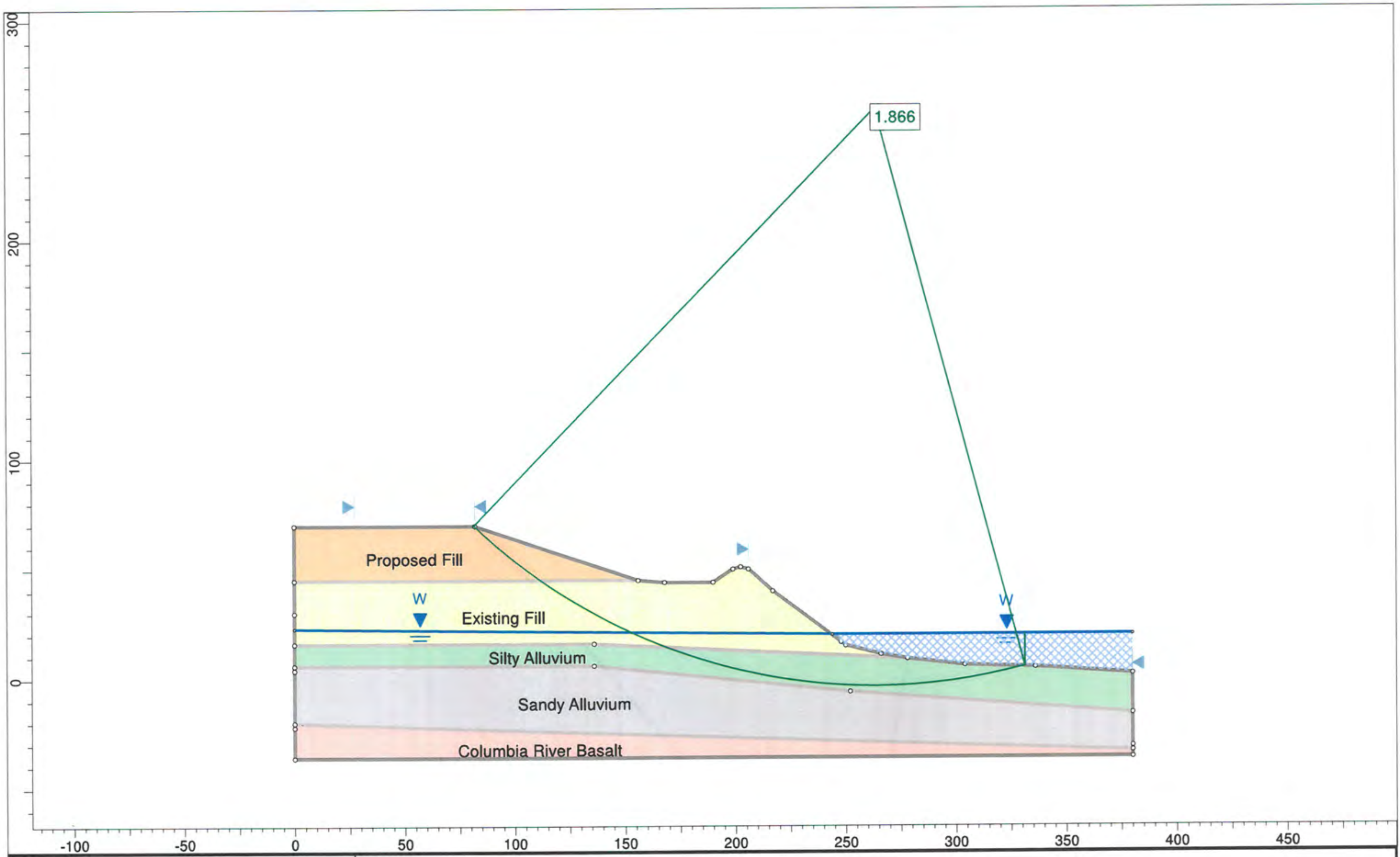
SLIDEINTERPRET 6.020



**GEOTECHNICS** LLC

| | |
|---|---|
| Project | Linnton Plywood Restoration |
| Analysis Description | C-C', high water, seismic |
| Drawn By | ADM |
| Scale | 1:800 |
| Company | Geotechnics LLC |
| Date | 9/18/2014 |
| File Name | LinnC2.slim |
| | Figure E4 |

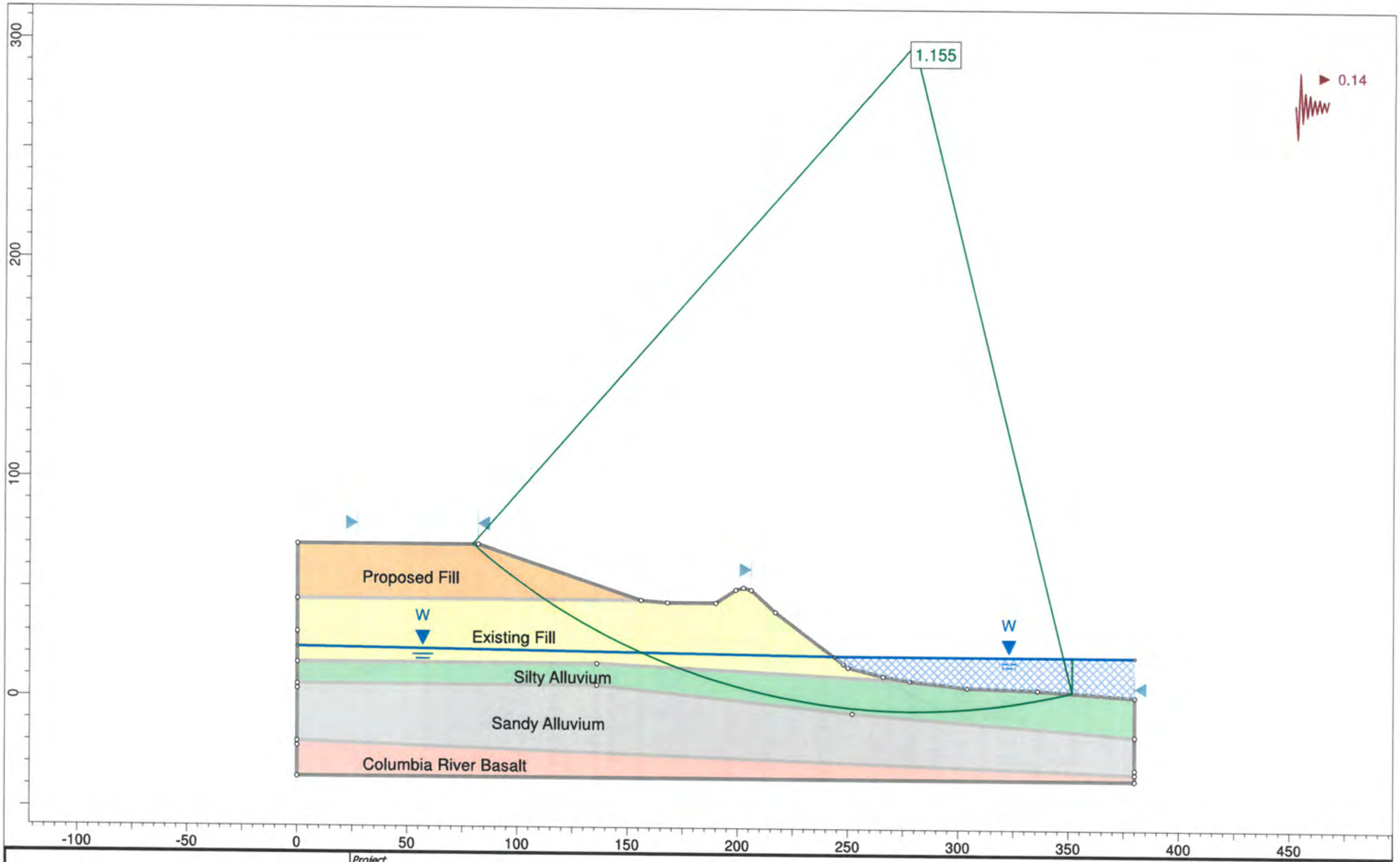
SLIDEINTERPRET 6.020



**GEOTECHNICS** LLC

| | | | |
|---|---|---|---|
| *Project* | Linnton Plywood Restoration | | |
| *Analysis Description* | E-E', high water, static, through embankment | | |
| *Drawn By* ADM | *Scale* 1:720 | *Company* | Geotechnics LLC |
| *Date* | 9/18/2014 | *File Name* LinnE1.slim | Figure E5 |

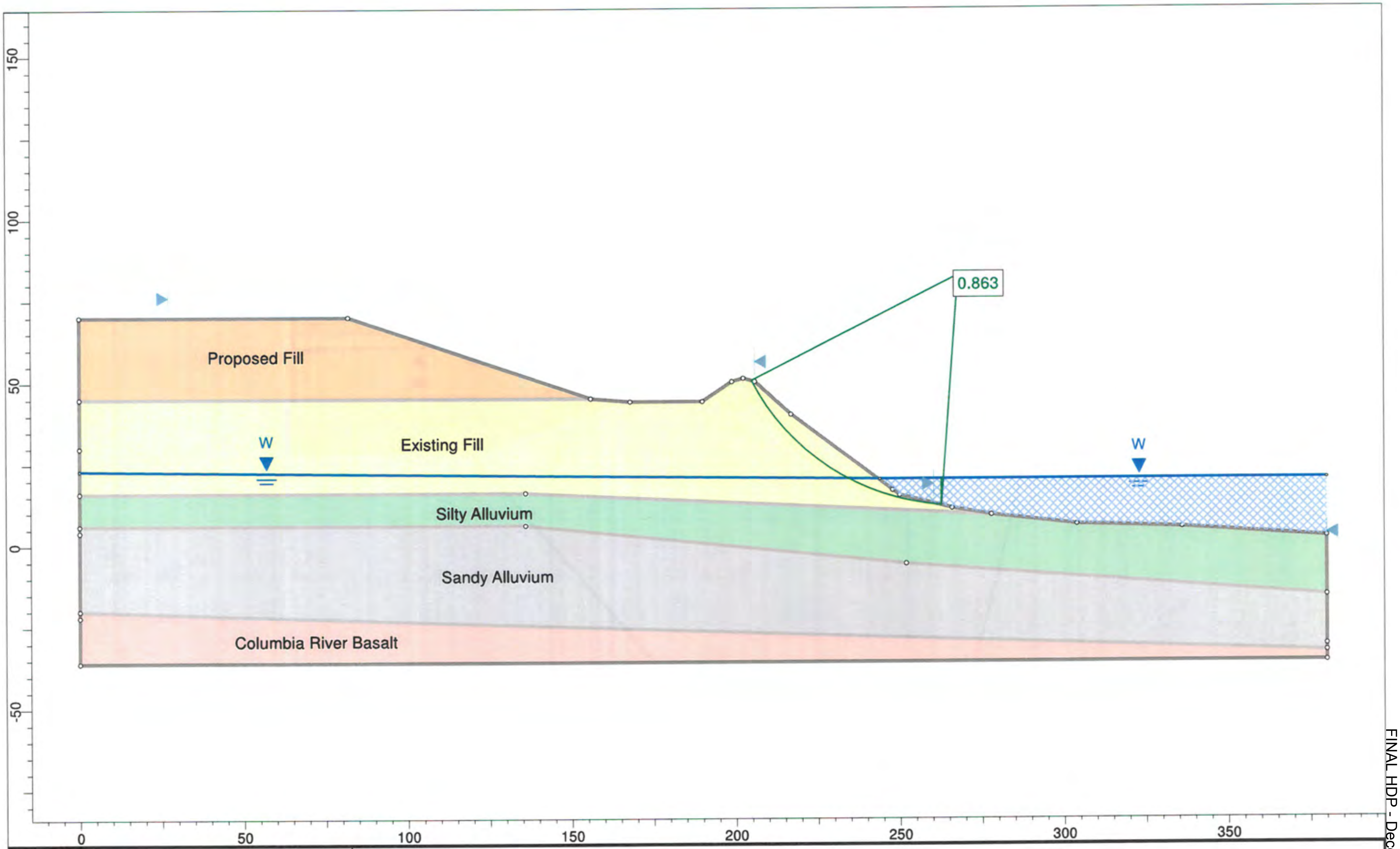
SLIDEINTERPRET 6.020



**GEOTECHNICS LLC**

| | | | |
|---|---|---|---|
| *Project* | Linnton Plywood Restoration | | |
| *Analysis Description* | E-E', high water, seismic, through embankment | | |
| *Drawn By* ADM | *Scale* 1:720 | *Company* Geotechnics LLC | |
| *Date* 9/18/2014 | | *File Name* LinnE2.slim | Figure E6 |

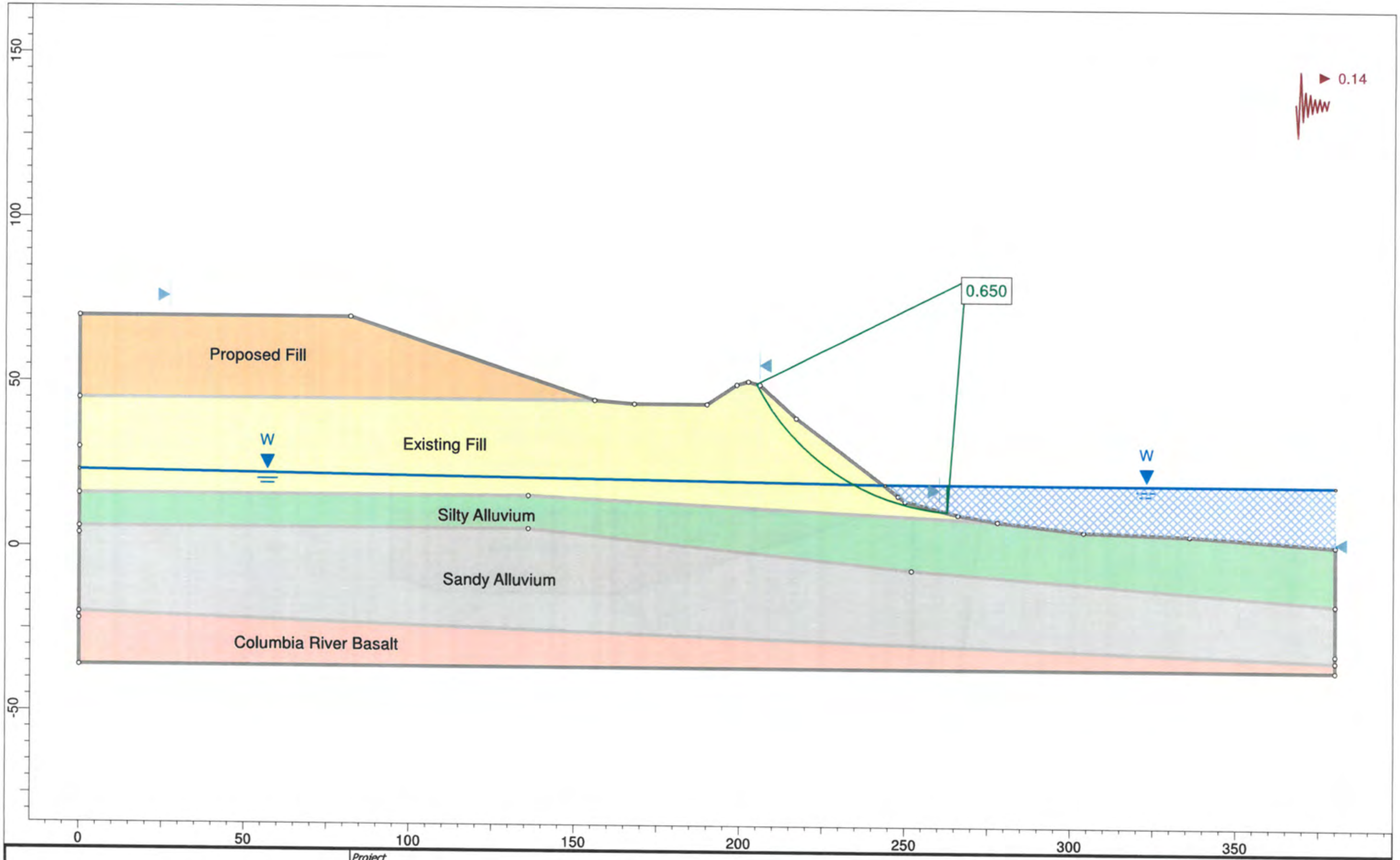
SLIDEINTERPRET 6.020



GEOTECHNICS LLC

| | | | |
|---|---|---|---|
| *Project* | Linnton Plywood Restoration | | |
| *Analysis Description* | E-E', high water, static, full search | | |
| *Drawn By* ADM | *Scale* 1:480 | *Company* Geotechnics LLC | |
| *Date* 9/18/2014 | | *File Name* LinnE3.slim | Figure E7 |

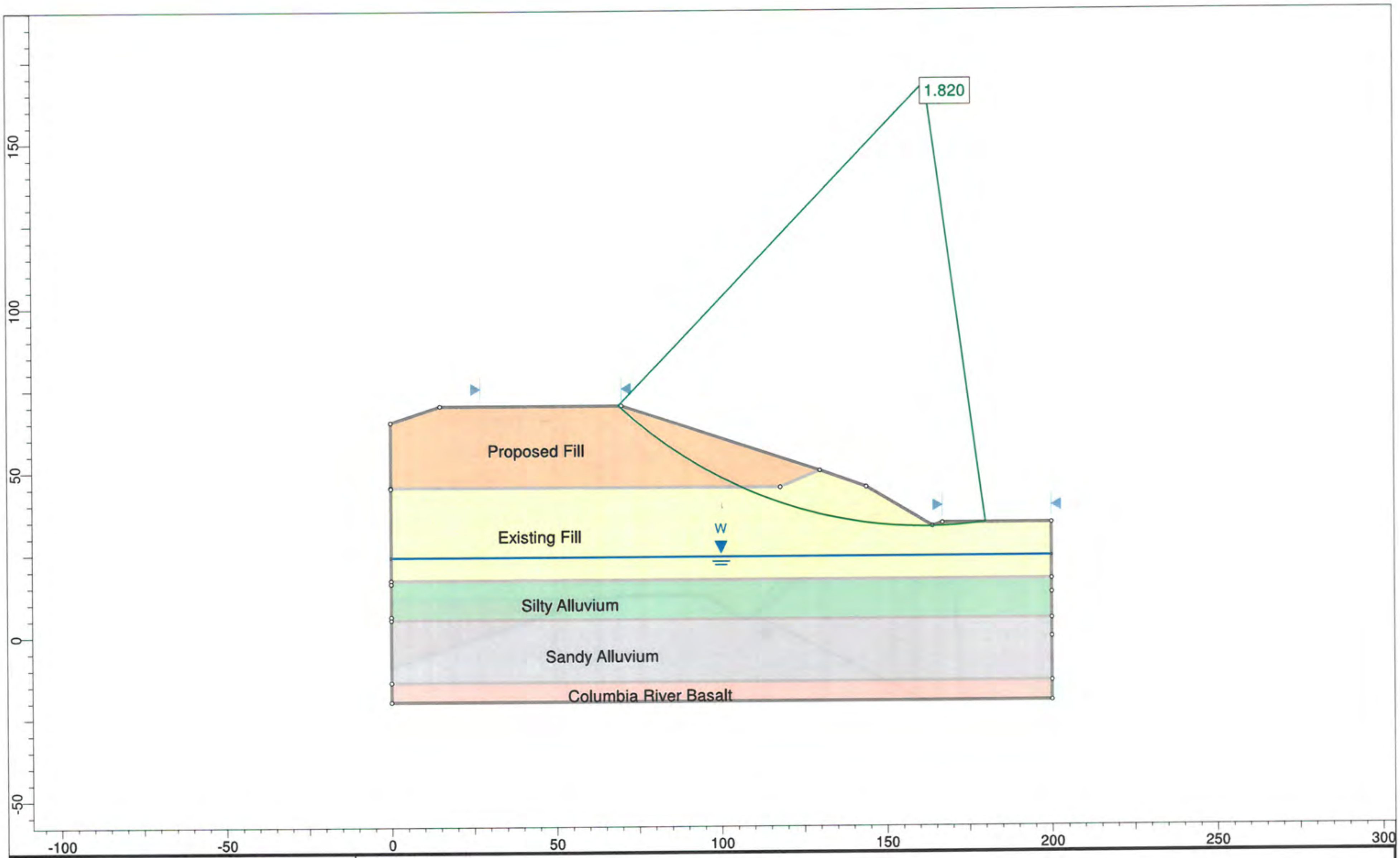
SLIDEINTERPRET 6.020



GEOTECHNICS LLC

| | | | |
|---|---|---|---|
| *Project* | Linnton Plywood Restoration | | |
| *Analysis Description* | E-E', high water, seismic, full search | | |
| *Drawn By* ADM | *Scale* 1:480 | *Company* Geotechnics LLC | |
| *Date* 9/18/2014 | | *File Name* LinnE3.slim | Figure E8 |

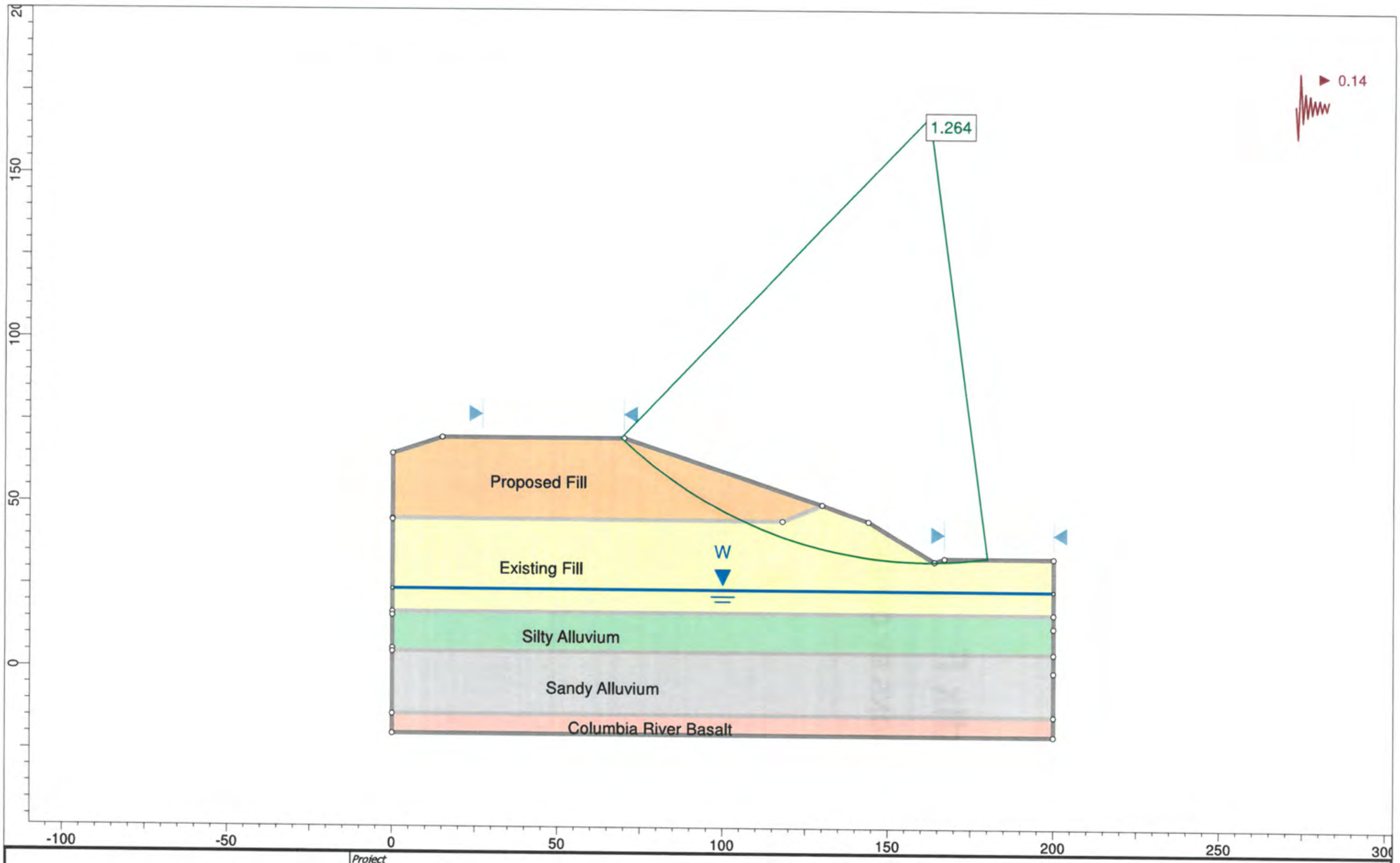
SLIDEINTERPRET 6.020



GEOTECHNICS LLC

| | | | |
|---|---|---|---|
| *Project* | Linnton Plywood Restoration | | |
| *Analysis Description* | F-F', static | | |
| *Drawn By* ADM | *Scale* 1:480 | *Company* Geotechnics LLC | |
| *Date* 9/18/2014 | | *File Name* LinnF1.slim | Figure E9 |

SLIDEINTERPRET 6.020

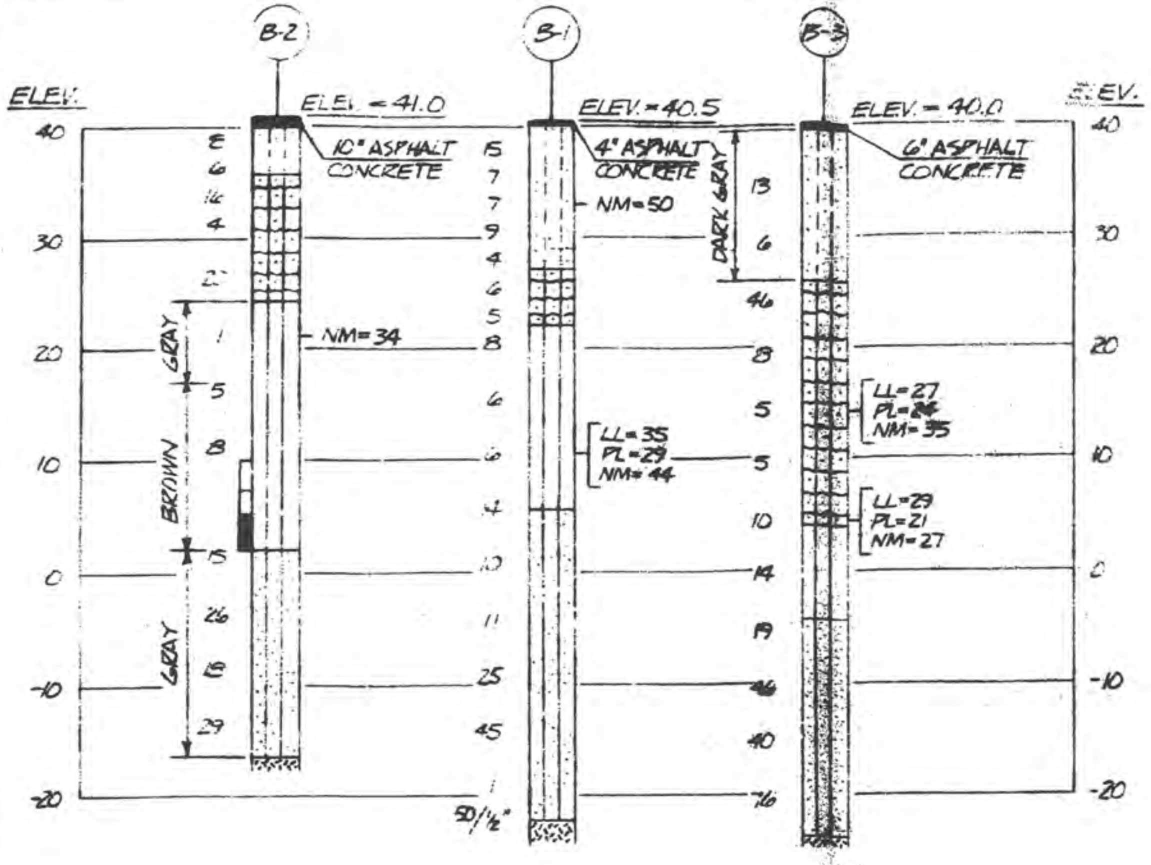


| | | | |
|---|---|---|---|
| GEOTECHNICS LLC | Project<br>Linnton Plywood Restoration | | |
| | Analysis Description<br>F-F', seismic | | |
| | Drawn By ADM | Scale 1:480 | Company Geotechnics LLC |
| SLIDEINTERPRET 6.020 | Date 9/18/2014 | File Name LinnF1.slim | Figure E10 |

# Appendix F

## EXPLORATIONS BY OTHERS

# CH2M Hill, 1974



SCALES
VERT. ~ 1" = 10'
HORTZ. ~ NONE

P8044.5

## BORING LOG SYMBOLS

- ▦ BROWN SAND, SOME SILT, SOME SILT LAYERS (PROBABLE FILL MATERIAL)
- ▥ BROWN SILTY SAND TO SANDY SILT
- ▯ GRAY-BROWN SILT
- ▦ GRAY SANDY SILT WITH PEAT AND WOOD CHIPS
- ▨ COLUMBIA RIVER BASALT

## BORING LOG LEGEND

B-1 BORING NO.

15 BLOWS PER FOOT (N), STANDARD PENETRATION TEST (2" O.D. SPLIT SPOON SAMPLER)

■ UNDISTURBED SAMPLE (3" O.D. SHELBY TUBE)

□ NO SAMPLE RECOVERY

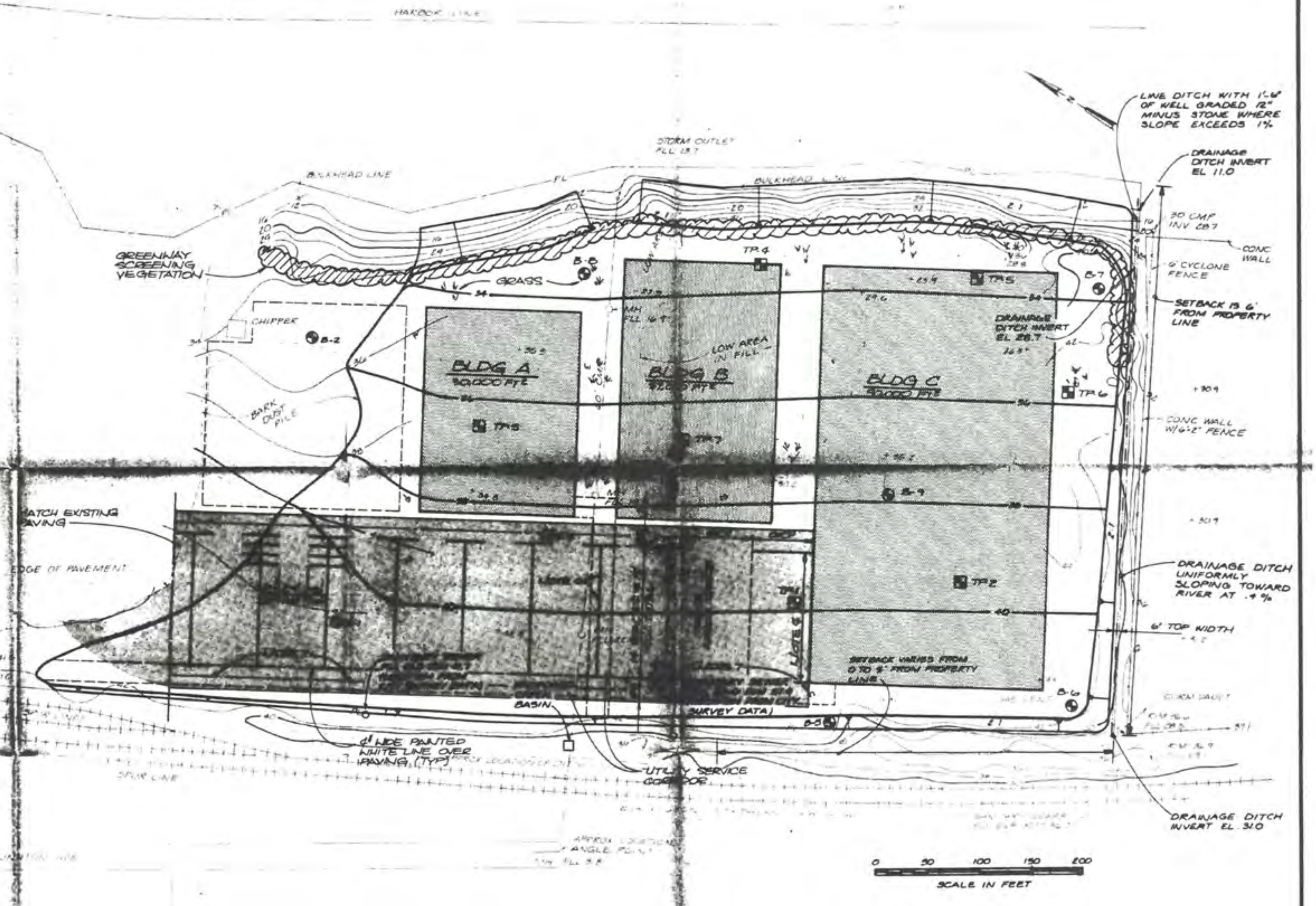
LL = LIQUID LIMIT
PL = PLASTIC LIMIT
NM = NATURAL MOISTURE CONTENT

FIGURE 2
LOG OF SOIL BORINGS
NEW DRYER BUILDING
LINNTON PLYWOOD ASSOCIATION
ST. HELENS ROAD
PORTLAND, ORE.

# CH2M Hill, 1981

**NOTES**

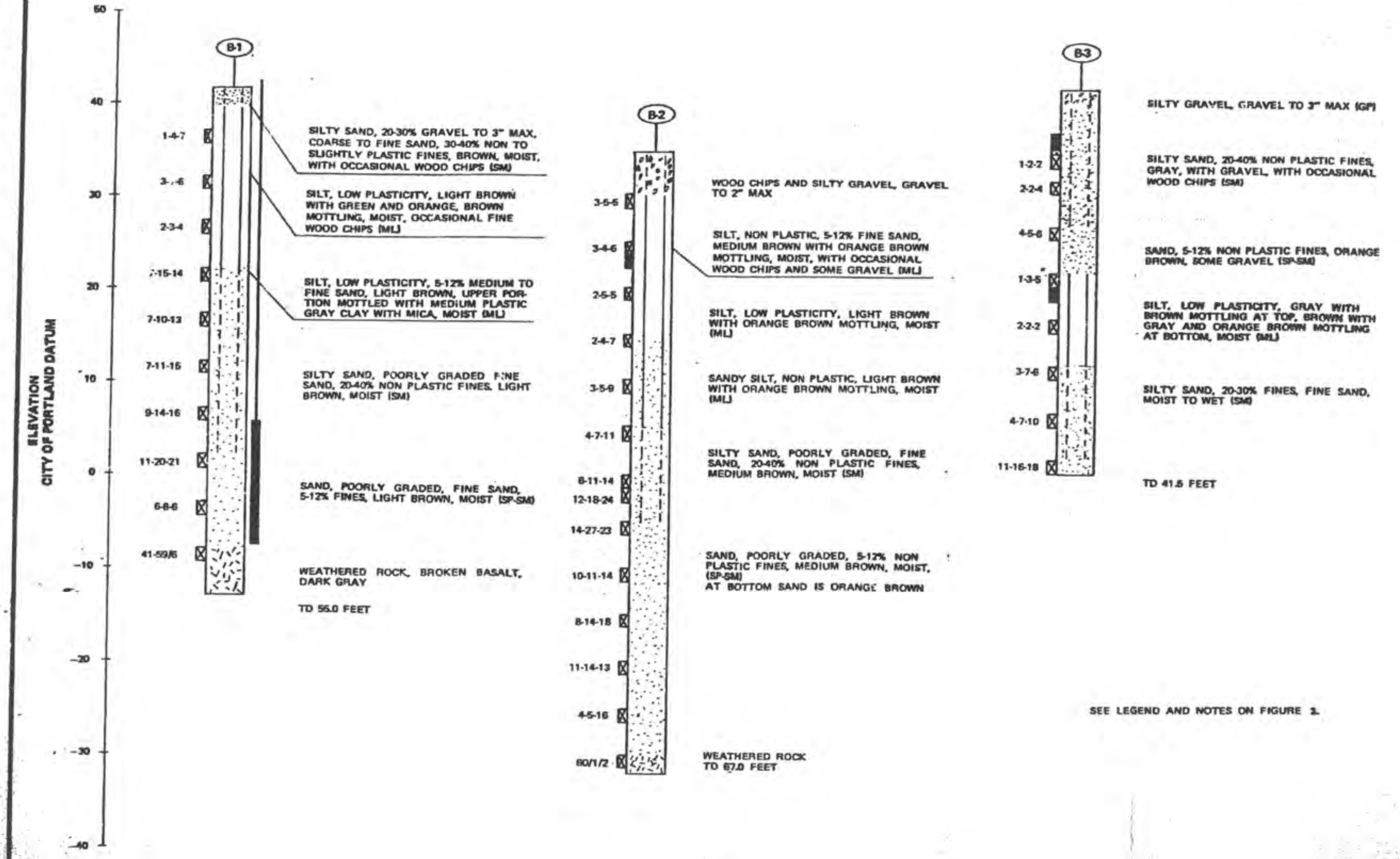
1. BOUNDARY LOCATION ESTABLISHED FROM RECORD SURVEY 37607.
2. ALL ELEVATIONS ARE BASED ON CITY OF PORTLAND DATUM.
3. BORINGS B-1 THROUGH B-5 WERE MADE FOR A PREVIOUS INVESTIGATION, AND THEIR LOCATIONS ARE SHOWN FOR INFORMATION ONLY. REFER TO CH2M HILL REPORT "GEOTECHNICAL EXPLORATION, LINNTON PLYWOOD ASSOCIATION" DATED MARCH, 1980.
4. 10 SPACES AT 12'-0" = 120'-0."
5. EXCAVATE AND COMPACT THE TOP 2' UNDER FINISHED GRADE IN PARKING LOT AREA AND [illegible].
6. EXCAVATE AND COMPACT THE EAST-WEST UTILITY CORRIDOR ABOVE ELEVATION 32 FROM PROPERTY LINE TO AND INCLUDING SEGMENT BETWEEN BLDGS A AND B.
7. EXCAVATE AND COMPACT THE NORTH-SOUTH UTILITY CORRIDOR ABOVE ELEVATION 35.
8. COMPACTION UNDER PARKING AND UTILITY CORRIDORS TO BE NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY UBC STANDARD 70-1. COMPACTION IN OTHER AREAS TO BE ACCOMPLISHED BY SPREADING IN 8" THICK LIFTS AND ROUTING CONSTRUCTION EQUIPMENT OVER EACH LIFT. EXCAVATION IS NOT REQUIRED.
9. ALL FILL PLACED UNDER THIS CONTRACT SHALL CONFORM TO UBC SECTION 7010(D).
10. ALL WORK SHALL CONFORM TO RECOMMENDATIONS IN CH2M HILL REPORT DATED OCTOBER 5, 1981.
11. BUILDINGS, GREENWAY SCREENING [illegible] INCLUDED IN THIS CONTRACT AND ARE SHOWN FOR INFORMATION ONLY.



| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CH2M HILL | DES. DK/DG | | | | | | LINNTON PLYWOOD ASSOCIATION<br>PORTLAND, OREGON | INDUSTRIAL SITE GRADING PLAN<br>AND CONCEPTUAL SITE DEVELOPMENT PLAN | SHEET 1<br>OF 1 |
| | DR. BHP | | | | | | | | |
| | CHK. JRS | 1 | [illegible] | ADDED BORINGS, TP'S, CONCEPTUAL PLAN & NOTES | [illegible] | JRS | | | DATE MAR 1981<br>DWG NO. C14592-1 |
| | APPD. JRS | NO. | DATE | REVISION | BY | APPD. | | | |

GT_002103

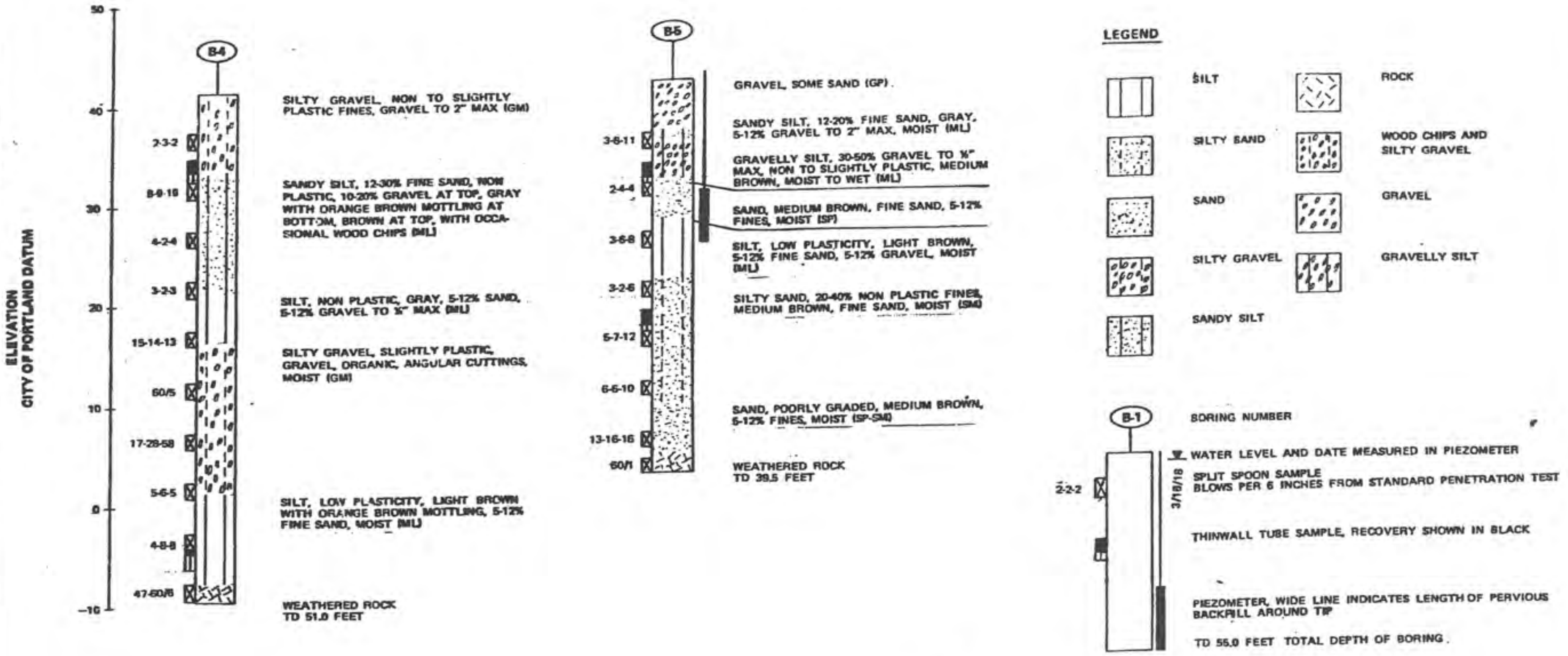
PRELIMINARY



SEE LEGEND AND NOTES ON FIGURE 1.

FIGURE 2
**SOIL BORING LOGS**
**LINNTON PLYWOOD ASSOCIATION**

CH2M HILL

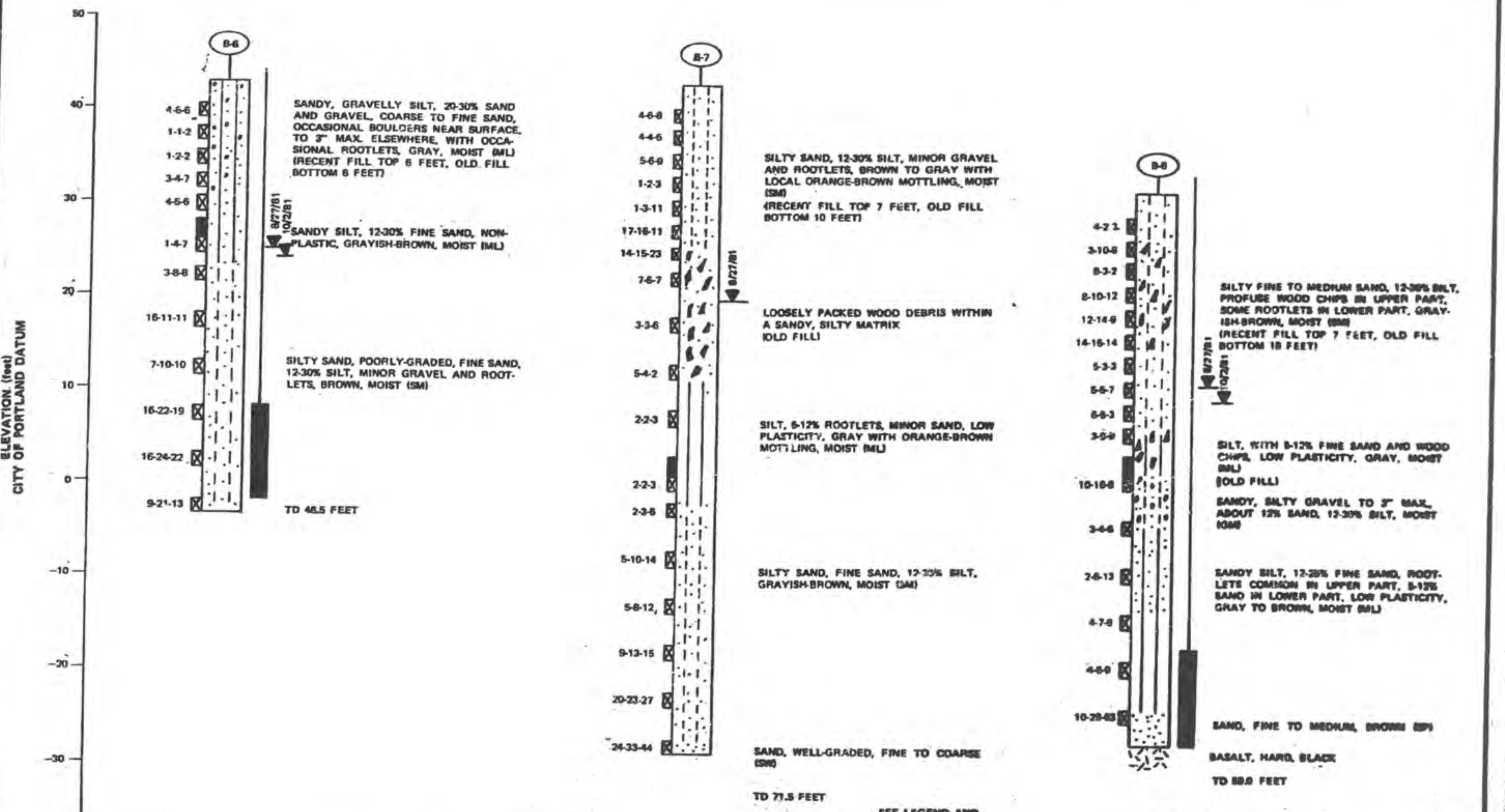


NOTES:

1. ALL BORINGS DRILLED BY CME 75 TRUCK MOUNTED ROTARY RIG USING DRILLING MUD.
2. BORINGS DRILLED FROM FEBRUARY 2, 1981, TO FEBRUARY 4, 1981.
3. ENGINEERING PROPERTIES OF SUBSURFACE MATERIALS ARE OPINION OF THE ENGINEER EXCEPT WHERE LABORATORY TESTING WAS CONDUCTED.
4. THE LOGS SHOW SUBSURFACE CONDITIONS ONLY AT THE TIME AND PLACE THAT THE BORINGS WERE MADE.
5. TRANSITIONS BETWEEN SOIL TYPES MAY BE GRADUAL AND ONLY APPROXIMATELY AT THE ELEVATIONS SHOWN. VARIATIONS MAY EXIST BETWEEN ADJACENT BORINGS.
6. WATER LEVELS WERE NOT OBSERVED DURING DRILLING BECAUSE DRILLING MUD WAS USED.
7. NO WATER LEVEL WAS OBSERVED IN THE PIEZOMETERS ON MARCH 17, 1981.

FIGURE 3
SOIL BORING LOGS
LINNTON PLYWOOD ASSOCIATION

CH2M HILL



SANDY, GRAVELLY SILT, 20-30% SAND AND GRAVEL, COARSE TO FINE SAND, OCCASIONAL BOULDERS NEAR SURFACE, TO 3" MAX. ELSEWHERE, WITH OCCASIONAL ROOTLETS, GRAY, MOIST (ML)
(RECENT FILL TOP 6 FEET, OLD FILL BOTTOM 6 FEET)

SANDY SILT, 12-30% FINE SAND, NON-PLASTIC, GRAYISH-BROWN, MOIST (ML)

SILTY SAND, POORLY-GRADED, FINE SAND, 12-30% SILT, MINOR GRAVEL AND ROOTLETS, BROWN, MOIST (SM)

TD 46.5 FEET

SILTY SAND, 12-30% SILT, MINOR GRAVEL AND ROOTLETS, BROWN TO GRAY WITH LOCAL ORANGE-BROWN MOTTLING, MOIST (SM)
(RECENT FILL TOP 7 FEET, OLD FILL BOTTOM 10 FEET)

LOOSELY PACKED WOOD DEBRIS WITHIN A SANDY, SILTY MATRIX
(OLD FILL)

SILT, 6-12% ROOTLETS, MINOR SAND, LOW PLASTICITY, GRAY WITH ORANGE-BROWN MOTTLING, MOIST (ML)

SILTY SAND, FINE SAND, 12-30% SILT, GRAYISH-BROWN, MOIST (SM)

SAND, WELL-GRADED, FINE TO COARSE (SW)

TD 71.5 FEET

SILTY FINE TO MEDIUM SAND, 12-30% SILT, PROFUSE WOOD CHIPS IN UPPER PART, SOME ROOTLETS IN LOWER PART, GRAYISH-BROWN, MOIST (SM)
(RECENT FILL TOP 7 FEET, OLD FILL BOTTOM 18 FEET)

SILT, WITH 6-12% FINE SAND AND WOOD CHIPS, LOW PLASTICITY, GRAY, MOIST (ML)
(OLD FILL)

SANDY, SILTY GRAVEL TO 3" MAX, ABOUT 12% SAND, 12-30% SILT, MOIST (GM)

SANDY SILT, 12-30% FINE SAND, ROOTLETS COMMON IN UPPER PART, 5-12% SAND IN LOWER PART, LOW PLASTICITY, GRAY TO BROWN, MOIST (ML)

SAND, FINE TO MEDIUM, BROWN (SP)

BASALT, HARD, BLACK

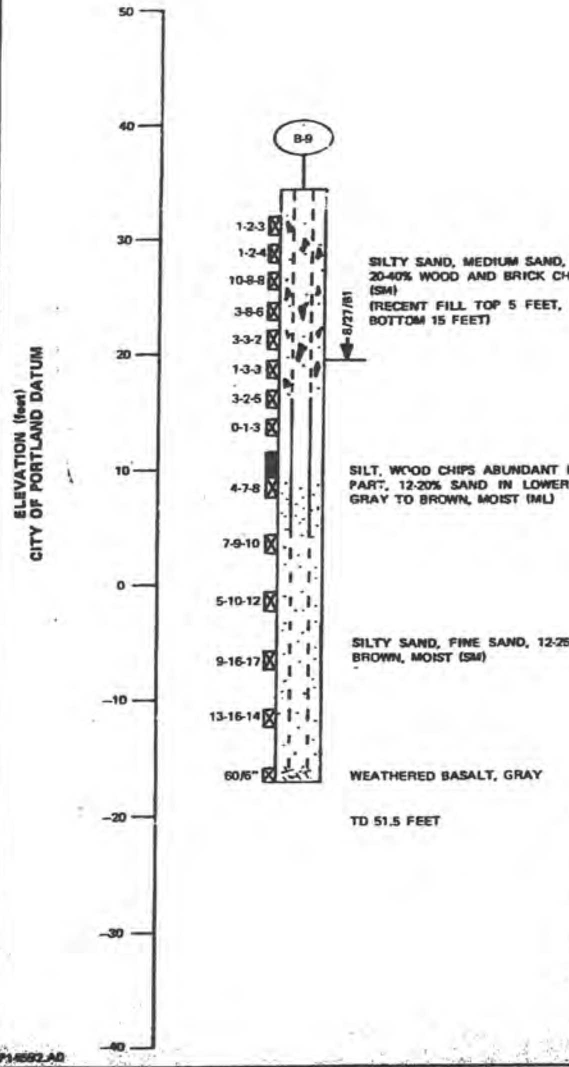
TD 59.0 FEET

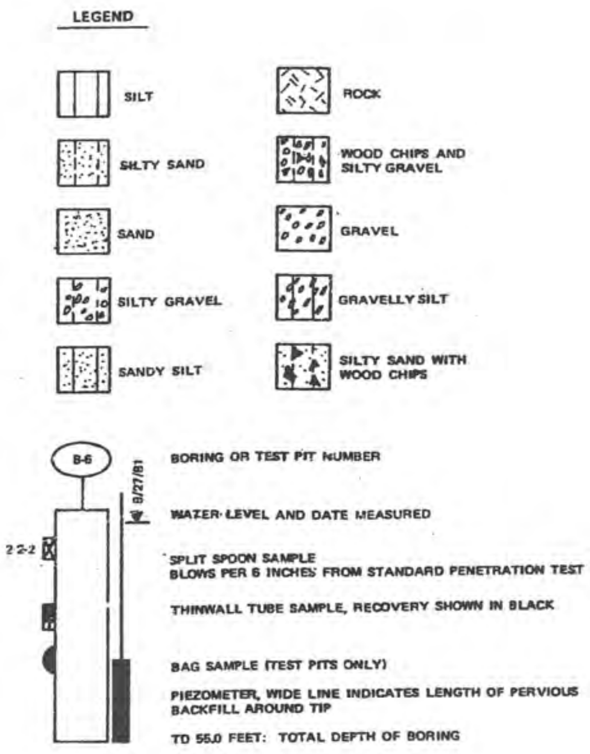
SEE LEGEND AND NOTES ON FIGURE 3

P14592.A0

FIGURE 2
SOIL BORING LOGS
LINNTON PLYWOOD ASSOCIATION

CH2M HILL





NOTES:

1. ALL BORINGS DRILLED BY CME 55 TRUCK MOUNTED ROTARY RIG USING DRILLING MUD.
2. BORINGS DRILLED FROM AUGUST 24, 1981, TO AUGUST 26, 1981.
3. TEST PITS EXCAVATED ON AUGUST 27, 1981.
4. ENGINEERING PROPERTIES OF SUBSURFACE MATERIALS ARE OPINION OF THE GEOLOGIST EXCEPT WHERE LABORATORY TESTING WAS CONDUCTED.
5. THE LOGS SHOW SUBSURFACE CONDITIONS ONLY AT THE TIME AND PLACE THAT THE BORINGS AND TEST PITS WERE MADE.
6. TRANSITIONS BETWEEN SOIL TYPES MAY BE GRADUAL AND ONLY APPROXIMATELY AT THE ELEVATIONS SHOWN. VARIATIONS MAY EXIST BETWEEN ADJACENT BORINGS.
7. WATER WAS NOT OBSERVED IN ANY OF THE TEST PITS.

FIGURE 3
SOIL BORING LOGS
LINNTON PLYWOOD ASSOCIATION

CH2M HILL

P14592.AD

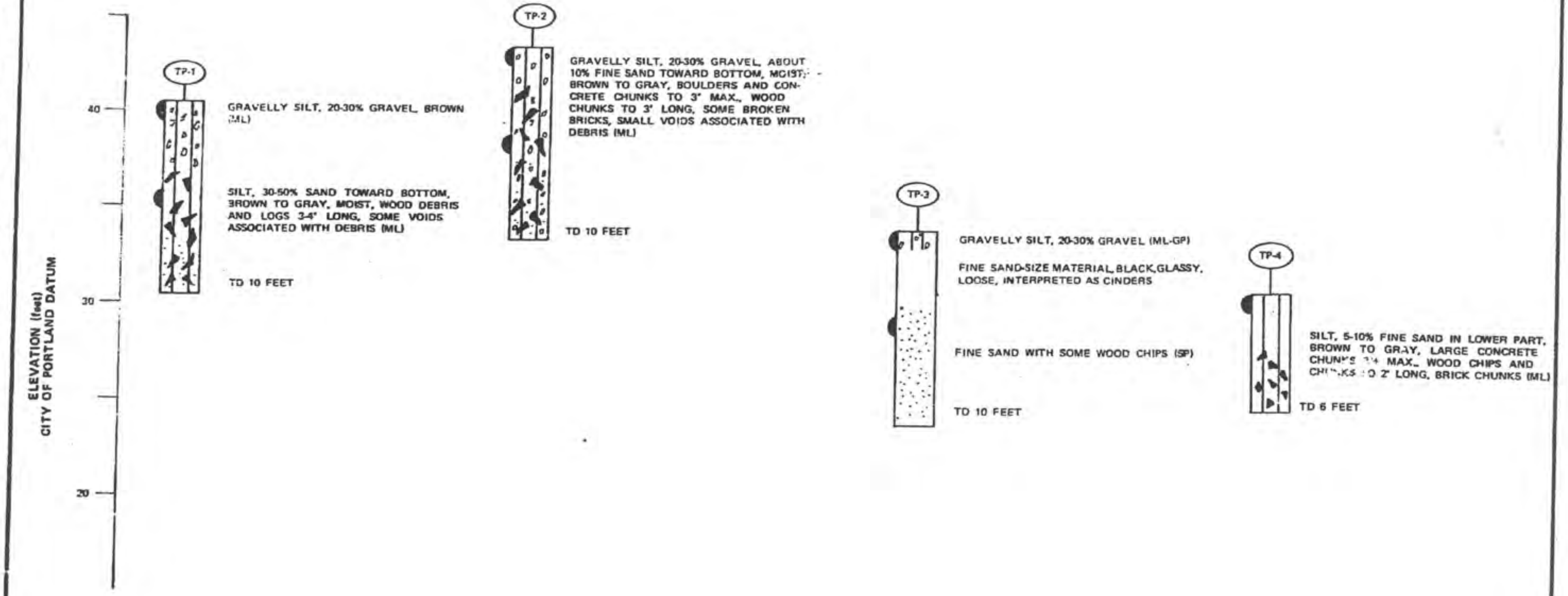


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FIGURE 4
TEST PIT LOGS
LINNTON PLYWOOD ASSOCIATION

CH2M HILL

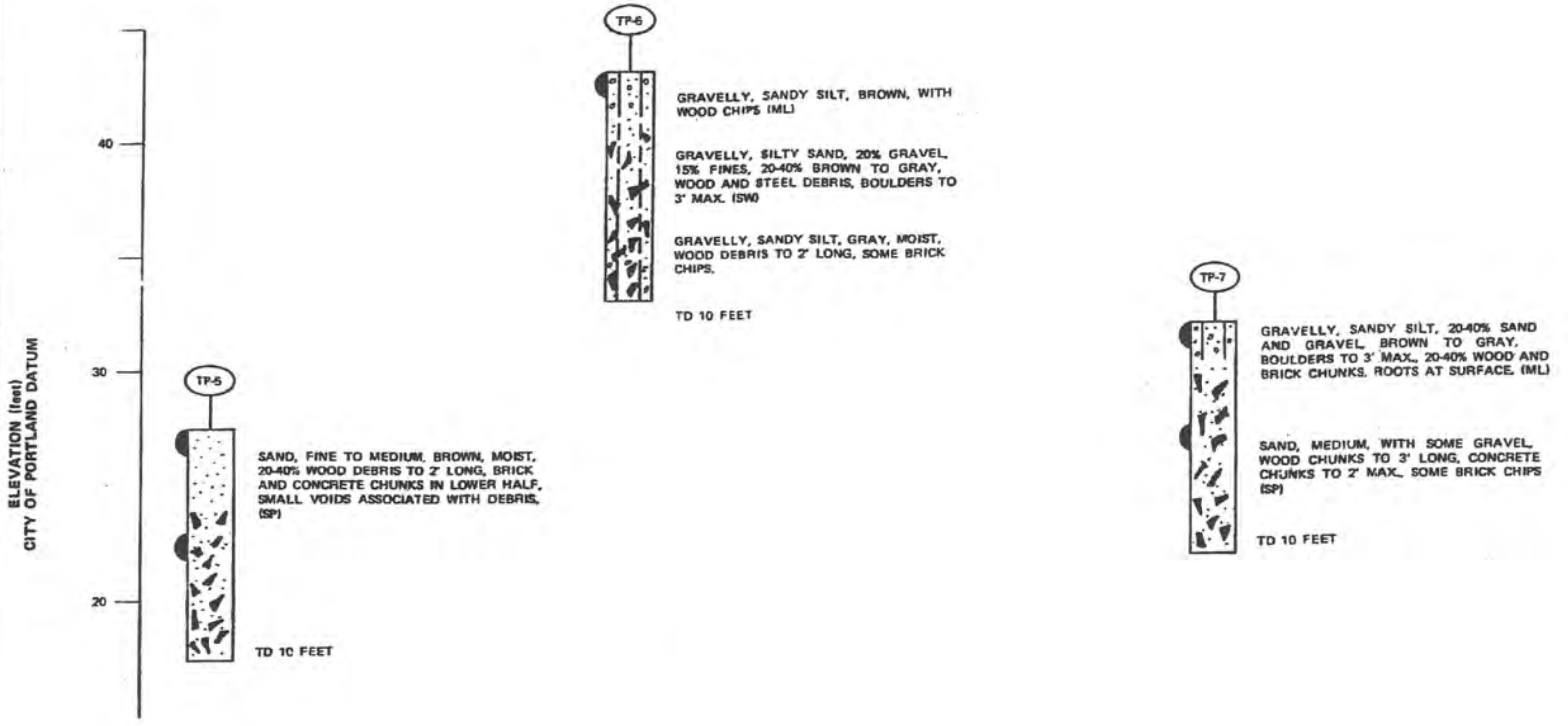

**FIGURE 5**
**TEST PIT LOGS**
**LINNTON PLYWOOD ASSOCIATION**

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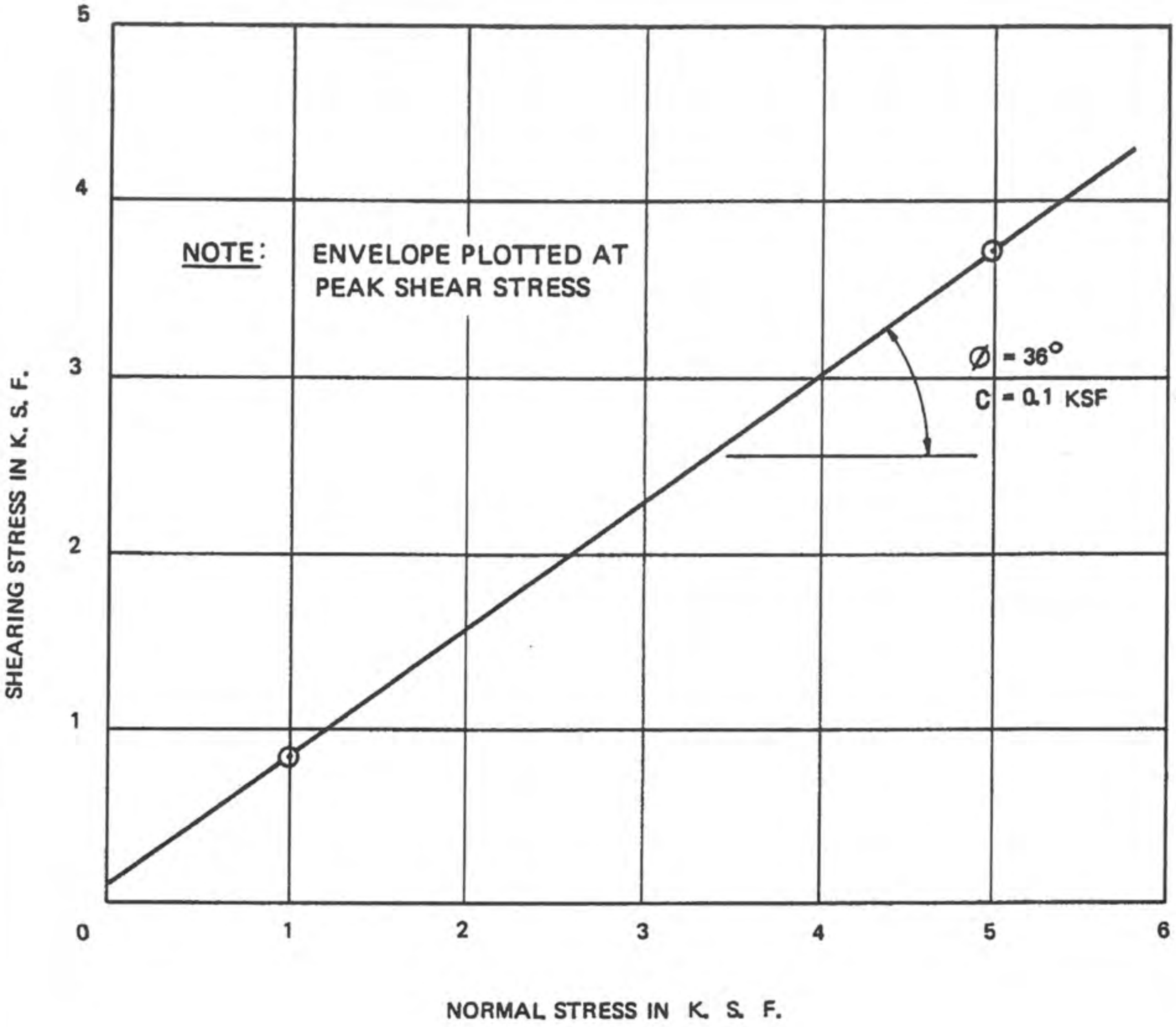


RATE OF SHEAR = 0.005 IN./MIN

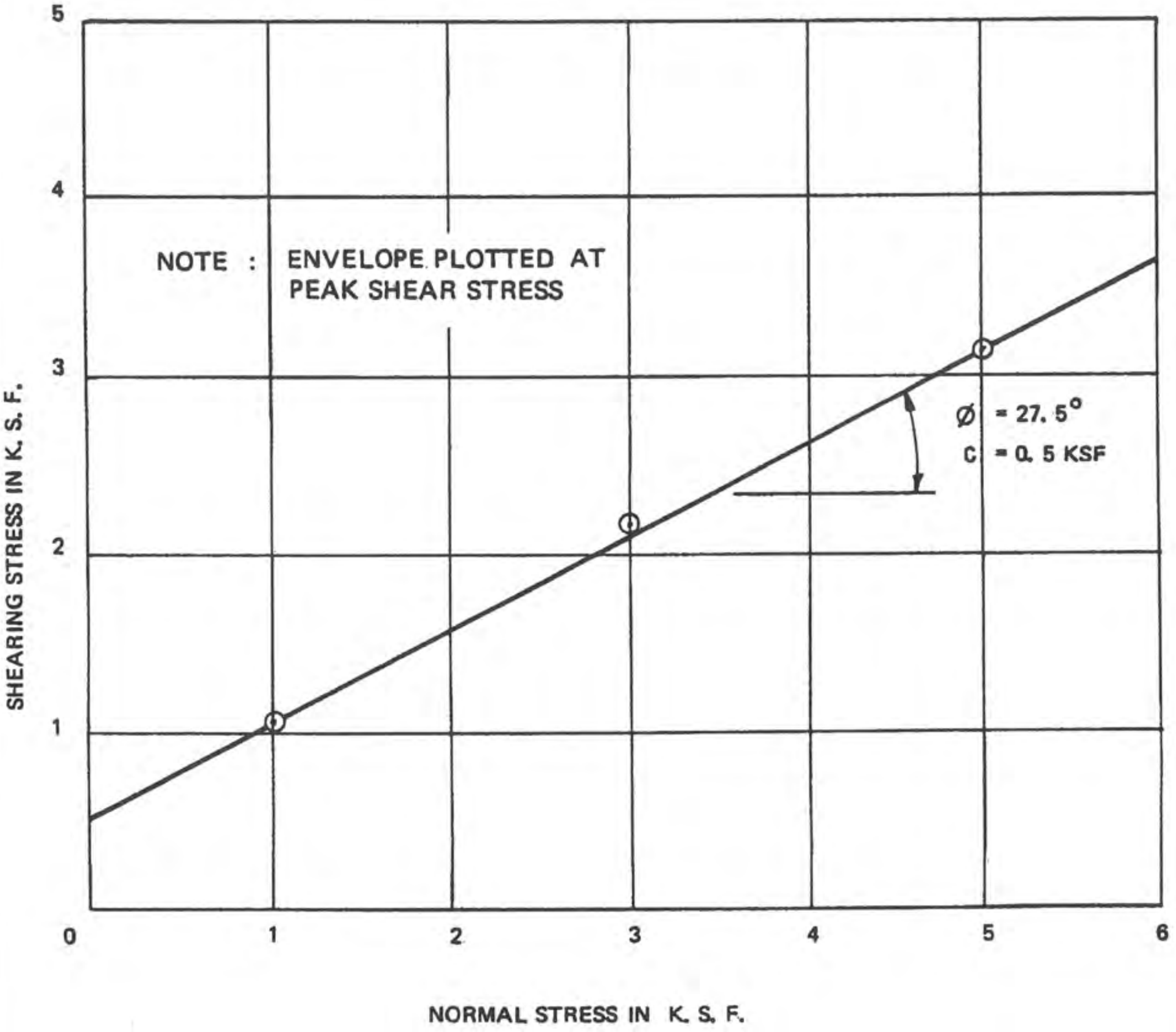
SAMPLE DATA

INITIAL DIAMETER = 2.50 IN.
INITIAL HEIGHT = 1.00 IN.
NATURAL WATER CONTENT = 39.7%
DRY DENSITY = 77.6 PCF
BROWN/GRAY SILT (ML)
DEPTH 5.0 - 6.7 FT

FIGURE 4
DIRECT SHEAR TEST
B – 3 ST – 1
LINNTON PLYWOOD ASSOCIATION

CH2M HILL

P14592.A0



RATE OF SHEAR = 0.005 IN./MIN

SAMPLE DATA

INITIAL DIAMETER = 2.50 IN.
INITIAL HEIGHT = 1.00 IN.
NATURAL WATER CONTENT = 40.5%
DRY DENSITY = 79.7 PCF
BROWN SILT (ML)
DEPTH 21.5 - 23.5 FT

FIGURE 5
DIRECT SHEAR TEST
B – 3 ST – 6
LINNTON PLYWOOD ASSOCIATION

CH2M HILL

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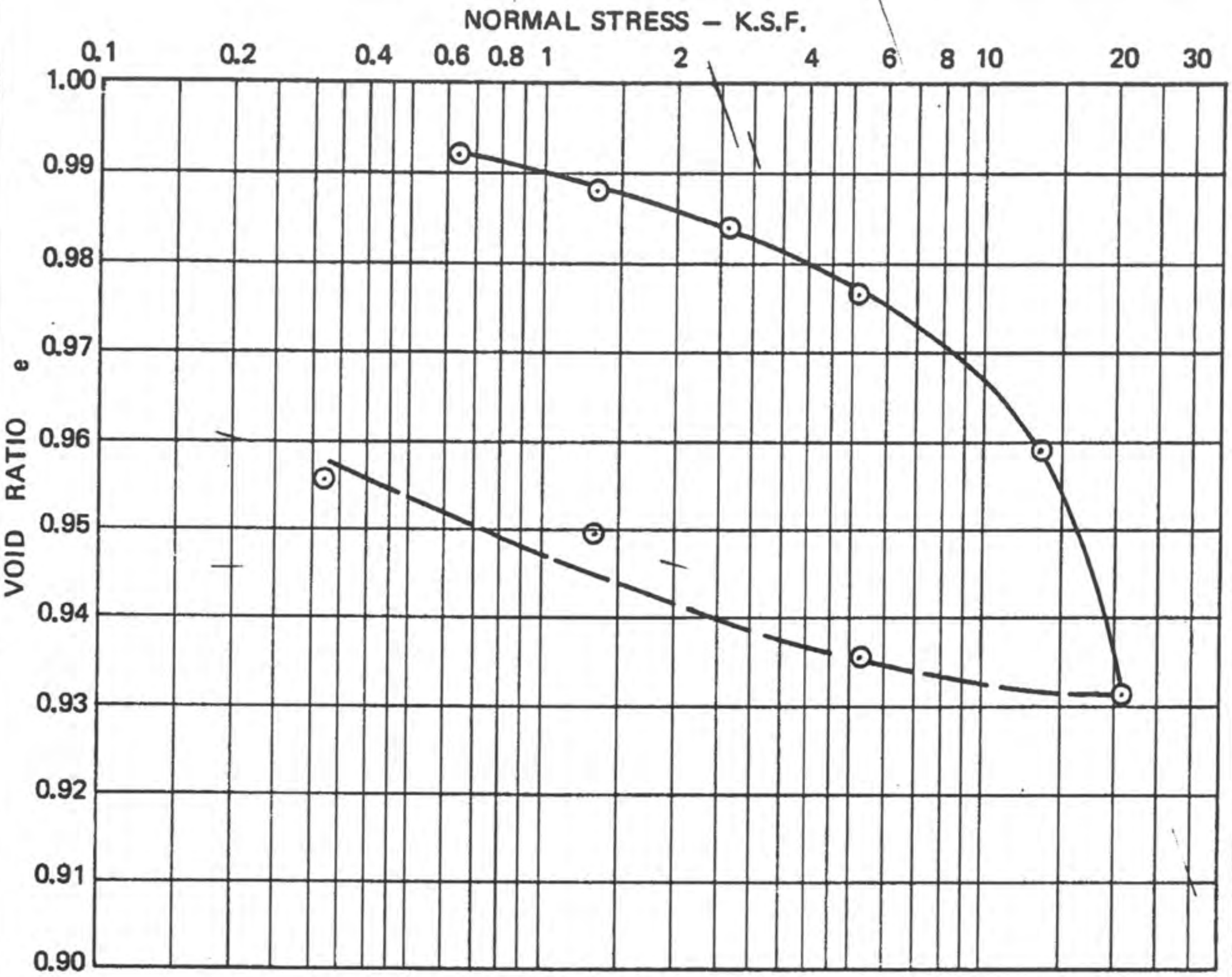


PLOT OF PRIMARY CONSOLIDATION

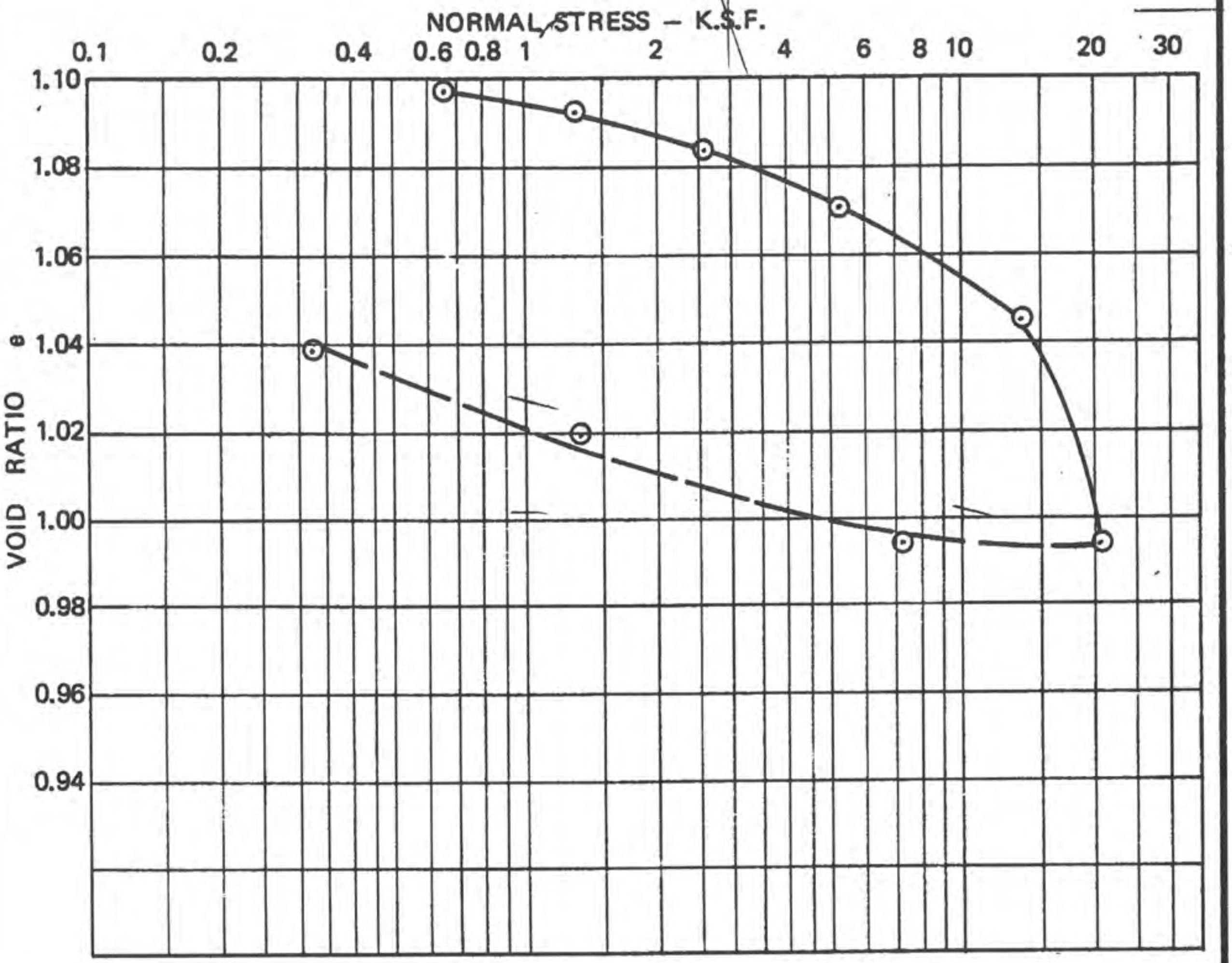
SAMPLE DATA:

INITIAL DIAMETER = 2.50 INCHES
INITIAL HEIGHT = 1.00 INCH
INITIAL VOID RATIO = 0.994
NATURAL MOISTURE CONTENT = 34.1%
DRY DENSITY = 83.8 PCF
BROWN SANDY SILT (ML)
DEPTH 11.5 — 13.4 FEET

FIGURE 6

CONSOLIDATION TEST
B — 2 ST — 3
LINNTON PLYWOOD ASSOCIATION

CH2M HILL



PLOT OF PRIMARY CONSOLIDATION

SAMPLE DATA:

INITIAL DIAMETER = 2.50 INCHES
INITIAL HEIGHT = 1.00 INCH
INITIAL VOID RATIO = 1.103
NATURAL MOISTURE CONTENT = 40.7%
DRY DENSITY = 79.7 PCF
BROWN SILT (ML)
DEPTH 21.5 – 23.5 FEET

FIGURE 7

CONSOLIDATION TEST
B – 3 ST – 6
LINNTON PLYWOOD ASSOCIATION

CH2M HILL

P14592.AO

# Shaw, 2011

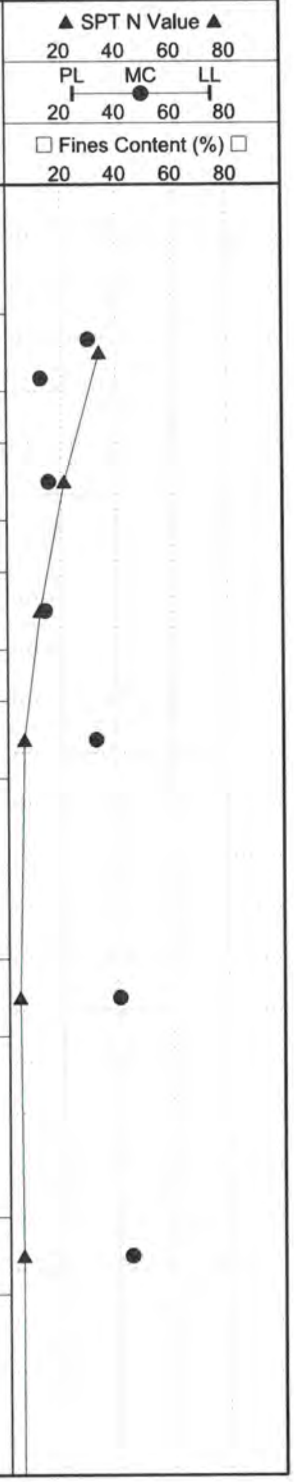
Shaw

# BORING NUMBER GT-01

PAGE 1 OF 2

| | | | |
|---|---|---|---|
| **OWNER** | Portland Harbor Holdings, LLC | **PROJECT NAME** | Linnton Plywood Association |
| **PROJECT NUMBER** | 141702 | **PROJECT LOCATION** | Portland, OR |
| **DATE STARTED** | 11/3/11 **COMPLETED** 11/3/11 | **GROUND ELEVATION** | 44 ft **HOLE SIZE** 4 7/8-inches |
| **DRILLING CONTRACTOR** | Major Drilling | **GROUNDWATER DEPTH** | |
| **DRILLING METHOD** | Mud Rotary | **BOREHOLE LOCATION** | See Site Plan |
| **LOGGED BY** | L. Terry **CHECKED BY** | **TOTAL DEPTH OF BOREHOLE** | 46.5 ft bgs |
| **NOTES** | | **SAMPLING METHOD(S)** | Standard Penetration Test (SPT) |

| Depth (ft) | MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|---|
| 0 | **ASPHALT** (fill) | 0.0<br>(44.0) | | | | |
| | **SILT (ML)**, medium gray, stiff, moist, (fill) | 0.5<br>(43.5) | | | | |
| | | | ⧗ | SPT<br>1 | 67 | 5-6-28<br>(34) |
| | **CLAYEY SAND WITH GRAVEL (SC)**, black, medium dense, moist, (fill) | 3.5<br>(40.5) | | | | |
| 5 | | | ⧗ | SPT<br>2 | 44 | 16-14-7<br>(21) |
| | **POORLY GRADED SAND (SP)**, dark brown, medium dense, moist, (fill) | 7.0<br>(37.0) | ⧗ | SPT<br>3 | 56 | 11-6-6<br>(12) |
| 10 | **LEAN CLAY (CL)**, olive gray, trace wood, medium stiff, moist, (fill) | 9.5<br>(34.5) | ⧗ | SPT<br>4 | 50 | 0-2-4<br>(6) |
| 15 | Trace fine gravel | 15.0<br>(29.0) | ⧗ | SPT<br>5 | 94 | 1-2-2<br>(4) |
| | **LEAN CLAY (CL)**, olive gray, trace wood, medium stiff, moist | 19.0<br>(25.0) | | | | |
| 20 | No wood, no gravel, wet | 20.0<br>(24.0) | ⧗ | SPT<br>6 | 89 | 0-2-3<br>(5) |
| 25 | | | | | | |



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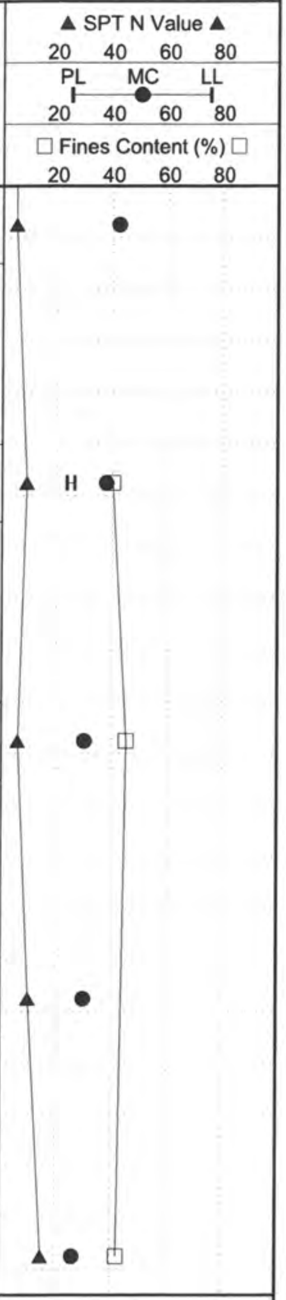
# BORING NUMBER GT-01

PAGE 2 OF 2

| | |
|---|---|
| **OWNER** Portland Harbor Holdings, LLC | **PROJECT NAME** Linnton Plywood Association |
| **PROJECT NUMBER** 141702 | **PROJECT LOCATION** Portland, OR |

| Depth (ft) | MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|---|
| 25 | **LEAN CLAY (CL)**, olive gray to medium brown, medium stiff, wet | 25.0 (19.0) | ⧗ | SPT 7 | 50 | 1-2-3 (5) |
| | **SILTY SAND (SM)**, olive gray, fine sand, loose, wet | 28.0 (16.0) | | | | |
| 30 | | | ⧗ | SPT 8 | 67 | 4-3-6 (9) |
| 35 | Medium brown | 35.0 (9.0) | ⧗ | SPT 9 | 78 | 3-2-4 (6) |
| 40 | Loose to medium dense | 40.0 (4.0) | ⧗ | SPT 10 | 78 | 4-4-6 (10) |
| 45 | Trace fine gravel, medium dense | 45.0 (-1.0) | ⧗ | SPT 11 | 44 | 6-8-7 (15) |



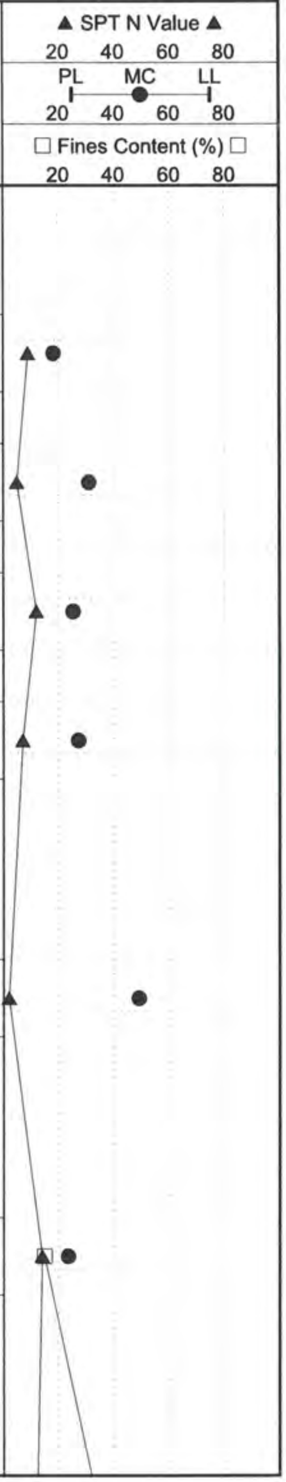
Bottom of borehole at 46.5 feet.

# BORING NUMBER GT-02

PAGE 1 OF 2

| | |
|---|---|
| **OWNER** Portland Harbor Holdings, LLC | **PROJECT NAME** Linnton Plywood Association |
| **PROJECT NUMBER** 141702 | **PROJECT LOCATION** Portland, OR |
| **DATE STARTED** 11/3/11 **COMPLETED** 11/3/11 | **GROUND ELEVATION** 43 ft **HOLE SIZE** 4 7/8-inches |
| **DRILLING CONTRACTOR** Major Drilling | **GROUNDWATER DEPTH** |
| **DRILLING METHOD** Mud Rotary | **BOREHOLE LOCATION** See Site Plan |
| **LOGGED BY** L. Terry **CHECKED BY** | **TOTAL DEPTH OF BOREHOLE** 46.5 ft bgs |
| **NOTES** | **SAMPLING METHOD(S)** Standard Penetration Test (SPT) |

| Depth (ft) | MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|---|
| 0 | **ASPHALT** | 0.0 (43.0) | | | | |
| | **POORLY GRADED SAND (SP)**, medium brown, fine sand, loose, moist, (fill) | 0.5 (42.5) | | | | |
| | | | ⧗ | SPT 1 | 67 | 6-5-4 (9) |
| 5 | **POORLY GRADED SAND WITH CLAY (SP-SC)**, medium brown, fine sand, loose, moist, (fill) | 4.5 (38.5) | | | | |
| | | | ⧗ | SPT 2 | 72 | 3-3-2 (5) |
| | Medium dense | 7.5 (35.5) | ⧗ | SPT 3 | 78 | 2-4-8 (12) |
| 10 | | | ⧗ | SPT 4 | 61 | 3-3-4 (7) |
| | **LEAN CLAY WITH SAND (CL)**, dark gray, fine sand, very soft, moist, (fill) | 13.0 (30.0) | | | | |
| 15 | | | ⧗ | SPT 5 | 83 | 1-1-1 (2) |
| | **POORLY GRADED SAND WITH SILT (SP-SM)**, dark brown, fine sand, medium dense, moist, (fill) | 18.0 (25.0) | | | | |
| 20 | | | ⧗ | SPT 6 | 44 | 6-7-7 (14) |
| 25 | | | | | | |



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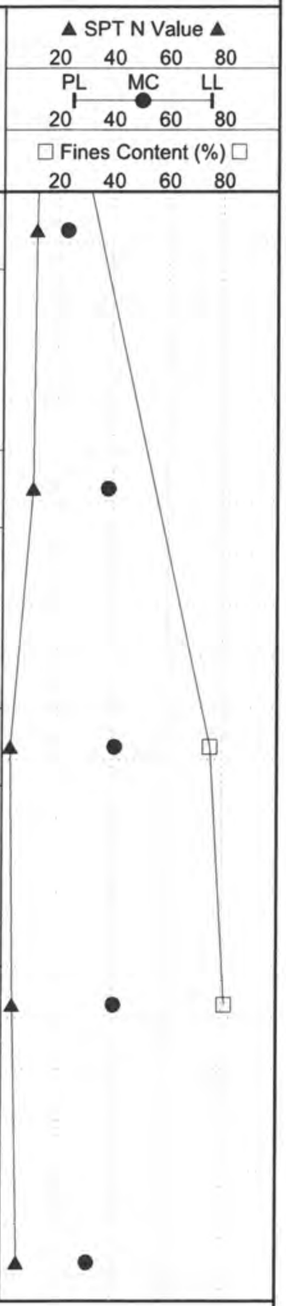
# BORING NUMBER GT-02

PAGE 2 OF 2

**OWNER** Portland Harbor Holdings, LLC
**PROJECT NAME** Linnton Plywood Association
**PROJECT NUMBER** 141702
**PROJECT LOCATION** Portland, OR

| Depth (ft) | Graphic Log | MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|---|---|
| 25 | | **POORLY GRADED SAND (SP)**, dark brown, fine sand, medium dense, moist, (fill) | 25.0<br>(18.0) | | SPT<br>7 | 67 | 7-6-6<br>(12) |
| | | With wood | 27.0<br>(16.0) | | | | |
| | | **SILT WITH SAND (ML)**, medium gray, fine sand, with wood, trace gravel, stiff, moist, (fill) | 28.0<br>(15.0) | | | | |
| 30 | | | | | SPT<br>8 | 67 | 6-8-3<br>(11) |
| | | **SILT WITH SAND (ML)**, medium gray, fine sand, with wood, trace gravel, stiff, moist | 33.0<br>(10.0) | | | | |
| 35 | | Soft, wet | 35.0<br>(8.0) | | SPT<br>9 | 78 | 3-1-2<br>(3) |
| 40 | | Increase in sand content | 40.0<br>(3.0) | | SPT<br>10 | 100 | 3-2-2<br>(4) |
| 45 | | Medium stiff, Gravel encountered, 1.5-inch diameter | 45.0<br>(-2.0) | | SPT<br>11 | 56 | 4-3-3<br>(6) |



Bottom of borehole at 46.5 feet.

GEO_BH_PLOTS - GINT STD US LAB.GDT - 12/2/11 14:48 - Y:\PROJECTS\WILDLANDS - LINNTON PLYWOOD\GEOTECH\003 DESIGN\003A EXPLORATION\OCTOBER 2011 BOREHOLES\141702_WILDLANDS_GT BORINGS.GPJ

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# BORING NUMBER GT-03

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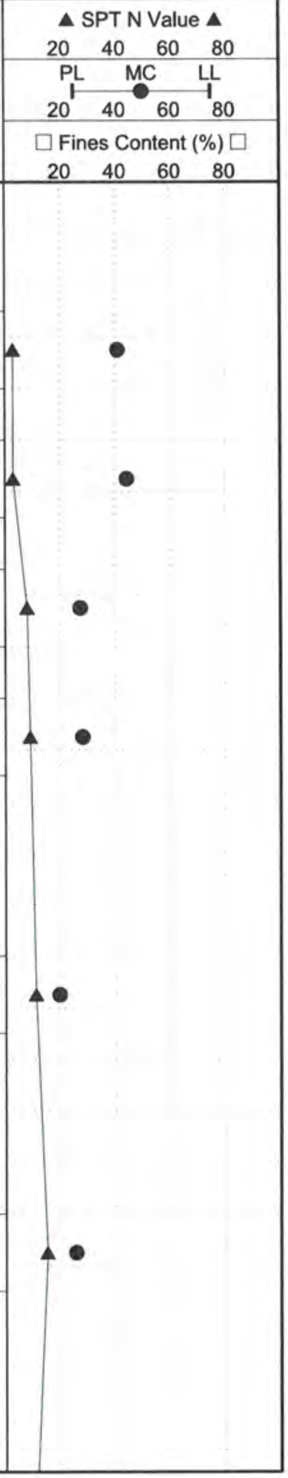
|  |  |  |  |
|---|---|---|---|
| **OWNER** Portland Harbor Holdings, LLC | | **PROJECT NAME** Linnton Plywood Association | |
| **PROJECT NUMBER** 141702 | | **PROJECT LOCATION** Portland, OR | |
| **DATE STARTED** 11/3/11 | **COMPLETED** 11/3/11 | **GROUND ELEVATION** 45 ft | **HOLE SIZE** 4 7/8-inches |
| **DRILLING CONTRACTOR** Major Drilling | | **GROUNDWATER DEPTH** | |
| **DRILLING METHOD** Mud Rotary | | **BOREHOLE LOCATION** See Site Plan | |
| **LOGGED BY** L. Terry | **CHECKED BY** | **TOTAL DEPTH OF BOREHOLE** 46.5 ft bgs | |
| **NOTES** | | **SAMPLING METHOD(S)** Standard Penetration Test (SPT) | |

| Depth (ft) | MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|---|
| 0 | **POORLY GRADED SAND (SP)**, medium brown, fine sand, moist, (fill) | 0.0 (45.0) | | | | |
| | **LEAN CLAY (CL)**, medium brown, soft, moist, (fill) | 0.5 (44.5) | | | | |
| | | | SPT | 1 | 100 | 0-1-2 (3) |
| 5 | | | SPT | 2 | 100 | 0-1-2 (3) |
| | **CLAYEY SAND (SC)**, medium brown, fine sand, loose, moist, (fill) | 7.0 (38.0) | | | | |
| | | | SPT | 3 | 61 | 4-4-4 (8) |
| 10 | | | SPT | 4 | 67 | 2-4-5 (9) |
| | **SILTY SAND (SM)**, medium brown, fine sand, medium dense, moist | 13.0 (32.0) | | | | |
| 15 | | | SPT | 5 | 72 | 6-5-6 (11) |
| 20 | | | SPT | 6 | 72 | 6-7-8 (15) |
| 25 | | | | | | |



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GEO_BH_PLOTS - GINT STD US LAB.GDT - 12/2/11 14:48 - Y:\PROJECTS\WILDLANDS - LINNTON PLYWOOD\GEOTECH\003 DESIGN\003A EXPLORATION\OCTOBER 2011 BOREHOLES\141702_WILDLANDS_GT BORINGS.GPJ

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# BORING NUMBER GT-03

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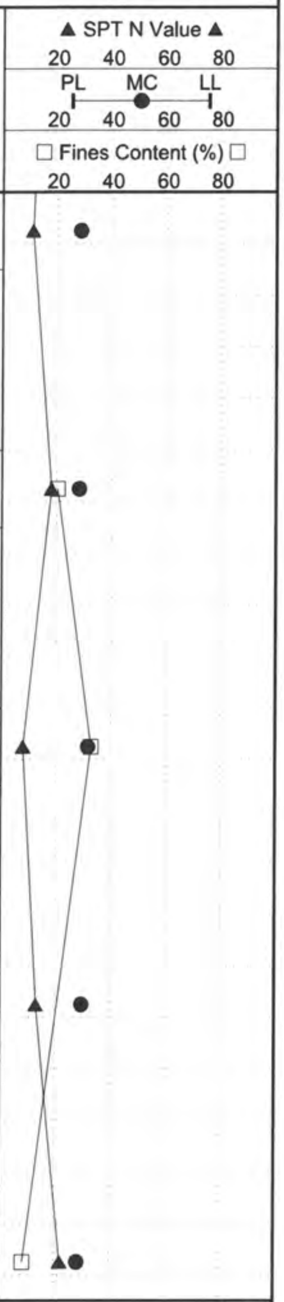
**OWNER** Portland Harbor Holdings, LLC
**PROJECT NAME** Linnton Plywood Association
**PROJECT NUMBER** 141702
**PROJECT LOCATION** Portland, OR

| Depth (ft) | Graphic Log | MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|---|---|
| 25 | | **SILTY SAND (SM)**, medium brown, fine sand, medium dense, wet | 25.0<br>(20.0) | ⧗ | SPT 7 | 61 | 6-5-6<br>(11) |
| 30 | | | | ⧗ | SPT 8 | 67 | 6-9-9<br>(18) |
| 35 | | Trace fine gravel, loose, increase in silt content | 35.0<br>(10.0) | ⧗ | SPT 9 | 67 | 4-4-4<br>(8) |
| 40 | | Medium dense | 40.0<br>(5.0) | ⧗ | SPT 10 | 89 | 5-6-7<br>(13) |
| | | **POORLY GRADED SAND WITH SILT (SP-SM)**, medium brown, fine sand, trace fine gravel, medium dense, wet | 43.0<br>(2.0) | | | | |
| 45 | | | | ⧗ | SPT 11 | 72 | 6-11-11<br>(22) |



Bottom of borehole at 46.5 feet.

GEO_BH_PLOTS - GINT STD US LAB.GDT - 12/2/11 14:48 - Y:\PROJECTS\WILDLANDS - LINNTON PLYWOOD\GEOTECH\003 DESIGN\003A EXPLORATION\OCTOBER 2011 BOREHOLES\141702_WILDLANDS_GT BORINGS.GPJ

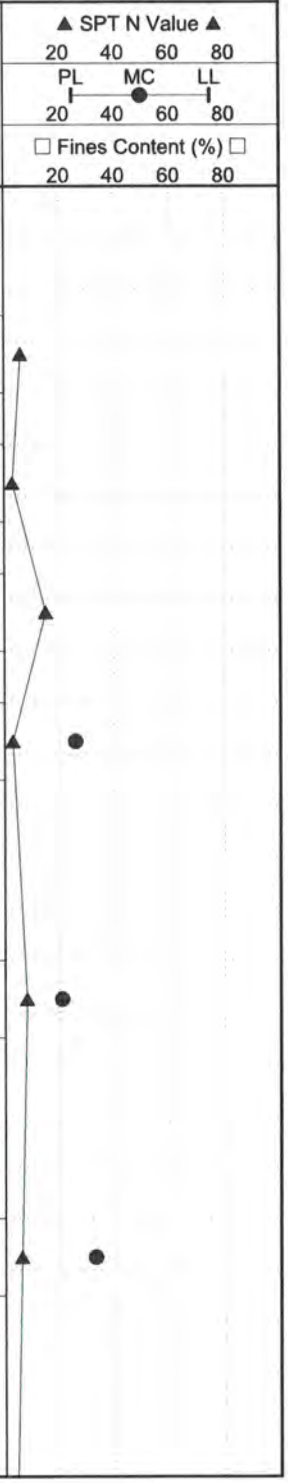
# BORING NUMBER GT-04

PAGE 1 OF 2

**Shaw**

**OWNER** Portland Harbor Holdings, LLC
**PROJECT NAME** Linnton Plywood Association
**PROJECT NUMBER** 141702
**PROJECT LOCATION** Portland, OR
**DATE STARTED** 11/7/11 **COMPLETED** 11/7/11
**GROUND ELEVATION** 42 ft **HOLE SIZE** 4 7/8-inches
**DRILLING CONTRACTOR** Major Drilling
**GROUNDWATER DEPTH**
**DRILLING METHOD** Mud Rotary
**BOREHOLE LOCATION** See Site Plan
**LOGGED BY** L. Terry **CHECKED BY**
**TOTAL DEPTH OF BOREHOLE** 46.5 ft bgs
**NOTES**
**SAMPLING METHOD(S)** Standard Penetration Test (SPT)

| MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|
| **CLAYEY SAND (SC)**, dark brown to light brown, fine sand, with wood, some sand, some gravel, loose, moist, (fill) | 0.0 (42.0) | | | | |
| | | | SPT 1 | 44 | 4-3-3 (6) |
| | | | SPT 2 | 44 | 0-1-2 (3) |
| **POORLY GRADED SAND WITH GRAVEL (SP)**, dark brown, fine sand, with wood, some clay, medium dense, moist, brick fragments, (fill) | 7.0 (35.0) | | | | |
| | | | SPT 3 | 33 | 5-8-7 (15) |
| **LEAN CLAY WITH GRAVEL (CL)**, olive gray, with wood, stiff, moist, (fill) | 9.5 (32.5) | | | | |
| | | | SPT 4 | 33 | 4-1-2 (3) |
| **CLAYEY GRAVEL (GC)**, olive gray, fine gravel, loose, wet, brick fragments, (fill) | 13.0 (29.0) | | | | |
| | | | SPT 5 | 17 | 5-4-4 (8) |
| **SILT (ML)**, olive gray, with wood, trace fine to coarse gravel, medium stiff, wet, (fill) | 18.0 (24.0) | | | | |
| | | | SPT 6 | 67 | 3-3-3 (6) |



Depth (ft): 0, 5, 10, 15, 20, 25

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# BORING NUMBER GT-04

PAGE 2 OF 2

**OWNER** Portland Harbor Holdings, LLC

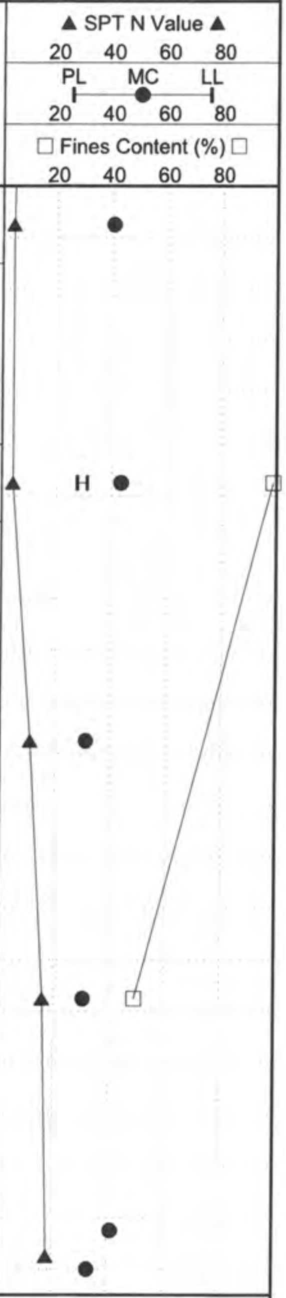
**PROJECT NAME** Linnton Plywood Association

**PROJECT NUMBER** 141702

**PROJECT LOCATION** Portland, OR

| Depth (ft) | MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|---|
| 25 | **SILT (ML)**, dark brown, trace fine sand, soft to medium stiff, wet | 25.0<br>(17.0) | SPT | 7 | 72 | 3-1-3<br>(4) |
| 30 | | | SPT | 8 | 89 | 1-2-2<br>(4) |
| | **SILTY SAND (SM)**, medium brown to dark brown, fine sand, medium dense, wet | 33.0<br>(9.0) | | | | |
| 35 | | | SPT | 9 | 78 | 6-5-6<br>(11) |
| 40 | | | SPT | 10 | 83 | 6-7-9<br>(16) |
| 45 | **POORLY GRADED SAND (SP)**, dark brown, fine to medium sand, medium dense, wet | 45.5<br>(-3.5) | SPT | 11 | 100 | 7-8-10<br>(18) |

Bottom of borehole at 46.5 feet.



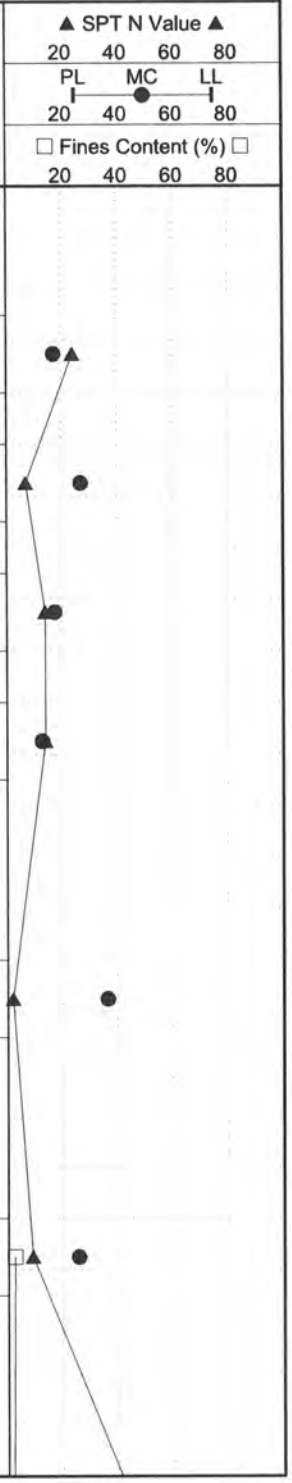
Shaw

# BORING NUMBER GT-05

PAGE 1 OF 2

**OWNER** Portland Harbor Holdings, LLC
**PROJECT NAME** Linnton Plywood Association
**PROJECT NUMBER** 141702
**PROJECT LOCATION** Portland, OR
**DATE STARTED** 11/7/11 **COMPLETED** 11/7/11
**GROUND ELEVATION** 46 ft **HOLE SIZE** 4 7/8-inches
**DRILLING CONTRACTOR** Major Drilling
**GROUNDWATER DEPTH**
**DRILLING METHOD** Mud Rotary
**BOREHOLE LOCATION** See Site Plan
**LOGGED BY** L. Terry **CHECKED BY**
**TOTAL DEPTH OF BOREHOLE** 46.5 ft bgs
**NOTES**
**SAMPLING METHOD(S)** Standard Penetration Test (SPT)

| MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|
| **CLAYEY GRAVEL (GC)**, medium brown to dark brown, fine gravel, medium dense, moist, (fill) | 0.0 (46.0) | | | | |
| | | SPT | 1 | 44 | 22-13-11 (24) |
| **LEAN CLAY WITH GRAVEL (CL)**, olive gray to medium brown, medium stiff, moist, (fill) | 5.3 (40.8) | SPT | 2 | 33 | 4-4-3 (7) |
| **POORLY GRADED SAND (SP)**, dark brown, fine to medium sand, medium dense, moist | 7.8 (38.2) | SPT | 3 | 83 | 6-7-7 (14) |
| 2-inch clay layer | 10.0 (36.0) | SPT | 4 | 72 | 5-6-8 (14) |
| **SILT WITH GRAVEL (ML)**, dark brown, fine to coarse gravel, very soft, wet | 13.0 (33.0) | | | | |
| | | SPT | 5 | 22 | 2-1-1 (2) |
| **POORLY GRADED GRAVEL WITH SAND (GP)**, medium brown to olive gray, fine to coarse gravel, trace silt, loose, wet, cobble in shoe | 18.0 (28.0) | | | | |
| | | SPT | 6 | 22 | 7-4-5 (9) |



Depth (ft): 0, 5, 10, 15, 20, 25

*(Continued Next Page)*

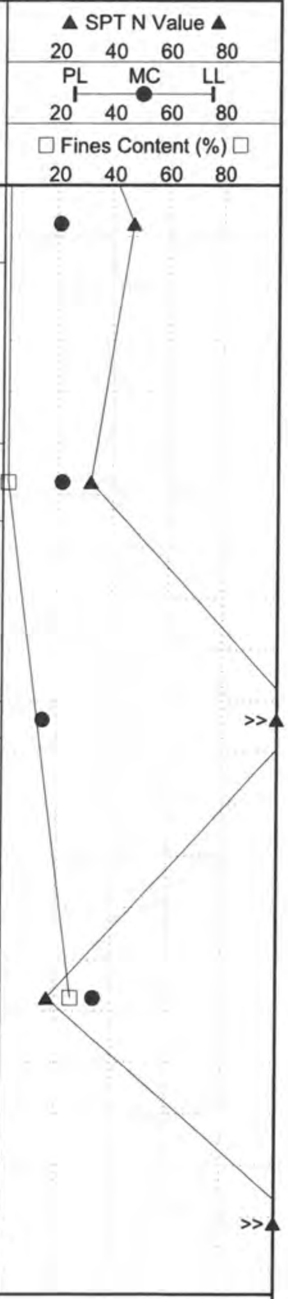
# BORING NUMBER GT-05

PAGE 2 OF 2

**OWNER** Portland Harbor Holdings, LLC
**PROJECT NAME** Linnton Plywood Association
**PROJECT NUMBER** 141702
**PROJECT LOCATION** Portland, OR

| Depth (ft) | MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|---|
| 25 | **POORLY GRADED GRAVEL WITH SAND (GP)**, medium brown to olive gray, fine to coarse gravel, trace silt, dense, wet | 25.0<br>(21.0) | SPT | 7 | 33 | 12-27-20<br>(47) |
| 30 | Medium brown, coarse gravel | 30.0<br>(16.0) | SPT | 8 | 61 | 13-9-23<br>(32) |
| | **SILTY SAND (SM)**, dark gray, fine sand, trace fine gravel, medium dense, wet | 33.0<br>(13.0) | | | | |
| 35 | Cobble in shoe | 35.0<br>(11.0) | SPT | 9 | 71 | 22-0/2.5" |
| 40 | | | SPT | 10 | 78 | 6-4-13<br>(17) |
| 45 | **POORLY GRADED GRAVEL (GP)**, 1.5-inch cobble in shoe (Columbia River Basalt) | 45.0<br>(1.0) | SPT | 11 | 0 | 50/3.0" |

Bottom of borehole at 46.5 feet.



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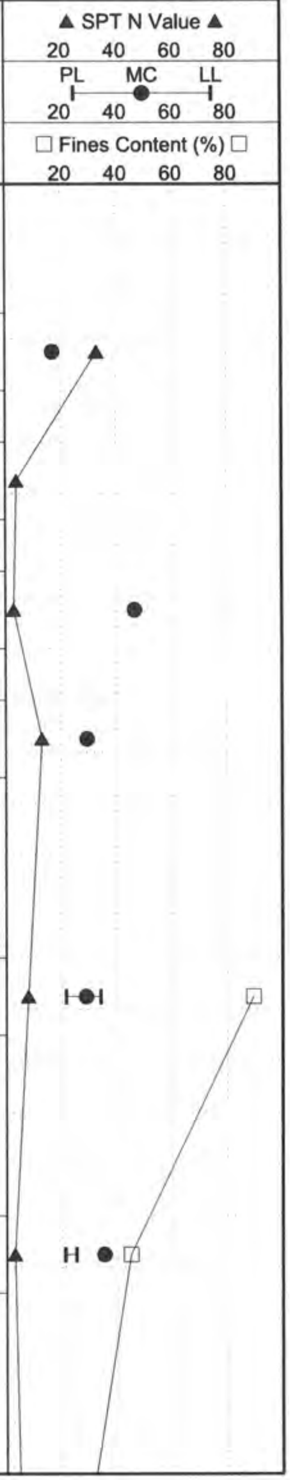
Shaw

# BORING NUMBER GT-06

PAGE 1 OF 2

|  |  |  |  |
|---|---|---|---|
| **OWNER** | Portland Harbor Holdings, LLC | **PROJECT NAME** | Linnton Plywood Association |
| **PROJECT NUMBER** | 141702 | **PROJECT LOCATION** | Portland, OR |
| **DATE STARTED** | 11/4/11 **COMPLETED** 11/4/11 | **GROUND ELEVATION** | 49 ft **HOLE SIZE** 4 7/8-inches |
| **DRILLING CONTRACTOR** | Major Drilling | **GROUNDWATER DEPTH** |  |
| **DRILLING METHOD** | Mud Rotary | **BOREHOLE LOCATION** | See Site Plan |
| **LOGGED BY** | L. Terry **CHECKED BY** | **TOTAL DEPTH OF BOREHOLE** | 46.5 ft bgs |
| **NOTES** |  | **SAMPLING METHOD(S)** | Standard Penetration Test (SPT) |

| Depth (ft) | MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|---|
| 0 | **CLAYEY GRAVEL WITH SAND (GC)**, dark gray, fine to coarse gravel, fine sand, dense, moist, (fill) | 0.0<br>(49.0) |  |  |  |  |
|  | Brick fragments | 2.5<br>(46.5) | ⧗ | SPT<br>1 | 56 | 7-10-23<br>(33) |
|  | Lose circulation | 4.0<br>(45.0) |  |  |  |  |
| 5 | Very loose | 5.0<br>(44.0) | ⧗ | SPT<br>2 | 0 | 4-2-2<br>(4) |
|  |  |  | ⧗ | SPT<br>3 | 39 | 1-2-1<br>(3) |
| 10 | **CLAYEY SAND WITH GRAVEL (SC)**, olive gray, fine sand, medium dense, wet, (fill) | 9.5<br>(39.5) | ⧗ | SPT<br>4 | 17 | 0-0-13<br>(13) |
| 15 | **LEAN CLAY WITH GRAVEL (CL)**, olive gray, fine gravel, medium stiff to stiff, wet, (fill) | 15.1<br>(33.9) | ⧗ | SPT<br>5 | 44 | 1-4-4<br>(8) |
|  | **SILTY SAND (SM)**, olive gray, fine sand, loose, wet | 18.0<br>(31.0) |  |  |  |  |
| 20 |  |  | ⧗ | SPT<br>6 | 94 | 1-2-1<br>(3) |
| 25 |  |  |  |  |  |  |



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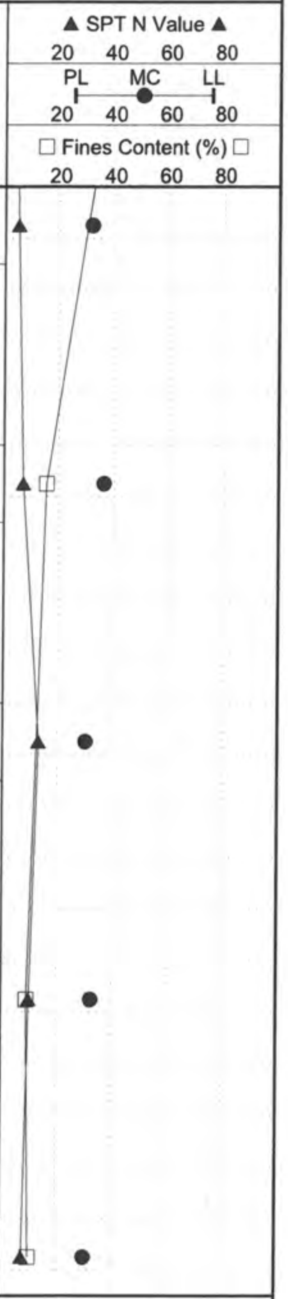
# BORING NUMBER GT-06

PAGE 2 OF 2

Shaw

**OWNER** Portland Harbor Holdings, LLC
**PROJECT NAME** Linnton Plywood Association
**PROJECT NUMBER** 141702
**PROJECT LOCATION** Portland, OR

| Depth (ft) | MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|---|
| 25 | **SILTY SAND (SM)**, medium brown, fine sand, trace fine gravel, loose, wet | 25.0<br>(24.0) | | SPT 7 | 50 | 3-3-2<br>(5) |
| 30 | | | | SPT 8 | 67 | 2-3-4<br>(7) |
| 35 | Medium dense | 35.0<br>(14.0) | | SPT 9 | 67 | 5-6-7<br>(13) |
| | **POORLY GRADED SAND WITH SILT (SP-SM)**, medium brown, fine sand, trace fine gravel, medium dense, wet | 38.0<br>(11.0) | | | | |
| 40 | | | | SPT 10 | 72 | 4-5-5<br>(10) |
| | **POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM)**, medium brown to medium gray, fine sand, fine gravel, loose, wet | 43.0<br>(6.0) | | | | |
| 45 | | | | SPT 11 | 44 | 6-5-3<br>(8) |



Bottom of borehole at 46.5 feet.

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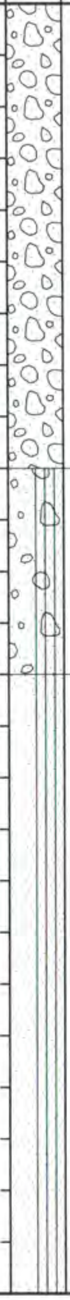
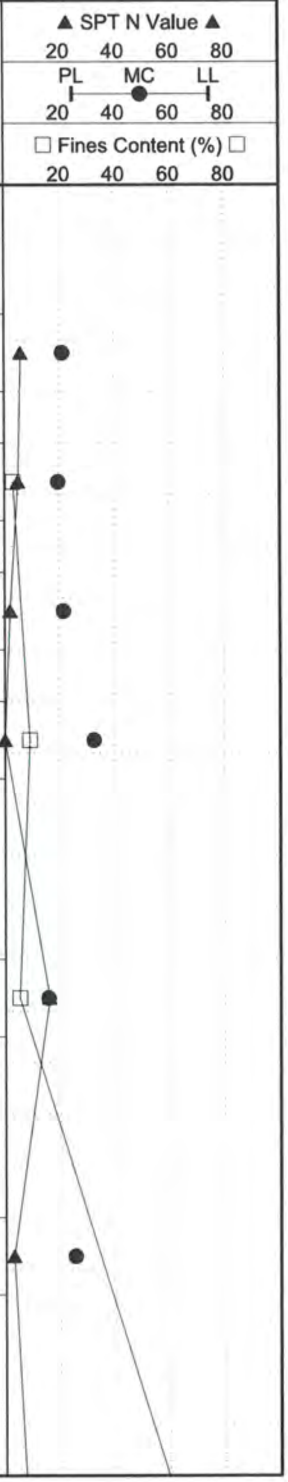
# BORING NUMBER GT-07

PAGE 1 OF 2

| | | | |
|---|---|---|---|
| **OWNER** | Portland Harbor Holdings, LLC | **PROJECT NAME** | Linnton Plywood Association |
| **PROJECT NUMBER** | 141702 | **PROJECT LOCATION** | Portland, OR |
| **DATE STARTED** | 11/4/11 **COMPLETED** 11/4/11 | **GROUND ELEVATION** | 45 ft **HOLE SIZE** 4 7/8-inches |
| **DRILLING CONTRACTOR** | Major Drilling | **GROUNDWATER DEPTH** | |
| **DRILLING METHOD** | Mud Rotary | **BOREHOLE LOCATION** | See Site Plan |
| **LOGGED BY** | L. Terry **CHECKED BY** | **TOTAL DEPTH OF BOREHOLE** | 46.5 ft bgs |
| **NOTES** | | **SAMPLING METHOD(S)** | Standard Penetration Test (SPT) |



| Depth (ft) | MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|---|
| 0 | **POORLY GRADED GRAVEL WITH SAND (GP)**, dark brown, fine gravel, fine to medium sand, trace silt, loose, moist, (fill) | 0.0 (45.0) | | | | |
| | | | ⧗ | SPT 1 | 83 | 6-3-3 (6) |
| 5 | Increasing gravel | 5.0 (40.0) | ⧗ | SPT 2 | 67 | 3-3-2 (5) |
| | Dark gray to dark brown, very loose | 7.5 (37.5) | ⧗ | SPT 3 | 22 | 1-1-1 (2) |
| | **POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM)**, dark brown, fine sand, very loose, moist, (fill) | 9.0 (36.0) | | | | |
| 10 | | | ⧗ | SPT 4 | 61 | 0-0-0 (0) |
| | **POORLY GRADED SAND WITH SILT (SP-SM)**, dark brown, fine sand, few fine gravel, trace organics, medium dense, moist, (fill) | 13.0 (32.0) | | | | |
| 15 | | | ⧗ | SPT 5 | 50 | 9-8-8 (16) |
| 20 | Loose, wet | 20.0 (25.0) | ⧗ | SPT 6 | 11 | 2-1-2 (3) |
| 25 | | | | | | |



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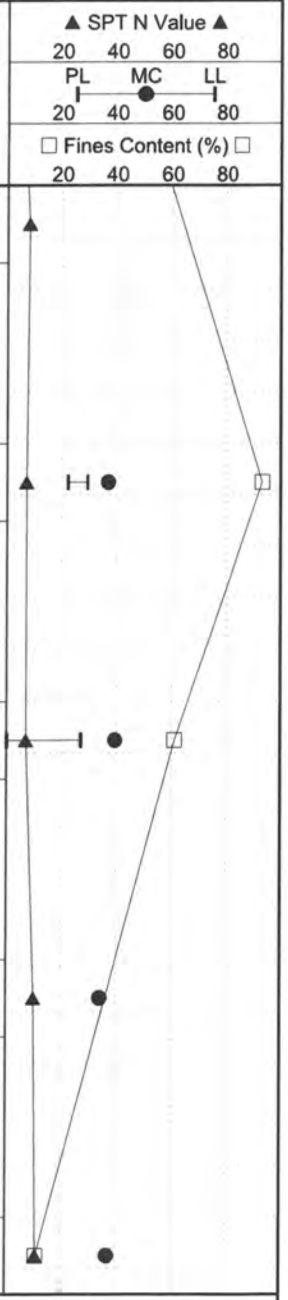
# BORING NUMBER GT-07

PAGE 2 OF 2

**OWNER** Portland Harbor Holdings, LLC
**PROJECT NAME** Linnton Plywood Association
**PROJECT NUMBER** 141702
**PROJECT LOCATION** Portland, OR

| Depth (ft) | Graphic Log | MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|---|---|
| 25 | | **WOOD**, dark brown to black, (fill) | 25.0<br>(20.0) | SPT | 7 | 6 | 4-4-4<br>(8) |
| | | **LEAN CLAY (CL)**, olive gray to medium brown, few fine sand, medium stiff, moist, (fill) | 29.0<br>(16.0) | | | | |
| 30 | | | | SPT | 8 | 78 | 1-4-3<br>(7) |
| | | **SANDY SILT (ML)**, olive gray to medium brown, medium stiff, moist | 33.0<br>(12.0) | | | | |
| 35 | | | | SPT | 9 | 89 | 1-3-4<br>(7) |
| 40 | | Medium brown to dark brown, stiff, wet | 40.0<br>(5.0) | SPT | 10 | 67 | 3-4-6<br>(10) |
| | | **POORLY GRADED SAND WITH SILT (SP)**, medium brown, fine to medium sand, few fine gravel, medium dense, wet | 43.0<br>(2.0) | | | | |
| 45 | | | | SPT | 11 | 67 | 4-6-5<br>(11) |



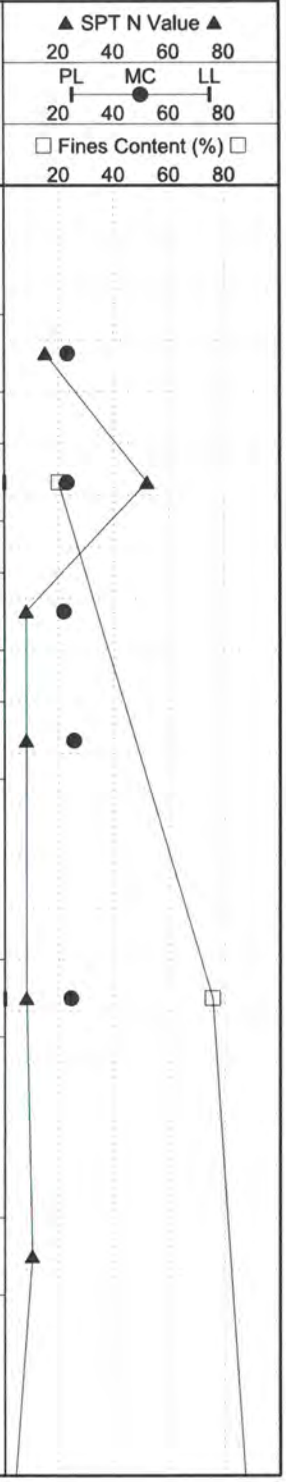
Bottom of borehole at 46.5 feet.

# BORING NUMBER GT-08

PAGE 1 OF 2

**OWNER** Portland Harbor Holdings, LLC
**PROJECT NAME** Linnton Plywood Association
**PROJECT NUMBER** 141702
**PROJECT LOCATION** Portland, OR
**DATE STARTED** 11/4/11 **COMPLETED** 11/4/11
**GROUND ELEVATION** 44 ft **HOLE SIZE** 4 7/8-inches
**DRILLING CONTRACTOR** Major Drilling
**GROUNDWATER DEPTH**
**DRILLING METHOD** Mud Rotary
**BOREHOLE LOCATION** See Site Plan
**LOGGED BY** L. Terry **CHECKED BY**
**TOTAL DEPTH OF BOREHOLE** 46.5 ft bgs
**NOTES**
**SAMPLING METHOD(S)** Standard Penetration Test (SPT)

| Depth (ft) | MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|---|
| 0 | **SILTY SAND (SM)**, dark brown, fine sand, trace wood, trace gravel, medium dense, moist, brick fragments, (fill) | 0.0<br>(44.0) | | | | |
| | | | | SPT<br>1 | 28 | 6-6-9<br>(15) |
| 5 | Brick fragment in shoe, trace cobbles, 1-inch diameter | 5.0<br>(39.0) | | SPT<br>2 | 56 | 6-12-40<br>(52) |
| | Loose | 7.5<br>(36.5) | | SPT<br>3 | 28 | 4-4-4<br>(8) |
| 10 | | | | SPT<br>4 | 50 | 3-4-4<br>(8) |
| | **SILT WITH SAND (ML)**, dark brown, fine sand, loose, moist, (fill) | 13.0<br>(31.0) | | | | |
| 15 | Hydrocarbon odor | 15.0<br>(29.0) | | SPT<br>5 | 56 | 6-4-4<br>(8) |
| | **WOOD**, hydrocarbon odor, driller notes difficult drilling from 17.5 - 19.5 feet bgs, wood log (fill) | 17.5<br>(26.5) | | | | |
| 20 | | | | SPT<br>6 | 44 | 4-4-6<br>(10) |
| 25 | | | | | | |



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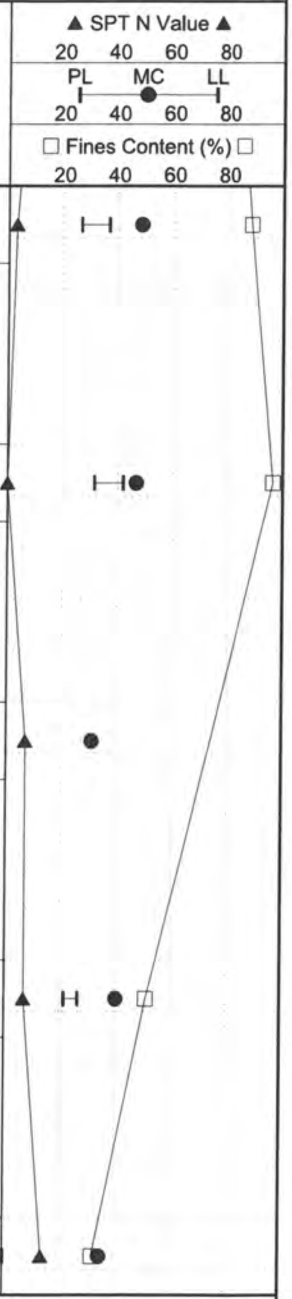
# BORING NUMBER GT-08

PAGE 2 OF 2

| | |
|---|---|
| **OWNER** Portland Harbor Holdings, LLC | **PROJECT NAME** Linnton Plywood Association |
| **PROJECT NUMBER** 141702 | **PROJECT LOCATION** Portland, OR |

| Depth (ft) | MATERIAL DESCRIPTION | Depth (Elev.) | Sample Type | Sample Number | Recovery (%) (RQD(%)) | Blow Counts (N Value) |
|---|---|---|---|---|---|---|
| 25 | **SILT WITH SAND (ML)**, medium brown to dark brown, fine sand, trace wood, soft, moist, (fill) | 25.0 (19.0) | ⧗ | SPT 7 | 56 | 4-1-2 (3) |
| | **SILT (ML)**, olive gray to medium brown, trace fine sand, very soft, wet, (fill) | 28.0 (16.0) | | | | |
| 30 | | 30.0 (14.0) | ⧗ | SPT 8 | 100 | 0-0-0 (0) |
| 35 | **SILT (ML)**, medium brown, trace fine sand, soft, wet | 35.0 (9.0) | ⧗ | SPT 9 | 94 | 2-4-3 (7) |
| | **SANDY SILTY CLAY (CL-ML)**, medium brown, medium stiff, wet | 38.0 (6.0) | | | | |
| 40 | | | ⧗ | SPT 10 | 94 | 4-3-4 (7) |
| | **SILTY SAND (SM)**, medium brown medium brown, fine sand, medium dense, wet | 43.0 (1.0) | | | | |
| 45 | | | ⧗ | SPT 11 | 72 | 4-6-8 (14) |



Bottom of borehole at 46.5 feet.

# GRAIN SIZE DISTRIBUTION

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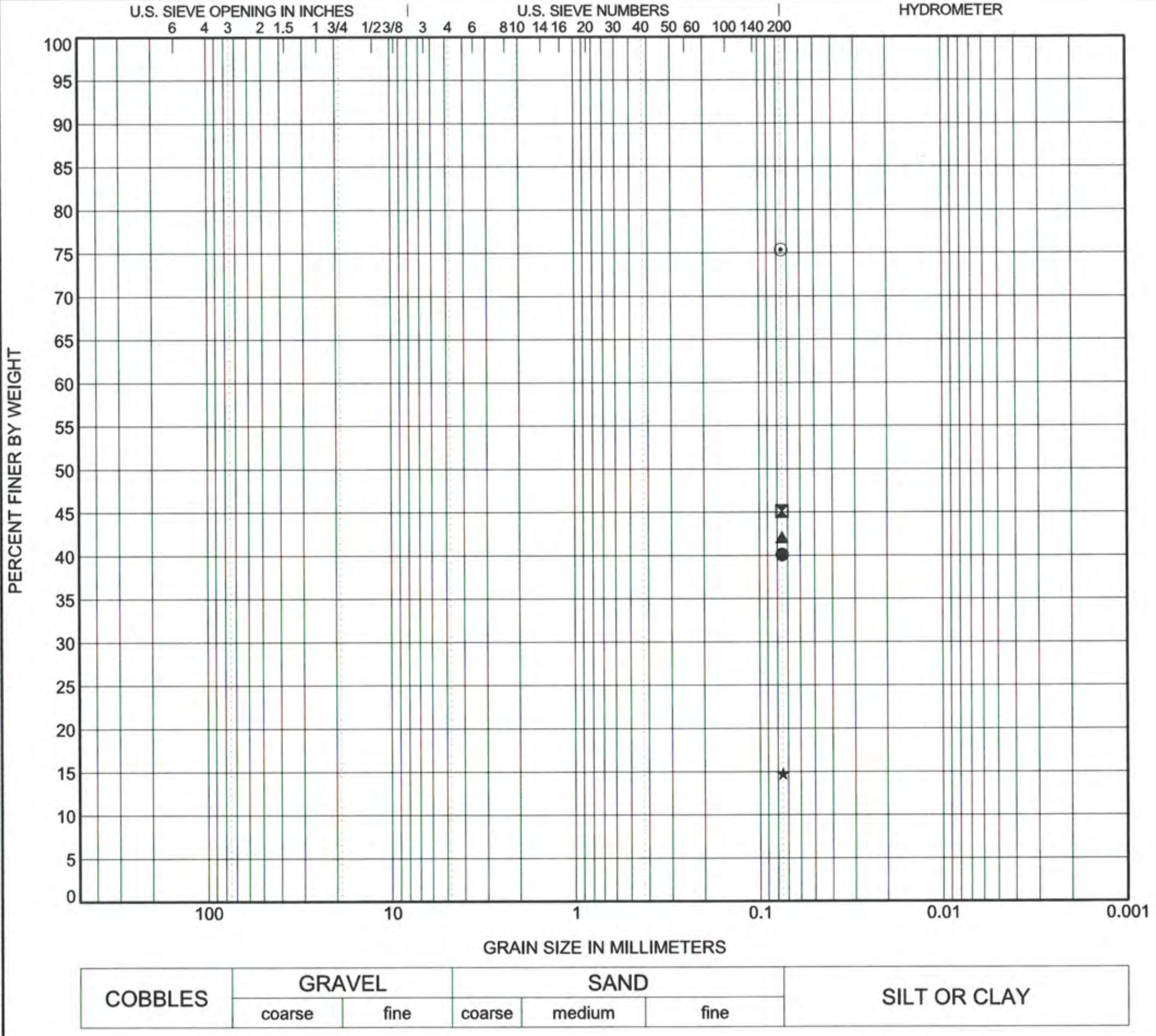
**OWNER** Portland Harbor Holdings, LLC
**PROJECT NAME** Linnton Plywood Association
**PROJECT NUMBER** 141702
**PROJECT LOCATION** Portland, OR



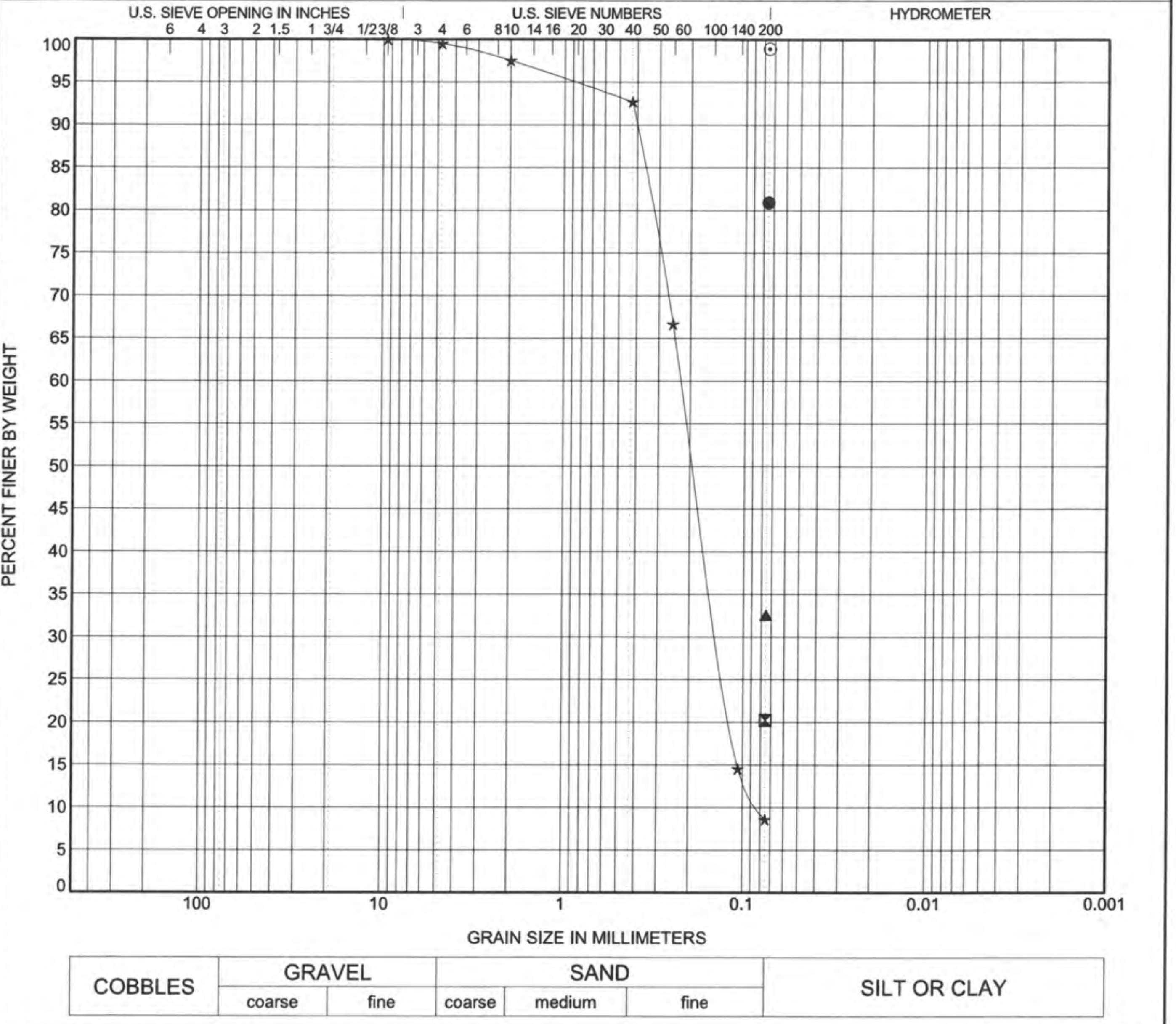
| Specimen Identification | | | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | GT-01 | 30.0 | **Silty Sand (SM)** | 26 | 24 | 2 | | |
| ⧗ | GT-01 | 35.0 | **Silty Sand (SM)** | | | | | |
| ▲ | GT-01 | 45.0 | **Silty Sand (SM)** | | | | | |
| ★ | GT-02 | 20.0 | **Poorly Graded Sand with Silt (SP-SM)** | | | | | |
| ⊙ | GT-02 | 35.0 | **Silt with Sand (ML)** | | | | | |

| Specimen Identification | | | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | GT-01 | 30.0 | 0.075 | | | | | | 40.1 | |
| ⧗ | GT-01 | 35.0 | 0.075 | | | | | | 45.1 | |
| ▲ | GT-01 | 45.0 | 0.075 | | | | | | 42.1 | |
| ★ | GT-02 | 20.0 | 0.075 | | | | | | 14.8 | |
| ⊙ | GT-02 | 35.0 | 0.075 | | | | | | 75.4 | |

Shaw

# GRAIN SIZE DISTRIBUTION

**OWNER** Portland Harbor Holdings, LLC
**PROJECT NAME** Linnton Plywood Association
**PROJECT NUMBER** 141702
**PROJECT LOCATION** Portland, OR



| Specimen Identification | | | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | GT-02 | 40.0 | **Silt with Sand (ML)** | | | | | |
| ⧗ | GT-03 | 30.0 | **Silty Sand (SM)** | | | | | |
| ▲ | GT-03 | 35.0 | **Silty Sand (SM)** | | | | | |
| ★ | GT-03 | 45.0 | **Silty Sand (SM)** | | | | 1.02 | 2.75 |
| ⊙ | GT-04 | 30.0 | **Silt (ML)** | 31 | 27 | 4 | | |

| Specimen Identification | | | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | GT-02 | 40.0 | 0.075 | | | | | | 80.9 | |
| ⧗ | GT-03 | 30.0 | 0.075 | | | | | | 20.2 | |
| ▲ | GT-03 | 35.0 | 0.075 | | | | | | 32.6 | |
| ★ | GT-03 | 45.0 | 9.5 | 0.224 | 0.137 | 0.081 | 0.5 | 90.9 | 8.6 | |
| ⊙ | GT-04 | 30.0 | 0.075 | | | | | | 98.9 | |

GRAIN SIZE - GINT STD US LAB.GDT - 12/2/11 14:49 - Y:\PROJECTS\WILDLANDS - LINNTON PLYWOOD\GEOTECH\003 DESIGN\003A EXPLORATION\OCTOBER 2011 BOREHOLES\141702_WILDLANDS_GT BORINGS.GPJ

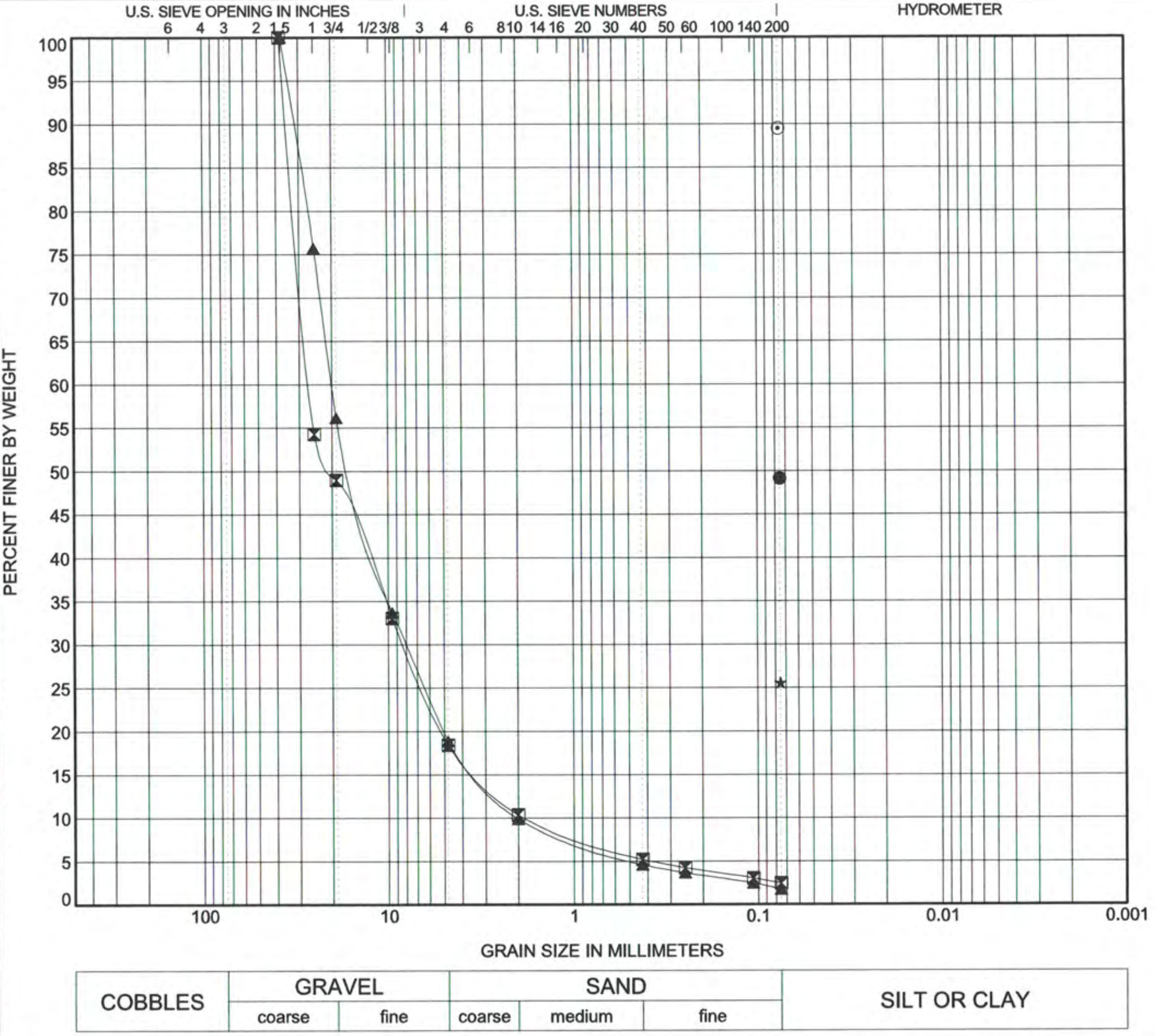
# GRAIN SIZE DISTRIBUTION

**OWNER** Portland Harbor Holdings, LLC

**PROJECT NAME** Linnton Plywood Association

**PROJECT NUMBER** 141702

**PROJECT LOCATION** Portland, OR



| | Specimen Identification | | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | GT-04 | 40.0 | **Silty Sand (SM)** | | | | | |
| ☒ | GT-05 | 20.0 | **Poorly Graded Gravel with Sand (GP)** | | | | 1.43 | 14.69 |
| ▲ | GT-05 | 30.0 | **Poorly Graded Gravel with Sand (GP)** | | | | 1.58 | 9.92 |
| ★ | GT-05 | 40.0 | **Silty Sand (SM)** | | | | | |
| ⊙ | GT-06 | 15.0 | **Lean Clay with Gravel (CL)** | 34 | 21 | 13 | | |

| | Specimen Identification | | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | GT-04 | 40.0 | 0.075 | | | | | | 49.1 | |
| ☒ | GT-05 | 20.0 | 38.1 | 26.356 | 8.219 | 1.794 | 81.6 | 16.0 | 2.5 | |
| ▲ | GT-05 | 30.0 | 37.5 | 20.057 | 7.995 | 2.023 | 81.1 | 17.1 | 1.8 | |
| ★ | GT-05 | 40.0 | 0.075 | | | | | | 25.6 | |
| ⊙ | GT-06 | 15.0 | 0.075 | | | | | | 89.5 | |

GRAIN SIZE - GINT STD US LAB.GDT - 12/2/11 14:49 - Y:\PROJECTS\WILDLANDS - LINNTON PLYWOOD\GEOTECH\003 DESIGN\003A EXPLORATION\OCTOBER 2011 BOREHOLES\141702_WILDLANDS_GT BORINGS.GPJ

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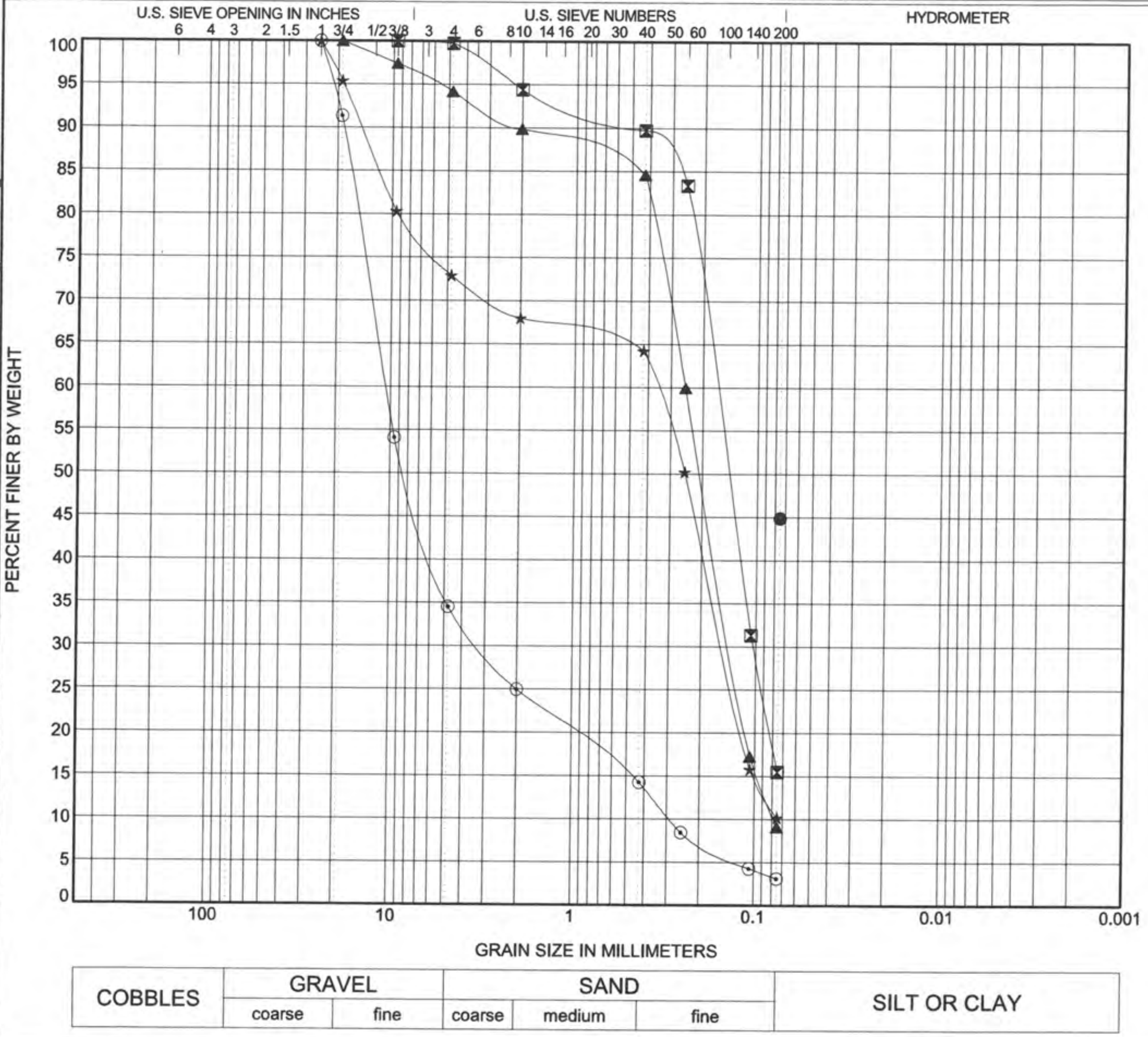
# GRAIN SIZE DISTRIBUTION

**OWNER** Portland Harbor Holdings, LLC

**PROJECT NAME** Linnton Plywood Association

**PROJECT NUMBER** 141702

**PROJECT LOCATION** Portland, OR



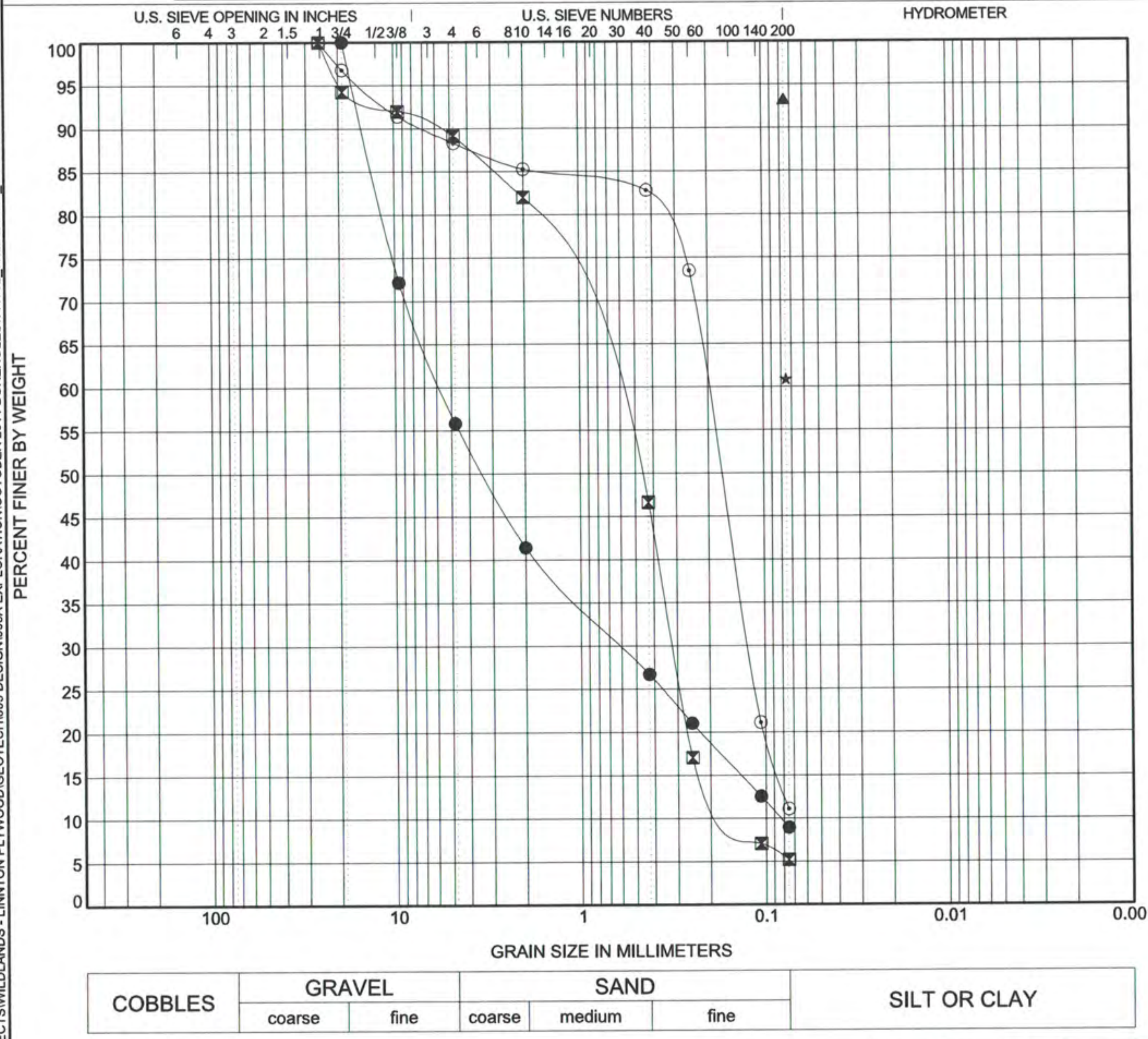
| Specimen Identification | | | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | GT-06 | 20.0 | Silty Sand (SM) | 25 | 21 | 4 | | |
| ⧗ | GT-06 | 30.0 | Silty Sand (SM) | | | | | |
| ▲ | GT-06 | 40.0 | Poorly Graded Sand with Silt (SP-SM) | | | | 0.96 | 3.21 |
| ★ | GT-06 | 45.0 | Poorly Graded Sand with Silt and Gravel (SP-SM) | | | | 0.85 | 4.88 |
| ⊙ | GT-07 | 5.0 | Poorly Graded Gravel with Sand (GP) | | | | 3.25 | 36.77 |

| Specimen Identification | | | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | GT-06 | 20.0 | 0.075 | | | | | | 44.9 | |
| ⧗ | GT-06 | 30.0 | 9.5 | 0.17 | 0.103 | | 0.3 | 84.2 | 15.5 | |
| ▲ | GT-06 | 40.0 | 19 | 0.25 | 0.137 | 0.078 | 5.8 | 85.1 | 9.1 | |
| ★ | GT-06 | 45.0 | 25 | 0.362 | 0.151 | | 27.1 | 62.7 | 10.2 | |
| ⊙ | GT-07 | 5.0 | 25 | 10.602 | 3.152 | 0.288 | 65.5 | 31.4 | 3.1 | |

GRAIN SIZE - GINT STD US LAB.GDT - 12/2/11 14:49 - Y:\PROJECTS\WILDLANDS - LINNTON PLYWOOD\GEOTECH\003 DESIGN\003A EXPLORATION\OCTOBER 2011 BOREHOLES\141702_WILDLANDS_GT BORINGS.GPJ

# GRAIN SIZE DISTRIBUTION

**OWNER** Portland Harbor Holdings, LLC
**PROJECT NAME** Linnton Plywood Association
**PROJECT NUMBER** 141702
**PROJECT LOCATION** Portland, OR



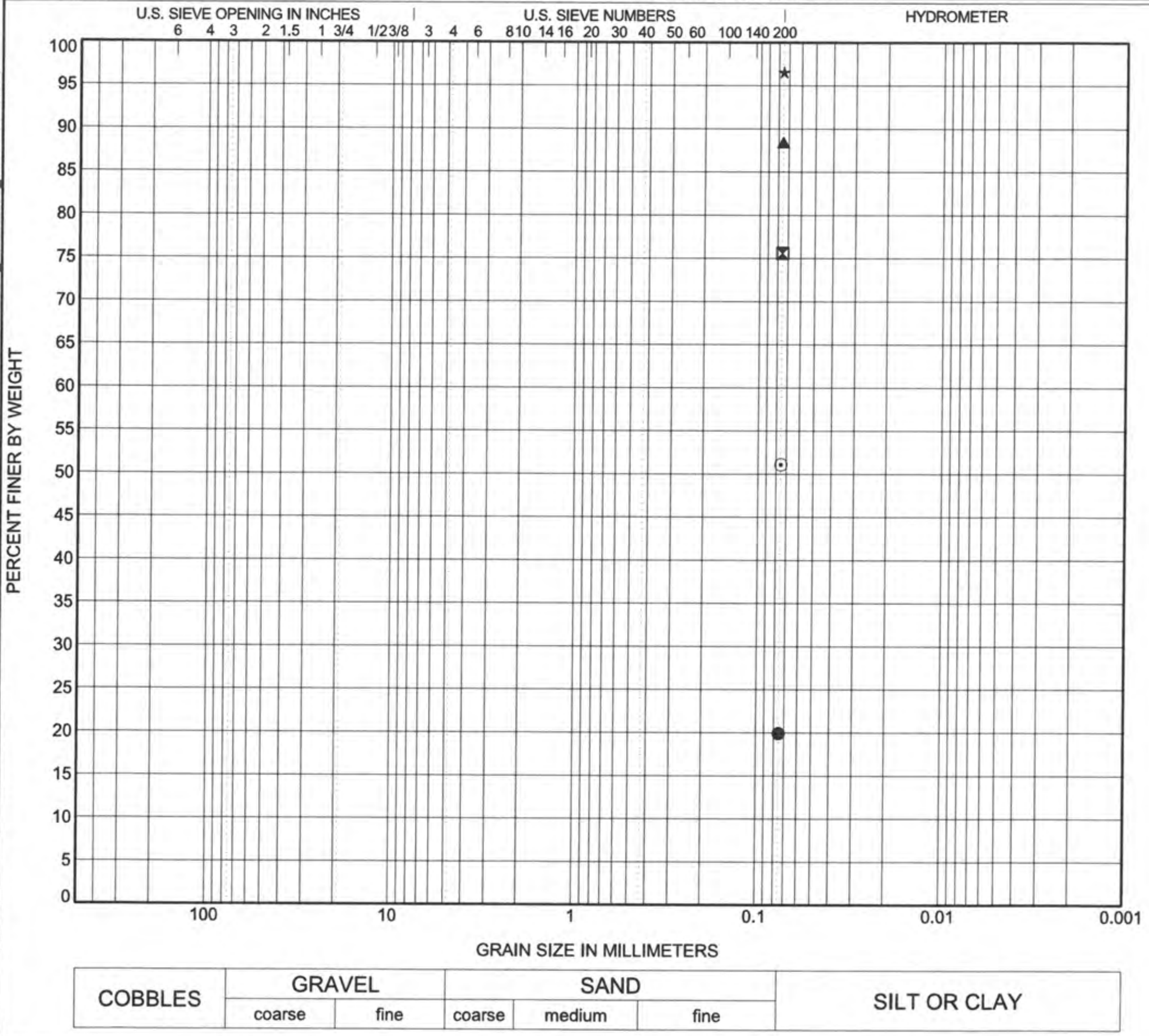
| | Specimen Identification | | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | GT-07 | 10.0 | Poorly Graded Sand with Silt and Gravel (SP-SM) | | | | 0.77 | 68.33 |
| ⧗ | GT-07 | 15.0 | Poorly Graded Sand with Silt (SP-SM) | | | | 0.95 | 5.59 |
| ▲ | GT-07 | 30.0 | Lean Clay (CL) | 29 | 22 | 7 | | |
| ★ | GT-07 | 35.0 | Sandy Silt (ML) | 27 | NP | NP | | |
| ⊙ | GT-07 | 45.0 | Poorly Graded Sand with Silt (SP-SM) | | | | 1.04 | 2.78 |

| | Specimen Identification | | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | GT-07 | 10.0 | 19 | 5.668 | 0.6 | 0.083 | 44.2 | 46.9 | 9.0 | |
| ⧗ | GT-07 | 15.0 | 25.4 | 0.763 | 0.315 | 0.136 | 10.9 | 83.9 | 5.2 | |
| ▲ | GT-07 | 30.0 | 0.075 | | | | | | 93.3 | |
| ★ | GT-07 | 35.0 | 0.075 | | | | | | 60.9 | |
| ⊙ | GT-07 | 45.0 | 25.4 | 0.2 | 0.123 | | 11.7 | 77.2 | 11.1 | |

GRAIN SIZE - GINT STD US LAB.GDT - 12/2/11 14:49 - Y:\PROJECTS\WILDLANDS - LINNTON PLYWOOD\GEOTECH\003 DESIGN\003A EXPLORATION\OCTOBER 2011 BOREHOLES\141702_WILDLANDS_GT BORINGS.GPJ

# GRAIN SIZE DISTRIBUTION

**OWNER** Portland Harbor Holdings, LLC
**PROJECT NAME** Linnton Plywood Association
**PROJECT NUMBER** 141702
**PROJECT LOCATION** Portland, OR



| Specimen Identification | | | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | GT-08 | 5.0 | **Silty Sand (SM)** | NP | NP | NP | | |
| ⌛ | GT-08 | 15.0 | **Silt with Sand (ML)** | NP | NP | NP | | |
| ▲ | GT-08 | 25.0 | **Silt with Sand (ML)** | 36 | 26 | 10 | | |
| ★ | GT-08 | 30.0 | **Silt (ML)** | 42 | 31 | 11 | | |
| ⊙ | GT-08 | 40.0 | **Sandy Silty Clay (CL-ML)** | 26 | 21 | 5 | | |

| Specimen Identification | | | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | GT-08 | 5.0 | 0.075 | | | | | | 19.9 | |
| ⌛ | GT-08 | 15.0 | 0.075 | | | | | | 75.6 | |
| ▲ | GT-08 | 25.0 | 0.075 | | | | | | 88.4 | |
| ★ | GT-08 | 30.0 | 0.075 | | | | | | 96.5 | |
| ⊙ | GT-08 | 40.0 | 0.075 | | | | | | 51.1 | |

GRAIN SIZE - GINT STD US LAB.GDT - 12/2/11 14:49 - Y:\PROJECTS\WILDLANDS - LINNTON PLYWOOD\GEOTECH\003 DESIGN\003A EXPLORATION\OCTOBER 2011 BOREHOLES\141702_WILDLANDS_GT BORINGS.GPJ

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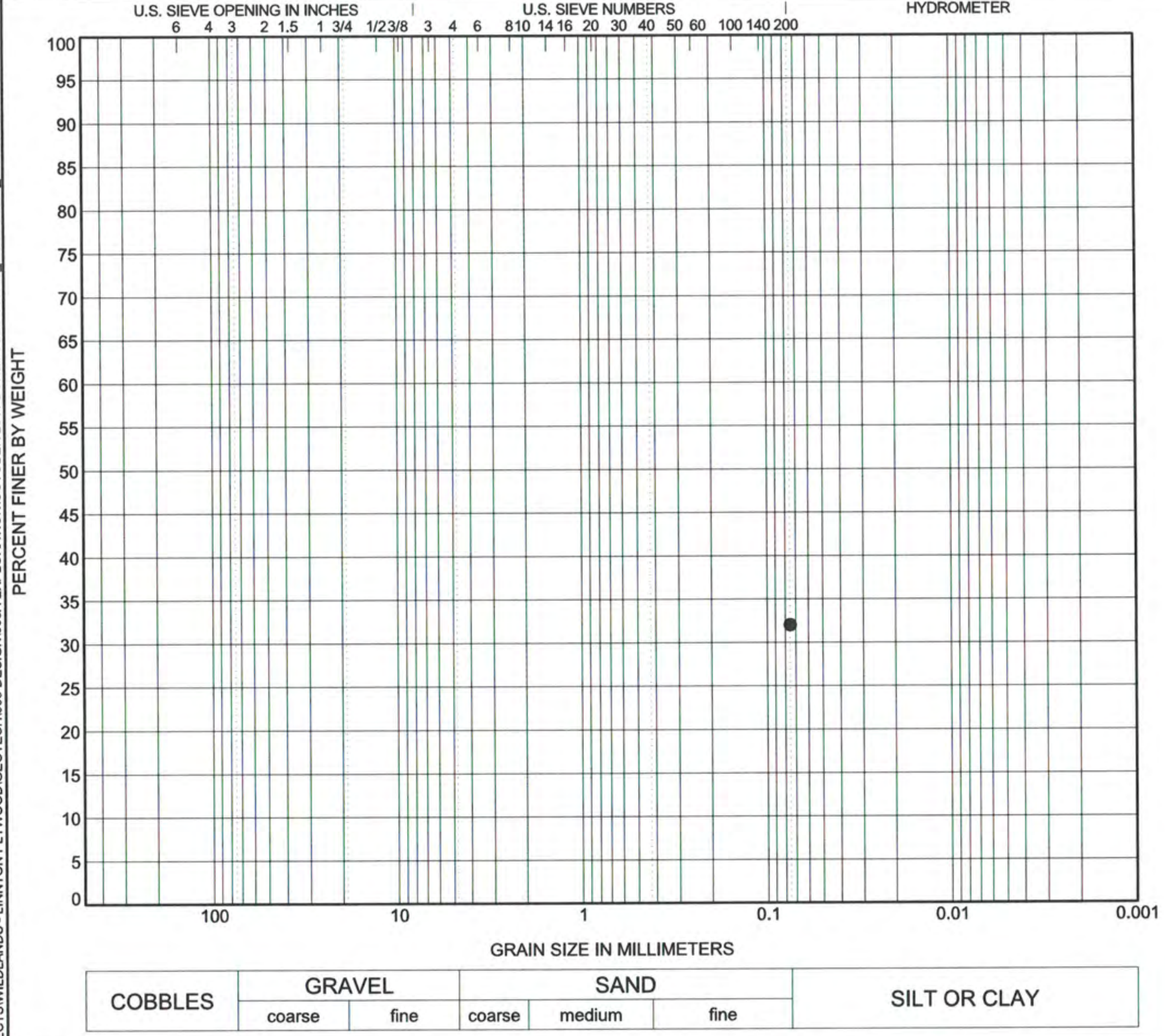
# GRAIN SIZE DISTRIBUTION

**OWNER** Portland Harbor Holdings, LLC

**PROJECT NAME** Linnton Plywood Association

**PROJECT NUMBER** 141702

**PROJECT LOCATION** Portland, OR



| | Specimen Identification | | Classification | LL | PL | PI | Cc | Cu |
|---|---|---|---|---|---|---|---|---|
| ● | GT-08 | 45.0 | **Silty Sand (SM)** | NP | NP | NP | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| | Specimen Identification | | D100 | D60 | D30 | D10 | %Gravel | %Sand | %Silt | %Clay |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | GT-08 | 45.0 | 0.075 | | | | | | 32.0 | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

GRAIN SIZE - GINT STD US LAB.GDT - 12/2/11 14:49 - Y:\PROJECTS\WILDLANDS - LINNTON PLYWOOD\GEOTECH\003 DESIGN\003A EXPLORATION\OCTOBER 2011 BOREHOLES\141702_WILDLANDS_GT BORINGS.GPJ

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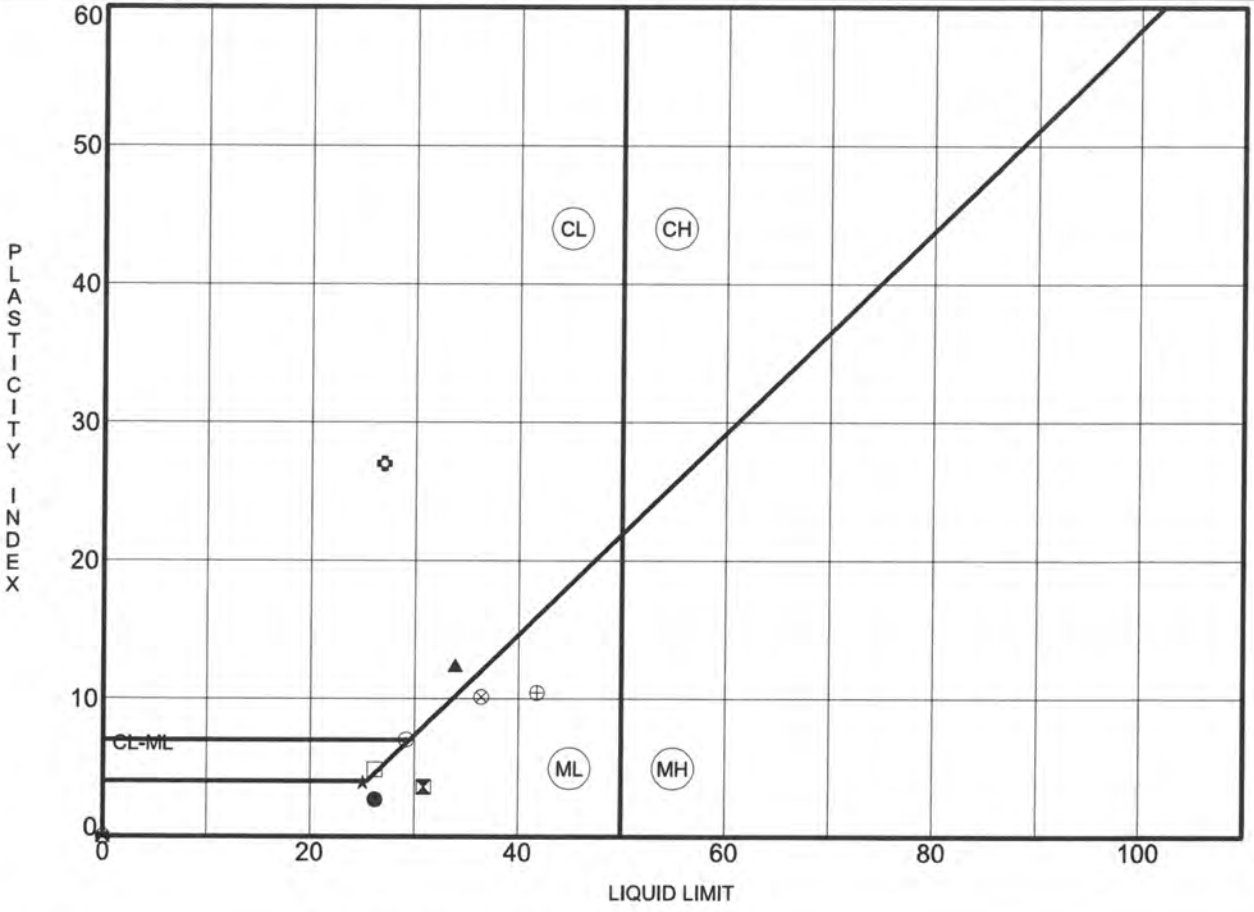
# ATTERBERG LIMITS' RESULTS

**OWNER** Portland Harbor Holdings, LLC

**PROJECT NAME** Linnton Plywood Association

**PROJECT NUMBER** 141702

**PROJECT LOCATION** Portland, OR



| | Specimen Identification | | LL | PL | PI | Fines | Classification |
|---|---|---|---|---|---|---|---|
| ● | GT-01 | 30.0 | 26 | 24 | 2 | 40 | Silty Sand (SM) |
| ⧗ | GT-04 | 30.0 | 31 | 27 | 4 | 99 | Silt (ML) |
| ▲ | GT-06 | 15.0 | 34 | 21 | 13 | 89 | Lean Clay with Gravel (CL) |
| ★ | GT-06 | 20.0 | 25 | 21 | 4 | 45 | Silty Sand (SM) |
| ⊙ | GT-07 | 30.0 | 29 | 22 | 7 | 93 | Lean Clay (CL) |
| ✿ | GT-07 | 35.0 | 27 | NP | NP | 61 | Sandy Silt (ML) |
| ○ | GT-08 | 5.0 | NP | NP | NP | 20 | Silty Sand (SM) |
| △ | GT-08 | 15.0 | NP | NP | NP | 76 | Silt with Sand (ML) |
| ⊗ | GT-08 | 25.0 | 36 | 26 | 10 | 88 | Silt with Sand (ML) |
| ⊕ | GT-08 | 30.0 | 42 | 31 | 11 | 97 | Silt (ML) |
| □ | GT-08 | 40.0 | 26 | 21 | 5 | 51 | Sandy Silty Clay (CL-ML) |
| ◉ | GT-08 | 45.0 | NP | NP | NP | 32 | Silty Sand (SM) |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

ATTERBERG LIMITS - GINT STD US LAB.GDT - 12/2/11 14:49 - Y:\PROJECTS\WILDLANDS - LINNTON PLYWOOD\GEOTECH\003 DESIGN\003A EXPLORATION\OCTOBER 2011 BOREHOLES\141702_WILDLANDS_GT BORINGS.GPJ

# URS, 2003-2004

**Project:** BP - T-22
**Project Location:** Portland, Oregon
**Project Number:** 38475873

# Log of Boring URS-GP-07

Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | **6/19/2003** | Logged By | **GL** | Checked By | **JOD** |
| Drilling Method | **GeoProbe** | Drill Bit Size/Type | **N/A** | Total Depth of Borehole | **40.0 feet** |
| Drill Rig Type | **GeoProbe** | Drilling Contractor | **ESN** | Approximate Surface Elevation | **N/A** |
| Groundwater Level and Date Measured | **N/A** | Sampling Method(s) | **Dual Tube** | Hammer Data | **158 lb** |
| Borehole Backfill | **Bentonite Grout** | Location | | | |

| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Recovery, (ft.) | Graphic Log | Lithologic Log (USCS Code) | MATERIAL DESCRIPTION | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| | 0 | | | | ░ | SP | **POORLY GRADED SAND [SP]**, very dark gray, dry, [FILL]. | |
| | 5 | | | | ░ | | | |
| | 8 | ■ | | | ‖ | ML | **SILT [ML]**, trace fine grained sand, very dark gray, organic odor, brick fragments, [FILL]. | |
| | 10 | ■ | S1 | 4.0 | ‖ | | | |
| | | ■ | S2 | 4.0 | ‖ | | | |
| | 15 | ■ | | | ░ | SP | **POORLY GRADED SAND [SP]**, very dark gray, organic odor, some wood fragments. [FILL] | |
| | | ■ | | | ░ | SP | **POORLY GRADED SAND [SP]**, very dark gray, moist to, wet, slight petroleum hydrocarbon [HC] odor. [FILL] | |
| | | ■ | S3 | 4.0 | ░ | | | |
| | | ■ | | | ▽ | | *19.0' to 28.0' Wood debris* [FILL] | |
| | 20 | ■ | | | ▽ | | | |
| | | ■ | S4 | 0 | ▽ | | | |
| | 25 | ■ | | | ▽ | | | |
| | | ■ | S5 | 0 | ▽ | | | |
| | | ■ | | | ‖ | ML | **SILT [ML]**, trace fine grained sand, dark gray, moist, slight HC odor. [Fine-Grained Quaternary Alluvium] | |
| | 30 | | | | | | | |

**Project:** BP - T-22
**Project Location:** Portland, Oregon
**Project Number:** 38475873

# Log of Boring URS-GP-07

Sheet 2 of 2

| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Recovery, (ft.) | Graphic Log | Lithologic Log (USCS Code) | MATERIAL DESCRIPTION | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| | 30 | ■ | S6 | 3.8 | | | | |
| | | ■ | S7 | 4.0 | | | | |
| | 35 | ■ | | | | | | |
| | | ■ | | | | ML | **SILT [ML]**, brown w/ iron staining, moist, weak organic odor. [Fine-Grained Quaternary Alluvium] | |
| | | ■ | S8 | 3.8 | | | | |
| | 40 | | | | | | Boring terminated at a depth of 40.0 feet bgs on 6/19/2003 and backfilled with betonite grout upon completion. | |
| | 45 | | | | | | | |
| | 50 | | | | | | | |
| | 55 | | | | | | | |
| | 60 | | | | | | | |
| | 65 | | | | | | | |

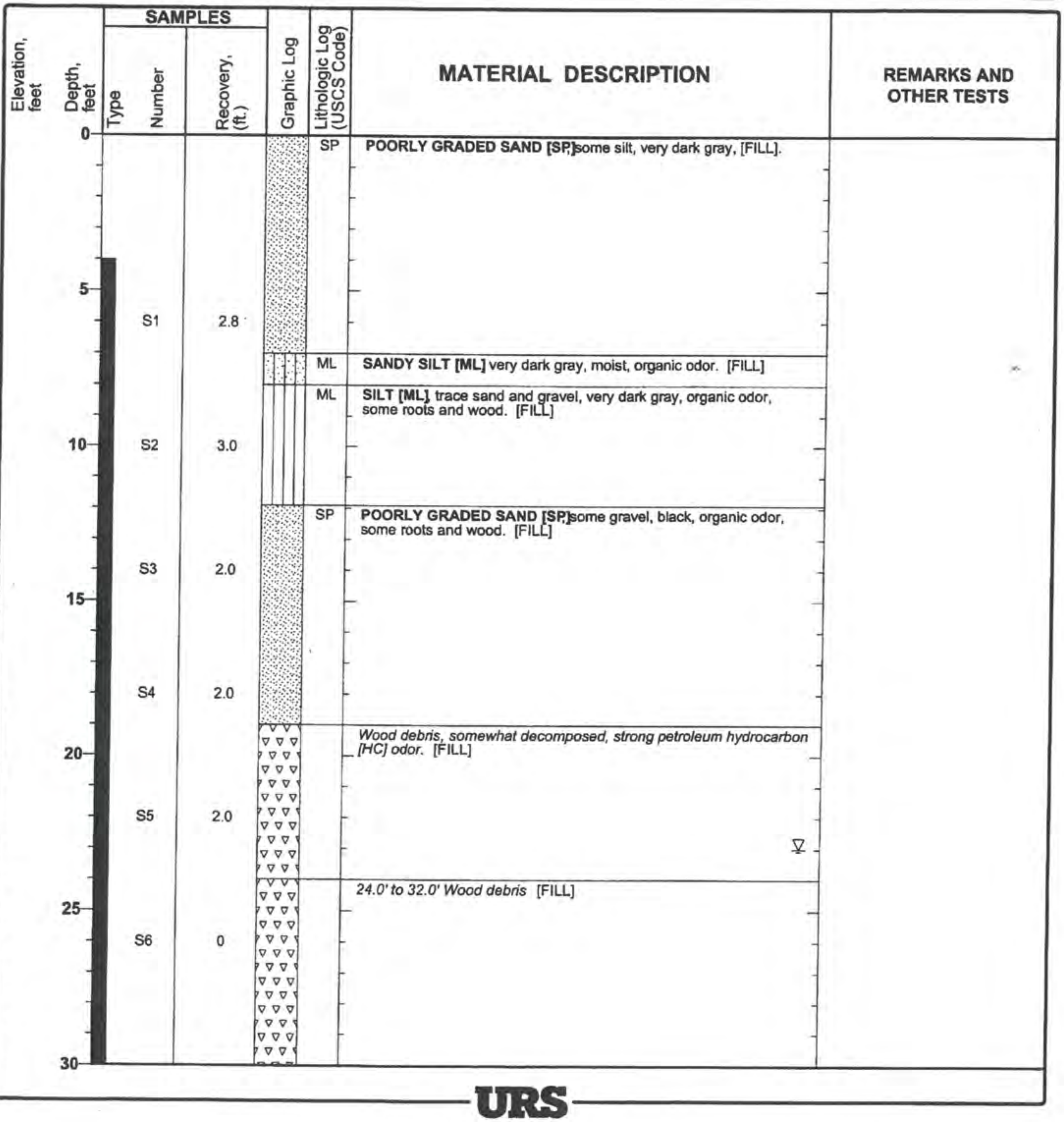
URS

**Project:** BP - T-22
**Project Location:** Portland, Oregon
**Project Number:** 38475873

# Log of Boring URS-GP-08

Sheet 1 of 2

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | 6/19/2003 | Logged By | GL | Checked By | JOD |
| Drilling Method | GeoProbe | Drill Bit Size/Type | N/A | Total Depth of Borehole | 32.0 feet |
| Drill Rig Type | GeoProbe | Drilling Contractor | ESN | Approximate Surface Elevation | N/A |
| Groundwater Level and Date Measured | 23.0 feet bgs | Sampling Method(s) | Dual Tube/Split Spoonspoon | Hammer Data | 158 lb |
| Borehole Backfill | Bentonite Grout | Location | | | |



| Elevation, feet | Depth, feet | SAMPLES Type | Number | Recovery, (ft.) | Lithologic Log (USCS Code) | MATERIAL DESCRIPTION | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|
| | 0 | | | | SP | **POORLY GRADED SAND [SP]** some silt, very dark gray, [FILL]. | |
| | 5 | | S1 | 2.8 | | | |
| | | | | | ML | **SANDY SILT [ML]** very dark gray, moist, organic odor. [FILL] | |
| | | | | | ML | **SILT [ML]** trace sand and gravel, very dark gray, organic odor, some roots and wood. [FILL] | |
| | 10 | | S2 | 3.0 | | | |
| | | | | | SP | **POORLY GRADED SAND [SP]** some gravel, black, organic odor, some roots and wood. [FILL] | |
| | | | S3 | 2.0 | | | |
| | 15 | | | | | | |
| | | | S4 | 2.0 | | | |
| | | | | | | *Wood debris, somewhat decomposed, strong petroleum hydrocarbon [HC] odor.* [FILL] | |
| | 20 | | | | | | |
| | | | S5 | 2.0 | | ∇ | |
| | | | | | | *24.0' to 32.0' Wood debris* [FILL] | |
| | 25 | | | | | | |
| | | | S6 | 0 | | | |
| | 30 | | | | | | |

Report: PORT NO_MC_DD_BC; File: BP - T22 BRAD.GPJ; 7/15/2005 URS-GP-08

URS

**Project:** BP - T-22
**Project Location:** Portland, Oregon
**Project Number:** 38475873

# Log of Boring URS-GP-08

Sheet 2 of 2

| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Recovery, (ft.) | Graphic Log | Lithologic Log (USCS Code) | MATERIAL DESCRIPTION | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| | 30 | ▮ | S7 | 0 | ▽ ▽ ▽ | | | |
| | | | | | | | Boring terminated at a depth of 32.0 feet bgs on 6/19/2003 and backfilled with bentonite grout upon completion. | |
| | 35 | | | | | | | |
| | 40 | | | | | | | |
| | 45 | | | | | | | |
| | 50 | | | | | | | |
| | 55 | | | | | | | |
| | 60 | | | | | | | |
| | 65 | | | | | | | |

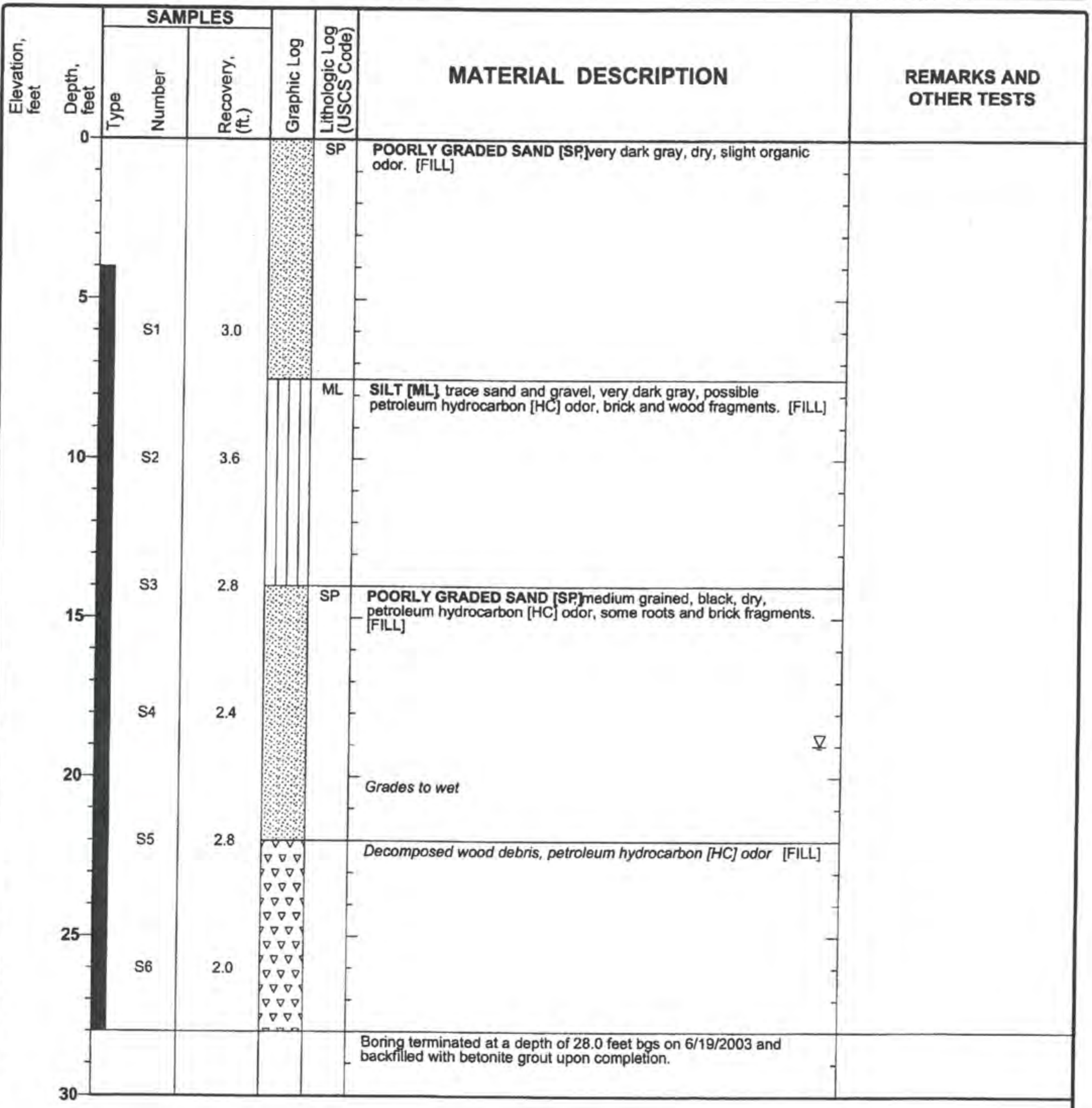
Report: PORT_ NO_MC_DD_BC; File: BP - T22 BRAD.GPJ; 7/15/2005 URS-GP-08

**Project:** BP - T-22
**Project Location:** Portland, Oregon
**Project Number:** 38475873

# Log of Boring URS-GP-09

Sheet 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | 6/19/2003 | Logged By | GL | Checked By | JOD |
| Drilling Method | GeoProbe | Drill Bit Size/Type | N/A | Total Depth of Borehole | 28.0 feet |
| Drill Rig Type | GeoProbe | Drilling Contractor | ESN | Approximate Surface Elevation | N/A |
| Groundwater Level and Date Measured | 19.0 feet bgs | Sampling Method(s) | Dual Tube/Split Spoon | Hammer Data | 158 lb |
| Borehole Backfill | Bentonite Grout | Location | | | |



| Elevation, feet | Depth, feet | Type | Number | Recovery, (ft.) | Graphic Log | Lithologic Log (USCS Code) | MATERIAL DESCRIPTION | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | SP | **POORLY GRADED SAND [SP]** very dark gray, dry, slight organic odor. [FILL] | |
| | 5 | | S1 | 3.0 | | | | |
| | | | | | | ML | **SILT [ML]**, trace sand and gravel, very dark gray, possible petroleum hydrocarbon [HC] odor, brick and wood fragments. [FILL] | |
| | 10 | | S2 | 3.6 | | | | |
| | | | S3 | 2.8 | | SP | **POORLY GRADED SAND [SP]** medium grained, black, dry, petroleum hydrocarbon [HC] odor, some roots and brick fragments. [FILL] | |
| | 15 | | | | | | | |
| | | | S4 | 2.4 | | | ∇ | |
| | 20 | | | | | | *Grades to wet* | |
| | | | S5 | 2.8 | | | *Decomposed wood debris, petroleum hydrocarbon [HC] odor* [FILL] | |
| | 25 | | S6 | 2.0 | | | | |
| | | | | | | | Boring terminated at a depth of 28.0 feet bgs on 6/19/2003 and backfilled with betonite grout upon completion. | |
| | 30 | | | | | | | |

**Project:** BP T22
**Project Location:** Portland, Oregon
**Project Number:** 38476051

# Log of Boring GB-5-2003

Sheet 1 of 3

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | 7/31/03 | Logged By | BJD | Checked By | JOD |
| Drilling Method | Hollow Stem Auger | Drill Bit Size/Type | 4 1/4" I.D. HSA | Total Depth of Borehole | 67.5 feet |
| Drill Rig Type | Truck Mounted CME 75 | Drilling Contractor | Cascade Drilling Inc. | Approximate Surface Elevation | 30 feet MSL |
| Groundwater Level and Date Measured | N/A | Sampling Method(s) | Split spoon/Dames & Moore | Hammer Data | 140lb Auto |
| Borehole Backfill | Bentonite Grout | Location | | | |

| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Sampling Resistance, Blows/12 in. | SAMPLES Recovery, (ft.) | Graphic Log | Lithologic Log (USCS Code) | MATERIAL DESCRIPTION | Moisture Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 | 0 | | | | | | | **AGGREGATE BASE ROCK**, 1" minus base rock with rounded 2" gravel on surface. | | | 1010 begin Vac, Vac to ~5.5' |
| | | | | | | | SM | **SILTY SAND [SM]**, ~20% silt, fine to medium grained, blackish-brown, moist, strong fuel odor. | | | |
| | | | | | | | SP | **POORLY GRADED SAND [SP]**, trace silt, fine to medium grained, sub angular, blackish-brown, loose, moist, strong fuel odor. | | | |
| 25 | 5 | ☒ | 1 | 6 | 1.5 | | SP-SM | **POORLY GRADED SAND WITH SILT [SP-SM]**, ~10% silt [in balls], loose. | | | Begin drilling @ 1040 |
| | | ■ | 2 | 19 | 1.5 | | SP-SM | **POORLY GRADED SAND WITH SILT [SP-SM]**, ~10-15% silt, fine to medium grained, sub angular, blackish-brown, loose, moist, strong fuel odor. | | | |
| 20 | 10 | ☒ | 3 | 11 | 1.25 | | | *Grades to medium dense* | 10.2 | | |
| | | ■ | 4 | 14 | 1.33 | | SP-SM | **POORLY GRADED SAND WITH SILT [SP-SM]**, ~10-15% silt, fine to medium grained, occasional coarse grain, sub angular, blackish-brown, loose, moist, fuel odor. | 17.2 | 91 | |
| 15 | 15 | ☒ | 5 | 6 | .67 | | GP | **POORLY GRADED GRAVEL WITH SAND [GP]**, ~20% sand, ~5% silt, fine to coarse grained, [clast up to 1"], subrounded, blackish-brown, loose, wet, fuel odor. | | | |
| | | | | | | | | *Wood encountered between 17.0' to 27.0' bgs, dark reddish brown, organic odor* | | | |
| | | ■ | 6 | 7 | .5 | | | | | | |
| 10 | 20 | ☒ | 7 | 6 | 1.25 | | | | | | |
| | | ■ | 8 | 108-8" | 1.17 | | | | 199.6 | | |
| 5 | 25 | | | | | | | | | | Difficult drilling 24-24.5' |

**Project:** BP T22
**Project Location:** Portland, Oregon
**Project Number:** 38476051

# Log of Boring GB-5-2003

Sheet 2 of 3

| Elevation, feet | Depth, feet | SAMPLES Type | Number | Sampling Resistance, Blows/12 in. | Recovery, (ft.) | Graphic Log | Lithologic Log (USCS Code) | MATERIAL DESCRIPTION | Moisture Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 25 | ☒ | 9 | 8 | .5 | | | *Wood encountered between 17.0' to 27.0' bgs, dark reddish brown, organic odor* | | | |
| | | ▥ | 10 | 9 | 1.5 | | ML | **SANDY SILT [ML]**, ~5% sand, fine grained, low plasticity, dark bluish-gray, medium stiff, wet. | | | |
| -5 | 30 | ☒ | 11 | 3 | 1.5 | | MH | **ELASTIC SILT [MH]**, ~5% sand, fine grained, low to medium plasticity, soft, dark-bluish gray, wet. | 54 | | |
| | | ▥ | 12 | 5 | 1.17 | | | *Grades to medium stiff* | 48.4 | 71.5 | |
| -10 | 35 | ☒ | 13 | 5 | 1.5 | | | *Grades to dark brown, medium stiff, some wood fragments* | | | |
| -15 | 40 | ▥ | 14 | 11 | 1.33 | | | *Larger wood fragments encountered* | 88.1 | 48.3 | |
| -20 | 45 | ☒ | 15 | 5 | 1.5 | | CL-ML | **SILTY CLAY [CL-ML]**, low plasticity, dark gray, medium stiff, wet. | 29 | | |
| | | | | | | | SM | **SILTY SAND [SM]**, ~40-50% silt, fine grained, dark bluish-gray, medium dense, wet | | | |
| -25 | 50 | ▥ | 16 | 37 | 1.25 | | | | 36.8 | 83.7 | |
| | | | | | | | SM | **SILTY SAND [SM]**, ~20% silt, fine grained, subangular to subrounded, dark gray, medium dense, wet. | | | |

**Project:** BP T22
**Project Location:** Portland, Oregon
**Project Number:** 38476051

# Log of Boring GB-5-2003

Sheet 3 of 3

| Elevation, feet | Depth, feet | SAMPLES Type | Number | Sampling Resistance, Blows/12 in. | Recovery, (ft.) | Graphic Log | Lithologic Log (USCS Code) | MATERIAL DESCRIPTION | Moisture Content, % | Dry Density, pcf | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | SM | **SILTY SAND [SM]**, ~20% silt, fine grained, subangular to subrounded, dark gray, medium dense, wet. | | | |
| -30 | 55 | ☒ | 17 | 20 | 1.5 | | | | 34.9 | | |
| | | | | | | | SM | **SILTY SAND [SM]**, ~30% silt, fine grained, subangular to subrounded, dark greenish gray, medium dense, wet. | | | |
| -35 | 60 | ■ | 18 | 45 | 1.5 | | | *In shoe mottled reddish brown, slight cementation, similar characteristics to above [grain sizes]. Stringer of cemented?* | | | Excess water in sampler-Heaving ? |
| | | | | | | | SP-SM | **PORLY GRADED SAND WITH SILT [SP-SM]**, ~10% silt, fine grained, subangular to subrounded, greenish-gray, medium dense, wet, [heaved sands?]. | | | Drilling resistance does not increase @ 61.5 |
| -40 | 65 | ☒ | 19 | 22 | 1.5 | | | | | | Drilling resistance increases @ 67' to refusal.<br>Finish 1630 |
| | | | 20 | 100-1" | | | GP | **POORLY GRADED GRAVEL WITH SAND [GP]**, ~25% sand, gravel fine to coarse grained [slough], dark gray to black, very dense, wet.<br>[Sample is broken up basalt fragments with sand similar to that above basalt is dark gray to black, very fine grained, appears to be fresh]. Basalt.<br>Boring terminated at a depth of 67.5' feet bgs on 7/31/2003 and backfilled with bentonite grout upon completion. | | | |
| -45 | 70 | | | | | | | | | | |
| -50 | 75 | | | | | | | | | | |
| -55 | 80 | | | | | | | | | | |

Report: PORT[illegible]C; File: BP - T22 GB.GPJ; 11/11/2005 GB-5-2003

| | |
|---|---|
| **Project:** BP Arco<br>**Project Location:** Linnton Plywood<br>**Project Number:** 38476060.0012301 | **Log of Boring NGP3**<br>Sheet 1 of 1 |

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | 02/18/2004 | Logged By | BPM | Checked By | DJD |
| Drilling Method | Geoprobe-Direct Push | Drill Bit Size/Type | N/A | Total Depth of Borehole | 32.0 feet |
| Drill Rig Type | Geoprobe | Drilling Contractor | CDI | Approximate Surface Elevation | N/A |
| Groundwater Level and Date Measured | 24.5 feet [bgs] | Sampling Method(s) | 4'x1 1/4" Macrocore | Hammer Data | N/A |
| Borehole Backfill | Bentonite Chips | Location | | | |

| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Recovery, (ft.) | Graphic Log | Lithologic Log (USCS Code) | MATERIAL DESCRIPTION | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | *No Observations between 0-12.0' [bgs]* | Surface Background Photoization Detecter Reading=0.5ppm |
| | 5 | | | | | | | |
| | 10 | | | | | | | |
| | | | | | | GP | **POORLY-GRADED GRAVEL WITH SAND [GW]**, trace silt, brick, glass, concrete, wood fragments, organic odor, [FILL]. | |
| | | | 1 | 1.25 | | | | |
| | 15 | | | | | | | |
| | | | | | | | *Hard Drilling between 16-19.0' [bgs], no recovery between 16-20.0' [bgs] wood stuck in shoe of drill rod* | |
| | | | 2 | 0.5 | | | | |
| | 20 | | | | | | *No recovery 20-24.0' [bgs] wood stuck in shoe of drill rod, Gasoline/Organic Odor* | |
| | | | 3 | 3.5 | | | | |
| | 25 | | | | | GP | **GRAVEL WITH WOOD [GW]**, petroleum stained soil, strong Hydrocarbon odor, saturated. ∇ | |
| | | | | | | ML | **SILT WITH SAND [ML]**, ~15-25% sand, trace clay, low to medium plasticity, very dark gray to green, soft, moist, slight to moderate gasoline odor. [Fine-Grained Quaternary Alluvium]<br>*~10% Clay encountered between 30-31.0'* | Collect Soil Sample GP3-021804 @ 28.0', petroleum stained soil/wood to 29.5' |
| | 30 | | | | | | | |
| | | | | | | | Boring terminated at 32.0 feet [bgs] on 02/18/2004. Set a tempoary well point from 24-28.0 feet. Collected groundwater sample and sample duplicate.<br>Backfilled boring with bentonite chips upon completion. | |
| | 35 | | | | | | | |

URS

**Project:** BP Arco
**Project Location:** Linnton Plywood
**Project Number:** 38476060.0012301

# Log of Boring NGP4

Sheet 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | 02/18/2004 | Logged By | BPM | Checked By | DJD |
| Drilling Method | Geoprobe-Direct Push | Drill Bit Size/Type | N/A | Total Depth of Borehole | 32.0 feet |
| Drill Rig Type | Geoprobe | Drilling Contractor | CDI. | Approximate Surface Elevation | N/A |
| Groundwater Level and Date Measured | 21.5 feet [bgs] | Sampling Method(s) | 4'x1 1/4" Macrocore | Hammer Data | N/A |
| Borehole Backfill | Bentonite Chips | Location | | | |

| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Recovery, (ft.) | Graphic Log | Lithologic Log (USCS Code) | MATERIAL DESCRIPTION | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| | 0 | ▨ | 1 | 3.0 | | SP | **POORLY GRADED SAND [SP]**, medium to coarse grained, brownish gray [10YR 3/1], soft, moist. No Hydrocarbon Odor. [FILL]<br>*Poor recovery. [slough]* | |
| | 5 | ▨ | 2 | 0.5 | | GP | **POORLY-GRADED GRAVEL [GW]**, coarse grained, dark gray, hard, moist to wet. [FILL]<br>*Wood debris at 6.5' [bgs]* | |
| | 10 | ▨ | 3 | 2.5 | | SP | **POORLY-GRADED SAND WITH GRAVEL [SW]**, sand and gravel coarse grained. [FILL]<br>*Brick Fragments and increase in Silt content 11-12.0' [bgs]* | Refusal @ 9.0', moved boring south 5.0'. |
| | 15 | ▨ | 4 | 2.2 | | | *Brick encountered at 15.0' [bgs]* | |
| | | ▨ | 5 | 3.2 | | SP | **POORLY GRADED SAND [SP]**, trace gravel, brick, medium dense. [FILL]<br>*Brick encountered at 18.0' [bgs]* | |
| | 20 | ▨ | 6 | 4.0 | | | ∇<br>*At 22-23.0' [bgs] increase in Silt content, fine to medium grained sand, trace coarse gravel, saturated.* | |
| | 25 | ▨ | 7 | 2.2 | | | | |
| | | | | | | SM | **SILTY SAND [SM]**, sand is fine grained, dark gray [2.5 4/1], soft, [wood fragments at 28.4']. No Hydrocarbon Odor. [FILL] | |
| | 30 | ▨ | 8 | 4.0 | | ML | **SILT [ML]**, trace clay, medium to low plasticity, gray [4/10 GY]. soft. [Fine-Grained Quaternary Alluvium] | |
| | | | | | | | Boring terminated at 32.0 feet [bgs] on 02/18/2004. Set a temporary Well screen between 23-27.0', boring pumped dry. Boring backfilled with bentonite chips upon completion. | |
| | 35 | | | | | | | |

URS

**Project:** BP Arco
**Project Location:** Linnton Plywood
**Project Number:** 38476060.0012301

# Log of Boring NGP5

Sheet 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | 02/17/2004 | Logged By | BPM | Checked By | DJD |
| Drilling Method | Geoprobe-Direct Push | Drill Bit Size/Type | N/A | Total Depth of Borehole | 32.0 feet |
| Drill Rig Type | Geoprobe | Drilling Contractor | CDI | Approximate Surface Elevation | N/A |
| Groundwater Level and Date Measured | Not Encountered | Sampling Method(s) | 4'x1 1/4" Macrocore | Hammer Data | N/A |
| Borehole Backfill | Bentonite Chips | Location | | | |

| Elevation, feet | Depth, feet | SAMPLES Type | Number | Recovery, (ft.) | Graphic Log | Lithologic Log (USCS Code) | MATERIAL DESCRIPTION | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| | 0 | ○ | 1 | 0.0 | | | *Surface PID Reading= 9.4ppm*<br>*No Recovery 0-4.0' [bgs], rock stuck in the shoe* | |
| | 5 | ▒ | 2 | 4.0 | | SP | **POORLY GRADED SAND [SP]**, sand is coarse grained, brownish gray, loose, moist. No Hydrocarbon Odor. [FILL] | |
| | | | | | | SM | **SILTY SAND [SM]**, sand is fine grained, medium dense, moist. No Hydrocarbon Odor. [FILL] | |
| | 10 | ▒ | 3 | 1.0 | | ML | **SANDY SILT [ML]**, soft, moist. [FILL] | |
| | | | | | | SM | **SILTY SAND [SM]**, brown to gray, wood fragments <1" in dia., soft to medium stiff, moist. No Hydrocarbon Odor. [FILL] | |
| | 15 | ○ | 4 | 0.0 | ▽ | | *Wood Debris to ~26.0', No Recovery between 12-26.0' [bgs], 20-24.0' wood fragment with greenish gray, medium to coarse grained sand.* [FILL] | Collect Soil Sample GP5-021704 @ 11-12.0' |
| | | ○ | 5 | 0.0 | ▽ | | | Refusal @ 16.0', moved boring 5' south. |
| | 20 | ○ | 6 | 0.0 | ▽ | | | |
| | 25 | ○ | 7 | 1.5 | ▽ | | | |
| | | | | | | SP | **POORLY GRADED SAND WITH SILT [SP]**, dark brown, wood debris, moist to wet. Strong Hydrocarbon Odor. [FILL] | Shut the Geoprobe rig down for ~40 minutes due to lighting<br>Collect Soil Sample GP5-021704 @ 27-28.0' [bgs], strong Hydrocarbon Odor |
| | 30 | ▒ | 8 | 2.5 | | ML | **SILT [ML]**, greenish gray, soft, moist to dry, <5% organics, slight organic odor, [roots, wood fragments <1/4"]. [Fine-Grained Quaternary Alluvium] | |
| | 35 | | | | | | Boring terminated at 32,0' [bgs] on 01/17/2004 and was backfilled with bentonite chips uopn completion. No Groundwater sample collected due to surface water encroachment [puddle] around borehole. | |

Report: POR[illegible]O_NO_MC_DD_BC; File: BP - T22 LINNTON PLYWOOD.GPJ; 11/11/2005 NGP5

**Project:** BP Arco
**Project Location:** Linnton Plywood
**Project Number:** 38476060.0012301

# Log of Boring NGP6

Sheet 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | 02/18/2004 | Logged By | BPM | Checked By | DJD |
| Drilling Method | Geoprobe-Direct Push | Drill Bit Size/Type | N/A | Total Depth of Borehole | 29.0 feet |
| Drill Rig Type | Geoprobe | Drilling Contractor | CDI | Approximate Surface Elevation | N/A |
| Groundwater Level and Date Measured | Not Encountered | Sampling Method(s) | 4'x1 1/4" Macrocore | Hammer Data | N/A |
| Borehole Backfill | Bentonite Chips | Location | | | |

| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Recovery, (ft.) | Graphic Log | Lithologic Log (USCS Code) | MATERIAL DESCRIPTION | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | *No Observations between 0-16.0' [bgs]* | |
| | 5 | | | | | | | |
| | 10 | | | | | | | |
| | 15 | | | | | | | |
| | | ▨ | 1 | 3.25 | ▥ | ML | **SILT [ML]**, trace fine grained sand and gravel, very dark gray [2.5 YR 3/1], soft, moist to dry. No Hydrocarbon Odor. [FILL]<br>*Grades to Medium Stiff* | |
| | 20 | ▨ | 2 | 4.0 | | SP | *Brick encountered at 20.0' [bgs]*<br>**POORLY GRADED SAND [SP]**, medium to coarse grained, loose, saturated [perched water?]. No Hydrocarbon Odor. [FILL]<br>*Moist @ 22-24.0' [bgs]*<br>*~15% coarse grained Gravel, loose, saturated* | Collect Soil Sample GP6-021804 @ 22-24.0' [bgs] and Soil Sample Duplicate GP6A-021804 2 @22-24.0' [bgs] |
| | 25 | ▨ | 3 | 3.25 | | | | |
| | | ▨ | 4 | 1.0 | ░ | SP | **POORLY GRADED SAND WITH GRAVEL [SP]**, ~65% sand, 30% gravel, trace silt, sand is fine grained, weakly coherant, loose, soft. No Hydrocarbon Odor. [FILL]<br>*Refusal at 29.0' [bgs], due to cobble and wood in shoe*<br>Boring terminated at 29.0 feet [bgs] on 02/18/2004. Set a temporary Well Point betweeen 23-27.0'. Well Point Dry.<br>Returned on 02/19/2004, boring is still dry, pulled up 4.0' boring still dry. Backfilled with bentonite chips. | |
| | 30 | | | | | | | |
| | 35 | | | | | | | |

Report: POR _NO_MC_DD_BC; File: BP - T22 LINNTON PLYWOOD.GPJ; 11/11/2005 NGP6

URS

**Project:** BP Arco
**Project Location:** Linnton Plywood
**Project Number:** 38476060.0012301

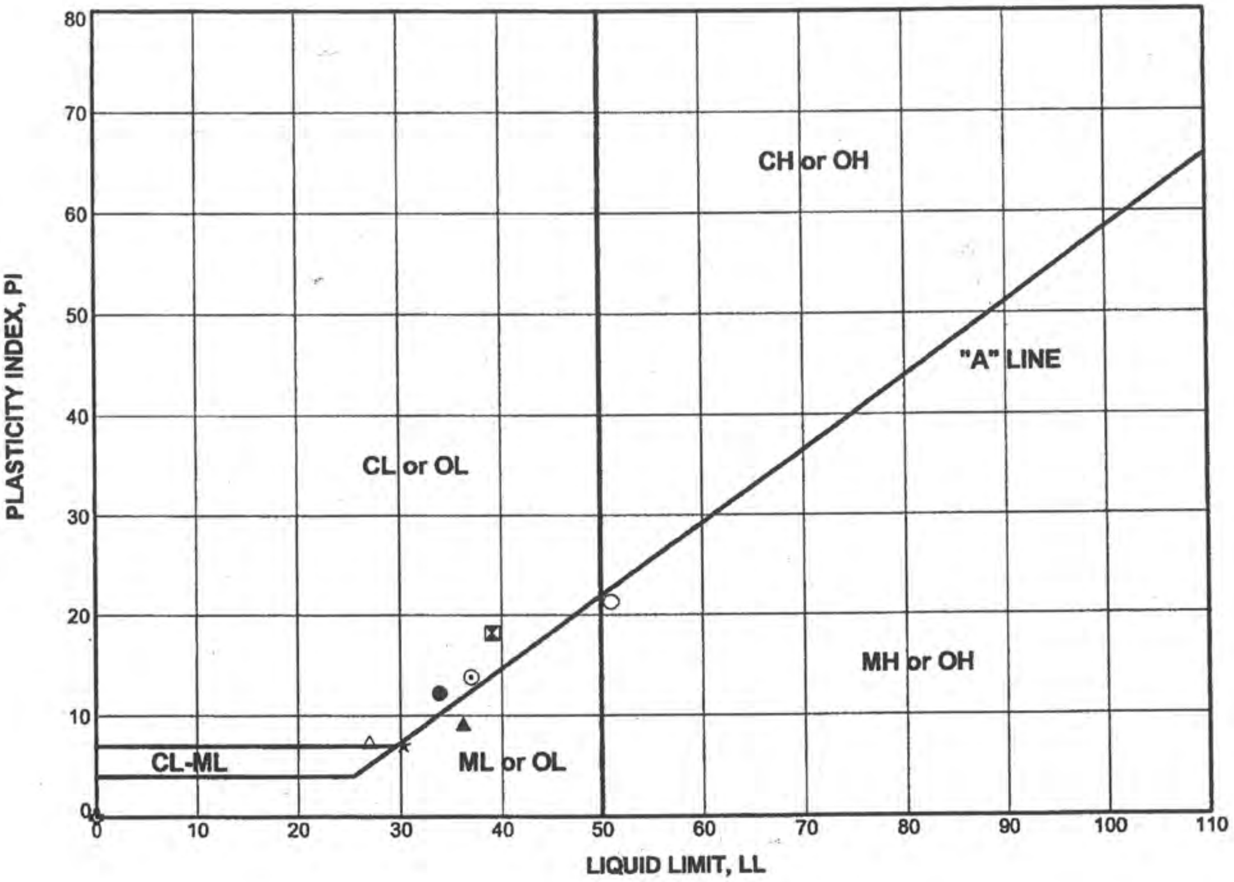
# Log of Boring LPMW-1-2004

Sheet 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | 02/26/2004 | Logged By | BPM | Checked By | DJD |
| Drilling Method | Limited Access, Hollow Stem Auger | Drill Bit Size/Type | 6 1/4" Augers | Total Depth of Borehole | 33.0 feet |
| Drill Rig Type | HSA | Drilling Contractor | CDI | Approximate Surface Elevation | N/A |
| Groundwater Level and Date Measured | 18.5 feet [bgs] | Sampling Method(s) | Grab from Auger Flights | Hammer Data | N/A |
| Borehole Backfill | Monitoring Well Installed | Location | | | |

| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | SAMPLES Recovery, (ft.) | Graphic Log | Lithologic Log (USCS Code) | MATERIAL DESCRIPTION | REMARKS AND OTHER TESTS |
|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | SP | *Soil observations based on Grab Samples from Auger Flights. Blind Drilled Site GP-7*<br>**POORLY GRADED SAND [SP]**, well sorted, non coherant, black [10YR 2/1], loose, dry to moist. No Hydrocarbon Odor. [FILL] | Vacu-Dig 0.0-5.0' |
| | 5 | | | | | | *At ~5.0' Increase in Silt content* | |
| | 10 | | | | | | | |
| | | | | | | SW | **WELL-GRADED SAND WITH GRAVEL [SW]**, gravel fine to coarse grained, with wood debris. [FILL]<br>*Driller reports gravel or cobbles ~12.0' [bgs], able to drill through with ease* | |
| | 15 | | | | | | | |
| | | | | | | | ∇ | |
| | 20 | | | | | SW-SM | **WELL-GRADED SAND WITH SILT [SP-SM]**, ~30% wood debris, gravel, concrete, [FILL]. Hydrocarbon Odor. | |
| | 25 | | | | | | | |
| | | | | | | ML | **SANDY SILT [ML]**, trace clay, gray [4/10 GY], soft. Hydrocarbon Odor. [Fine-Grained Quaternary Alluvium] | |
| | 30 | | | | | | *Driller reports soft drilling at ~30-32.0'* | |
| | | | | | | | Boring terminated at 33.0 feet [bgs] on 02/262004. Set a 2" diameter sch. 40 PVC Monitoring Well within Borehole. [See attatched Well schematic]. | |
| | 35 | | | | | | | |

URS



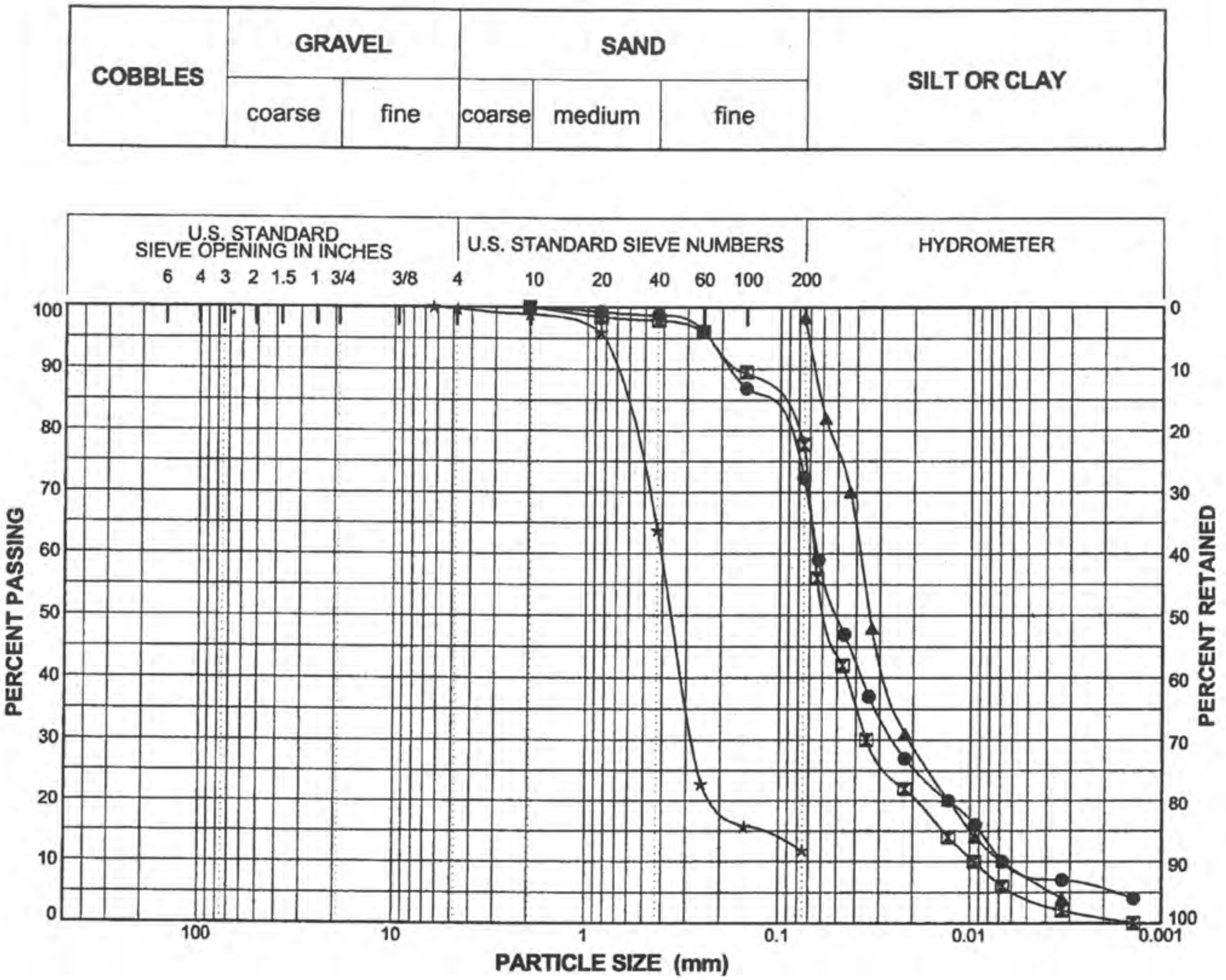
| Boring ID | Sample # | Depth (feet) | Symbol | Sample Moisture % | LL | PL | PI | Classification |
|---|---|---|---|---|---|---|---|---|
| GB-1-2003 | 13 | 35.0-36.5 | ● | | 34 | 22 | 12 | Lean Clay [CL] |
| GB-2-2003 | 11 | 30.0-31.5 | ⧗ | 37.6 | 39 | 21 | 18 | Lean Clay [CL] |
| GB-2-2003 | 14 | 40.0-41.5 | ▲ | 37.8 | 36 | 27 | 9 | Silt [ML] |
| GB-4-2003 | 1 | 5.0-6.5 | ★ | 24.3 | 30 | 23 | 7 | Silt w/Sand [ML] |
| GB-4-2003 | 11 | 30-31.5 | ⊙ | 40.8 | 37 | 23 | 14 | Lean Clay [CL] |
| GB-5-2003 | 3 | 10.0-11.5 | ✤ | 10.2 | NP | NP | NP | Poorly Graded Sand w/Silt [SP-SM] |
| GB-5-2003 | 11 | 30.0-31.5 | ○ | 54 | 51 | 30 | 21 | Elastic Silt [MH] |
| GB-5-2003 | 15 | 45.0-46.5 | △ | 29 | 27 | 20 | 7 | Lean Clay [CL] |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Report: ATTERBERG_PLOT_12 PTS; File: BP - T22 GB.GPJ; 11/11/2005 GB-5-2003

**BP T22**
**Portland, Oregon**
**38476051**

## PLASTICITY CHART

URS



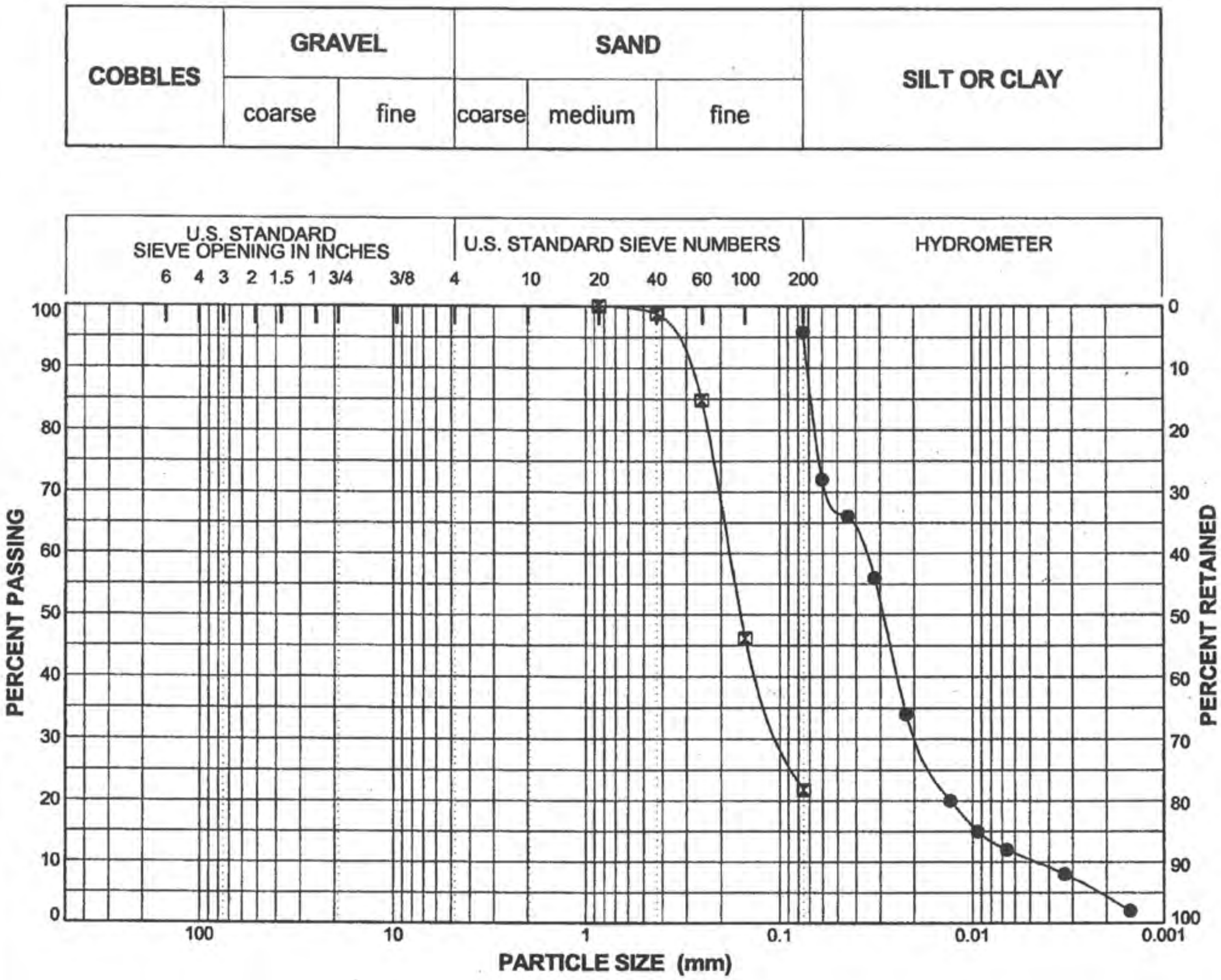
| Boring ID | Sample # | Depth (feet) | Sample Moisture (%) | Dry Density (lbs/ft³) | Symbol | LL | PI | % G | % S | % F | Classification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GB-4-2003 | 1 | 5.0-6.5 | 24.3 | | ● | 30 | 7 | 0.0 | 27.7 | 72.3 | Silt w/Sand [ML] |
| GB-4-2003 | 5 | 15-16.5 | 31.4 | | ⊠ | | | 0.0 | 22.3 | 77.7 | Silty Sand [SM] |
| GB-4-2003 | 11 | 30-31.5 | 40.8 | | ▲ | 37 | 14 | | | 98.4 | Lean Clay [CL] |
| GB-5-2003 | 3 | 10.0-11.5 | 10.2 | | ★ | NP | NP | 0.3 | 87.9 | 11.8 | Poorly Graded Sand w/Silt [SP-SM] |

**BP T22**
**Portland, Oregon**
**38476051**

## PARTICLE SIZE DISTRIBUTION CURVES

URS

Report: SIEVE_4_PORT; File: BP - T22 GB.GPJ; 11/11/2005 GB-5-2003



| Boring ID | Sample # | Depth (feet) | Sample Moisture (%) | Dry Density (lbs/ft$^3$) | Symbol | LL | PI | % G | % S | % F | Classification |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GB-5-2003 | 11 | 30.0-31.5 | 54 | | ● | 51 | 21 | | | 95.8 | Elastic Silt [MH] |
| GB-5-2003 | 17 | 55.0-56.5 | 34.9 | | ☒ | | | 0.0 | 78.2 | 21.8 | Silty Sand [SM] |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Report: SIEVE_4_PORT; File: BP - T22 GB.GPJ; 11/11/2005 GB-5-2003

**BP T22**
**Portland, Oregon**
**38476051**

## PARTICLE SIZE DISTRIBUTION CURVES

URS

**Northwest Testing, Inc.**
A Division of Northwest Geotech, Inc.
9120 SW Pioneer Court, Suite B • Wilsonville, Oregon 97070 503/682-1880 FAX: 503/682-2753

# TECHNICAL REPORT

| | | | |
|---|---|---|---|
| **Report To:** | Mr. Tim Ritcher<br>URS Corporation<br>111 SW Columbia, Suite 900<br>Portland, Oregon 97201 | **Date:**<br>**Lab No.:** | 11/17/05<br>05-473 |
| **Project:** | Laboratory Testing | **Project No.:** | 1179.1.1 |

**Report of:** Atterberg limits, direct shear, and gradation test results.

## Sample Identification

As requested, NTI determined Atterberg limits, direct shear, and gradation on samples of soil delivered to our laboratory on October 4, 2005 by a URS Corporation representative. All testing was performed in general accordance with the methods indicated. Our laboratory's test results are summarized on the following table and attached pages.

**Note:** Samples from GB-1 contain wood particles throughout the rings. NTI was unable to obtained enough material to test.

### Laboratory Test Results

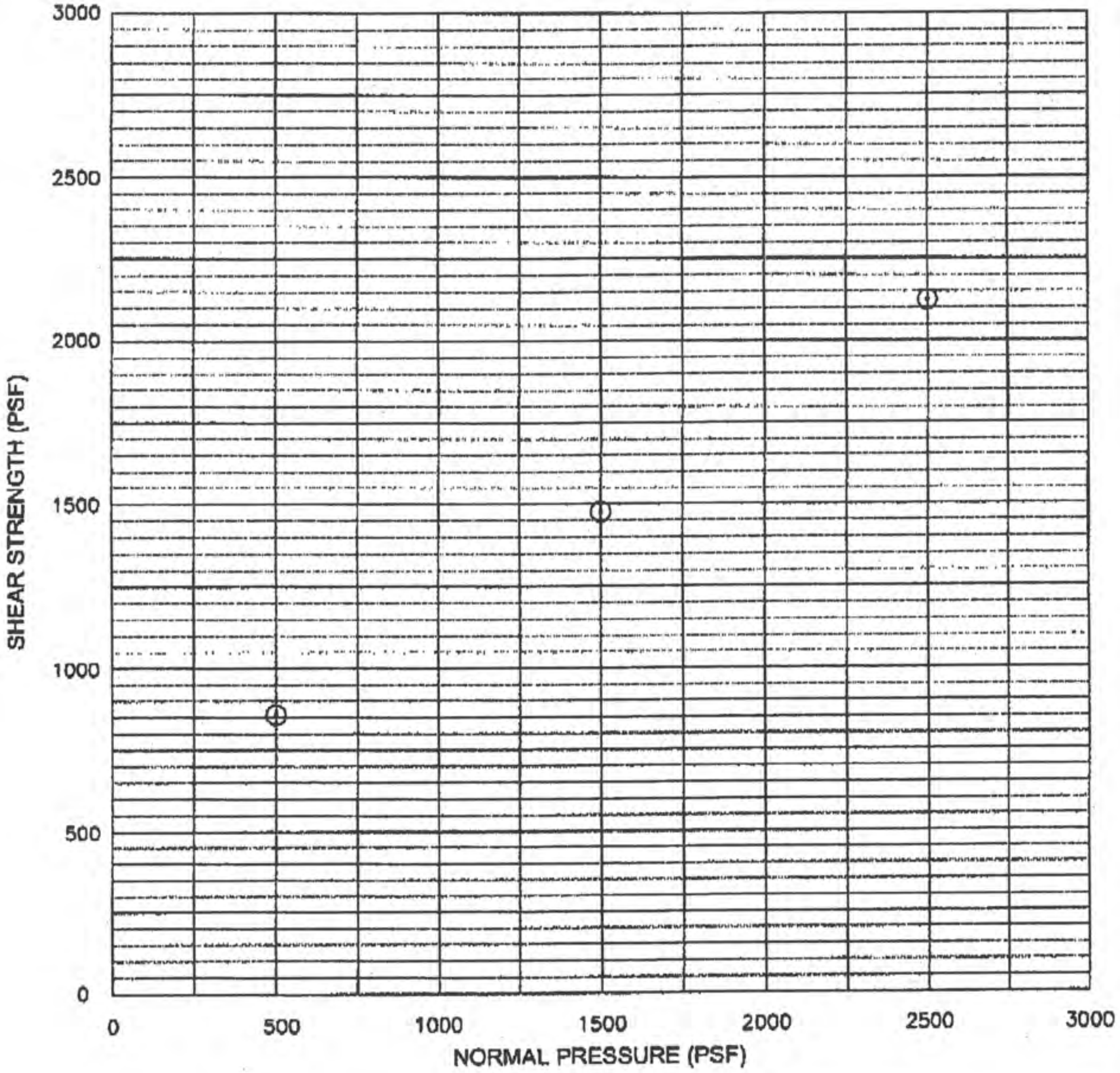
| | Atterberg Limits (ASTM D 4318) | | |
|---|---|---|---|
| Sample ID | Liquid Limit | Plastic Limit | Plasticity Index |
| GB-2, S-4 @ 12.5'-14' | NP | NP | NP |
| GB-2, S-6 @ 17.5'-19' | NP | NP | NP |
| GB-3, S-4 | NP | NP | NP |
| GB-3, S-14 | NP | NP | NP |
| GB-4, S-6 | 38 | 25 | 13 |
| GB-4, S-12 @ 32'-34' | 39 | 24 | 15 |
| GB-5, S-16 | 37 | 23 | 14 |

**Attachments:** Direct Shear Results
Gradation Test Results

**Copies:** Addressee, (facsimile)

This report shall not be reproduced except in full, without written approval of Northwest Testing, Inc.

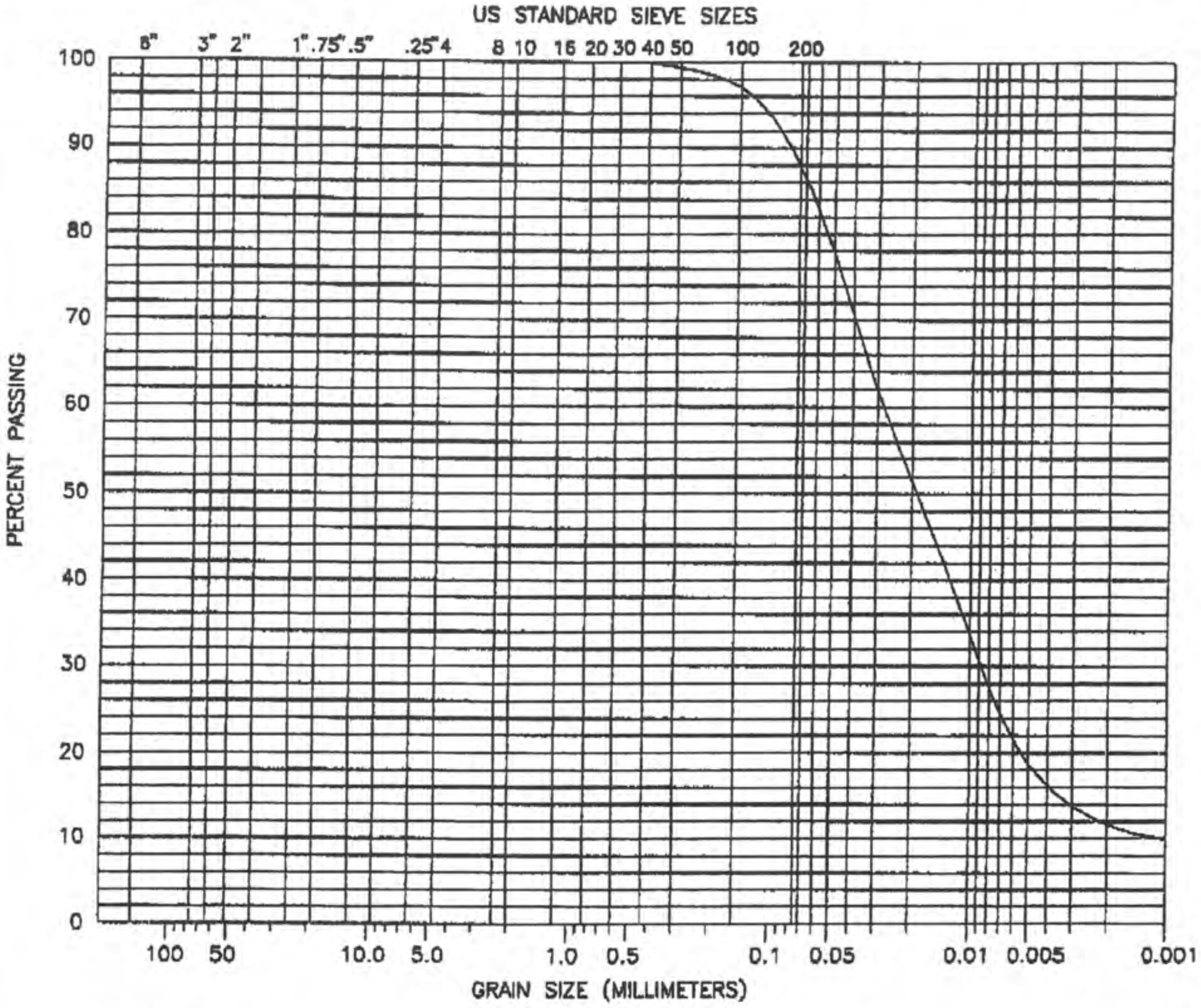
REVIEWED BY: Bridgett Adams



| SYMBOL | SAMPLE LOCATION | COHESION (psf) | FRICTION ANGLE | REMARKS |
|---|---|---|---|---|
| —— | GB-5, S-16 | – | – | SATURATED, UNDISTRUBED |

# DIRECT SHEAR TEST RESULTS

| | | |
|---|---|---|
| PROJECT NO. 1179.1.1 | URS CORPORATION<br>LABORATORY TESTING | LAB NO. 05-473 |



| COBBLES | GRAVEL | | SAND | | | SILT AND CLAY |
|---|---|---|---|---|---|---|
| | COARSE | FINE | COARSE | MEDIUM | FINE | |

| SYMBOL | SAMPLE LOCATION | FIELD MOISTURE (%) | % PASSING NO. 200 SIEVE | % PASSING $2\mu$ | UNIFIED SOIL CLASSIFICATION |
|---|---|---|---|---|---|
| — | GB-5 S-16 | -- | 88 | 12 | -- |

# GRADATION TEST RESULTS

| | | |
|---|---|---|
| PROJECT NO. 1179.1.1 | URS CORPORATION<br>LABORATORY TESTING | LAB NO. 05-473 |

# Exhibit D. Wetland Reconnaissance Report (Grette Associates)

# WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

This form must be included with any wetland delineation report submitted to the Department of State Lands for review and approval. A wetland delineation report submittal is not “complete” unless the fully completed and signed report cover form and the required fee are submitted. Attach this form to the front of an unbound report or include a hard copy of the completed form with a CD/DVD that includes a single PDF file of the report cover form and report (minimum 300 dpi resolution) and submit to: **Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279.** A single PDF attachment of the completed cover from and report may be e-mailed to **Wetland_Delineation@dsl.state.or.us**. For submittal of PDF files larger than 10 MB, e-mail instructions on how to access the file from your ftp or other file sharing website. Fees can be paid by check or credit card. Make the check payable to the Oregon Department of State Lands. To pay the fee by credit card, call 503-986-5200.

☐ Applicant ☒ Owner Name, Firm and Address:
**Rob Marinai; Linnton Water Credits, LLC**
**337 17th Street, Suite 200**
**Oakland, CA 94612**

Business phone # **(510) 326-7131**
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E-mail: **robm@restorcap.net**

☒ Authorized Legal Agent, Name and Address:
**Glenn Grette; Grette Associates**
**151 South Worthen, Suite 101**
**Wenatchee, WA 98801**

Business phone # **(509) 663-6300**
Mobile phone #
E-mail: **glenng@gretteassociates.com**

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.

Typed/Printed Name: **Glenn Grette** Signature: Glenn E Grette
Date: **3/7/16** Special instructions regarding site access:

**Project and Site Information** (using decimal degree format for lat/long.,enter centroid of site or start & end points of linear project)

Project Name: **Linnton Mill Restoration Site** Latitude: **45.59747°** Longitude: **-122.78245°**

Proposed Use: **Restoration Site**

Tax Map # **1N 1W 2C**

Project Street Address (or other descriptive location):
**10504 NW St Helens Rd**

City: **Portland** County: **Multnomah**

Township **1N** Range **1W** Section **2** QQ **C**
Tax Lot(s) **TL 100 and 200**

Waterway: **Willamette River (adj)** River Mile: **4.7**
NWI Quad(s): **Linnton**

**Wetland Delineation Information**

Wetland Consultant Name, Firm and Address:
**Jay Dirkse; Grette Associates**
**151 South Worthen St., Suite 101**
**Wenatchee, WA 98801**

Phone # **(509) 663-6300**
Mobile phone #
E-mail: **jayd@gretteassociates.com**

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.

Consultant Signature: Jay D
Date: **3/7/16**

**Primary Contact** for report review and site access is ☒ Consultant ☐ Applicant/Owner ☒ Authorized Agent

Wetland/Waters Present? ☐ Yes ☒ No Study Area size: **21.6** Total Wetland Acreage: **N/A**

**Check Box Below if Applicable:**

☐ R-F permit application submitted
☒ Mitigation bank site
☐ Wetland restoration/enhancement project (not mitigation)
☐ Industrial Land Certification Program Site
☐ Reissuance of a recently expired delineation
Previous DSL # Expiration date _____

**Fees:**

☐ Fee payment submitted **$**
☐ Fee ($100) for resubmittal of rejected report
☐ No fee for request for reissuance of an expired report

| **Other Information:** | Y | N | |
|---|---|---|---|
| Has previous delineation/application been made on parcel? | ☐ | ☒ | If known, previous DSL # |
| Does LWI, if any, show wetland or waters on parcel? | ☐ | ☒ | |

**For Office Use Only**

DSL Reviewer: _______________ Fee Paid Date: _____ / _____ / _____ DSL WD # _______________
Date Delineation Received: ___ / ____ / ____ DSL Project # _____________ DSL Site # _______________
Scanned: ☐ Final Scan: ☐ DSL WN # ________________ DSL App. # _______________

# Linnton Water Credits LLC

# Linnton Mill – Wetland Determination Report

Prepared for:

**Linnton Water Credits, LLC**
337 17th Street, Suite 200
Oakland, CA 94612

Submitted to:

**Linnton Water Credits, LLC**
ATTN: Rob Marinai
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Prepared by:

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Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

# Linnton Water Credits LLC

# Linnton Mill – Wetland Determination Report

Revised March 7, 2016

Chad Wallin
Biologist

Date

Revised March 7, 2016

Jay Dirkse
Biologist

Date

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

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# 1 INTRODUCTION

Grette Associates, LLC conducted a wetland reconnaissance at the Linnton Mill site on February 2, 2015, as well as a follow-up site visit on December 16, 2015. The Linnton Mill site is located at 10504 NW St. Helens Rd, in Portland, Oregon, in Section 2, Township 1 North, Range 1 West W.M. The study area encompasses the entire Linnton Mill site, approximately 21.6 acres (Appendix A). Per Oregon Administrative Rule 141-090-0035-13(b), an assessors tax lot map is attached in Appendix A (State of Oregon 2015). The Tax Lot numbers for the site are 100 and 800.

Grette Associates wetland specialists collected data at six sample locations within the Linnton Mill site to evaluate conditions within potential wetland areas. Data were collected using the criteria defined in the U.S. Army Corps of Engineers (USACE) *1987 Wetland Delineation Manual* (1987) and the USACE *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (2010). Based on the results, no jurisdictional wetland or water features were identified within the Linnton Mill site. A reconnaissance map identifying data sample locations is presented in Appendix A and field datasheets are presented in Appendix B.

## 1.1 Contact Information

| **Applicant/Owner:** | **Report preparers** | |
|---|---|---|
| Linnton Water Credits, LLC | Grette Associates LLC | Grette Associates LLC |
| ATTN: Rob Marinai | ATTN: Chad Wallin | ATTN: Jay Dirkse |
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# 2 SITE DESCRIPTION

## 2.1 Landscape Setting and Land Use

The Linnton Mill site is located on the western bank of the Willamette River in the Norwest Industrial district of Portland, Oregon (Appendix A; Figures 1-8). The study area is approximately 21.6 acres in size and is bordered by Portland Western Railroad and the Willamette River. The neighboring sites are fully developed and are utilized for private industry.

Vegetation within the Linnton Mill site is limited due to the development of the site. The shoreline consists of a scrub-shrub vegetation community that is dominated by Himalayan blackberry (*Rubus armeniacus*), willows (*Salix spp.*), red alder (*Alnus rubra*), and black cottonwood (*Populus balsamifera*). The remaining vegetated area is above the river bank in the southern portion of the site. This area consists of an herbaceous and shrub vegetation community that is dominated by rushes (*Juncus spp.*), velvetgrass (*Holcus lanatus*), bluegrass (*Poa spp.*), scotch broom (*Cytisus scoparius*) and willows.

The Linnton Mill is no longer operational. Currently, the site is not being utilized for industrial purposes. The Linnton Mill site is comprised of a dilapidated plywood mill and maritime pier, paved and gravel roadways and parking areas, paved and gravel storage areas, and unmaintained vegetated areas. Undeveloped portions of the Linnton Mill site are limited to the southern area of the site.

## 2.2 Site Alteration

The site consists of a flat, high-bank area at the top of a steep, armored Willamette River bank. The flat upland and over-steepened banks were created with fill decades ago. There is no indication that the site was created by fill placed in the Willamette River (i.e. former waters of the U.S.) , but rather was created by fill placed in uplands to raise the elevation to be usable, flat, waterfront industrial property.

On this flattened riverfront upland, the northern (downstream) portion of the Linnton Mill has been used as a plywood manufacturing facility since 1951. The mill produced an assortment of plywood products. Products and manufacturing supplies were transported to and from the site via railway, truck, and ship. While in operation, this portion of the Linnton Mill site did not undergo significant site alterations. The buildings and infrastructure of this operation are still present, though the operations have ceased.

Beginning in 1997, the southern (upstream) portion of the site was used for stockpiling and distributing clean sand dredged from the Columbia River (CH2M Hill 2007). As the sand apparently contained little water, Willamette River water was added to slurry the sand off the barges. The sand was then placed in the upland for a two-stage dewatering process, which included several man-made settling ponds, constructed from uplands, in the riverward portion of the site (CH2M Hill 2007). The Linnton Mill held an NPDES permit (NPDES IW-B16 Permit #102452) to discharge the process water back into the Willamette River. The discharge pipe has been removed since operations ceased. Large sand stockpiles were located in the landward portion of this site. This operation ceased between 2011 and 2012 and the site was filled/graded relatively flat, though shallow, localized depressions exist.

In addition, two drainages have been piped under the property and daylight on the Willamette River shoreline. It is unknown when the piping occurred, but likely several decades ago. Site conditions within the Linnton Mill site between 2012 and 2014 have not changed significantly.

## 2.3 Precipitation Data and Analysis

On February 2, the day of the site assessment, the weather station at the Portland International Airport (Station 24229, Lat. 45.596º N, Lon. 122.609º W) recorded 0.38 inch of rainfall (NRCS 2015a). In the 14 days preceding the site assessment (January 19-February 1), an additional 0.41 inch of rainfall was recorded at the station (NRCS 2015a and NRCS 2015b). The nearest City of Portland HYDRA Rainfall Network rain gage—the Shipyard Rain Gage, directly across the Willamette River from the site—recorded 0.61 inch on the day of the site assessment, all prior to the site visit that day (City of Portland 2015). This gage recorded 0.49 inch over the 14 days prior to the site assessment. On the day of the follow-up site assessment on December 16, 0.10 inch and

0.15 inch were recorded at the two stations, respectively, and the previous 14 days' precipitation was 9.82 inches and 11.11 inches, respectively.

The total precipitation from October 1, 2014 through February 2, 2015 (18.91 inches) was approximately 98 percent of the normal rainfall (19.25 inches) that occurs during the same time period (NOAA 2015). Therefore, precipitation levels are considered to be normal for the purpose of evaluating hydrological conditions on the site. The average rainfall within the last seven Water Years was 42.77 inches. Table 1 below presents an analysis of the appropriate NRCS WETS table (NRCS 2015c) for the three months preceding the field investigation.

**Table 1. NRCS WETS table analysis**

| **Preceding Month** | **WETS Rainfall Percentile (inches)** | | **Measured Rainfall[1] (inches)** | **Conditions[2]** | **Condition Value[3]** | **Month Weight** | **Value** |
|---|---|---|---|---|---|---|---|
| | **30%** | **70%** | | | | | |
| January | 2.87 | 6.17 | 3.33 | Normal | 2 | 3 | 6 |
| December | 3.80 | 6.85 | 6.05 | Normal | 2 | 2 | 4 |
| November | 3.62 | 6.75 | 2.99 | Dry | 1 | 1 | 1 |
| | | | | | | Sum: | 11 |

[1] Observed rainfall for the month

[2] Dry conditions are below 30% WETS table value, Normal conditions are between 30% and 70% of the WETS table values, Wet conditions are above 70% of the WETS table value.

[3] dry equals a value of 1, normal equals a value of 2, wet equals a value of 3

Bins were established to determine the overall rainfall period during the field investigation; drier (sum in 6-9), normal (sum is 10-14), wet (sum is 15-18). A sum of 11 indicates that hydrologic conditions are normal.

## 3 METHODS

On February 2, 2015, the Linnton Mill site was investigated and data were collected to determine if any portions of the site contained all thee wetland criteria as defined in USACE's *Delineation Manual* (1987), USACE's *Regional Supplement* (2010), the Administrative Rules for Wetland Delineation Report Requirements and for Jurisdictional Determinations for the Purpose of Regulating Fill and Removal within Waters of the State (OAR 141-090-0005 to 0055). A follow-up site visit was conducted on December 16, 2015, for the purpose of verifying the findings. Data plots and soil test pits were excavated to evaluate vegetation and soil conditions. Guidance from USACE's *Regional Supplement* was used to evaluate the data at each data plot.

### 3.1 Site-Specific Methods

Data were collected at six data plots to determine if wetland conditions were present. The location of each data plot was defined by the placement of a wooden stake with orange flagging tape. Each data plot was labeled and recorded using a differential GPS (±16 inches of horizontal accuracy). Data plots were established based on the hydrological and vegetation characteristic that were observed during the site assessment. The location of the data plots are in areas where a predominance of hydrophytic vegetation exists. At each data plot, soil pits were dug between 19 and 20 inches to examine the soils, except for data plots five and six. These two data plots contained a restrictive layer approximately six inches below ground surface.

### 3.2 Hydrophytic Vegetation

The U.S. Fish and Wildlife Service (USFWS) and the National Wetland Inventory (NWI) have established a rating system that has been applied to commonly occurring plant species on the basis of their frequency of occurrence in wetlands (Table 2). Species indicator status expresses the range in which plants may occur in wetlands and non-wetlands (uplands). Under this system, vegetation is considered hydrophytic when there is an indicator status of facultative (FAC), facultative wetland (FACW), or obligate (OBL) (Table 2). The hydrophytic vegetation criterion for wetland determination is met when more than 50 percent of the dominant species in the plant community are FAC or wetter. The *National Wetland Plant List* (Lichvar 2014) was used to determine vegetation indicator status.

**Table 2. Definitions for USFWS plant indicator status**

| Plant Indicator Status Category | Indicator Status Abbreviation | Definition (Estimated Probability of Occurrence) |
|---|---|---|
| Obligate Upland | UPL | Occur rarely (<1 percent) in wetlands, and almost always (>99 percent) in uplands |
| Facultative Upland | FACU | Occur sometimes (1 percent to <33 percent) in wetlands, but occur more often (>67 percent to 99 percent) in uplands |
| Facultative | FAC | Similar likelihood (33 percent to 67 percent) of occurring in both wetlands and uplands |
| Facultative Wetland | FACW | Occur usually in wetlands (>67 percent to 99 percent), but also occur in uplands (1 percent to 33 percent) |
| Obligate Wetland | OBL | Occur almost always (>99 percent) in wetlands, but rarely occur in uplands (<1 percent) |
| Not Listed | NL | Not listed due to insufficient information to determine status |

### 3.3 Wetland Hydrology

Evidence of permanent or periodic inundation (water marks, drift lines, drainage patterns) or soil saturation to the surface for 17 consecutive days or more during the growing season meets the hydrology criterion. Oxidized root channels, a high water table in the top 12 inches, and the presence of surface water are primary indicators. Drainage patterns, water-stained leaves, and geomorphic position are secondary indicators of wetland hydrology.

### 3.4 Hydric Soils

Soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper soil horizons are considered hydric soils. Field indicators of hydric soil conditions include histosols, the presence of a histic epipedon, a sulfidic odor, and a depleted soil matrix. Soil conditions were compared to the Field Indicators of Hydric Soils detailed in the USACE's *Regional Supplement.*

### 3.5 Description of Previously Identified Wetlands and Other Non-Wetland Waters

Based on a review of local critical area inventory databases, no wetland features are identified within the Linnton Mill site. According to Portland Maps (2015), there are several streams within the Linnton Mill site. However, these streams are piped west of NW St Helens Rd and continue subsurface until reaching the shoreline of the Willamette River. With the exception of the Willamette River, there are no surface streams within or adjacent to the Linnton Mill site.

Until recently, the southern portion of the Linnton Mill site was used to offload and dewater dredged sand from the Columbia River. According to the Linnton Plywood Association Environmental Assessment (2007), the operation used a series of settling ponds for a two-stage land-based settling and dewatering process. To support this process, three process water settlement ponds and one dewatering area, as well as stormwater swales and settling ponds, were constructed from uplands within this area. The sand and gravel operation facility was decommissioned between 2011 and 2012, which included the filling of the settling ponds. However, the area of the former main settling pond is still a slight depression that collects rain water.

### 3.6 National Wetlands Inventory

The USFWS's National Wetland Inventory (NWI) was queried to determine if previously-identified wetlands are present on or near the Linnton Mill site (USFWS 2015). According to the NWI Interactive Online Mapper, there are six features within the Linnton Mill site (Appendix A; Figure 4). These features include the Willamette River and five freshwater ponds. No wetlands are identified within the Linnton Mill site by the NWI.

The five freshwater ponds identified by the NWI correspond with the settling ponds associated with the sand and gravel operation that no longer exists. These features were filled during the decommissioning of the sand and gravel operation.

### 3.7 Mapping Method

The location of each data plot evaluated during the field investigation was recorded using a differential GPS datalogger (±16 inches horizontal accuracy). These positions were then transferred into AutoCAD software and overlaid onto a scaled aerial image of the site. Based on the absence of wetlands and other waters, no land survey was completed to capture the data plots or existing features within the Linnton Mill site. The map is provided in Appendix A.

## 4 ADDITIONAL INFORMATION

### 4.1 Site Conditions

#### *4.1.1 Vegetation*

The vegetation within the Linnton Mill site consists of a scrub-shrub shoreline dominated by Himalayan blackberry. Other species along the shoreline include willows, red alder, and black cottonwood. The blackberry has established a dense thicket that extends over a majority of the shoreline. Herbaceous vegetation dominates the southern portion of the

Linnton Mill site where the former sand and gravel operation was located. This area consists of an herbaceous and shrub vegetation community that is dominated by rushes, velvetgrass, bluegrass, scotch broom, and willows. In addition, there is a narrow band of black cottonwood along the railway in the southwest portion of the Linnton Mill site. With the exception of the vegetation along the shoreline, the northern portion of the Linnton Mill site is devoid of vegetation.

### *4.1.2 Soil Information*

The NRCS Web Soil Survey (NRCS 2015d) identifies the soil within the Linnton Mill site as Urban land, 0 to 3 percent slopes (Appendix A; Figure 5). Urban land soils are mostly found within the City of Portland along the Willamette River where flooding could occur. Approximately 95 percent of this type of soil is covered by impervious surfaces (NRCS 2015d). According to the NRCS, the Urban land soil complex is listed as having zero percent classified as hydric (NRCS 2015d).

### *4.1.3 Hydrology*

Based on geomorphic position, hydrologic support of the Linnton Mill site is provided by direct precipitation. The Linnton Mill site receives minimal surface water runoff from adjacent areas due to the railway, access roads, and stormwater collection infrastructure. These features act as barriers or collect stormwater and do not allow significant surface water to flow into the site.

# 5 RESULTS AND CONCLUSION

The wetland reconnaissance at the Linnton Mill site did not identify any areas that qualify as jurisdictional wetlands. Grette Associates observed two isolated, shallow depressions areas that contained hydrophytic vegetation and ponded surface water at the time of the site visit (Areas 1 and 2; Appendix A). These two areas were investigated to determine if wetland conditions were present. Area 1 is in the general location of two filled settling ponds, and Area 2 is in a slight depression where sand was formerly stockpiled to dewater during the sand and gravel operation. Other former ponds were vegetated with upland species and did not include surface water or hydrophytic vegetation during the site visits.

It is our determination that both Areas 1 and 2 are not subject to ODSL or Corps jurisdiction as wetlands because they were created by human actions from non-wetlands, they do not meet the hydric soils criteria, and they are isolated from the Willamette River. A reconnaissance map and photographs are presented in Appendix A and Appendix C, respectively. Datasheets are presented in Appendix B.

## 5.1 Area 1

Area 1 is an approximately 0.85 acre, isolated shallow depression located in the southeastern corner of the Linnton Mill site. Area 1 exists in the location of two former sediment settling ponds that were not completely filled (Appendix A). These settling ponds were dug in the late 1990s and were covered by an NPDES permit to discharge process water into the Willamette River. The discharge pipe was removed when the sand operation was decommissioned (Appendix A; Figure 7). Each of the three wetland criteria is discussed below.

### *Vegetation*

This area consists of an herbaceous and shrub community dominated by grasses, rushes, and immature willows and cottonwoods. Cattail (*Typha latifolia*) was also present, but was limited in extent. Surrounding upland species present around the depression include Scots broom (*Cytisus scoparius*—NL/UPL) and hairy cat's ear (*Hypochaeris radicata*—FACU). Based on this data, Area 1 passes the hydrophytic criterion.

### *Hydrology*

Hydrology in Area 1 is supported entirely by direct precipitation runoff from rain events that is perched in this shallow remnant depression. No surface drainages or groundwater sources feed Area 1. Further, Area 1 is isolated from the Willamette River, with surface water perched on the ground surface to evaporate rather than discharge into the Willamette River. An approximately 5 ft high berm at the top of the bank between the flat upland and the Willamette River keeps the water from discharging to the Willamette River. The discharge pipe from the pond to the Willamette River was decommissioned when the sand/gravel operation ceased (Appendix A; Figure 7). During the reconnaissance approximately six to eight inches of surface water was present as a result of recent rain. During the second site visit, slightly more water was present due to heavy rains over the previous two weeks. Test pits dug outside the inundated areas did not reveal groundwater in the pits.

Without long-term monitoring it is not known if the surface water observed is present for at least 14 consecutive days during the growing season in at least 5 of every 10 years. Since hydrology is limited to direct precipitation, it is likely that surface water generally evaporates quickly following rain storms and is not likely present for long durations. However, in the absence of long-term monitoring and based on the direct observation of surface inundation during the site visits, the hydrology criterion is passed in Area 1.

### *Soils*

Four soil pits were dug in Area 1 to determine soil conditions. Based on that data, hydric soils were not observed. A typical soil profile within Area 1 consisted of a surface layer (0-20 inches) of a very dark grayish brown (10YR3/2) sand that contained no redoximorphic features. Furthermore, no hydrogen sulfide odor was observed. Although a predominance of hydrophytic vegetation and wetland hydrology was observed, the soils within Area 1 did not meet the hydric soil criterion defined in the USACE's *Regional Supplement*.

Since the settling ponds were filled 3-4 years ago, it is our best professional judgment that the sandy soil would likely have formed redoximorphic features in that time if hydrology had been present for a sufficient duration and frequency. This lack of redoximorphic features may indicate that hydrology is not present at a duration or frequency necessary to form these features and qualify as a wetland. However, in the absence of long-term monitoring, this is not known. Another possible explanation for the lack of redoximorphic features is that the soils do not readily develop redoximorphic features, and would qualify as "Problematic Hydric Soils" despite the lack of redoximorphic features. However, as discussed above, inundation of Area 1 is likely short-term since direct precipitation is the only water source. It is our best professional judgment that short-term inundation cycles better explain the lack of redoximorphic features than a problematic soil. Thus, it is determined that the hydric soils criterion is not passed.

### *Jurisdiction*

Even if all three wetland criteria were present, Area 1 is not a jurisdictional wetland. It is exempt from ODSL jurisdiction as it qualifies as is an "Exempt Artificially Created Wetland" per OAR 141-085-515(7)(b). It should also be exempt from Corps jurisdiction as it is an isolated, Man-Induced Wetland per the 1987 Corps Wetland Delineation Manual.

As mentioned above, Area 1 is in the location of former sediment settling ponds, which were purposefully excavated from former uplands for the sand/gravel operations (Appendix A; Figure 8). An NPDES permit covered discharge of the process water to the Willamette River. After sand/gravel operations closed in early 2012, the ponds were partially filled, leaving a shallow depression. Nevertheless, the presence of the depression is due to these two settling ponds. Therefore, this area meets the exemption criteria listed in OAR 141-085-0515(7)(b):

> "*Artificially created wetlands and ponds created entirely from upland, regardless of size, are not waters of this state if they are constructed for the purpose of…(b) settling of sediment*".

Since, as of early 2012, Area 1 was two sediment settling ponds that were excavated for that express purpose from uplands, Area 1 clearly meets this definition. Any current surface ponding in Area 1 is due to remnant depressions from the incomplete filling of these ponds. Thus, the remaining depressions are also artificially created. Therefore, Area 1 is a non-jurisdictional "Exempt Artificially Created Wetland" and is exempt from ODSL regulation as a wetland.

For the reasons discussed above under "*Hydrology*", Area 1 is isolated from the Willamette River. Its only water source is direct precipitation, which remains in the depression to evaporate and is separated from the Willamette River by a berm at the top of the bank. Thus, there is no physical/chemical/biological connection to the water of the U.S.

Further, Area 1 meets the definition of a "man-induced wetland" as defined in the 1987 Corps Wetland Delineation Manual (Subsection 4). Subsection 4 focuses on alterations to hydrology as the cause of man-induced wetlands. One example given in this Subsection of an exempt man-induced wetland caused by alterations to hydrology is "dredged material disposal areas". The site consists entirely of a former "dredged material disposal area", and the related operations led to the formation of the depression in Area 1. Hydrology was altered by excavating a depression for use as a permitted settling pond, which was insufficiently filled and now collects surface runoff. Due to this alteration, the site possesses wetland characteristics. Therefore, Area 1 is an isolated, man-induced wetland with altered hydrology, and should be exempt from Corps jurisdiction.

### 5.2 Area 2

Area 2 is an approximately 0.18 acre area west of Area 1, separated by areas of higher elevation and upland vegetation. Area 2 is located where dredged sand was formerly stockpiled to be dewatered. The last of the sand in this location was removed in early 2012. Based on the presence of a shallow depression in the former location of a large stockpile, it is clear that sand removal resulted in slight over-excavation. Years of sand stockpiling also appears to have compacted the soils. Each of the three wetland criteria is discussed below.

#### *Vegetation*

Area 2 is mostly devoid of vegetation, but the vegetation that does exist within this area is dominated by rushes and immature willows. Surrounding upland vegetation consists of Scots broom (NL/UPL), hairy cat's ear (FACU), and other upland species. Based on this data, Area 2 passes the hydrophytic vegetation criterion.

#### *Hydrology*

During the reconnaissance, approximately six inches of surface water was observed. This is due to a shallow restrictive soil layer that temporarily perches surface water, likely due to compaction of soils from sand stockpiling. No groundwater was observed in the soil pits. As with Area 1, the duration of surface inundation is not known in the absence of long-term monitoring, but given that hydrologic support is only from direct precipitation, it is likely that hydrology is only present for brief periods following rain storms before evaporating. However, based on the direct observation of surface water during the site visits, the hydrology criterion is passed.

#### *Soils*

A typical soil profile within Area 2 consisted of a surface layer (0-6 inches) of brown sand with a restrictive layer of compacted sand beneath. No redox features or hydrogen sulfide odor was observed. As with Area 1, one possible explanation for the lack of redoximorphic features is that the soils are "problematic hydric soils" that do not readily produce redoximorphic features. However, as mentioned above under "*Hydrology*", it is likely that surface water is not present for sufficient duration to form hydric soils since it is only present after rain storms and likely evaporates relatively quickly. It is our best professional judgment that this best explains the lack of redoximorphic features, and Area 2 does not meet the hydric soils criterion.

#### *Jurisdiction*

Similar to Area 1, even if all three wetland criteria are present, Area 2 does not qualify as a jurisdictional wetland as the shallow depression is isolated from waters of the state/U.S. and was artificially created from upland areas. Prior to the sand/gravel operation Area 2 appears to have been upland. There is no evidence of the presence of waters of the state in Area 2 in the past (Appendix A). During sand/gravel operations, Area 2 was a large sand stockpile (Appendix A). It is likely that this stockpile compacted the soil, creating a slight depression, which was possibly exacerbated by over-excavation of sand during decommissioning of the site. These factors, which resulted from human actions, explain the presence of surface ponding.

Area 2 also does not meet the definition of ODSL-jurisdictional wetlands per OAR 141-085-0515(6), which describes when artificially-created waters are jurisdictional:

> "*These waters are jurisdictional when they are:*
> *(a) equal to or greater than one acre in size;*
> *(b) created, in part or in while, in waters of this state; or*
> *(c) identified in an authorization as a mitigation site."*

Since Area 2 was created by human actions, and it meets none of the three above criteria, it is exempt from regulation as a wetland by ODSL.

Similar to Area 1, Area 2 is isolated from the Willamette River by distance and by a berm at the top of the bank; it does not have a surface connection to the Willamette River. The soil in Area 2 is highly compacted, perching the water on the surface to evaporate and not allowing it to infiltrate. Further, Area 2 meets the definition of a "man-induced wetland" as defined in the 1987 Corps Wetland Delineation Manual (Subsection 4). The site was formerly a "dredged material disposal area", and hydrology was altered by excavating a depression that collects surface runoff. Due to this alteration, the site possesses wetland characteristics. Therefore, Area 2 is an isolated, man-induced wetland with altered hydrology, and should be exempt from Corps jurisdiction.

### 5.3 Summary

At the time of the reconnaissance, the Linnton Mill site did not exhibit all three indicators required for the presence of wetlands. A total of six data plots were evaluated in the two areas most likely to contain wetland conditions. Neither of these areas met the hydric soil criteria defined in USACE's *Regional Supplement*. It is our best professional judgment that a short-term hydrology is the best explanation for a lack of hydric soil indicators, rather than problematic hydric soils. Further, both areas are exempt from jurisdiction as wetlands by ODSL and the Corps since they are "Exempt Artificially Created Wetlands" and isolated, "Man-Induced Wetlands", respectively.

## 6 DISCLAIMER

This report documents the investigation, best professional judgment, and conclusions of the investigators. It is correct and complete to the best of our judgment. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State Lands in accordance with OAR 141-090-0005 through 141-090-0055.

# 7 BIOLOGIST QUALIFICATIONS

## 7.1 Chad Wallin

Chad Wallin is a Biologist with extensive training in wetland science and ecological restoration. Chad also has professional experience in stream and fish habitat restoration, marine vegetation and habitat monitoring, mitigation monitoring, and fish and wildlife assessments.

Chad has earned a Bachelor's of Arts degree in Environmental Studies from the University of Washington along with certificates in ecological restoration and wetland science.

## 7.2 Jay Dirkse

Jay Dirkse is a Biologist with 10 years of professional training and experience in wetland ecology as well as fisheries and wildlife ecology, habitat restoration, wetland, stream, and benthic delineations and assessments, stream assessments, monitoring programs, and mitigation planning and design. Jay received his wetland delineation certificate in 2005 and has experience throughout the Northwest.

Jay earned a B.S. in Biology from Whitworth University in 2003 and an M.S. in Environmental Science from Washington State University in 2006. He also has professional level training certifications in advanced wetland science and management techniques from the Washington State Department of Ecology's Coastal Training Program. For a list of representative projects, please contact him at Grette Associates.

# 8 REFERENCES

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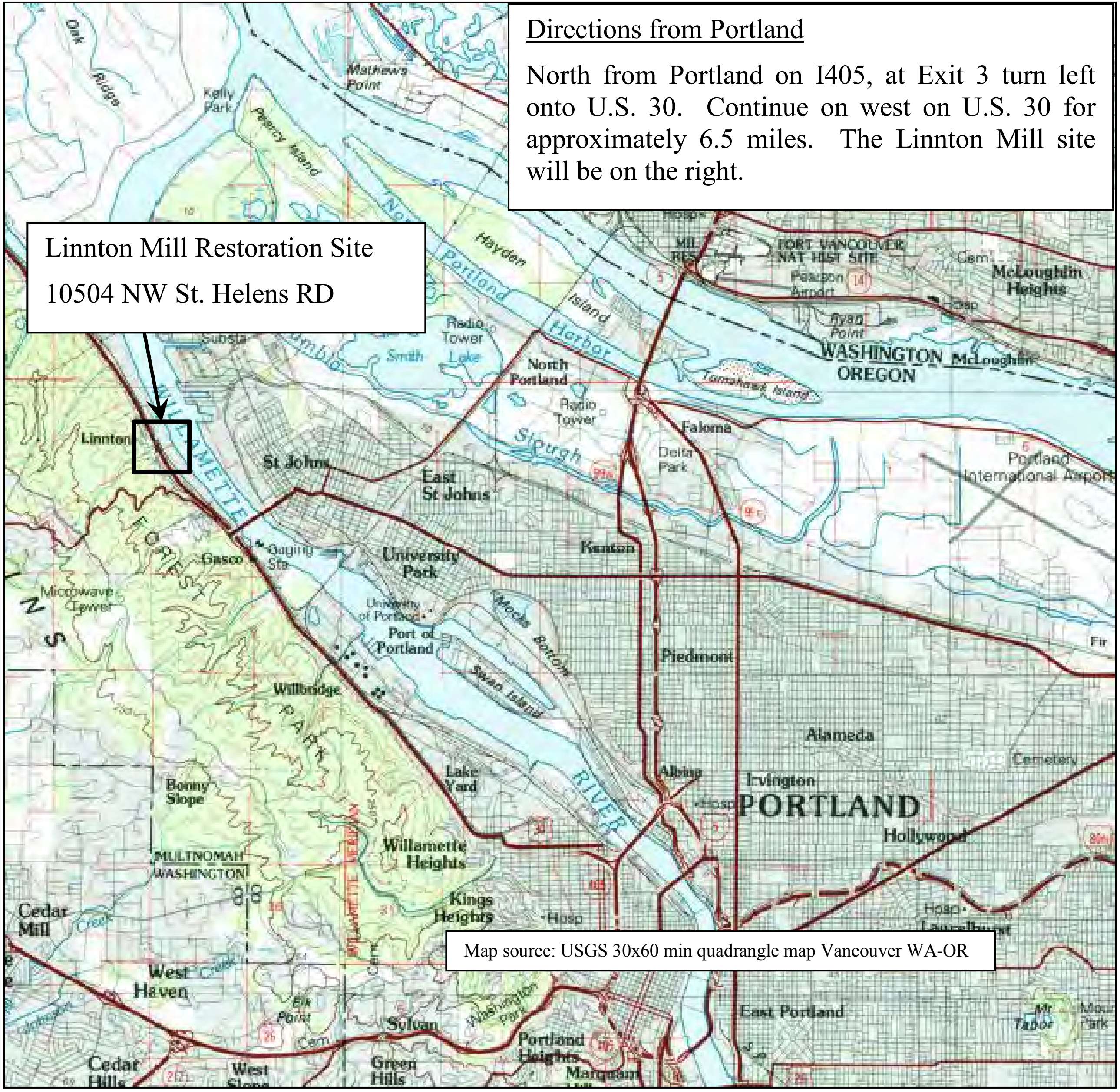
# LINNTON MILL – WETLAND DETERMINATION REPORT

## APPENDIX A: FIGURES AND MAPS

**Figure 1. Location map**



Directions from Portland

North from Portland on I405, at Exit 3 turn left onto U.S. 30. Continue on west on U.S. 30 for approximately 6.5 miles. The Linnton Mill site will be on the right.

Linnton Mill Restoration Site

10504 NW St. Helens RD

Map source: USGS 30x60 min quadrangle map Vancouver WA-OR

**Figure 2. Assessors map**

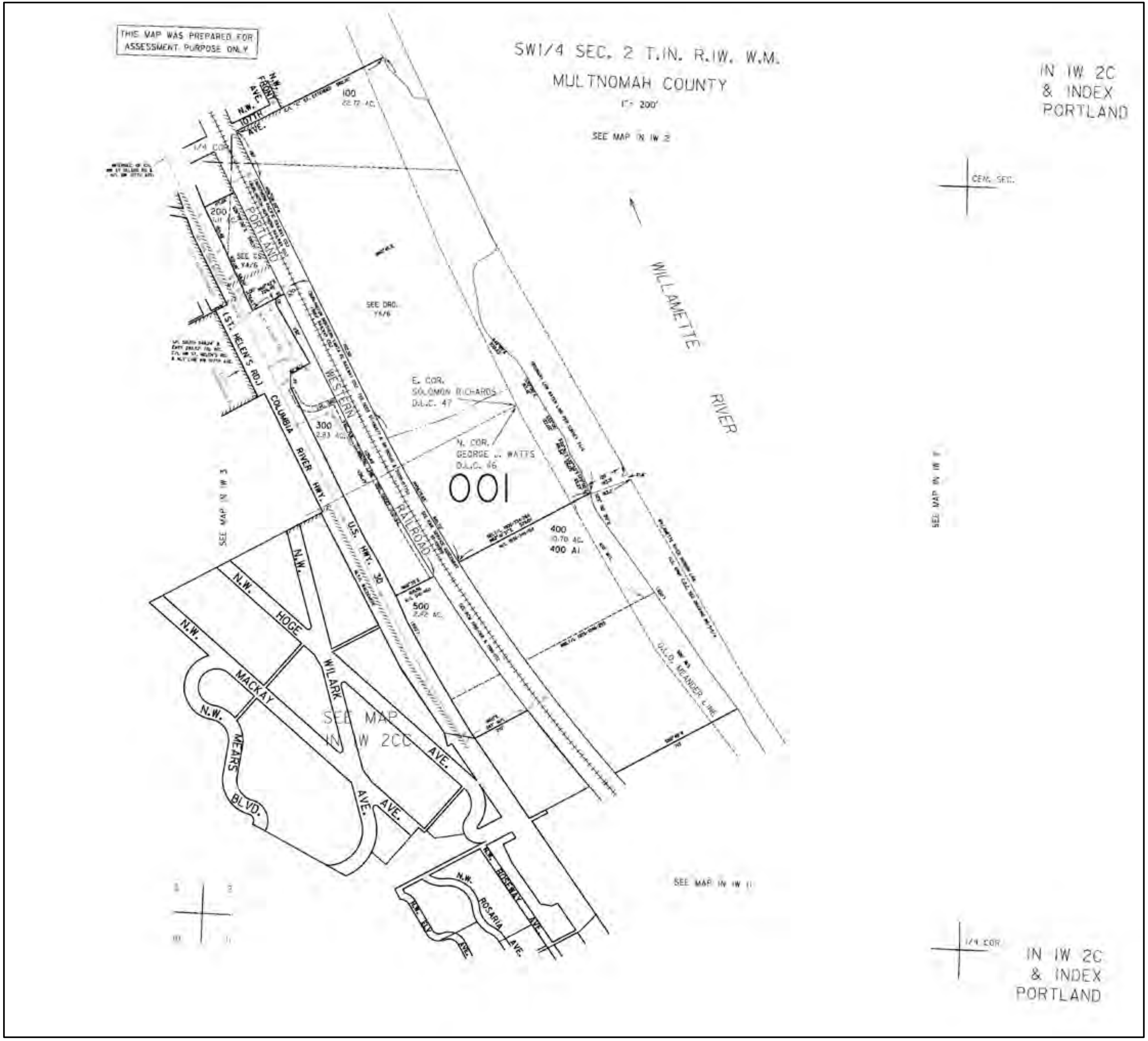
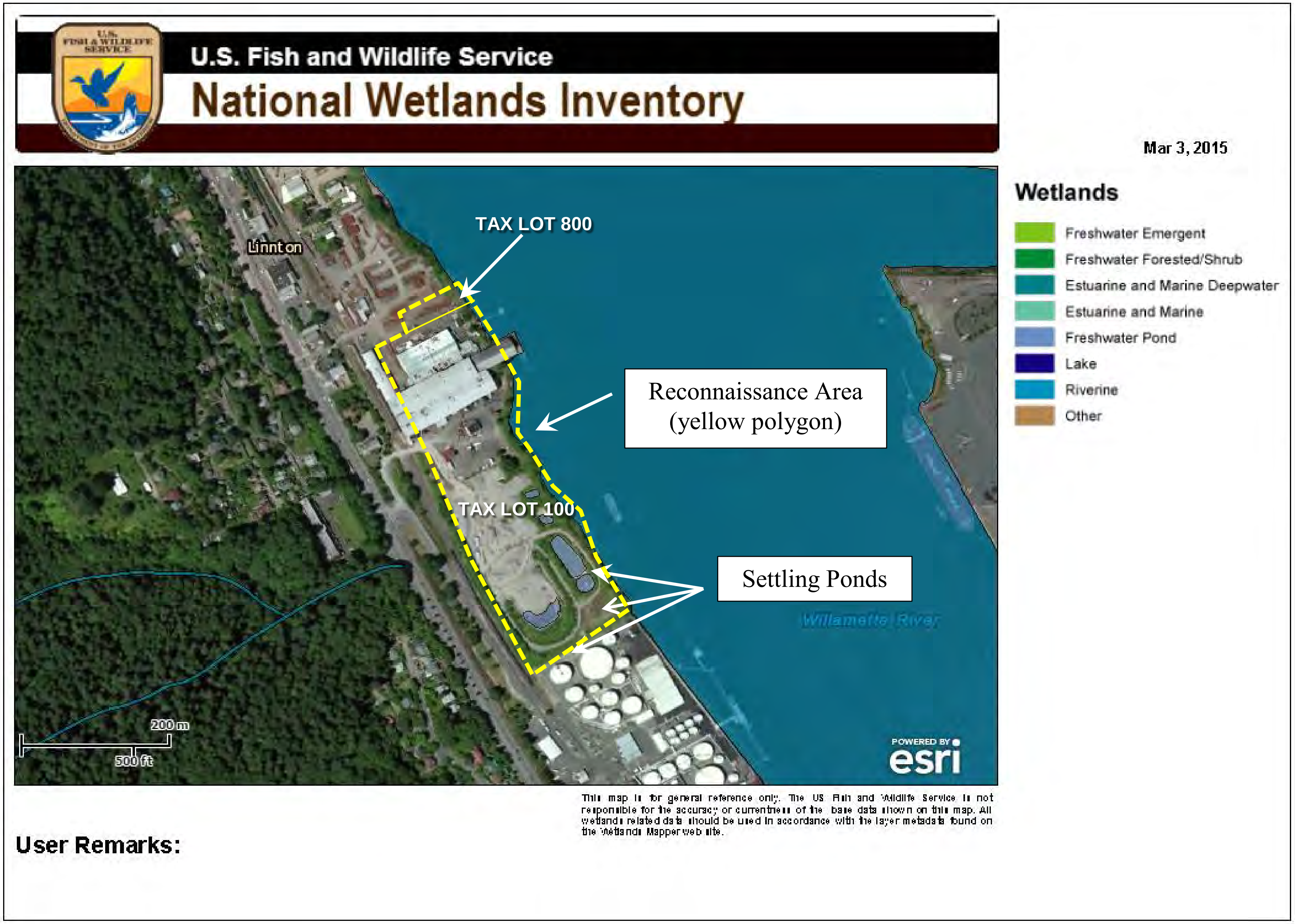


Figure 3. Site map aerial photo (7/14/2014)

**Figure 4. National Wetland Inventory map**

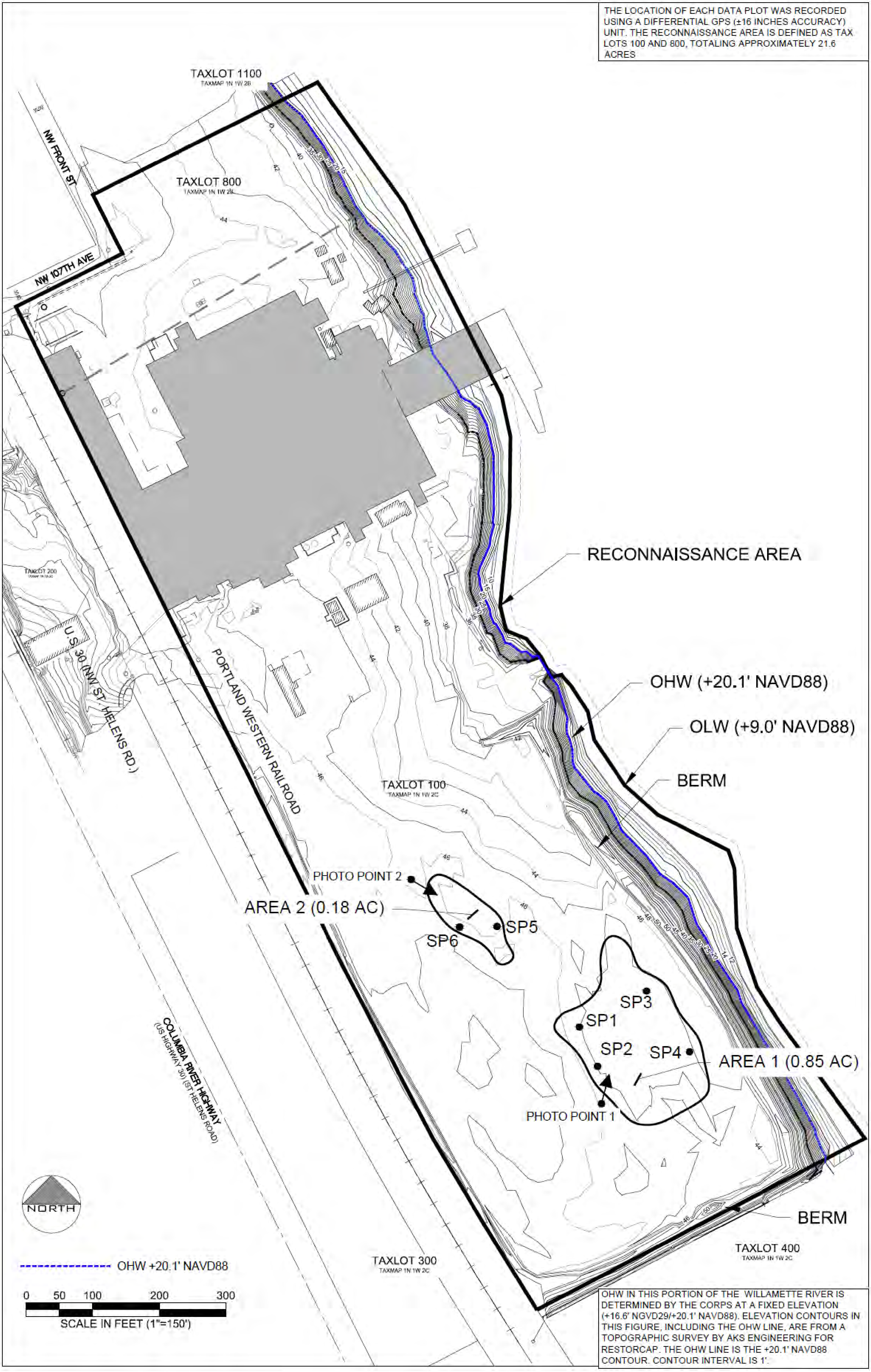


This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

**User Remarks:**

**Figure 5. NRCS soil map**

Figure 6. Reconnaissance area map – Topographic survey 5/16/2013 (AKS Engineering)



THE LOCATION OF EACH DATA PLOT WAS RECORDED USING A DIFFERENTIAL GPS (±16 INCHES ACCURACY) UNIT. THE RECONNAISSANCE AREA IS DEFINED AS TAX LOTS 100 AND 800, TOTALING APPROXIMATELY 21.6 ACRES

OHW IN THIS PORTION OF THE WILLAMETTE RIVER IS DETERMINED BY THE CORPS AT A FIXED ELEVATION (+16.6' NGVD29/+20.1' NAVD88). ELEVATION CONTOURS IN THIS FIGURE, INCLUDING THE OHW LINE, ARE FROM A TOPOGRAPHIC SURVEY BY AKS ENGINEERING FOR RESTORCAP. THE OHW LINE IS THE +20.1' NAVD88 CONTOUR. CONTOUR INTERVAL IS 1'.

Figure 7. Reconnaissance area map with historic aerial – 5/13/2010

Figure 8. Aerial photo of Linnton Mill Site – 7/14/1990

# LINNTON MILL – WETLAND DETERMINATION REPORT

## APPENDIX B: DATASHEETS

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Linnton Mill Restoration Site City/County: Portland/Multnomah Sampling Date: 2/2/15

Applicant/Owner: Linnton Water Credits LLC State: OR Sampling Point: SP-1

Investigator(s): CW, JD; Grette Associates Section, Township, Range: T1N R1W S2

Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): concave Slope (%): _____

Subregion (LRR): A Lat: 45.5961285° Long: -122.7814346° Datum: _____

Soil Map Unit Name: Urban land, 0-3% slopes NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | | |
|---|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ☒ | No ☐ | **Is the Sampled Area within a Wetland?** | **Yes** ☐ **No** ☒ |
| Hydric Soil Present? | Yes ☐ | No ☒ | | |
| Wetland Hydrology Present? | Yes ☒ | No ☐ | | |

Remarks: **Within large ponded area. BPJ soils not likely problematic. Likely inundated after precipitation events, then infiltrates wihtin a short period of time.**

## VEGETATION – Use scientific names of plants

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: 20') | | | |
| 1. _____ | _____ | ____ | ____ |
| 2. _____ | _____ | ____ | ____ |
| 3. _____ | _____ | ____ | ____ |
| 4. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | _____ | = Total Cover | |
| Sapling/Shrub Stratum (Plot size: 10') | | | |
| 1. *Salix spp (unknown)* | 40 | yes | FAC |
| 2. _____ | _____ | ____ | ____ |
| 3. _____ | _____ | ____ | ____ |
| 4. _____ | _____ | ____ | ____ |
| 5. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | 40 | = Total Cover | |
| Herb Stratum (Plot size: 5') | | | |
| 1. *Salix spp. (unknown)* | 35 | yes | FACW |
| 2. *Juncus effusus* | 20 | yes | FACW |
| 3. *Juncus acuminatus* | 20 | yes | FACW |
| 4. *Typha latifolia* | 20 | yes | OBL |
| 5. *Juncus patens* | 5 | no | FACW |
| 6. _____ | _____ | ____ | ____ |
| 7. _____ | _____ | ____ | ____ |
| 8. _____ | _____ | ____ | ____ |
| 9. _____ | _____ | ____ | ____ |
| 10. _____ | _____ | ____ | ____ |
| 11. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | 100 | = Total Cover | |
| Woody Vine Stratum (Plot size: _____) | | | |
| 1. _____ | _____ | ____ | ____ |
| 2. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | _____ | = Total Cover | |
| % Bare Ground in Herb Stratum 0 | | | |

**Dominance Test Worksheet:**

| | | |
|---|---|---|
| Number of Dominant Species That Are OBL, FACW, or FAC: | 5 | (A) |
| Total Number of Dominant Species Across All Strata: | 5 | (B) |
| Percent of Dominant Species That Are OBL, FACW, or FAC: | 100 | (A/B) |

**Prevalence Index worksheet:**

| | Total % Cover of: | Multiply by: | |
|---|---|---|---|
| OBL species | _____ | x1 = | _____ |
| FACW species | _____ | x2 = | _____ |
| FAC species | _____ | x3 = | _____ |
| FACU species | _____ | x4 = | _____ |
| UPL species | _____ | x5 = | _____ |
| Column Totals: | _____ (A) | | _____ (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

☒ 1 – Rapid Test for Hydrophytic Vegetation

☒ 2 - Dominance Test is >50%

☐ 3 - Prevalence Index is ≤3.0[1]

☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ 5 - Wetland Non-Vascular Plants[1]

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** **Yes** ☒ **No** ☐

Remarks: *

Project Site: Linnton Mill Restoration Site

## SOIL

Sampling Point: SP-1

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-7 | 10YR 4/1 | 100 | None | | | | Sand | |
| 7-19 | 10YR 3/2 | 100 | None | | | | Sand | |

[1] Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soils Present?** Yes ☐ No ☒

Remarks: No oxidized root channels, no hydrogen sulfide odor. Soils unllikley to be problematic as sandy soils typically develop redoximorphic features if wetland hydrology present. Sufficient time (3-4 years) since pond was decommissioned to have developed redoximorphic features.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

☒ Surface Water (A1)
☒ High Water Table (A2)
☒ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)
☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Stunted or Stresses Plants (D1) **(LRR A)**
☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☒ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) **(LRR A)**
☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☒ No ☐ Depth (inches): 3" above surface

Water Table Present? Yes ☒ No ☐ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): _____

**Wetland Hydrology Present?** **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Sole water source is direct precipitation. Duration of inundation not known. Based on flashy nature of hydrology and lack of redoximorphic indicators in the soil, it is likely that hydrology is not present for at least 14 consecutive growing-season days, 5 in 10 years. However, in the lack of long-term hydrology monitoring, the wetland hydrology criterion is satisfied based on direct observation of surface water.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Linnton Mill Restoration Site City/County: Portland/Multnomah Sampling Date: 2/2/15

Applicant/Owner: Linnton Water Credits LLC State: OR Sampling Point: SP-2

Investigator(s): CW, JD; Grette Associates Section, Township, Range: T1N R1W S2

Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): A Lat: 45.5959673° Long: -122.7813218° Datum: _____

Soil Map Unit Name: Urban land, 0-3% slopes NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ☒ No ☐ | **Is the Sampled Area within a Wetland?** | **Yes** ☐ **No** ☒ |
| Hydric Soil Present? | Yes ☐ No ☒ | | |
| Wetland Hydrology Present? | Yes ☒ No ☐ | | |

Remarks: **Within large ponded area. BPJ soils not likely problematic. Likely inundated after precipitation events, then infiltrates wihtin a short period of time.**

## VEGETATION – Use scientific names of plants

| Tree Stratum (Plot size: 20') | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. _____ | _____ | ____ | ____ |
| 2. _____ | _____ | ____ | ____ |
| 3. _____ | _____ | ____ | ____ |
| 4. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | _____ | = Total Cover | |
| Sapling/Shrub Stratum (Plot size: 10') | | | |
| 1. *Salix spp (unknown)* | 10 | yes | FAC |
| 2. _____ | _____ | ____ | ____ |
| 3. _____ | _____ | ____ | ____ |
| 4. _____ | _____ | ____ | ____ |
| 5. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | 10 | = Total Cover | |
| Herb Stratum (Plot size: 5') | | | |
| 1. *Holcus lanatus* | 30 | yes | FAC |
| 2. *Salix spp.* | 30 | yes | FACW |
| 3. *Poa spp.* | 15 | no | FAC |
| 4. *Juncus patens* | 10 | no | FACW |
| 5. *Phalaris arundinacea* | 5 | no | FACW |
| 6. *Scirpus acutus* | 2 | no | OBL |
| 7. _____ | _____ | ____ | ____ |
| 8. _____ | _____ | ____ | ____ |
| 9. _____ | _____ | ____ | ____ |
| 10. _____ | _____ | ____ | ____ |
| 11. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | 92 | = Total Cover | |
| Woody Vine Stratum (Plot size: _____) | | | |
| 1. _____ | _____ | ____ | ____ |
| 2. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | _____ | = Total Cover | |
| % Bare Ground in Herb Stratum 8 | | | |

**Dominance Test Worksheet:**

| | | |
|---|---|---|
| Number of Dominant Species That Are OBL, FACW, or FAC: | 3 | (A) |
| Total Number of Dominant Species Across All Strata: | 3 | (B) |
| Percent of Dominant Species That Are OBL, FACW, or FAC: | 100 | (A/B) |

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | _____ | x1 = | _____ |
| FACW species | _____ | x2 = | _____ |
| FAC species | _____ | x3 = | _____ |
| FACU species | _____ | x4 = | _____ |
| UPL species | _____ | x5 = | _____ |
| Column Totals: | _____ (A) | | _____ (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is $\leq 3.0^1$
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** **Yes** ☒ **No** ☐

Remarks: *

Project Site: Linnton Mill Restoration Site

## SOIL

Sampling Point: SP-2

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-20 | 10YR 3/2 | 100 | None | | | | Sand | |

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soils Present?** **Yes** ☐ **No** ☒

Remarks: No oxidized root channels, no hydrogen sulfide odor. Soils unllikley to be problematic as sandy soils typically develop redoximorphic features if wetland hydrology present. Sufficient time (3-4 years) since pond was decommissioned to have developed redoximorphic features.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

| | | | | | | |
|---|---|---|---|---|---|---|
| Surface Water Present? | Yes | ☒ | No | ☐ | Depth (inches): | 6" above surface |
| Water Table Present? | Yes | ☒ | No | ☐ | Depth (inches): | |
| Saturation Present? (includes capillary fringe) | Yes | ☒ | No | ☐ | Depth (inches): | |

**Wetland Hydrology Present?** **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Sole water source is direct precipitation. Duration of inundation not known. Based on flashy nature of hydrology and lack of redoximorphic indicators in the soil, it is likely that hydrology is not present for at least 14 consecutive growing-season days, 5 in 10 years. However, in the lack of long-term hydrology monitoring, the wetland hydrology criterion is satisfied based on direct observation of surface water.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Linnton Mill Restoration Site City/County: Portland/Multnomah Sampling Date: 2/2/15

Applicant/Owner: Linnton Water Credits LLC State: OR Sampling Point: SP-3

Investigator(s): CW, JD; Grette Associates Section, Township, Range: T1N R1W S2

Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): concave Slope (%): <1

Subregion (LRR): A Lat: 45.5962866° Long: -122.7810468° Datum: _____

Soil Map Unit Name: Urban land, 0-3% slopes NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | |
|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ☒ No ☐ | **Is the Sampled Area within a Wetland?** | **Yes** ☐ **No** ☒ |
| Hydric Soil Present? | Yes ☐ No ☒ | | |
| Wetland Hydrology Present? | Yes ☒ No ☐ | | |

Remarks: **Within large ponded area. BPJ soils not likely problematic. Likely inundated after precipitation events, then infiltrates wihtin a short period of time.**

## VEGETATION – Use scientific names of plants

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: 20') | | | |
| 1. _____ | _____ | ____ | ____ |
| 2. _____ | _____ | ____ | ____ |
| 3. _____ | _____ | ____ | ____ |
| 4. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | _____ | = Total Cover | |
| Sapling/Shrub Stratum (Plot size: 10') | | | |
| 1. _____ | _____ | ____ | ____ |
| 2. _____ | _____ | ____ | ____ |
| 3. _____ | _____ | ____ | ____ |
| 4. _____ | _____ | ____ | ____ |
| 5. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | _____ | = Total Cover | |
| Herb Stratum (Plot size: 5') | | | |
| 1. *Hypochaeris radicata* | 10 | yes | FACU |
| 2. *UNID grasses* | 5 | yes | FAC |
| 3. *Juncus bufonis* | 5 | yes | FACW |
| 4. *Trifolium pratense* | 1 | no | FACU |
| 5. _____ | _____ | ____ | ____ |
| 6. _____ | _____ | ____ | ____ |
| 7. _____ | _____ | ____ | ____ |
| 8. _____ | _____ | ____ | ____ |
| 9. _____ | _____ | ____ | ____ |
| 10. _____ | _____ | ____ | ____ |
| 11. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | 21 | = Total Cover | |
| Woody Vine Stratum (Plot size: _____) | | | |
| 1. _____ | _____ | ____ | ____ |
| 2. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | _____ | = Total Cover | |
| % Bare Ground in Herb Stratum 79 | | | |

**Dominance Test Worksheet:**

| | | |
|---|---|---|
| Number of Dominant Species That Are OBL, FACW, or FAC: | 2 | (A) |
| Total Number of Dominant Species Across All Strata: | 3 | (B) |
| Percent of Dominant Species That Are OBL, FACW, or FAC: | 67 | (A/B) |

**Prevalence Index worksheet:**

| | Total % Cover of: | Multiply by: | |
|---|---|---|---|
| OBL species | _____ | x1 = | _____ |
| FACW species | _____ | x2 = | _____ |
| FAC species | _____ | x3 = | _____ |
| FACU species | _____ | x4 = | _____ |
| UPL species | _____ | x5 = | _____ |
| Column Totals: | _____ (A) | | _____ (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** **Yes** ☒ **No** ☐

Remarks: *

Project Site: Linnton Mill Restoration Site

## SOIL

Sampling Point: SP-3

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-20 | 10YR 3/2 | 100 | None | | | | Sand | |

[1] Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soils Present?** **Yes** ☐ **No** ☒

Remarks: No oxidized root channels, no hydrogen sulfide odor. Soils unllikley to be problematic as sandy soils typically develop redoximorphic features if wetland hydrology present. Sufficient time (3-4 years) since pond was decommissioned to have developed redoximorphic features.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☒ No ☐ Depth (inches): 3" above surface

Water Table Present? Yes ☒ No ☐ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): _____

**Wetland Hydrology Present?** **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Sole water source is direct precipitation. Duration of inundation not known. Based on flashy nature of hydrology and lack of redoximorphic indicators in the soil, it is likely that hydrology is not present for at least 14 consecutive growing-season days, 5 in 10 years. However, in the lack of long-term hydrology monitoring, the wetland hydrology criterion is satisfied based on direct observation of surface water.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Linnton Mill Restoration Site City/County: Portland/Multnomah Sampling Date: 2/2/15
Applicant/Owner: Linnton Water Credits LLC State: OR Sampling Point: SP-4
Investigator(s): CW, JD; Grette Associates Section, Township, Range: T1N R1W S2
Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): concave Slope (%): <1
Subregion (LRR): A Lat: 45.5960384° Long: -122.7807838° Datum: _____
Soil Map Unit Name: Urban land, 0-3% slopes NWI classification: NA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | | |
|---|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ☒ | No ☐ | **Is the Sampled Area within a Wetland?** | **Yes** ☐ **No** ☒ |
| Hydric Soil Present? | Yes ☐ | No ☒ | | |
| Wetland Hydrology Present? | Yes ☒ | No ☐ | | |

Remarks: **Within large ponded area. BPJ soils not likely problematic. Likely inundated after precipitation events, then infiltrates wihtin a short period of time.**

## VEGETATION – Use scientific names of plants

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: 20') | | | |
| 1. _____ | _____ | ____ | ____ |
| 2. _____ | _____ | ____ | ____ |
| 3. _____ | _____ | ____ | ____ |
| 4. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | _____ | = Total Cover | |
| Sapling/Shrub Stratum (Plot size: 10') | | | |
| 1. *Salix aureum* | 60 | yes | FACW |
| 2. _____ | _____ | ____ | ____ |
| 3. _____ | _____ | ____ | ____ |
| 4. _____ | _____ | ____ | ____ |
| 5. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | 60 | = Total Cover | |
| Herb Stratum (Plot size: 5') | | | |
| 1. *Salix spp.* | 35 | yes | FACW |
| 2. *Poa spp.* | 15 | yes | FAC |
| 3. *Rumex crispus* | 5 | no | FAC |
| 4. *Juncus patens* | 5 | no | FACW |
| 5. *Juncus effusus* | 5 | no | FACW |
| 6. _____ | _____ | ____ | ____ |
| 7. _____ | _____ | ____ | ____ |
| 8. _____ | _____ | ____ | ____ |
| 9. _____ | _____ | ____ | ____ |
| 10. _____ | _____ | ____ | ____ |
| 11. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | 65 | = Total Cover | |
| Woody Vine Stratum (Plot size: _____) | | | |
| 1. _____ | _____ | ____ | ____ |
| 2. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | _____ | = Total Cover | |
| % Bare Ground in Herb Stratum 35 | | | |

**Dominance Test Worksheet:**

| | | |
|---|---|---|
| Number of Dominant Species That Are OBL, FACW, or FAC: | 2 | (A) |
| Total Number of Dominant Species Across All Strata: | 2 | (B) |
| Percent of Dominant Species That Are OBL, FACW, or FAC: | 100 | (A/B) |

**Prevalence Index worksheet:**

| | Total % Cover of: | Multiply by: | |
|---|---|---|---|
| OBL species | _____ | x1 = | _____ |
| FACW species | _____ | x2 = | _____ |
| FAC species | _____ | x3 = | _____ |
| FACU species | _____ | x4 = | _____ |
| UPL species | _____ | x5 = | _____ |
| Column Totals: | _____ (A) | | _____ (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

☐ 1 – Rapid Test for Hydrophytic Vegetation
☒ 2 - Dominance Test is >50%
☐ 3 - Prevalence Index is ≤3.0[1]
☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
☐ 5 - Wetland Non-Vascular Plants[1]
☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** **Yes** ☒ **No** ☐

Remarks: *

Project Site: Linnton Mill Restoration Site

## SOIL

Sampling Point: SP-4

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-20 | 10YR 3/2 | 100 | None | | | | Sand | @16" shell, possile dredge spoils garbage. |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: _____

Depth (inches): _____

**Hydric Soils Present?** **Yes** ☐ **No** ☒

Remarks: No oxidized root channels, no hydrogen sulfide odor. Soils unllikley to be problematic as sandy soils typically develop redoximorphic features if wetland hydrology present. Sufficient time (3-4 years) since pond was decommissioned to have developed redoximorphic features.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stresses Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☒ No ☐ Depth (inches): 4" above surface

Water Table Present? Yes ☒ No ☐ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): _____

**Wetland Hydrology Present?** **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Sole water source is direct precipitation. Duration of inundation not known. Based on flashy nature of hydrology and lack of redoximorphic indicators in the soil, it is likely that hydrology is not present for at least 14 consecutive growing-season days, 5 in 10 years. However, in the lack of long-term hydrology monitoring, the wetland hydrology criterion is satisfied based on direct observation of surface water.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Linnton Mill Restoration Site    City/County: Portland/Multnomah    Sampling Date: 2/2/15
Applicant/Owner: Linnton Water Credits LLC    State: OR    Sampling Point: SP-5
Investigator(s): CW, JD; Grette Associates    Section, Township, Range: T1N R1W S2
Landform (hillslope, terrace, etc.): Flat    Local relief (concave, convex, none): concave    Slope (%): <1
Subregion (LRR): A    Lat: 45.5965376°    Long: -122.7819350°    Datum: _____
Soil Map Unit Name: Urban land, 0-3% slopes    NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are “Normal Circumstances” present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes ☒ No ☐ | **Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☒ |
| Hydric Soil Present? | Yes ☐ No ☒ | |
| Wetland Hydrology Present? | Yes ☒ No ☐ | |

Remarks:

## VEGETATION – Use scientific names of plants

| | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| Tree Stratum (Plot size: 20') | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 50% = _____, 20% = _____ | | = Total Cover | |
| Sapling/Shrub Stratum (Plot size: 10') | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 50% = _____, 20% = _____ | | = Total Cover | |
| Herb Stratum (Plot size: 5') | | | |
| 1. *Salix spp.* | 10 | yes | FACW |
| 2. *Poa spp.* | 2 | no | FAC |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 11. | | | |
| 50% = _____, 20% = _____ | 12 | = Total Cover | |
| Woody Vine Stratum (Plot size: _____) | | | |
| 1. | | | |
| 2. | | | |
| 50% = _____, 20% = _____ | | = Total Cover | |
| % Bare Ground in Herb Stratum 88 | | | |

**Dominance Test Worksheet:**

| | | |
|---|---|---|
| Number of Dominant Species That Are OBL, FACW, or FAC: | 1 | (A) |
| Total Number of Dominant Species Across All Strata: | 1 | (B) |
| Percent of Dominant Species That Are OBL, FACW, or FAC: | 100 | (A/B) |

**Prevalence Index worksheet:**

| | Total % Cover of: | Multiply by: | |
|---|---|---|---|
| OBL species | | x1 = | |
| FACW species | | x2 = | |
| FAC species | | x3 = | |
| FACU species | | x4 = | |
| UPL species | | x5 = | |
| Column Totals: | (A) | | (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

☒ 1 – Rapid Test for Hydrophytic Vegetation
☒ 2 - Dominance Test is >50%
☐ 3 - Prevalence Index is ≤3.0[1]
☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
☐ 5 - Wetland Non-Vascular Plants[1]
☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** **Yes** ☒ **No** ☐

Remarks: *

Project Site: Linnton Mill Restoration Site

## SOIL

Sampling Point: SP-5

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-6 | 10YR 4/2 | 100 | None | | | | Sand | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1] Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: Compacted soil

Depth (inches): 6

**Hydric Soils Present?** Yes ☐ No ☒

Remarks: Soils unllikley to be problematic as sandy soils typically develop redoximorphic features if wetland hydrology present. Sufficient time (3-4 years) since sand mound was removed to have developed redoximorphic features.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

☒ Surface Water (A1)
☒ High Water Table (A2)
☒ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)
☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Stunted or Stresses Plants (D1) **(LRR A)**
☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☒ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) **(LRR A)**
☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☒ No ☐ Depth (inches): 3" above surface
Water Table Present? Yes ☒ No ☐ Depth (inches): _____
Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): _____

**Wetland Hydrology Present?** **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Sole water source is direct precipitation. Duration of inundation not known. Based on flashy nature of hydrology and lack of redoximorphic indicators in the soil, it is likely that hydrology is not present for at least 14 consecutive growing-season days, 5 in 10 years. However, in the lack of long-term hydrology monitoring, the wetland hydrology criterion is satisfied based on direct observation of surface water.

# WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Linnton Mill Restoration Site City/County: Portland/Multnomah Sampling Date: 2/2/15

Applicant/Owner: Linnton Water Credits LLC State: OR Sampling Point: SP-6

Investigator(s): MH, CW; Grette Associates Section, Township, Range: T1N R1W S2

Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): concave Slope (%): <1

Subregion (LRR): A Lat: 45.5965310° Long: -122.7821551° Datum: _____

Soil Map Unit Name: Urban land, 0-3% slopes NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or Hydrology ☐, significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ☐, Soil ☐, or Hydrology ☐, naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | | | | |
|---|---|---|---|---|---|
| Hydrophytic Vegetation Present? | Yes ☒ | No ☐ | **Is the Sampled Area within a Wetland?** | **Yes** ☐ | **No** ☒ |
| Hydric Soil Present? | Yes ☐ | No ☒ | | | |
| Wetland Hydrology Present? | Yes ☒ | No ☐ | | | |

Remarks:

## VEGETATION – Use scientific names of plants

| Tree Stratum (Plot size: 20') | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. _____ | _____ | ____ | ____ |
| 2. _____ | _____ | ____ | ____ |
| 3. _____ | _____ | ____ | ____ |
| 4. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | _____ | = Total Cover | |
| Sapling/Shrub Stratum (Plot size: 10') | | | |
| 1. _____ | _____ | ____ | ____ |
| 2. _____ | _____ | ____ | ____ |
| 3. _____ | _____ | ____ | ____ |
| 4. _____ | _____ | ____ | ____ |
| 5. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | _____ | = Total Cover | |
| Herb Stratum (Plot size: 5') | | | |
| 1. *Juncus bufonis* | 5 | yes | FACW |
| 2. *Salix spp.* | 5 | yes | FACW |
| 3. *Poa spp.* | 3 | no | FAC |
| 4. _____ | _____ | ____ | ____ |
| 5. _____ | _____ | ____ | ____ |
| 6. _____ | _____ | ____ | ____ |
| 7. _____ | _____ | ____ | ____ |
| 8. _____ | _____ | ____ | ____ |
| 9. _____ | _____ | ____ | ____ |
| 10. _____ | _____ | ____ | ____ |
| 11. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | 13 | = Total Cover | |
| Woody Vine Stratum (Plot size: _____) | | | |
| 1. _____ | _____ | ____ | ____ |
| 2. _____ | _____ | ____ | ____ |
| 50% = _____, 20% = _____ | _____ | = Total Cover | |
| % Bare Ground in Herb Stratum 87 | | | |

**Dominance Test Worksheet:**

| | | |
|---|---|---|
| Number of Dominant Species That Are OBL, FACW, or FAC: | 2 | (A) |
| Total Number of Dominant Species Across All Strata: | 2 | (B) |
| Percent of Dominant Species That Are OBL, FACW, or FAC: | 100 | (A/B) |

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | _____ | x1 = | _____ |
| FACW species | _____ | x2 = | _____ |
| FAC species | _____ | x3 = | _____ |
| FACU species | _____ | x4 = | _____ |
| UPL species | _____ | x5 = | _____ |
| Column Totals: | _____ (A) | | _____ (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

- ☒ 1 – Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present?** **Yes** ☒ **No** ☐

Remarks: *

Project Site: Linnton Mill Restoration Site

## SOIL

Sampling Point: SP-6

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
| 0-6 | 7.5YR 4/2 | 100 | None | | | | Sand | |

[1]Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: Compacted soil

Depth (inches): 6

**Hydric Soils Present?** **Yes** ☐ **No** ☒

Remarks: Soils unllikley to be problematic as sandy soils typically develop redoximorphic features if wetland hydrology present. Sufficient time (3-4 years) since sand mound was removed to have developed redoximorphic features.

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

☒ Surface Water (A1)
☒ High Water Table (A2)
☒ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)
☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Stunted or Stresses Plants (D1) **(LRR A)**
☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☒ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) **(LRR A)**
☐ Frost-Heave Hummocks (D7)

**Field Observations:**

Surface Water Present? Yes ☒ No ☐ Depth (inches): 3" above surface
Water Table Present? Yes ☒ No ☐ Depth (inches): _____
Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): _____

**Wetland Hydrology Present?** **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Sole water source is direct precipitation. Duration of inundation not known. Based on flashy nature of hydrology and lack of redoximorphic indicators in the soil, it is likely that hydrology is not present for at least 14 consecutive growing-season days, 5 in 10 years. However, in the lack of long-term hydrology monitoring, the wetland hydrology criterion is satisfied based on direct observation of surface water.

# LINNTON MILL – WETLAND DETERMINATION REPORT

## APPENDIX C: GROUND LEVEL COLOR PHOTOGRAPHS

**Photograph of Area 1, facing east; berm separating Areas 1 and 2 from the river is visible in the background.**

**Photograph of Area 2, facing southeast; berm is visible in the background.**

# LINNTON MILL – WETLAND DETERMINATION REPORT CONCURRENCES

**DEPARTMENT OF THE ARMY**
CORPS OF ENGINEERS, PORTLAND DISTRICT
P.O. BOX 2946
PORTLAND, OREGON 97208-2946

October 5, 2016

Regulatory Branch
Corps No.: NWP-2014-477

Mr. Rob Marinai
Linnton Water Credits, LLC
337 17th Street, Suite 200
Oakland, CA 94612

Dear Mr. Marinai:

The U.S. Army Corps of Engineers (Corps) has received your request for our concurrence with your wetland delineation of potentially jurisdictional waters located at 10504 NW St. Helens Rd, Portland, Multnomah County, Oregon. The area is located adjacent to the Willamette River between River Mile 4.7 and 5.0 (latitude 45.59747° North, longitude -122.78245° W). Your delineation has been assigned Corps No. NWP-2014-477. Please refer to this number in all correspondence.

Under Section 10 of the RHA, the Corps has authority to issue permits for structures or work (including excavation) in or affecting navigable waters of the United States. The limits of our jurisdiction extend landward up to the mean high water mark in tidally influenced areas and to the ordinary high water mark in non-tidal, navigable waters.

Under Section 404 of the Clean Water Act, the Corps has authority to issue permits for the placement of dredged or fill material into waters of the United States. The term "waters of the United States" includes the territorial seas and tidally influenced waters. Limits of jurisdiction under Section 404 extend landward to the high tide line. "Waters" also include all other waters that are part of a surface tributary system to and including navigable (non-tidal) waters of the United States. Limits of jurisdiction extend landward up to the ordinary high water mark. Wetlands adjacent to these waters are also "waters of the United States."

The wetland delineation report entitled "Wetland Determination Report" (Report) prepared by Grette Associates and dated January 28, 2016, indicates the absence of any jurisdictional wetlands on the subject property. The Corps concurs that Areas 1 and 2 are isolated waters and, therefore, are not jurisdictional waters of the United States as shown in Figures 6 and 7 (Enclosure 1). In addition, Grette Associates indicates in the Report the presence of two unnamed streams (i.e., herein known as the “North Tributary” and “Linnton Creek”) that are piped beginning west of NW St Helens Road and continue subsurface until reaching the shoreline of the Willamette River. Because culverting or piping an otherwise jurisdictional water does not sever Federal jurisdiction over such a water, the Corps has determined that the two streams are waters of the United States. If you propose to discharge fill or dredged material into the “North Tributary” or “Linnton Creek,” as shown in Figures A and 7 of 14 (Enclosure 1), a Department of the Army permit will likely be required under Section 404 before you can proceed.

The Willamette River is considered navigable under Section 10. If you intend to place structures or conduct work in the Willamette River (Figures A and 7 of 14 in Enclosure 1), a Department of the Army permit is required before you can proceed.

Enclosure 2 is the approved jurisdictional determination (JD) form that identifies the basis for asserting jurisdiction. If you are not in agreement with the approved JD, you can make an administrative appeal under 33 CFR 331. Please see the enclosed Notification of Administrative Appeal Options and Process and Request for Appeal for further information about that process (Enclosure 3). This approved JD is valid for a period of five years from the date of this letter unless new information warrants revision of the determination before the expiration date, or the District Commander has identified, after public notice and comment, this geographic area as having rapidly changing environmental conditions that merit re-verification on a more frequent basis.

If you have any questions, please contact Mr. Tom Taylor at the letterhead address, by telephone at (503) 808-4386, or via E-mail at: Thomas.j.taylor@usace.army.mil.

Sincerely,

for Shawn H. Zinszer
Chief, Regulatory Branch

Enclosures

CC:

Oregon Department of State Lands (Melinda Butterfield & Dana Hicks, 58909-RF)
Grette Associates (Glenn Grette)

Oregon
Kate Brown, Governor

**Department of State Lands**
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200
FAX (503) 378-4844
www.oregon.gov/dsl

March 14, 2016

Linnton Water Credits, LLC
Attn: Rob Marinai
337 17th Street, Suite 200
Oakland, CA 94612

Re: WD #2016-0027 Wetland Delineation Report for the Proposed
Linnton Mill Restoration Site, Multnomah County;
T 1N R 1W S 2B TL 800; S 2C TL 100

Dear Mr. Marinai and Mr. Grette:

The Department of State Lands has reviewed the wetland delineation report prepared by Grette Associates for the site referenced above. Based upon the information presented in the report and additional information submitted upon request, we concur with the wetland and waterway boundaries as mapped in Figure 6 of the report. Within the study area, two wetlands (totaling approximately 1.03 acres) and a segment of the Willamette River were identified.

The river is subject to the permit requirements of the state Removal-Fill Law, but the two wetlands are exempt per OAR 141-085-0515 (7) and are not subject to this state law. In addition, normally a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more below the ordinary high water line (OHWL) of a waterway (or the 2 year recurrence interval flood elevation if OHWL cannot be determined). However, the Willamette River is an essential salmonid stream; therefore, fill or removal of any amount of material below its OHWL may require a state permit.

This concurrence is for purposes of the state Removal-Fill Law only. Federal or local permit requirements may apply as well. The Army Corps of Engineers will review the report and make a determination of jurisdiction for purposes of the Clean Water Act at the time that a permit application is submitted. We recommend that you attach a copy of this concurrence letter to both copies of any subsequent joint permit application to speed application review.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

Thank you for having the site evaluated. Please phone me at 503-986-5232 if you have any questions.

Sincerely,

Pete

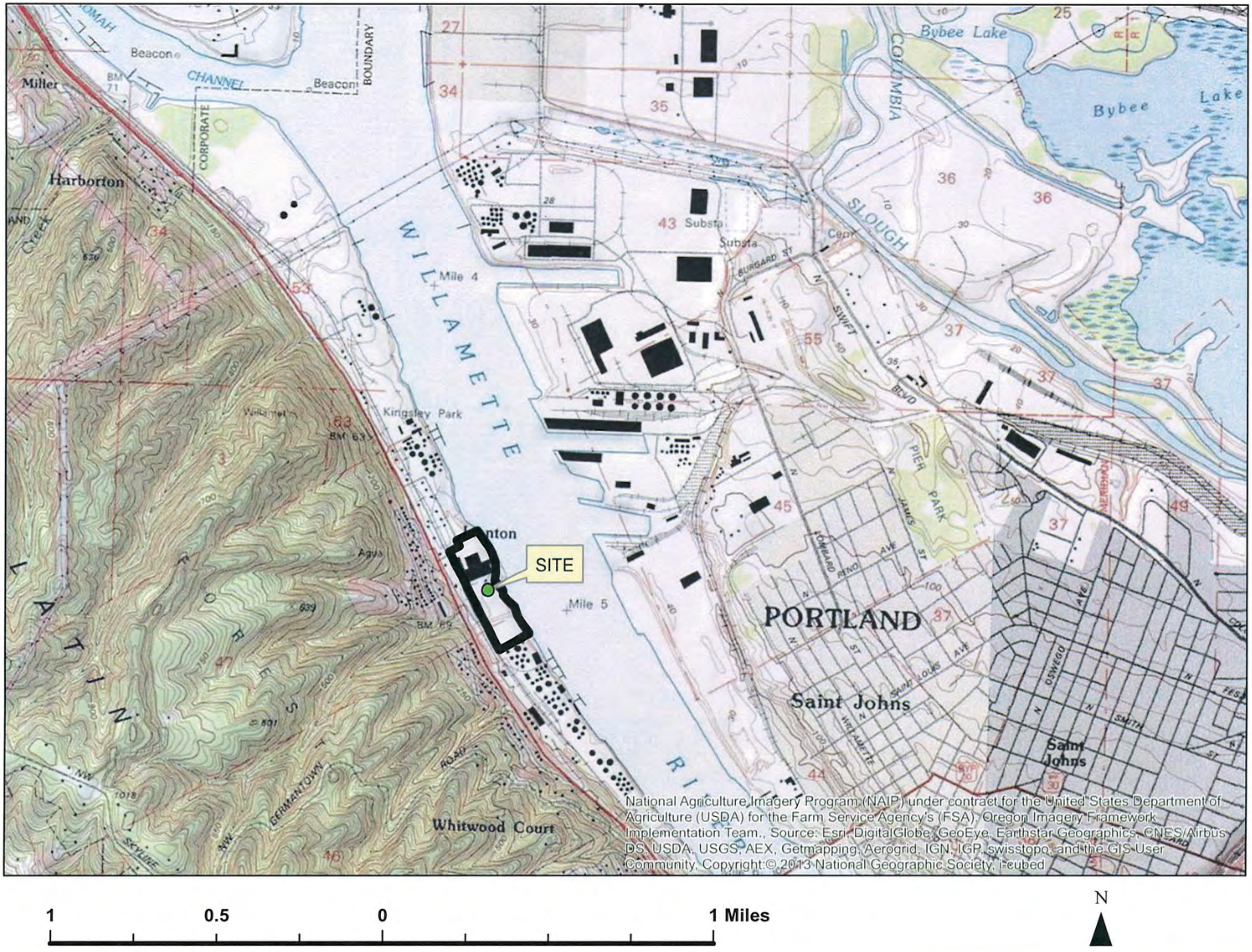
Peter Ryan, PWS
Jurisdiction Coordinator

Approved by Kathy Verble
Kathy Verble, CPSS
Aquatic Resource Specialist

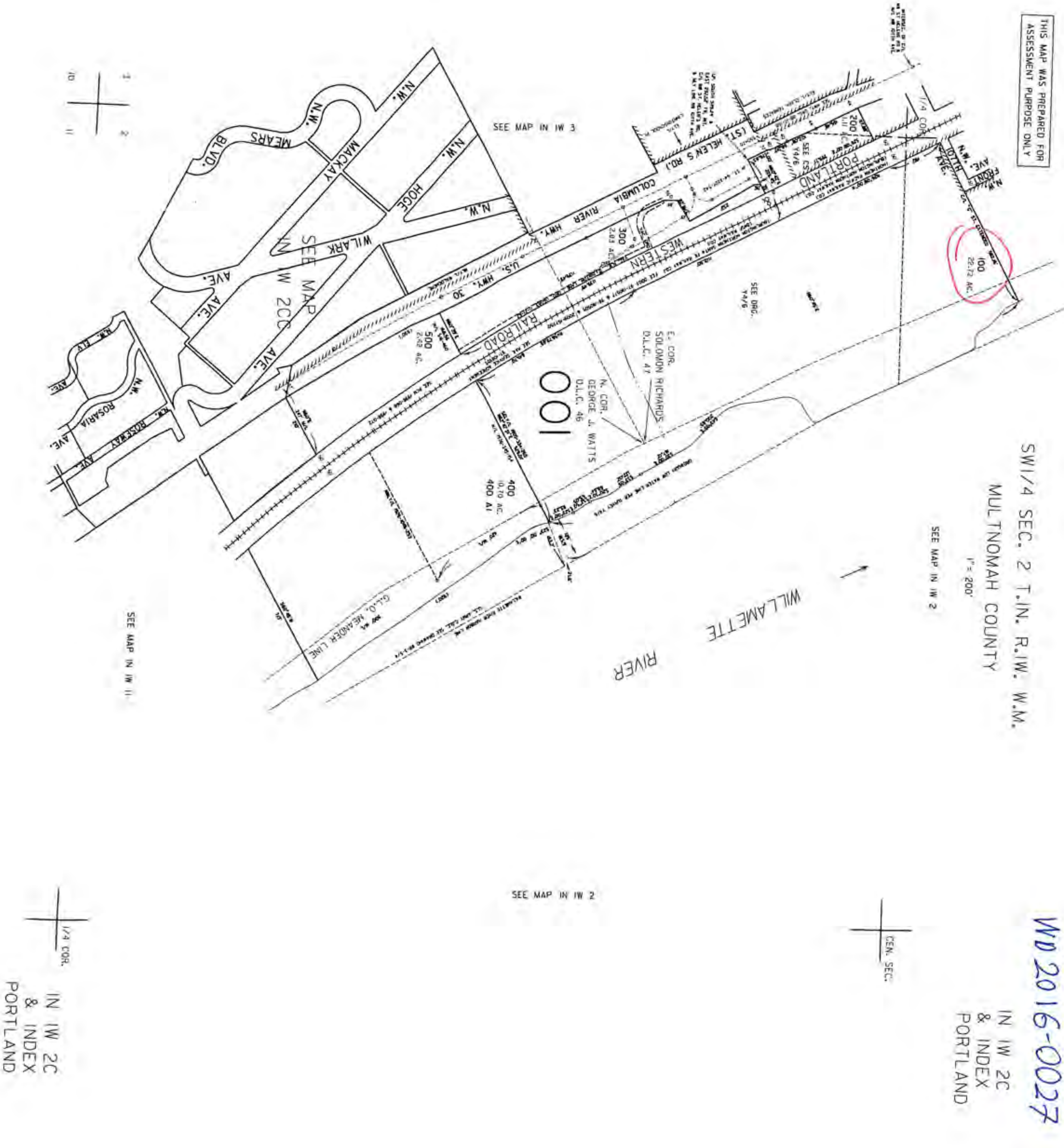
Enclosures

ec: Jay Dirkse, Grette Associates
City of Portland Planning Department
Melody White, Corps of Engineers
Melinda Butterfield, DSL

# WD2016-0027- Vicinity Map



National Agriculture Imagery Program (NAIP) under contract for the United States Department of Agriculture (USDA) for the Farm Service Agency's (FSA). Oregon Imagery Framework Implementation Team., Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, Copyright:© 2013 National Geographic Society, i-cubed



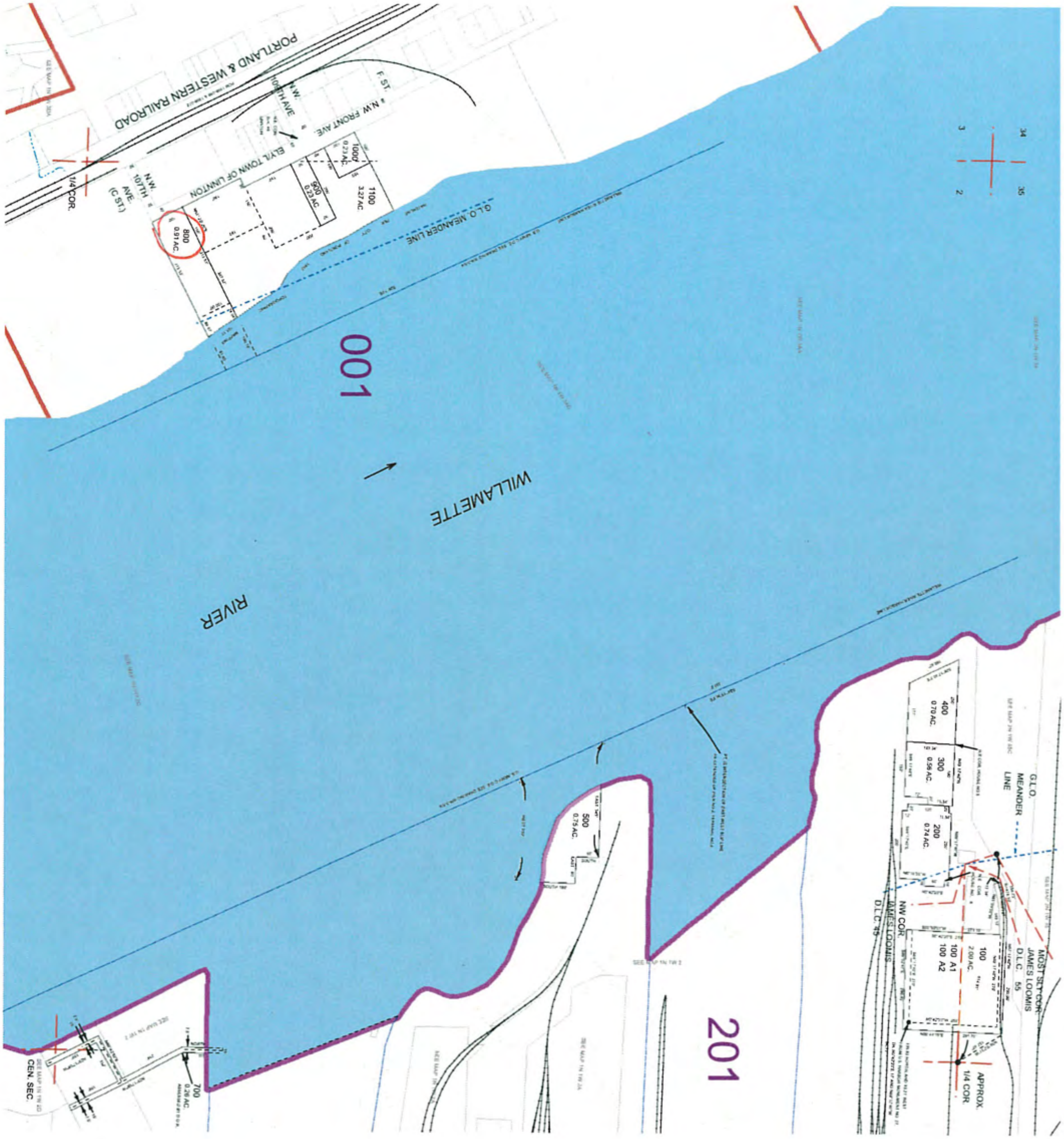
SW1/4 SEC. 2 T.1N. R.1W. W.M.
MULTNOMAH COUNTY
1"=200'

1N 1W 2C
& INDEX
PORTLAND

WD 2016-0027

THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSE ONLY

N.W.1/4 SEC.2 T.1N. R.1W. W.M.
MULTNOMAH COUNTY
1" = 200'



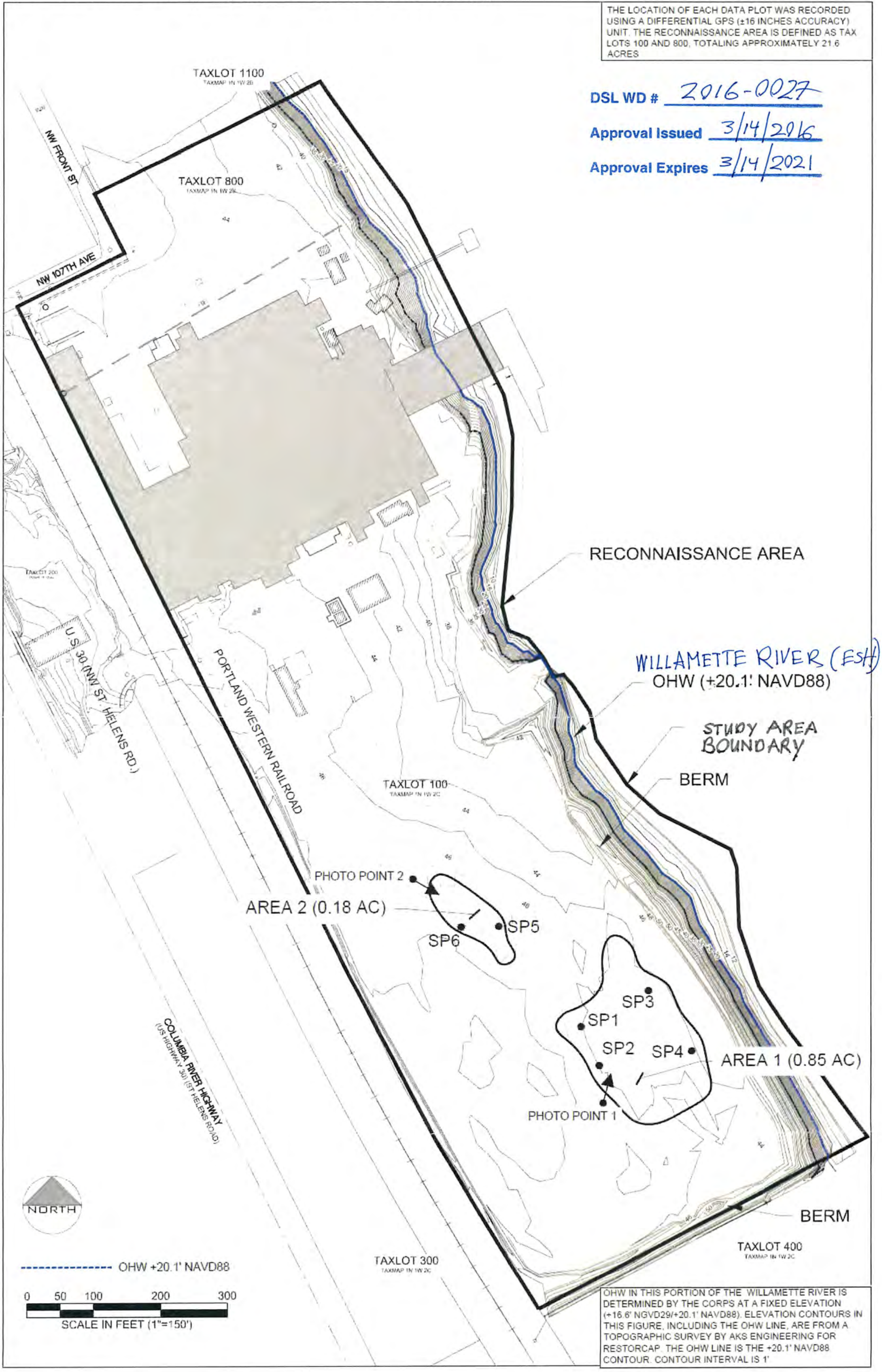
WD2016-0027

1N 1W 2B
PORTLAND

1N 1W 2B
PORTLAND

8/27/2014

Figure 6. Reconnaissance area map – Topographic survey 5/16/2013 (AKS Engineering)



THE LOCATION OF EACH DATA PLOT WAS RECORDED USING A DIFFERENTIAL GPS (±16 INCHES ACCURACY) UNIT. THE RECONNAISSANCE AREA IS DEFINED AS TAX LOTS 100 AND 800, TOTALING APPROXIMATELY 21.6 ACRES

**DSL WD #** 2016-0027

**Approval Issued** 3/14/2016

**Approval Expires** 3/14/2021

OHW IN THIS PORTION OF THE WILLAMETTE RIVER IS DETERMINED BY THE CORPS AT A FIXED ELEVATION (+16.6' NGVD29/+20.1' NAVD88). ELEVATION CONTOURS IN THIS FIGURE, INCLUDING THE OHW LINE, ARE FROM A TOPOGRAPHIC SURVEY BY AKS ENGINEERING FOR RESTORCAP. THE OHW LINE IS THE +20.1' NAVD88 CONTOUR. CONTOUR INTERVAL IS 1'

# Exhibit E. Title Policy and Discussion

RestorCap

**To:** Portland Harbor Natural Resource Trustee Council

**From:** RestorCap, LLC and Linnton Water Credits, LLC

**Date:** March 29, 2018

**Re:** Notes on Review of Linnton Restoration Project Title Report and Surveys

This memorandum provides a discussion of the Linnton Restoration Site title issues. An updated Title Report dated March 26, 2018 is attached and referenced herein.

Exceptions to the Title Report are discussed below. Copies of documents referenced below are also attached.

**Easements:**

1) *Easement for a Slope and Retaining Wall to the State of Oregon, by and through its State Highway Commission (Bk 2178, Pg 262) (Title Report, Item #15)*

   This easement is located adjacent to St. Helens Road, outside of the current project boundary.

2) *Sewer Easement to the City of Portland (Bk 856, Pg 154) (Title Report, Item #17)*

   This easement is located within the current project boundary. Linnton Water Credits, LLC (LWC) is not seeking credits for the area covered by this easement. See attached Figure 1.

3) *Sewer Easement to the City of Portland (Bk 918, Pg 300) (Title Report, Item #18)*

   This easement is located within the current project boundary. LWC is not seeking credits for the area covered by this easement. See attached Figure 1.

4) *Gas Pipeline Easement (No. 2006-211171) (Title Report, Item #25)*

   This easement is located within the current project boundary. LWC is not seeking credits for the area covered by this easement. See attached Figure 1.

**Other:**

1) *Unpaid Property Taxes with Partial Payment (Title Report, Items #6, #7, and #8)*

Inclusion of these items on the Title Report is due to the fact that LWC makes monthly tax payments on these accounts. As of the date of this memo, tax accounts reflected in Items #7 and #8 have a zero balance.

Further, Item #7 relates to the tax account for Tax Lot 200 of Parcel I, which is located outside of the current project boundary.

2) *1969 and 1973 Revocable Permits to install liquefied petroleum storage tank (Bk 708, Pg 1343 and Bk 943, Pg 1440 (Title Report, Items #16 and #20)*

The permits were granted to Linnton Plywood Association for construction of a 30,000-gallon above-ground liquefied petroleum gas (LPG) storage tank (a 20,250-gallon tank was approved under the 1969 permit). Use was to maintain a standby fuel to power plywood dryers in the event of a natural gas disruption.

Pursuant to these permits, two above-ground LPG tanks were installed approximately 250 feet to the south of the mill buildings. Such tanks were sold at auction in 2001.

3) *1973 & 1981 Conditional Use Requests (Bk 939, Pg 1203 and Bk 1495, Pg 1839) (Title Report, Items #19 and #22).*

Both Conditional Use Approvals permitted Linnton Plywood Association to perform dredging and filling at the site. While the exact locations and uses are not set forth in these approvals, interviews with the former mill manager indicate that dredging occurred near the log storage area immediately upstream of the mill docks (near the shoreline metal sea wall). Dredging was required to maintain log storage in this area. Such uses were discontinued with the closure of the mill.

4) *Earth Fill Area Covenant (Bk 1580, Pg 1884 and Bk 1600, Pg 479) (Title Report, Item #23).*

These covenants prohibit site improvements such as building construction, or other structures requiring foundations, without approved geotechnical design. Such covenants do not apply to restoration activities and do not conflict with future conservation easements.

5) *City of Portland Land Use Review File (No. 94-131844) (Title Report, Item # 24)*

Linnton Plywood Association leased approximately 6 acres of property in the mid-southern portion of the property to Columbia River Sand & Gravel (later Glacier Northwest) between approximately 1994 and 2009. This Land Use Administrative Decision allowed for sand distribution from dredging activities as allowed by the lease, and such operations permanently ceased with the termination of the lease.

6) *Terms and Provisions of Consent Judgment Entered August 25, 2015 in the Circuit Court for Multnomah County, Oregon (Title Report, Item #26)*

This Consent Judgment memorializes the Prospective Purchaser Agreement (PPA) between LWC and the Oregon Department of Environmental Quality (DEQ). Section XIII, Access and Institutional Controls, requires that access be granted to US EPA and Oregon DEQ if necessary to perform response activities associated with the Portland Harbor Superfund Site.

7) *City of Portland Land Use Review File No. LU 14239831GW (Title Report, Item # 27)*

This Land Use Review constitutes the City of Portland's approval of a Greenway Review to conduct planned restoration activities at the site.

Chicago Title Insurance Company

Policy No.: 472512502586JL
File No.: 472512502586JL-CT50

## OWNER'S POLICY OF TITLE INSURANCE
Issued by
***Chicago Title Insurance Company***

**Any notice of claim and any other notice or statement in writing required to be given to the Company under this Policy must be given to the Company at the address shown in Section 18 of the Conditions.**

### COVERED RISKS

SUBJECT TO THE EXCLUSIONS FROM COVERAGE, THE EXCEPTIONS FROM COVERAGE CONTAINED IN SCHEDULE B, AND THE CONDITIONS, Chicago Title Insurance Company, a Nebraska corporation (the "Company") insures as of Date of Policy and, to the extent stated in Covered Risks 9 and 10, after Date of Policy, against loss or damage, not exceeding the Amount of Insurance, sustained or incurred by the Insured by reason of:

1. Title being vested other than as stated in Schedule A.
2. Any defect in or lien or encumbrance on the Title. This Covered Risk includes but is not limited to insurance against loss from
   (a) A defect in the Title caused by
      (i) forgery, fraud, undue influence, duress, incompetency, incapacity, or impersonation;
      (ii) failure of any person or Entity to have authorized a transfer or conveyance;
      (iii) a document affecting Title not properly created, executed, witnessed, sealed, acknowledged, notarized, or delivered;
      (iv) failure to perform those acts necessary to create a document by electronic means authorized by law;
      (v) a document executed under a falsified, expired, or otherwise invalid power of attorney;
      (vi) a document not properly filed, recorded, or indexed in the Public Records including failure to perform those acts by electronic means authorized by law; or
      (vii) a defective judicial or administrative proceeding.
   (b) The lien of real estate taxes or assessments imposed on the Title by a governmental authority due or payable, but unpaid.
   (c) Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land. The term "encroachment" includes encroachments of existing improvements located on the Land onto adjoining land, and encroachments onto the Land of existing improvements located on adjoining land.
3. Unmarketable Title.
4. No right of access to and from the Land.
5. The violation or enforcement of any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
   (a) the occupancy, use, or enjoyment of the Land;
   (b) the character, dimensions, or location of any improvement erected on the Land;
   (c) the subdivision of land; or
   (d) environmental protection

   if a notice, describing any part of the Land, is recorded in the Public Records setting forth the violation or intention to enforce, but only to the extent of the violation or enforcement referred to in that notice.
6. An enforcement action based on the exercise of a governmental police power not covered by Covered Risk 5 if a notice of the enforcement action, describing any part of the Land, is recorded in the Public Records, but only to the extent of the enforcement referred to in that notice.
7. The exercise of the rights of eminent domain if a notice of the exercise, describing any part of the Land, is recorded in the Public Records.
8. Any taking by a governmental body that has occurred and is binding on the rights of a purchaser for value without Knowledge.

Owner's Policy Jacket PO-04 - Covered Risks
(continued)

9. Title being vested other than as stated in Schedule A or being defective
    (a) as a result of the avoidance in whole or in part, or from a court order providing an alternative remedy, of a transfer of all or any part of the title to or any interest in the Land occurring prior to the transaction vesting Title as shown in Schedule A because that prior transfer constituted a fraudulent or preferential transfer under federal bankruptcy, state insolvency, or similar creditors' rights laws; or duress, incompetency, incapacity, or impersonation;
    (b) because the instrument of transfer vesting Title as shown in Schedule A constitutes a preferential transfer under federal bankruptcy, state insolvency, or similar creditors' rights laws by reason of the failure of its recording in the Public Records
        (i) to be timely, or
        (ii) to impart notice of its existence to a purchaser for value or to a judgment or lien creditor.
10. Any defect in or lien or encumbrance on the Title or other matter included in Covered Risks 1 through 9 that has been created or attached or has been filed or recorded in the Public Records subsequent to Date of Policy and prior to the recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

The Company will also pay the costs, attorneys' fees, and expenses incurred in defense of any matter insured against by this Policy, but only to the extent provided in the Conditions.

**CHICAGO TITLE INSURANCE COMPANY**

BY President

ATTEST Secretary

## SCHEDULE A

Chicago Title Insurance Company
8585 SW Cascade Avenue, Suite 200
Beaverton, OR 97008

| | |
|---|---|
| File No. | 472512502586JL-CT50 |
| Policy No.: | 472512502586JL |
| Address Reference: | 10504 NW St Helens Road, Portland, OR 97231 |
| Amount of Insurance: | $ 5,750,000.00 |
| Premium: | $ 15,053.00 |
| Date of Policy: | September 2, 2015 at 02:14 PM |

1. Name of Insured:

   Linnton Water Credits, LLC, a California limited liability company

2. The estate or interest in the Land that is insured by this policy is:

   Fee Simple

3. Title is vested in:

   Linnton Water Credits, LLC, a California limited liability company

4. The Land referred to in this policy is described as follows:

   See Schedule C Attached Hereto

**Policy Valid Only If Schedule B is Attached**

## SCHEDULE B

File No. 472512502586JL-CT50
Policy No. 472512502586JL

This policy does not insure against loss or damage, and the Company will not pay costs, attorneys' fees, or expenses that arise by reason of:

1. Property taxes, which are a lien not yet due and payable, including any assessments collected with taxes to be levied for the fiscal year 2015-2016.

2. The rights of the public in and to that portion of the premises herein described lying within the limits of streets, roads and highways.

3. Rights of the public and of governmental bodies in and to that portion of the premises herein described lying below the high water mark of Willamette River.

4. Any adverse claims based upon the assertion that Willamette River has changed in location.

5. Any adverse claim based on the assertion that any portion of said land has been created by artificial means or has accreted to such portions so created.

6. Rights established pursuant to ORS 274.905, et seq to all or any portion of the herein described premises created by artificial means.

7. An Easement created by instrument, including terms and provisions thereof;
   Dated: October 14, 1913
   Recorded: November 10, 1914
   Book: 669
   Page: 378
   In Favor Of: Town of Linnton
   For: Sewer
   Affects: Parcel II

8. An Easement created by instrument, including terms and provisions thereof;
   Dated: May 27, 1963
   Recorded: July 23, 1963
   Book: 2178
   Page: 262
   In Favor Of: State of Oregon, by and through its State Highway Commission
   For: Slope and a retaining wall
   Affects: Portion adjacent to N.W. St. Helens Road

9. Revocable Permit to install liquefied petroleum storage tank, as set forth in City of Portland Ordinance No. 130032, including the terms and provisions thereof;
   Recorded: November 24, 1969
   Book: 708
   Page: 1343

10. An Easement created by instrument, including terms and provisions thereof;
    Dated: February 8, 1972
    Recorded: May 11, 1972
    Book: 856
    Page: 154
    In Favor Of: City of Portland, a municipal corporation
    For: Sewer
    Affects: The Northwesterly portion of Parcel I

## SCHEDULE B
(Continued)

File No. 472512502586JL-CT50
Policy No. 472512502586JL

11. An Easement created by instrument, including terms and provisions thereof;
Dated: December 22, 1972
Recorded: April 2, 1973
Book: 918
Page: 300
In Favor Of: City of Portland, a municipal corporation
For: Sewer
Affects: The Northwesterly portion of Parcel I

12. City of Portland Conditional Use Request No. CU 55 -73, including the terms and provisions thereof;
Recorded: July 24, 1973
Book: 939
Page: 1203

13. Revocable Permit to install one liquefied petroleum gas storage tank, as set forth in City of Portland Ordinance No. 136982, including the terms and provisions thereof;
Recorded: August 16, 1973
Book: 943
Page: 1440

14. Easement for ingress and egress above and below the surface of the land as implied by reservation of mineral rights in Quitclaim Deed;
From: Spokane, Portland and Seattle Railway Company
Recording Date: February 28, 1975
Book: 1029
Page: 1716
(Affects Parcel II)

And re-asserted by statement of claim recorded August 24, 2011, Fee No. 2011-093722.

15. City of Portland Conditional Use File No. CU 96-80, including the terms and provisions thereof;
Recorded: January 12, 1981
Recorder's Fee No.: 81-002494
Book: 1495
Page: 1839

16. Covenant - Earthfill Area, including the terms and provisions thereof;
Recorded: February 25, 1982
Recorder's Fee No.: 82-011468
Book: 1580
Page: 1884

And also by instrument;
Recorded: June 8, 1982
Recorder's Fee No.: 82-032194
Book: 1600
Page: 479

17. City of Portland Land Use Review File No. LUR 94-00462 GW, including the terms and provisions thereof;
Recorded: August 31, 1994
Recorder's Fee No.: 94-131844

## SCHEDULE B
(Continued)

File No. 472512502586JL-CT50
Policy No. 472512502586JL

18. An Easement created by instrument, including terms and provisions thereof;
Dated: November 10, 2006
Recorded: November 14, 2006
Recorder's Fee No.: 2006-211171
In Favor Of: Northwest Natural Gas Company
For: Gas Pipeline
Affects: A strip of land 7.5 feet in width near the Northwesterly corner of Parcel I

19. Terms and Provisions of Consent Judgment entered August 25, 2015 in the Cicuit Court for Multnomah County Oregon, Case No. 15CV19278;
Plaintiff: State of Oregon on behalf of Department of Environmental Quality, acting by and through Dick Pederson, Director
Defendant: Linnton Water Credits, LLC

20. Any encroachments as may be revealed by an ALTA/ACSM survey certified to Chicago Title Insunace Company. Note: Chicago title insurance company is in reciept of an existing conditions survey, prepared by AKS Engineering & Forestry, dated October 20, 2010, Job No. 2713 which shows no matters of encroachment.

21. Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing, including the terms and provisions thereof, given to secure an indebtedness with interest thereon and such future advances as may be provided therein;

| | |
|---|---|
| Dated: | September 2, 2015 |
| Recording Date: | September 2, 2015 |
| Recording No: | 2015-113604 |
| Amount: | $3,250,000.00 |
| Grantor: | Linnton Water Credits, LLC, a California limited liability company |
| Trustee: | Chicago Title Company of Oregon |
| Beneficiary: | Linnton Plywood Association, an Oregon cooperative corporation |

22. The rights of tenants in possession, as tenants only, under any unrecorded leases, with no option to purchase or right of first refusal.

# SCHEDULE C

File No. 472512502586JL-CT50
Policy No. 472512502586JL

The Land referred to in this policy is described as follows:

PARCEL I:

The following tract of land situated in Sections 2 and 3, Township 1 North, Range 1 West of the Willamette Meridian, in the City of Portland, County of Multnomah and State of Oregon, described as follows:

BEGINNING at the Southeast corner of the Donation Land Claim of Solomon Richards No. 47 which is the Northeast corner of the George G. Watts Donation Land Claim No. 46, in said Section 2; thence Northeasterly along the Northeasterly extension of the division line between said Donation Land Claim of Solomon Richards and George G. Watts to a point on the harbor line, as now established, of the Willamette River, which point is the true point of beginning of the tract herein described; thence Northwesterly along said harbor line, to the point of intersection with the center line of "C" Street in the TOWN OF LINNTON if extended in a straight line Easterly; thence Westerly, along said extended center line of "C" Street, to the Easterly line of the Burlington Northern Inc. right of way; thence Southerly along the East line of said right of way, 190 feet to a point of intersection with the Northerly line of the Southerly 15 feet of Lot 2, Block 65, TOWN OF LINNTON, if said line were extended Eastward; thence Westerly along said extended Northerly line, parallel with the Southerly line of said Block 65 to the East line of N.W. St. Helens Road; thence Southerly along the Easterly line of said N.W. St. Helens Road to an iron pipe on said Easterly line, which is 549.24 feet South and 292.52 feet East from the intersection of the Center line of N.W. St. Helens Road with the Northerly line of N.W. 107th Avenue, formerly "C" Street, in the TOWN OF LINNTON; thence North 60°42' East, 226.45 feet to a point of intersection with the Easterly line of the Burlington Northern Inc. right of way; thence Southerly along the Easterly line of said right of way to the point of intersection with the Northerly line of that tract of land conveyed to Linnton Realty Company, an Oregon corporation, to Signal Oil Company, a California corporation, by Deed recorded July 8, 1936 in Book 345, Page 154, Deed Records; thence Northeasterly along the Northerly line of said Signal Oil Company Tract to the harbor line of the Willamette River; thence Northerly along said harbor line to the true point of beginning.

EXCEPTING THEREFROM the right of way of the Burlington Northern Inc.

ALSO EXCEPTING THEREFROM that portion West of the Burlington Northern Inc. right of way conveyed to the State of Oregon, by and through its State Highway Commission, by Deed recorded July 23, 1963 in Book 2178, Page 262, Deed Records.

AND FURTHER EXCEPTING THEREFROM the ownership of the State of Oregon in that portion lying below the line of mean high water of the Willamette River.

PARCEL II:

A tract of land in the Solomon Richards, et ux, Donation Land Claim in Section 2, Township 1 North, Range 1 West, of the Willamette Meridian in the City of Portland, County of Multnomah and State of Oregon, said tract of land lying between the Easterly line of 1st Street (now known as Northwest Front Avenue) in the Town of Linnton, and the Harbor Line, as now established, of the Willamette River, and between the Easterly extension of the centerline of "C" Street (now known as Northwest 107th Avenue) in the Town of Linnton and a line drawn parallel to and 100 feet Northerly of when measured at right angles to the said Easterly extension of the centerline of said "C" Street.

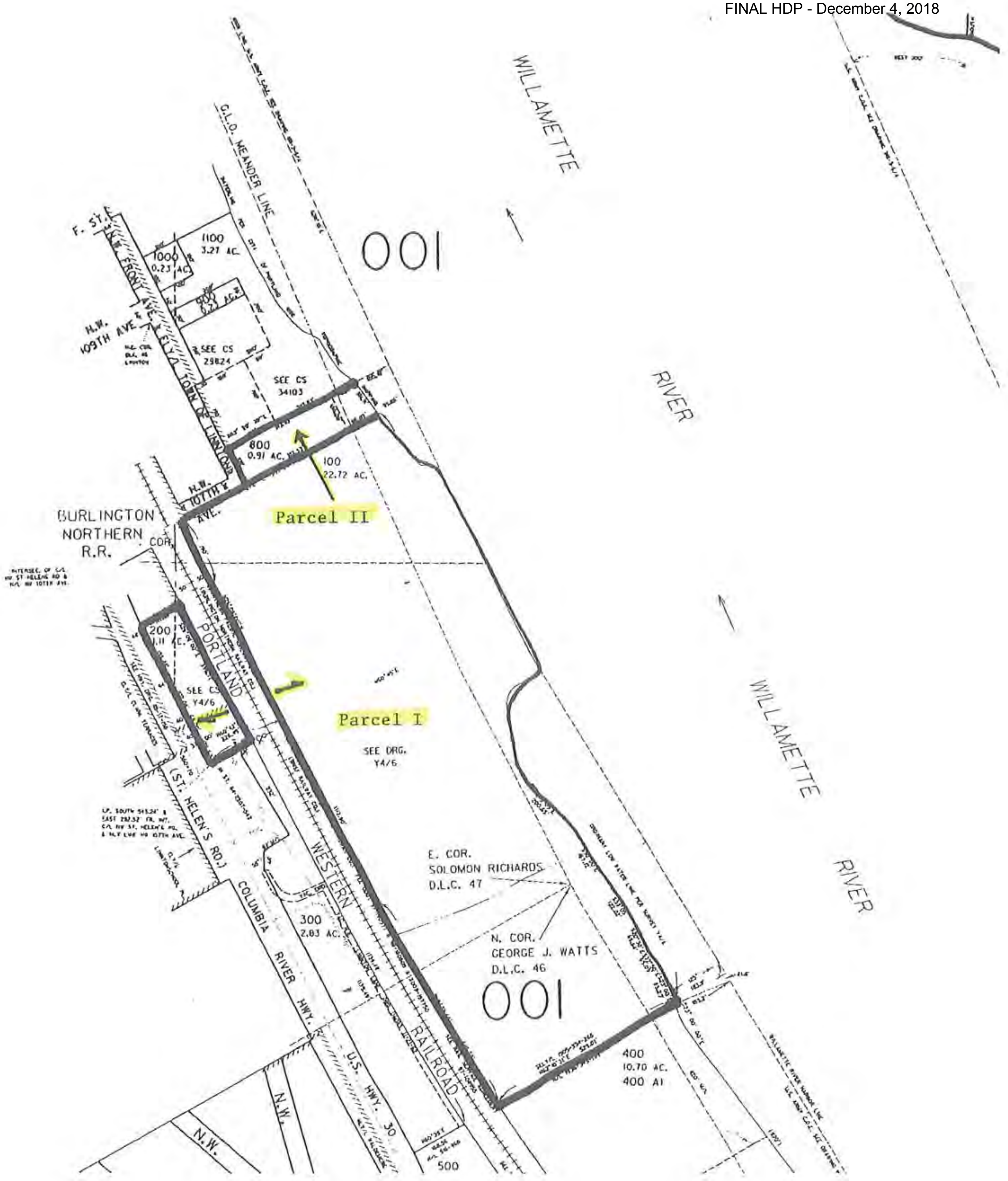
EXCEPTING THEREFROM the reservation of all of the coal, oil, gas, casinghead gas and all ores and minerals of every kind and nature underlying the surface of the premises as reserved by the Spokane, Portland and Seattle Railway Company, a Washington corporation in Deed recorded February 28, 1975 in Book 1029, Page 1716,

## SCHEDULE C
(Continued)

File No. 472512502586JL-CT50
Policy No. 472512502586JL

Multnomah County Deed Records and statement of claim recorded August 24, 2011 as Fee No. 2011-093722.

ALSO EXCEPTING THEREFROM the ownership of the State of Oregon in that portion lying below the line of mean high water of the Willamette River.


WILLAMETTE
RIVER
WILLAMETTE
RIVER
001
001
G.L.O. MEANDER LINE
F. ST.
N.W. FRONT AVE.
N.W. 109TH AVE.
1100
3.27 AC.
1000
0.23 AC
900
0.23 AC.
SEE CS
29824
SEE CS
34103
800
0.91 AC.
100
22.72 AC.
N.W. 110TH AVE.
Parcel II
BURLINGTON
NORTHERN
R.R.
COR.
200
1.11 AC.
PORTLAND
SEE CS
Y4/6
Parcel I
SEE DRG.
Y4/6
(ST. HELEN'S RD.)
WESTERN
RAILROAD
COLUMBIA
RIVER
HWY.
U.S. HWY. 30
300
2.83 AC.
E. COR.
SOLOMON RICHARDS
D.L.C. 47
N. COR.
GEORGE J. WATTS
D.L.C. 46
400
10.70 AC.
400 A1
500
N.W.
N.W.

N

Reference: 472512502586JL-CT50

# ENDORSEMENT

Covenants, Conditions and Restrictions - Improved Land - Owner's Policy Endorsement
Attached to
Policy Number 472512502586JL
Issued by
CHICAGO TITLE INSURANCE COMPANY

Date: September 2, 2015 Premium: $ 1,500.00

1. The insurance provided by this endorsement is subject to the exclusions in Section 4 of this endorsement; and the Exclusions from Coverage, the Exceptions from Coverage contained in Schedule B, and the Conditions in the policy.
2. For the purposes of this endorsement only,
   a. "Covenant" means a covenant, condition, limitation or restriction in a document or instrument in effect at Date of Policy.
   b. "Improvement" means a building, structure located on the surface of the Land, road, walkway, driveway, or curb, affixed to the Land at Date of Policy and that by law constitutes real property, but excluding any crops, landscaping, lawn, shrubbery, or trees.
3. The Company insures against loss or damage sustained by the Insured by reason of:
   a. A violation on the Land at Date of Policy of an enforceable Covenant, unless an exception in Schedule B of the policy identifies the violation;
   b. Enforced removal of an Improvement as a result of a violation, at Date of Policy, of a building setback line shown on a plat of subdivision recorded or filed in the Public Records, unless an exception in Schedule B of the policy identifies the violation; or
   c. A notice of a violation, recorded in the Public Records at Date of Policy, of an enforceable Covenant relating to environmental protection describing any part of the Land and referring to that Covenant, but only to the extent of the violation of the Covenant referred to in that notice, unless an exception in Schedule B of the policy identifies the notice of the violation.
4. This endorsement does not insure against loss or damage (and the Company will not pay costs, attorneys' fees, or expenses) resulting from:
   a. any Covenant contained in an instrument creating a lease;
   b. any Covenant relating to obligations of any type to perform maintenance, repair, or remediation on the Land; or
   c. except as provided in Section 3.c., any Covenant relating to environmental protection of any kind or nature, including hazardous or toxic matters, conditions, or substances.

This endorsement is issued as part of the policy. Except as it expressly states, it does not (i) modify any of the terms and provisions of the policy, (ii) modify any prior endorsements, (iii) extend the Date of Policy, or (iv) increase the Amount of Insurance. To the extent a provision of the policy or a previous endorsement is inconsistent with an express provision of this endorsement, this endorsement controls. Otherwise, this endorsement is subject to all of the terms and provisions of the policy and of any prior endorsements.

Order Reference: 472512502586JL-CT50

Chicago Title Insurance Company

By: ______________________
Authorized Signature

OTIRO Endorsement No. 209.2-06 ALTA Endorsement Form 9.2-06 (04-02-12)
Covenants, Conditions and Restrictions-Improved Land-Owner's Policy Endorsement

FDOR0558.rdw

Reference: 472512502586JL-CT50

## ENDORSEMENT

Utility Access
Attached to
Policy Number 472512502586JL
Issued by
CHICAGO TITLE INSURANCE COMPANY

Date: September 2, 2015

Premium: $ 275.00

The Company insures against loss or damage sustained by the Insured by reason of the lack of a right of access to the following utilities or services: [CHECK ALL THAT APPLY]

☒ Water service
☒ Electrical power service
☒ Natural gas service
☒ Sanitary sewer
☒ Telephone service
☒ Storm water drainage

either over, under or upon rights-of-way or easements for the benefit of the Land because of:

(1) a gap or gore between the boundaries of the Land and the rights-of-way or easements;
(2) a gap between the boundaries of the rights-of-way or easements ; or
(3) a termination by a grantor, or its successor, of the rights-of-way or easements.

This endorsement is issued as part of the policy. Except as it expressly states, it does not (i) modify any of the terms and provisions of the policy, (ii) modify any prior endorsements, (iii) extend the Date of Policy, or (iv) increase the Amount of Insurance. To the extent a provision of the policy or a previous endorsement is inconsistent with an express provision of this endorsement, this endorsement controls. Otherwise, this endorsement is subject to all of the terms and provisions of the policy and of any prior endorsements.

Order Reference: 472512502586JL-CT50

Chicago Title Insurance Company

By: ______________________________
Authorized Signature

OTIRO Endorsement No. 217.2-06
Utility Access (Owner's Policy)

ALTA Endorsement Form 17.2-06 (10/16/08)

Reference: 472512502586JL-CT50

# ENDORSEMENT

Same as Survey Endorsement
Attached to Policy Number 472512502586JL
Issued by
CHICAGO TITLE INSURANCE COMPANY

Date: September 2, 2015 Premium: $ 100.00

The Company insures against loss or damage sustained by the Insured by reason of the failure of the Land as described in Schedule A to be the same as that identified on the survey made by AKS Engineering & Forestry dated October 20, 2010, and designated Job No. 2713.

This endorsement is issued as part of the policy. Except as it expressly states, it does not (i) modify any of the terms and provisions of the policy, (ii) modify any prior endorsements, (iii) extend the Date of Policy, or (iv) increase the Amount of Insurance. To the extent a provision of the policy or a previous endorsement is inconsistent with an express provision of this endorsement, this endorsement controls. Otherwise, this endorsement is subject to all of the terms and provisions of the policy and of any prior endorsements.

Order Reference: 472512502586JL-CT50

Chicago Title Insurance Company

By: ________________________
Authorized Signature

OTIRO Endorsement No. 225-06 ALTA Endorsement Form 25-06 (10/16/08)
Same as Survey Endorsement

FDOR0645.rdw

Reference: 472512502586JL-CT50

## ENDORSEMENT

Minerals and Other Subsurface Substances Buildings Endorsement
Attached to
Policy Number 472512502586JL
Issued by
CHICAGO TITLE INSURANCE COMPANY

Date: September 2, 2015

Premium: $ 461.00

1. The insurance provided by this endorsement is subject to the exclusion in Section 4 of this endorsement; and the Exclusions from Coverage, the Exceptions from Coverage contained in Schedule B, and the Conditions in the policy.
2. For purposes of this endorsement only, "Improvement" means a building on the Land at Date of Policy.
3. The Company insures against loss or damage sustained by the Insured by reason of the enforced removal or alteration of any Improvement resulting from the future exercise of any right existing at Date of Policy to use the surface of the Land for the extraction or development of minerals or any other subsurface substances excepted from the description of the Land or excepted in Schedule B.
4. This endorsement does not insure against loss or damage (and the Company will not pay costs, attorneys' fees, or expenses) resulting from:
    a. contamination, explosion, fire, vibration, fracturing, earthquake or subsidence;
    b. negligence by a person or an Entity exercising a right to extract or develop minerals or other subsurface substances; or
    c. the exercise of the rights described in mineral resevation affecting Parcel II as excepted in the legal description.

This endorsement is issued as part of the policy. Except as it expressly states, it does not (i) modify any of the terms and provisions of the policy, (ii) modify any prior endorsements, (iii) extend the Date of Policy, or (iv) increase the Amount of Insurance. To the extent a provision of the policy or a previous endorsement is inconsistent with an express provision of this endorsement, this endorsement controls. Otherwise, this endorsement is subject to all of the terms and provisions of the policy and of any prior endorsements.
Order Reference: 472512502586JL-CT50

Chicago Title Insurance Company

By: ______________________
Authorized Signature

Reference: 472512502586JL-CT50

## ENDORSEMENT

Minerals and Other Subsurface Substances Buildings Endorsement
Attached to
Policy Number 472512502586JL
Issued by
CHICAGO TITLE INSURANCE COMPANY

Date: September 2, 2015

Premium: $ 461.00

1. The insurance provided by this endorsement is subject to the exclusion in Section 4 of this endorsement; and the Exclusions from Coverage, the Exceptions from Coverage contained in Schedule B, and the Conditions in the policy.
2. For purposes of this endorsement only, "Improvement" means a building on the Land at Date of Policy.
3. The Company insures against loss or damage sustained by the Insured by reason of the enforced removal or alteration of any Improvement resulting from the future exercise of any right existing at Date of Policy to use the surface of the Land for the extraction or development of minerals or any other subsurface substances excepted from the description of the Land or excepted in Schedule B.
4. This endorsement does not insure against loss or damage (and the Company will not pay costs, attorneys' fees, or expenses) resulting from:
    a. contamination, explosion, fire, vibration, fracturing, earthquake or subsidence;
    b. negligence by a person or an Entity exercising a right to extract or develop minerals or other subsurface substances; or
    c. the exercise of the rights described in mineral resevation affecting Parcel II as excepted in the legal description.

This endorsement is issued as part of the policy. Except as it expressly states, it does not (i) modify any of the terms and provisions of the policy, (ii) modify any prior endorsements, (iii) extend the Date of Policy, or (iv) increase the Amount of Insurance. To the extent a provision of the policy or a previous endorsement is inconsistent with an express provision of this endorsement, this endorsement controls. Otherwise, this endorsement is subject to all of the terms and provisions of the policy and of any prior endorsements.
Order Reference: 472512502586JL-CT50

Chicago Title Insurance Company

By: ______________________
Authorized Signature

Reference: 472512502586JL-CT50

## ACCESS AND ENTRY ENDORSEMENT

2006 ALTA POLICY

Attached to Policy No. 472512502586JL
Issued by

CHICAGO TITLE INSURANCE COMPANY

Date: September 2, 2015

Premium: $ 125.00

The Company insures against loss or damage sustained by the Insured if, at Date of Policy (i) the Land does not abut and have both actual vehicular and pedestrian access to and from NW 107th Avenue (Tax lots 100 & 800) and NW St Helens Road (Tax Lot 200) (the "Street"), (ii) the Street is not physically open and publicly maintained, or (iii) the Insured has no right to use existing curb cuts or entries along that portion of the Street abutting the Land.

This endorsement is issued as part of the policy. Except as it expressly states, it does not (i) modify any of the terms and provisions of the policy, (ii) modify any prior endorsements, (iii) extend the Date of Policy or (iv) increase the Amount of Insurance. To the extent a provision of the policy or a previous endorsement is inconsistent with an express provision of this endorsement, this endorsement controls. Otherwise, this endorsement is subject to all of the terms and provisions of the policy and of any prior endorsements.

CHICAGO TITLE INSURANCE COMPANY

By: ______________________
Authorized Signature

OTIRO Endorsement No. 217-06
Access and Entry Endorsement

ALTA Endorsement Form 17-06 (6/17/06)

FDOR0483.rdw

Reference: 472512502586JL-CT50

# CONTIGUITY- MULTIPLE PARCELS ENDORSEMENT

2006 ALTA POLICY

Attached to Policy No. 472512502586JL
Issued by

CHICAGO TITLE INSURANCE COMPANY

Date: September 2, 2015

Premium: $ 75.00

The Company insures against loss or damage sustained by the Insured by reason of:

1. the failure of the common boundary lines separating Parcels I and II of the Land to be contiguous to each other and the failure of the land described in Paragraph 4, Schedule A of the policy to be one whole and contiguous tract of land with no intervening gaps, strips or gores, except that Tax Lot 200 of Parcel I is not contiguous to Tax Lot 100 of Parcel I as it is separated by the railroad right-of-way; or
2. the presence of any gaps, strips or gores separating the contiguous boundary lines described above.

This endorsement is issued as part of the policy. Except as it expressly states, it does not (i) modify any of the terms and provisions of the policy, (ii) modify any prior endorsements, (iii) extend the Date of Policy or (iv) increase the Amount of Insurance. To the extent a provision of the policy or a previous endorsement is inconsistent with an express provision of this endorsement, this endorsement controls. Otherwise, this endorsement is subject to all of the terms and provisions of the policy and of any prior endorsements.

CHICAGO TITLE INSURANCE COMPANY

By: ____________________
Authorized Signature

OTIRO Endorsement No. 219-06
Contiguity-Multiple Parcels Endorsement

ALTA Endorsement Form 19-06 (6/17/06)

FDOR0499.rdw

## EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
    - (i) the occupancy, use, or enjoyment of the Land;
    - (ii) the character, dimensions, or location of any improvement erected on the Land;
    - (iii) the subdivision of land; or
    - (iv) environmental protection;

    or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.

    (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
    - (a) created, suffered, assumed, or agreed to by the Insured Claimant;
    - (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
    - (c) resulting in no loss or damage to the Insured Claimant;
    - (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 and 10); or
    - (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is
    - (a) a fraudulent conveyance or fraudulent transfer, or
    - (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests title as shown in Schedule A.

## CONDITIONS

### 1. DEFINITION OF TERMS

The following terms when used in this policy mean:

(a) "Amount of Insurance": The amount stated in Schedule A, as may be increased or decreased by endorsement to this policy, increased by Section 8(b) or decreased by Section 10 and 11 of these Conditions.

(b) "Date of Policy": The date designated as "Date of Policy" in Schedule A.

(c) "Entity": A corporation, partnership, trust, limited liability company, or other similar legal entity.

(d) "Insured": The Insured named in Schedule A.

  (i) The term "Insured" also includes

    (A) successors to the Title of the Insured by operation of law as distinguished from purchase, including heirs, devisees, survivors, personal representatives, or next of kin

    (B) successors to an Insured by dissolution, merger, consolidation, distribution, or reorganization;

    (C) successors to an Insured by its conversion to another kind of Entity;

    (D) a grantee of an Insured under a deed delivered without payment of actual valuable consideration conveying the Title

      (1) if the stock, shares, memberships, or other equity interests of the grantee are wholly-owned by the named Insured

      (2) if the grantee wholly owns the named Insured, or

      (3) if the grantee is wholly-owned by an affiliated Entity of the named Insured, provided the affiliated Entity and the named Insured are both wholly-owned by the same person or Entity;

      (4) if the grantee is a trustee or beneficiary of a trust created by a written instrument established by the Insured named in Schedule A for estate planning purposes.

  (ii) With regard to (A), (B), (C), (D) , and (E) reserving, however, all rights and defenses as to any successor that the Company would have had against any predecessor Insured.

(e) "Insured Claimant": An Insured claiming loss or damage.

(f) "Knowledge" or "Known": Actual knowledge, not constructive knowledge or notice that may be imputed to an Insured by reason of the Public Records or any other records that impart constructive notice of matters affecting the Title.

(g) "Land": The land described in Schedule A, and affixed improvements that by law constitute real property. The term "Land" does not include any property beyond the lines of the area described in Schedule A, nor any right, title, interest, estate, or easement in abutting streets, roads, avenues, alleys, lanes, ways, or waterways, but this does not modify or limit the extent that a right of access to and from the Land is insured by this policy.

(h) "Mortgage": Mortgage, deed of trust, trust deed, or other security instrument, including one evidenced by electronic means authorized by law.

(i) "Public Records": Records established under state statutes at Date of Policy for the purpose of imparting constructive notice of matters relating to real property to purchasers for value and without Knowledge. With respect to Covered Risk 5(d), "Public Records" shall also include environmental protection liens filed in the records of the clerk of the United States District Court for the district where the Land is located.

(j) "Title": The estate or interest described in Schedule A.

(k) "Unmarketable Title": Title affected by an alleged or apparent matter that would permit a prospective purchaser or lessee of the Title or lender on the Title to be released from the obligation to purchase, lease, or lend if there is a contractual condition requiring the delivery of marketable title.

## 2. CONTINUATION OF INSURANCE

The coverage of this policy shall continue in force as of Date of Policy in favor of an Insured, but only so long as the Insured retains an estate or interest in the Land, or holds an obligation secured by a purchase money Mortgage given by a purchaser from the Insured, or only so long as the Insured shall have liability by reason of warranties in any transfer or conveyance of the Title. This policy shall not continue in force in favor of any purchaser from the Insured of either (i) an estate or interest in the Land, or (ii) an obligation secured by a purchase money Mortgage given to the Insured.

## 3. NOTICE OF CLAIM TO BE GIVEN BY INSURED CLAIMANT

The Insured shall notify the Company promptly in writing (i) in case of any litigation as set forth in Section 5(a) of these Conditions, (ii) in case Knowledge shall come to an Insured hereunder of any claim of title or interest that is adverse to the Title, as insured, and that might cause loss or damage for which the Company may be liable by virtue of this policy, or (iii) if the Title, as insured, is rejected as Unmarketable Title. If the Company is prejudiced by the failure of the Insured Claimant to provide prompt notice, the Company's liability to the Insured Claimant under the policy shall be reduced to the extent of the prejudice.

## 4. PROOF OF LOSS

In the event the Company is unable to determine the amount of loss or damage, the Company may, at its option, require as a condition of payment that the Insured Claimant furnish a signed proof of loss. The proof of loss must describe the defect, lien, encumbrance, or other matter insured against by this policy that constitutes the basis of loss or damage and shall state, to the extent possible, the basis of calculating the amount of the loss or damage.

## 5. DEFENSE AND PROSECUTION OF ACTIONS

(a) Upon written request by the Insured, and subject to the options contained in Section 7 of these Conditions, the Company, at its own cost and without unreasonable delay, shall provide for the defense of an Insured in litigation in which any third party asserts a claim covered by this policy adverse to the Insured. This obligation is limited to only those stated causes of action alleging matters insured against by this policy. The Company shall have the right to select counsel of its choice (subject to the right of the Insured to object for reasonable cause) to represent the Insured as to those stated causes of action. It shall not be liable for and will not pay the fees of any other counsel. The Company will not pay any fees, costs, or expenses incurred by the Insured in the defense of those causes of action that allege matters not insured against by this policy.

(b) The Company shall have the right, in addition to the options contained in Section 7 of these Conditions, at its own cost, to institute and prosecute any action or proceeding or to do any other act that in its opinion may be necessary or desirable to establish the Title, as insured, or to prevent or reduce loss or damage to the Insured. The Company may take any appropriate action under the terms of this policy, whether or not it shall be liable to the Insured. The exercise of these rights shall not be an admission of liability or waiver of any provision of this policy. If the Company exercises its rights under this subsection, it must do so diligently.

(c) Whenever the Company brings an action or asserts a defense as required or permitted by this policy, the Company may pursue the litigation to a final determination by a court of competent jurisdiction, and it expressly reserves the right, in its sole discretion, to appeal any adverse judgment or order.

## 6. DUTY OF INSURED CLAIMANT TO COOPERATE

(a) In all cases where this policy permits or requires the Company to prosecute or provide for the defense of any action or proceeding and any appeals, the Insured shall secure to the Company the right to so prosecute or provide defense in the action or proceeding, including the right to use, at its option, the name of the Insured for this purpose. Whenever requested by the Company, the Insured, at the Company's expense, shall give the Company all reasonable aid (i) in securing evidence, obtaining witnesses, prosecuting or defending the action or proceeding, or effecting settlement, and (ii) in any other lawful act that in the opinion of the Company may be necessary or desirable to establish the Title or any other matter as insured. If the Company is prejudiced by the failure of the Insured to furnish the required cooperation, the Company's obligations to the Insured under the policy shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation, with regard to the matter or matters requiring such cooperation.

(b) The Company may reasonably require the Insured Claimant to submit to examination under oath by any authorized representative of the Company and to produce for examination, inspection, and copying, at such reasonable times and places as may be designated by the authorized representative of the Company, all records, in whatever medium maintained, including books, ledgers, checks, memoranda, correspondence, reports, e-mails, disks, tapes, and videos whether bearing a date before or after Date of Policy, that reasonably pertain to the loss or damage. Further, if requested by any authorized representative of the Company, the Insured Claimant shall grant its permission, in writing, for any authorized representative of the Company to examine, inspect, and copy all of these records in the custody or control of a third party that reasonably pertain to the loss or damage. All information designated as confidential by the Insured Claimant provided to the Company pursuant to this Section shall not be disclosed to others unless, in the reasonable judgment of the Company, it is necessary in the administration of the claim. Failure of the Insured Claimant to submit for examination under oath, produce any reasonably requested information, or grant permission to secure reasonably necessary information from third parties as required in this subsection, unless prohibited by law or governmental regulation, shall terminate any liability of the Company under this policy as to that claim.

## 7. OPTIONS TO PAY OR OTHERWISE SETTLE CLAIMS; TERMINATION OF LIABILITY

In case of a claim under this policy, the Company shall have the following additional options:

(a) To Pay or Tender Payment of the Amount of Insurance.

To pay or tender payment of the Amount of Insurance under this policy together with any costs, attorneys' fees, and expenses incurred by the Insured Claimant that were authorized by the Company up to the time of payment or tender of payment and that the Company is obligated to pay.

Upon the exercise by the Company of this option, all liability and obligations of the Company to the Insured under this policy, other than to make the payment required in this subsection, shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation.

When the Company purchases the Indebtedness, the Insured shall transfer, assign, and convey to the Company the Indebtedness and the Insured Mortgage, together with any collateral security.

(b) To Pay or Otherwise Settle With Parties Other Than the Insured or With the Insured Claimant.

(i) To pay or otherwise settle with other parties for or in the name of an Insured Claimant any claim insured against under this policy. In addition, the Company will pay any costs, attorneys' fees, and expenses incurred by the Insured Claimant that were authorized by the Company up to the time of payment and that the Company is obligated to pay; or

(ii) To pay or otherwise settle with the Insured Claimant the loss or damage provided for under this policy, together with any costs, attorneys' fees, and expenses incurred by the Insured Claimant that were authorized by the Company up to the time of payment and that the Company is obligated to pay.

Upon the exercise by the Company of either of the options provided for in subsections (b)(i) or (ii), the Company's obligations to the Insured under this policy for the claimed loss or damage, other than the payments required to be made, shall terminate, including any liability or obligation to defend, prosecute, or continue any litigation.

8. **DETERMINATION AND EXTENT OF LIABILITY**

This policy is a contract of indemnity against actual monetary loss or damage sustained or incurred by the Insured Claimant who has suffered loss or damage by reason of matters insured against by this policy.

(a) The extent of liability of the Company for loss or damage under this policy shall not exceed the lesser of
  (i) the Amount of Insurance,
  (ii) the difference between the value of the Title as insured and the value of the Title subject to the risk insured against by this policy, or

(b) If the Company pursues its rights under Section 5 of these Conditions and is unsuccessful in establishing the Title or the lien of the Insured Mortgage, as insured,
  (i) the Amount of Insurance shall be increased by 10%, and
  (ii) the Insured Claimant shall have the right to have the loss or damage determined either as of the date the claim was made by the Insured Claimant or as of the date it is settled and paid.

(c) In addition to the extent of liability under (a) and (b), the Company will also pay those costs, attorneys' fees, and expenses incurred in accordance with Sections 5 and 7 of these Conditions.

9. **LIMITATION OF LIABILITY**

(a) If the Company establishes the Title, or removes the alleged defect, lien, or encumbrance, or cures the lack of a right of access to or from the Land, or cures the claim of Unmarketable Title, all as insured, in a reasonably diligent manner by any method, including litigation and the completion of any appeals, it shall have fully performed its obligations with respect to that matter and shall not be liable for any loss or damage caused to the Insured.

(b) In the event of any litigation, including litigation by the Company or with the Company's consent, the Company shall have no liability for loss or damage until there has been a final determination by a court of competent jurisdiction, and disposition of all appeals, adverse to the Title, as insured.

(c) The Company shall not be liable for loss or damage to the Insured for liability voluntarily assumed by the Insured in settling any claim or suit without the prior written consent of the Company.

10. **REDUCTION OF INSURANCE; REDUCTION OR TERMINATION OF LIABILITY**

All payments under this policy, except payments made for costs, attorneys' fees, and expenses, shall reduce the Amount of Insurance by the amount of the payment.

11. **LIABILITY NONCUMULATIVE**

The Amount of Insurance shall be reduced by any amount the Company pays under any policy insuring a Mortgage to which exception is taken in Schedule B or to which the Insured has agreed, assumed, or taken subject, or which is executed by an Insured after Date of Policy and which is a charge or lien on the Title, and the amount so paid shall be deemed a payment to the Insured under this policy.

12. **PAYMENT OF LOSS**

When liability and the extent of loss or damage have been definitely fixed in accordance with these Conditions, the payment shall be made within 30 days.

## 13. RIGHTS OF RECOVERY UPON PAYMENT OR SETTLEMENT

(a) Whenever the Company shall have settled and paid a claim under this policy, it shall be subrogated and entitled to the rights of the Insured Claimant in the Title and all other rights and remedies in respect to the claim that the Insured Claimant has against any person or property, to the extent of the amount of any loss, costs, attorneys' fees, and expenses paid by the Company. If requested by the Company, the Insured Claimant shall execute documents to evidence the transfer to the Company of these rights and remedies. The Insured Claimant shall permit the Company to sue, compromise, or settle in the name of the Insured Claimant and to use the name of the Insured Claimant in any transaction or litigation involving these rights and remedies.

If a payment on account of a claim does not fully cover the loss of the Insured Claimant, the Company shall defer the exercise of its right to recover until after the Insured Claimant shall have recovered its loss.

(b) The Company's right of subrogation includes the rights of the Insured to indemnities, guaranties, other policies of insurance, or bonds, notwithstanding any terms or conditions contained in those instruments that address subrogation rights.

## 14. ARBITRATION

Either the Company or the Insured may demand that the claim or controversy shall be submitted to arbitration pursuant to the Title Insurance Arbitration Rules of the American Land Title Association ("Rules"). Except as provided in the Rules, there shall be no joinder or consolidation with claims or controversies of other persons. Arbitrable matters may include, but are not limited to, any controversy or claim between the Company and the Insured arising out of or relating to this policy, any service in connection with its issuance or the breach of a policy provision, or to any other controversy or claim arising out of the transaction giving rise to this policy. All arbitrable matters when the Amount of Insurance is $2,000,000 or less shall be arbitrated at the option of either the Company or the Insured. All arbitrable matters when the Amount of Insurance is in excess of $2,000,000 shall be arbitrated only when agreed to by both the Company and the Insured. Arbitration pursuant to this policy and under the Rules shall be binding upon the parties. Judgment upon the award rendered by the Arbitrator(s) may be entered in any court of competent jurisdiction.

## 15. LIABILITY LIMITED TO THIS POLICY; POLICY ENTIRE CONTRACT

(a) This policy together with all endorsements, if any, attached to it by the Company is the entire policy and contract between the Insured and the Company. In interpreting any provision of this policy, this policy shall be construed as a whole.

(b) Any claim of loss or damage that arises out of the status of the Title or by any action asserting such claim shall be restricted to this policy.

(c) Any amendment of or endorsement to this policy must be in writing and authenticated by an authorized person, or expressly incorporated by Schedule A of this policy.

(d) Each endorsement to this policy issued at any time is made a part of this policy and is subject to all of its terms and provisions. Except as the endorsement expressly states, it does not (i) modify any of the terms and provisions of the policy, (ii) modify any prior endorsement, (iii) extend the Date of Policy, or (iv) increase the Amount of Insurance.

## 16. SEVERABILITY

In the event any provision of this policy, in whole or in part, is held invalid or unenforceable under applicable law, the policy shall be deemed not to include that provision or such part held to be invalid, but all other provisions shall remain in full force and effect.

## 17. CHOICE OF LAW; FORUM

(a) Choice of Law: The Insured acknowledges the Company has underwritten the risks covered by this policy and determined the premium charged therefor in reliance upon the law affecting interests in real property and applicable to the interpretation, rights, remedies, or enforcement of policies of title insurance of the jurisdiction where the Land is located.

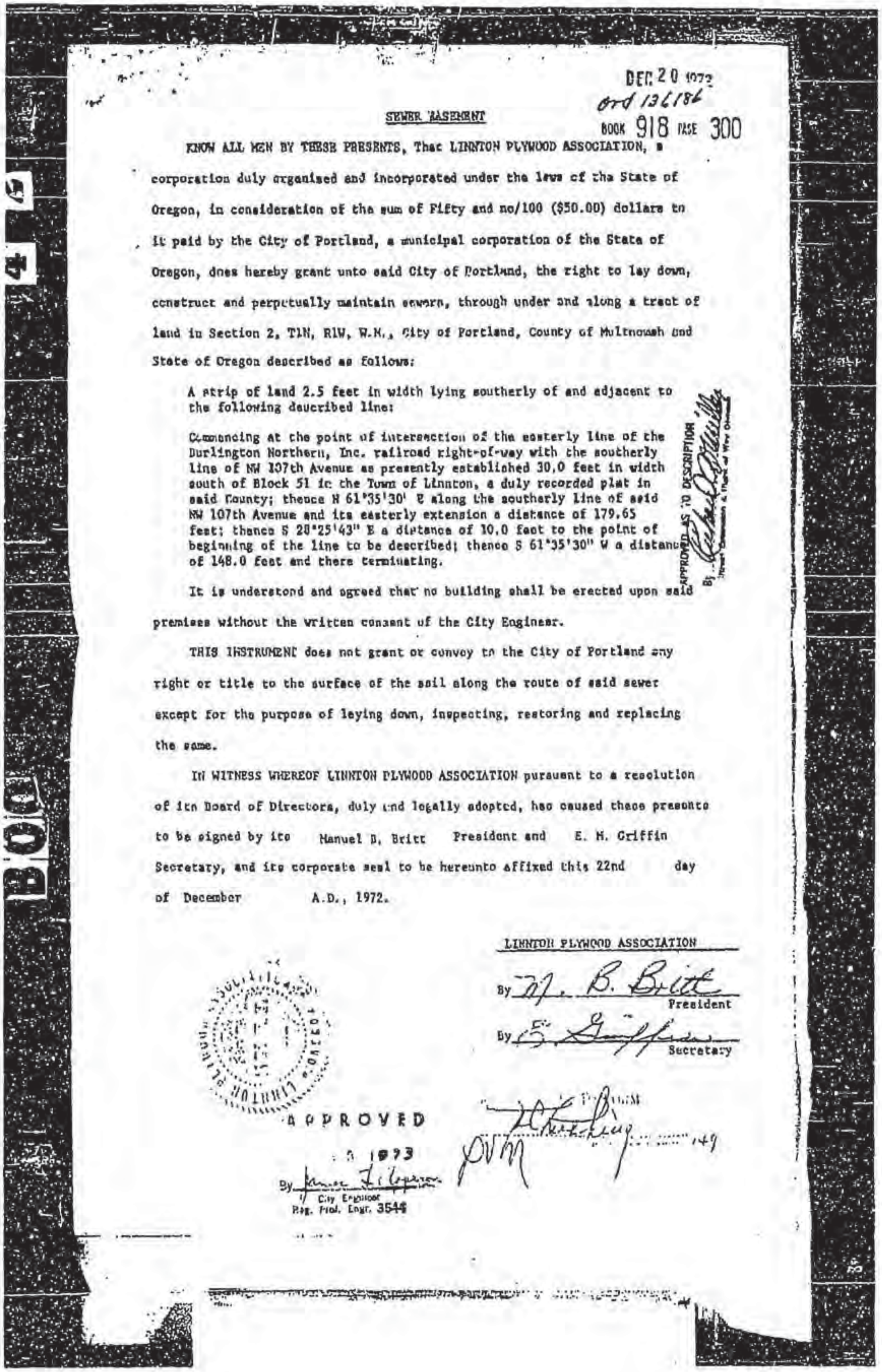
Therefore, the court or an arbitrator shall apply the law of the jurisdiction where the Land is located to determine the validity of claims against the Title that are adverse to the Insured and to interpret and enforce the terms of this policy. In neither case shall the court or arbitrator apply its conflicts of law principles to determine the applicable law.

(b) Choice of Forum: Any litigation or other proceeding brought by the Insured against the Company must be filed only in a state or federal court within the United States of America or its territories having appropriate jurisdiction.

### 18. NOTICES, WHERE SENT

Any notice of claim and any other notice or statement in writing required to be given to the Company under this policy must be given to the Company at Chicago Title Insurance Company, Attn. Claims Department, PO Box 45023, Jacksonville, FLorida, 32232-5023.

# Encumbrances



DEC 20 1972
ord 136186
BOOK 918 PAGE 300

## SEWER EASEMENT

KNOW ALL MEN BY THESE PRESENTS, That LINNTON PLYWOOD ASSOCIATION, a corporation duly organized and incorporated under the laws of the State of Oregon, in consideration of the sum of Fifty and no/100 ($50.00) dollars to it paid by the City of Portland, a municipal corporation of the State of Oregon, does hereby grant unto said City of Portland, the right to lay down, construct and perpetually maintain sewers, through under and along a tract of land in Section 2, T1N, R1W, W.M., City of Portland, County of Multnomah and State of Oregon described as follows:

> A strip of land 2.5 feet in width lying southerly of and adjacent to the following described line:
>
> Commencing at the point of intersection of the easterly line of the Burlington Northern, Inc. railroad right-of-way with the southerly line of NW 107th Avenue as presently established 30.0 feet in width south of Block 51 in the Town of Linnton, a duly recorded plat in said County; thence N 61°35'30" E along the southerly line of said NW 107th Avenue and its easterly extension a distance of 179.65 feet; thence S 28°25'43" E a distance of 10.0 feet to the point of beginning of the line to be described; thence S 61°35'30" W a distance of 148.0 feet and there terminating.

APPROVED AS TO DESCRIPTION
By

It is understood and agreed that no building shall be erected upon said premises without the written consent of the City Engineer.

THIS INSTRUMENT does not grant or convey to the City of Portland any right or title to the surface of the soil along the route of said sewer except for the purpose of laying down, inspecting, restoring and replacing the same.

IN WITNESS WHEREOF LINNTON PLYWOOD ASSOCIATION pursuant to a resolution of its Board of Directors, duly and legally adopted, has caused these presents to be signed by its Manuel B. Britt President and E. H. Griffin Secretary, and its corporate seal to be hereunto affixed this 22nd day of December A.D., 1972.

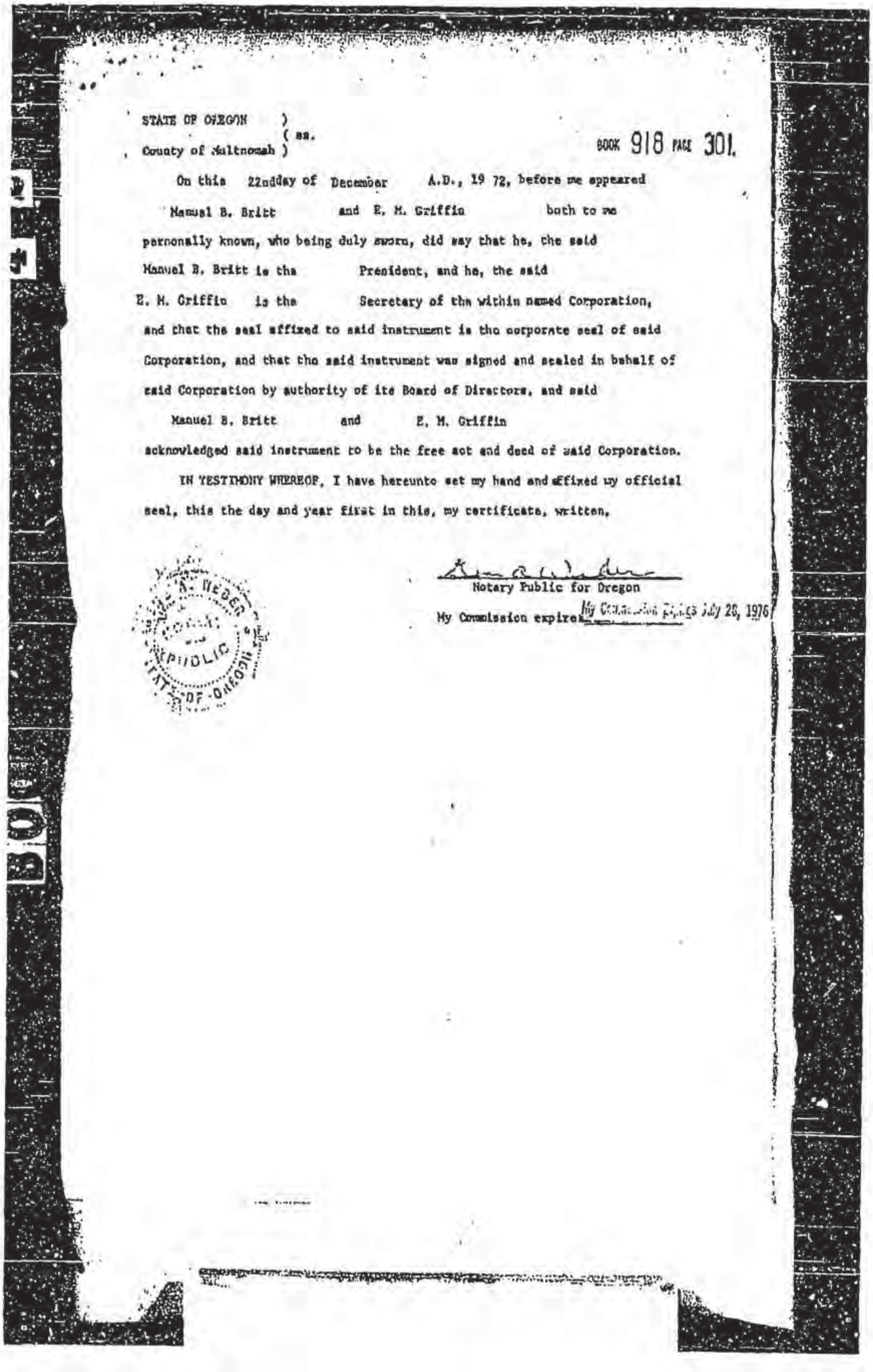
LINNTON PLYWOOD ASSOCIATION

By M. B. Britt
President

By E. Griffin
Secretary

APPROVED
1973
By
City Engineer
Reg. Prof. Engr. 3544

FORM
149



STATE OF OREGON )
( ss.
County of Multnomah )

BOOK 918 PAGE 301.

On this 22nd day of December A.D., 19 72, before me appeared Manuel B. Britt and E. M. Griffin both to me personally known, who being duly sworn, did say that he, the said Manuel B. Britt is the President, and he, the said E. M. Griffin is the Secretary of the within named Corporation, and that the seal affixed to said instrument is the corporate seal of said Corporation, and that the said instrument was signed and sealed in behalf of said Corporation by authority of its Board of Directors, and said Manuel B. Britt and E. M. Griffin acknowledged said instrument to be the free act and deed of said Corporation.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal, this the day and year first in this, my certificate, written.

A. WEBER

Notary Public for Oregon

My Commission expires My Commission Expires July 28, 1976

SEWER EASEMENT

LINNTON PLYWOOD ASSOCIATION

48557 TO

CITY OF PORTLAND

STATE OF OREGON } ss.
Multnomah County }

I, JOHN D. WELDON, Director, Department of Records and Elections and Recorder of Conveyances, in and for said County, do hereby certify that the within instrument of writing was received for record and recorded in the [illegible] of said County [illegible]

APR 2 [illegible] 38 PM '73

JOHN D. WELDON
DIR. REC. & ELEC.
MULTNOMAH CO. OREGON

In Book 918 On Page 300

Witness my hand and seal of office affixed.

JOHN D. WELDON, Director,
Department of Records and
Elections.

Deputy.

Rec-17

BOOK 918 PAGE 302

RETURN TO CITY AUDITOR
CITY HALL
PORTLAND, OREGON 97204 DH

-1

10
5
11

Recorded By Ticor Title
Courtesy Only. Not Examined

886710-7

After recording return to:
Northwest Natural Gas Co.
Risk and Land Department
220 NW Second Avenue
Portland OR 97209

Recorded in MULTNOMAH COUNTY, OREGON
C. Swick, Deputy Clerk
A49 2 ATLJH
Total : 26.00
2006-211171 11/14/2006 10:32:28am

## GAS PIPELINE EASEMENT

Grantor(s): **LINNTON PLYWOOD ASSOCIATION**

Grantee: **NORTHWEST NATURAL GAS COMPANY**

For the sum of one dollar and other valuable consideration, Grantor(s), **LINNTON PLYWOOD ASSOCIATION,** hereby grant(s) and convey(s) to Grantee, **NORTHWEST NATURAL GAS COMPANY,** and its successors and assigns, an easement to install, operate, maintain, replace and change the size of a gas pipeline or pipelines and related equipment in and upon the following described property:

**A 7.50 foot wide gas pipeline easement located in the Southeast quarter of Section 3, Township 1 North, Range 1 West, of the Willamette Meridian, City of Portland, Multnomah County, Oregon and being more particularly described as follows;**

**The Westerly 7.50 feet of the Southerly 40.00 feet of the Northerly 60.00 feet of that tract of land conveyed to Linnton Plywood Association and described in Deed Book 828, Page 214 dated December 7, 1971 of the Multnomah County records.**

This easement includes the right of the Grantee to enter and use the above-described property to do or to take any of the actions described in this document.

Grantee will install the pipeline with the least amount of disturbance to Grantor(s)'s property as possible and will, to the extent practical, restore Grantor(s)'s property to the condition existing prior to Grantee's construction. Grantee will reimburse Grantor(s) for any damage to Grantor(s)'s property caused by Grantee during its use of the easement.

Grantor(s) agree(s) that no buildings or other structures or potentially large growing trees will be placed upon the easement and that no actions will be allowed that would jeopardize or interfere with the safe operation of the pipeline.

2

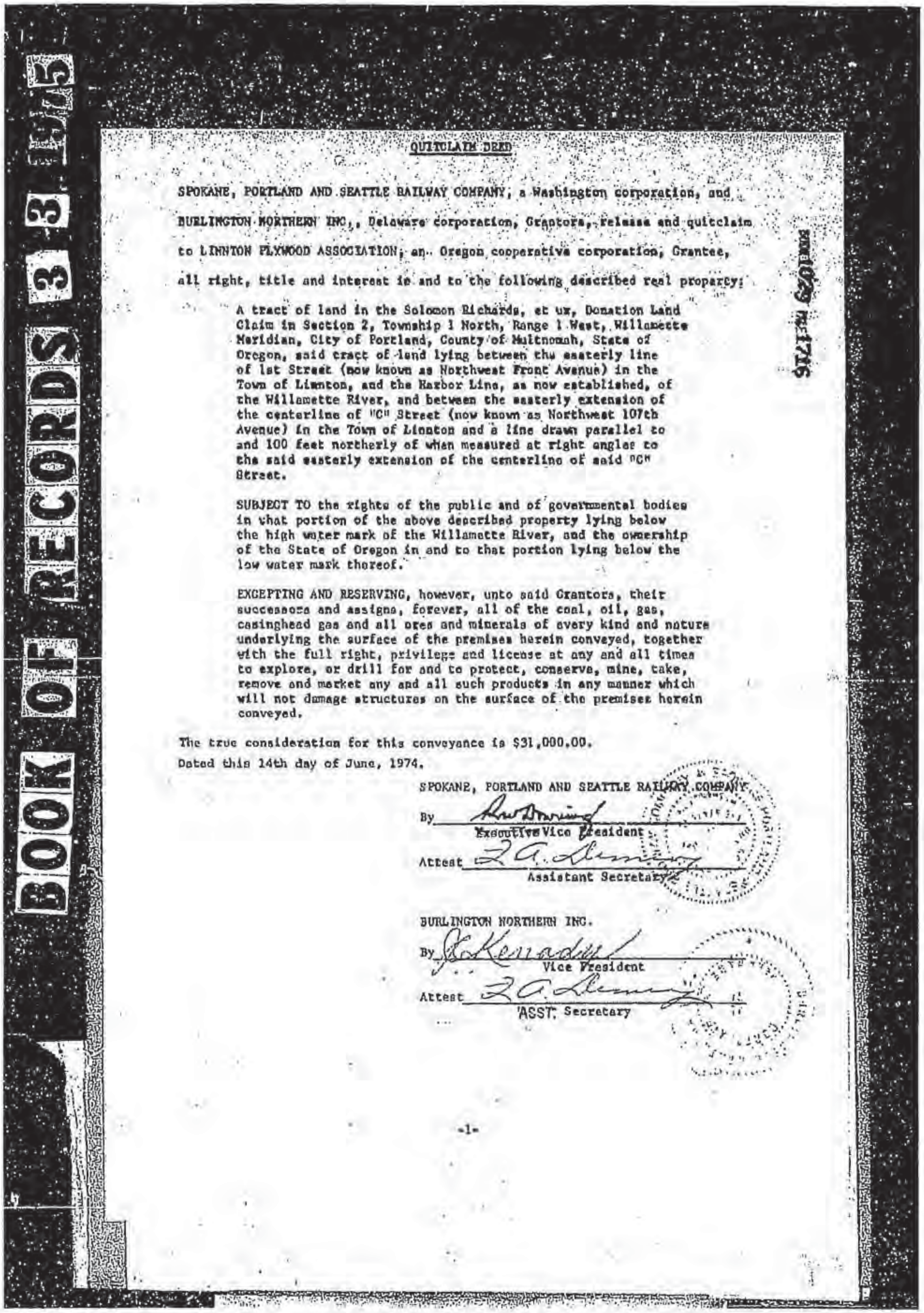
Signed this 10 day of November, 2006
**LINNTON PLYWOOD ASSOCIATION**
By Jimmy R Stahly
Title General Manager

OFFICIAL SEAL
CARMEN C. GIANCANA
NOTARY PUBLIC-OREGON
COMMISSION NO. 389503
MY COMMISSION EXPIRES MARCH 22, 2009

STATE OF Oregon
COUNTY OF Multnomah

This instrument was acknowledged before me on November 10, 2006
By Jimmy R. Stahly as General Manager of
LINNTON PLYWOOD ASSOCIATION

Carmen C. Giancana
Notary



BOOK OF RECORDS 3 3 [illegible]

BOOK 1029 PAGE 1716

## QUITCLAIM DEED

SPOKANE, PORTLAND AND SEATTLE RAILWAY COMPANY, a Washington corporation, and BURLINGTON NORTHERN INC., Delaware corporation, Grantors, release and quitclaim to LINNTON PLYWOOD ASSOCIATION, an Oregon cooperative corporation, Grantee, all right, title and interest in and to the following described real property:

A tract of land in the Solomon Richards, et ux, Donation Land Claim in Section 2, Township 1 North, Range 1 West, Willamette Meridian, City of Portland, County of Multnomah, State of Oregon, said tract of land lying between the easterly line of 1st Street (now known as Northwest Front Avenue) in the Town of Linnton, and the Harbor Line, as now established, of the Willamette River, and between the easterly extension of the centerline of "C" Street (now known as Northwest 107th Avenue) in the Town of Linnton and a line drawn parallel to and 100 feet northerly of when measured at right angles to the said easterly extension of the centerline of said "C" Street.

SUBJECT TO the rights of the public and of governmental bodies in that portion of the above described property lying below the high water mark of the Willamette River, and the ownership of the State of Oregon in and to that portion lying below the low water mark thereof.

EXCEPTING AND RESERVING, however, unto said Grantors, their successors and assigns, forever, all of the coal, oil, gas, casinghead gas and all ores and minerals of every kind and nature underlying the surface of the premises herein conveyed, together with the full right, privilege and license at any and all times to explore, or drill for and to protect, conserve, mine, take, remove and market any and all such products in any manner which will not damage structures on the surface of the premises herein conveyed.

The true consideration for this conveyance is $31,000.00.

Dated this 14th day of June, 1974.

SPOKANE, PORTLAND AND SEATTLE RAILWAY COMPANY

By ____________________
Executive Vice President

Attest ____________________
Assistant Secretary

BURLINGTON NORTHERN INC.

By ____________________
Vice President

Attest ____________________
ASST. Secretary

BOOK OF RECORDS 335

335 PAGE 1717

STATE OF MINNESOTA )
) ss.
County of Ramsey )

June 14, 1974, personally appeared

R. W. Downing and F. A. Deming,

who, being first duly sworn, did say that they are the/Executive Vice President and Assistant Secretary, respectively, of Spokane, Portland and Seattle Railway Company, a corporation, and that the foregoing instrument was signed in behalf of said corporation; and acknowledged the said instrument to be the corporation's voluntary act and deed.

Before me: R. H. Brokopp
Notary Public for Minnesota

My commission expires April 22, 1976

R. H. BROKOPP
NOTARY PUBLIC - MINNESOTA
RAMSEY COUNTY
My Comm. Expires April 22, 1976

STATE OF MINNESOTA )
) ss.
County of Ramsey )

June 14, 1974, personally appeared

J. C. Kenady and F. A. Deming,

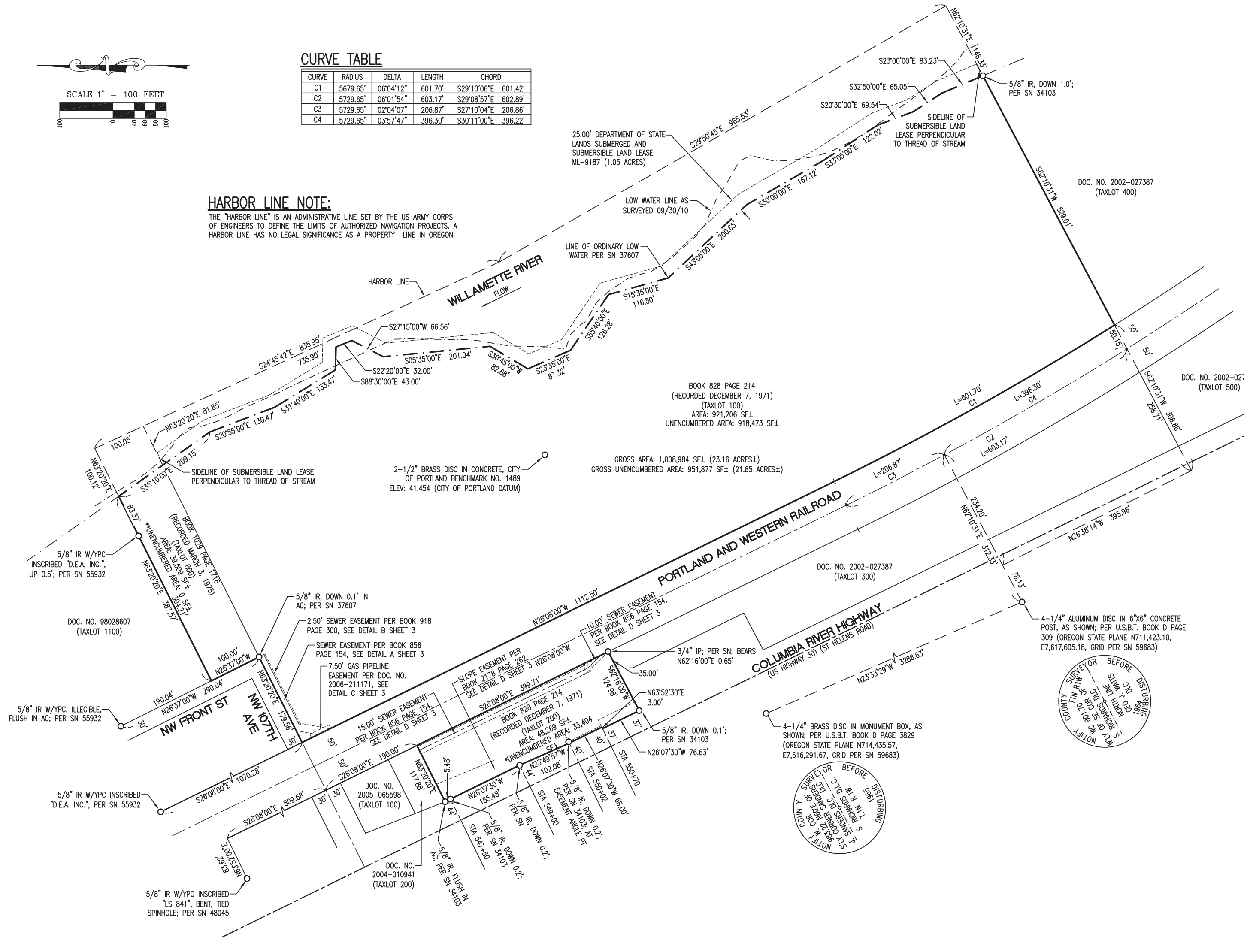
who, being first duly sworn, did say that they are the Vice President and/Assistant Secretary, respectively, of Burlington Northern Inc., a corporation, and that the foregoing instrument was signed in behalf of said corporation; and acknowledged the said instrument to be the corporation's voluntary act and deed.

Before me: R. H. Brokopp
Notary Public for Minnesota

My commission expires April 22, 1976

R. H. BROKOPP
NOTARY PUBLIC - MINNESOTA
RAMSEY COUNTY
My Comm. Expires April 22, 1976

# Figures



## CURVE TABLE

| CURVE | RADIUS | DELTA | LENGTH | CHORD |
|---|---|---|---|---|
| C1 | 5679.65' | 06°04'12" | 601.70' | S29°10'06"E 601.42' |
| C2 | 5729.65' | 06°01'54" | 603.17' | S29°08'57"E 602.89' |
| C3 | 5729.65' | 02°04'07" | 206.87' | S27°10'04"E 206.86' |
| C4 | 5729.65' | 03°57'47" | 396.30' | S30°11'00"E 396.22' |

## HARBOR LINE NOTE:

THE "HARBOR LINE" IS AN ADMINISTRATIVE LINE SET BY THE US ARMY CORPS OF ENGINEERS TO DEFINE THE LIMITS OF AUTHORIZED NAVIGATION PROJECTS. A HARBOR LINE HAS NO LEGAL SIGNIFICANCE AS A PROPERTY LINE IN OREGON.

## LEGEND

| | |
|---|---|
| ○ | FOUND MONUMENT AS NOTED, HELD UNLESS NOTED OTHERWISE |
| DOC. NO. | DOCUMENT NUMBER PER MULTNOMAH COUNTY DEED RECORDS |
| IP | IRON PIPE |
| IR | IRON ROD |
| W/YPC | WITH A YELLOW PLASTIC CAP |
| SN | SURVEY NUMBER PER MULTNOMAH COUNTY SURVEY RECORDS |
| ROW | RIGHT-OF-WAY |
| SF | SQUARE FEET |

## BOUNDARY NARRATIVE:

BEARINGS, DISTANCES, AND FOUND MONUMENTS PER SURVEY NUMBER 37607 WERE HELD TO ESTABLISH THE BOUNDARY OF THE SUBJECT PROPERTY.

## EASEMENT NOTE:

SEE SHEET 3 FOR EASEMENT DIMENSIONS.

## NOTE:

*THE UNENCUMBERED AREA DOES NOT INCLUDE AREAS ENCUMBERED BY RECORD EASEMENTS; HOWEVER, THE UNENCUMBERED AREA INCLUDES AREAS THAT MAY BE SUBJECT TO EASEMENTS BY PRESCRIPTION (LONG STANDING USE).

**TAX LOT 800 IS SUBJECT TO A BLANKET EASEMENT FOR MINERAL RIGHTS PER PER BOOK 1029 PAGE 1716, SEE NOTE 26 ON SHEET 1.

DATE: 10/20/10

REVISIONS:

# PROPERTY
# BOUNDARY PLAN

ENGINEERING · PLANNING SURVEYING · FORESTRY
LICENSED IN OR, WA & AK
13910 SW GALBREATH DR., SUITE 100
SHERWOOD, OR 97140
PHONE: (503) 925-8799
FAX: (503) 925-8969
AKS ENGINEERING & FORESTRY
Offices Located In:
SHERWOOD, OREGON
REDMOND, OREGON
VANCOUVER, WASHINGTON
www.aks-eng.com

| | | | |
|---|---|---|---|
| DESIGNED BY: | | DRAWING NO.: | 2713XMPL |
| DRAWN BY: | JOH | SCALE: | AS NOTED |
| CHECKED BY: | NSW | | |

**PREPARED FOR:**
WILDLANDS INC.
3855 ATHERTON ROAD
ROCKLIN, CA 95765
PHONE: (916) 435-3555

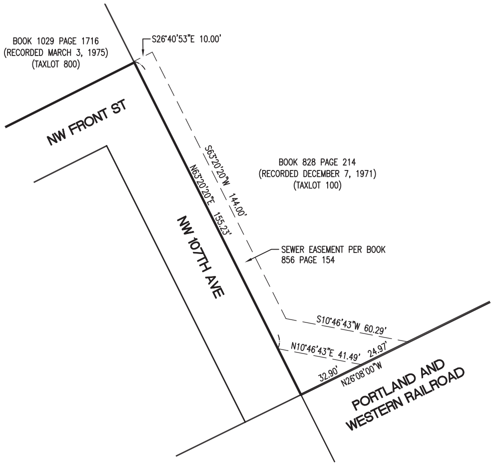
# LINNTON PLYWOOD MILL

**LINNTON** **OREGON**
TAX LOTS 100, 200 AND 800
MULTNOMAH COUNTY TAX MAPS 1N 1W 2B AND 2C

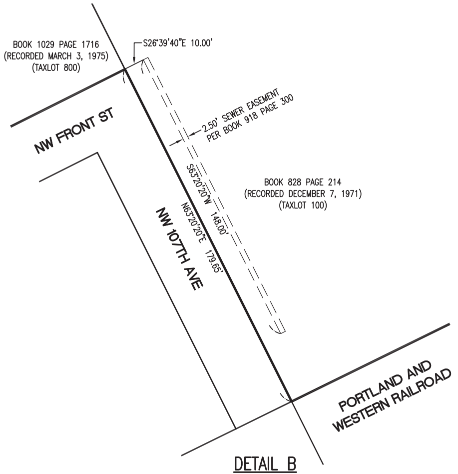
REGISTERED
PROFESSIONAL
LAND SURVEYOR
Montgomery B Hurley
OREGON
JULY 15, 2003
MONTGOMERY B. HURLEY
58542LS
RENEWS: 6/30/11

JOB NUMBER
2713

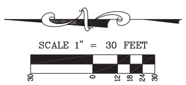
SHEET
2 OF

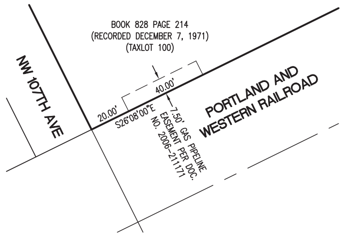


DETAIL A
SCALE: 1"=30'

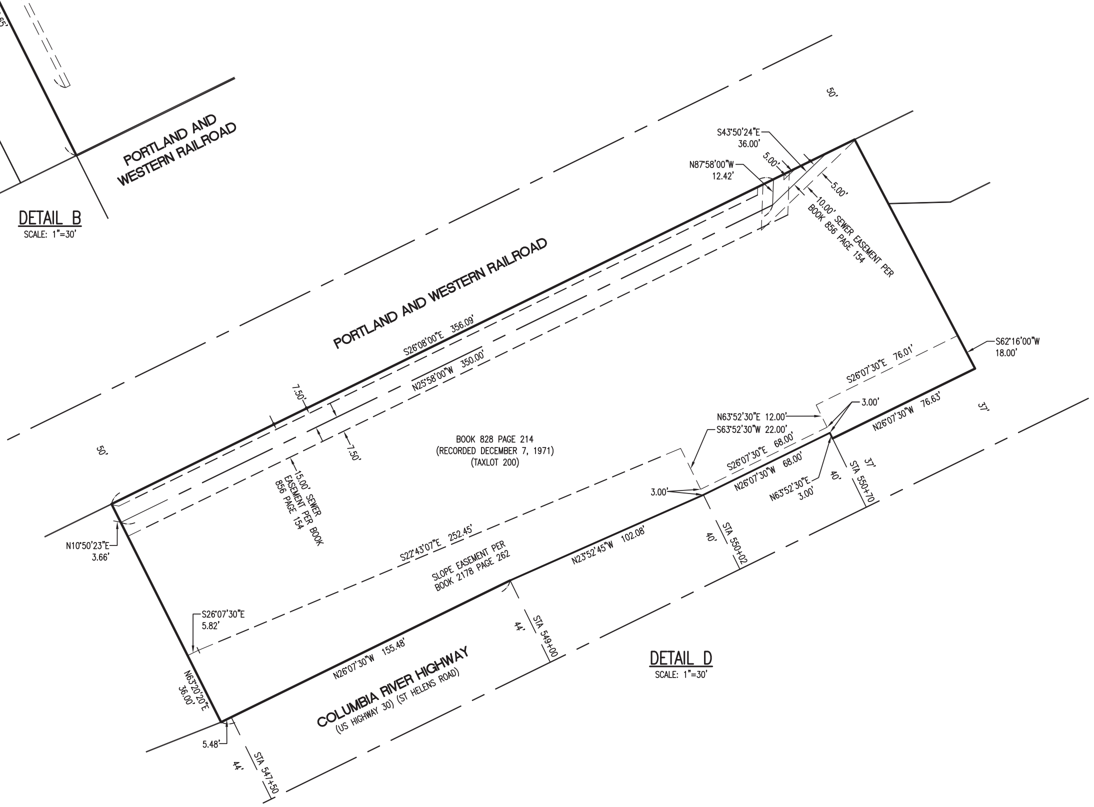


DETAIL B
SCALE: 1"=30'





DETAIL C
SCALE: 1"=30'



DETAIL D
SCALE: 1"=30'

REVISIONS:

EASEMENT DETAILS

ENGINEERING · PLANNING SURVEYING · FORESTRY
LICENSED IN OR, WA & AK
13910 SW GALBREATH DR., SUITE 100
SHERWOOD, OR 97140
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AKS
ENGINEERING & FORESTRY

Offices Located In:
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REDMOND, OREGON
VANCOUVER, WASHINGTON
www.aks-eng.com

| | | | |
|---|---|---|---|
| DESIGNED BY: | | DRAWING NO.: | 2713XMPL |
| DRAWN BY: | JOH | SCALE: | AS NOTED |
| CHECKED BY: | NSW | | |

PREPARED FOR:
WILDLANDS INC.
3855 ATHERTON ROAD
ROCKLIN, CA 95765
PHONE: (916) 435-3555

LINNTON PLYWOOD MILL

LINNTON
TAX LOTS 100, 200 AND 800

OREGON
MULTNOMAH COUNTY TAX MAPS 1N 1W 2B AND 2C

DATE: 10/20/10

REGISTERED
PROFESSIONAL
LAND SURVEYOR
Montgomery B Hurley
OREGON
JULY 15, 2003
MONTGOMERY B. HURLEY
58542LS
RENEWS: 6/30/11

JOB NUMBER
2713

SHEET
3 OF 7

# Mineral Rights Quitclaim Deed

*Goldfinch Exchange Company LLC*
*A Delaware limited liability company*
*40 Lake Bellevue Drive, Suite 275*
*Bellevue, WA 98005*
*425-646-4020*
*425-637-2873 fax*

# NOTICE OF ASSIGNMENT

TO: Linnton Water Credits, LLC
and any assignees or exchange intermediaries of Buyer

You and BNSF Railway Company ("BNSF") have entered into the Release of Mineral Interest, dated 9/20, 2017 for the release of the mineral rights described therein. You are hereby notified that BNSF has assigned its rights as Grantor, but not its obligations, to Goldfinch Exchange Company LLC for the purpose of effecting a tax deferred exchange under Internal Revenue Code Section 1031. This is an assignment of rights only and BNSF will deed the property directly to you.

**ACKNOWLEDGED:**

By: ______________________
Print Name: ROBERT MARINAI
Title: PRESIDENT

# EXHIBIT “B”

# NOTICE OF ASSIGNMENT

# EXHIBIT "A"

**BNSF RAILWAY COMPANY**
Corporate Real Estate Development
2500 Lou Menk Drive, AOB 3
Fort Worth, Texas 76131-2830

**RE: RELEASE OF MINERAL INTEREST**

**GENTLEMAN:**

Linnton Water Credits, LLC, a Delaware limited liability company (hereinafter Grantee) has made an offer to acquire BNSF Railway Company's mineral interest in our ownership. By instrument dated June 14, 1974 and recorded on February 28, 1975 in Book 1029, Page 1716, and re-asserted by statement of claim recorded August 24, 2011, Fee No. 2011-093722, Spokane, Portland and Seattle Railway Company and Burlington Northern Inc., now BNSF Railway Company, (hereinafter Grantor) conveyed to Linnton Plywood Association, an Oregon cooperative corporation, the subject property reserving all minerals.

I (we) hereby acknowledge by virtue of the attached copy of my (our) ownership deed, that I (we) am the owner of the underlying property of Grantor's mineral interest located in Portland, Multnomah County, State of Oregon, as shown on Exhibit "A", attached hereto and by this reference made a part hereof.

I (we) do hereby requests that **Grantor** issue a quitclaim and release deed for the purpose of releasing its mineral interest in the subject property for and in consideration of Two Thousand Five Hundred and No/100 Dollars ($2,500.00). Check should be made payable to The Bank of New York Mellon Trust Company, NA. I (we) will be responsible for any outstanding taxes and costs for survey, abstract, title insurance, excise taxes, documentary stamps, recording fees, etc.

Upon execution and return of 2 copies of this letter and check, to Jones Lang LaSalle, Grantor's agent, a Quitclaim and Release Deed will be prepared and delivered to Grantor for acceptance and execution. Upon execution, the Quitclaim and Release Deed will be returned to us for recording in the county records.

Grantor may assign its rights (but not its obligations) under this Release of Mineral Interest to Goldfinch Exchange Company LLC, an exchange intermediary, in order for Grantor to effect an exchange under Section 1031 of the Internal Revenue Code. In such event, Grantor shall provide Grantee with a Notice of Assignment, attached as Exhibit B, and Grantee shall execute an acknowledgement of receipt of such notice.

Grantee acknowledges that a material consideration for this agreement, without which it would not be made, is the agreement between Grantee and Grantor, that the Grantee shall pay upon return of this Agreement signed by Grantee to Grantor a processing fee in the amount of

$2,000.00 over and above the agreed upon consideration. Said fee shall be made payable to BNSF Railway Company by a separate check.

This agreement is not a binding agreement and shall become binding only when, and if, it is executed by me (us) and fully approved and executed by the Grantor.

Sincerely,

**Linnton Water Credits, LLC**
Prospective Buyer
By: ______________

**GRANTEE:**

**LINNTON WATER CREDITS, LLC,**
**A Delaware limited liability company**

Grantee's Address:

337 17th Street, Suite 200
Oakland, CA 94612

Attn: Andrew Gregg
Fax: 562-427-3314
Phone: 714-580-2004

Grantee's SSN or EIN:
61-1775653

**GRANTOR:**

**BNSF RAILWAY COMPANY,**
**A Delaware corporation**

By: ______________
Print Name: ______________
Title: ______________

Dated: ______________

BNSF Address:
c/o Jones Lang LaSalle

4200 Buckingham Rd. Suite 110
Fort Worth, Texas 76155
Attn: Title and Escrow
Fax: 817-306-8129
Phone: 817-230-2600

# Exhibit F. Geotechnical Memorandum (Geotechnics)

GEOTECHNICS LLC
7629 SE Harrison Street | Portland, OR 97215 | 503-774-1619

## MEMORANDUM

Date: April 10, 2014

To: Mr. Robert Marinai
RestorCap
337 17th Street, Suite 200
Oakland, CA 94612

From: André Maré, P.E., G.E.

Re: Memorandum #2
Embankment Stability and Settlement
Preliminary Analyses and Discussion
Linnton Plywood Site Restoration
Portland, Oregon
Project No. 13-016-1

19463
OREGON
SEPT. 16, 1997
ANDRÉ DAVID MARÉ
EXPIRES: 12/31/14

## INTRODUCTION

Based on 30% design documents, the proposed fill embankment on the north portion of the property will have a maximum height of approximately 40 feet, with elevation varying from approximately 41 ft at the base to 81 ft at the top (NAVD88 datum). Proposed sideslope inclination is 3H:1V (Horizontal:Vertical) on all sides. On the riverward side (NE side), the embankment toe will be set-back approximately 40 ft from the top of the riverbank slope. This riverfront slope drops from approximately elevation 40 ft to 16 ft, where the beach begins. Because it is mantled with rip-rap, the existing riverbank maintains a relatively steep inclination, between 1H:1V and 2H:1V. Figure 1 illustrates the site and the location of the proposed embankment.

The purpose of this memorandum is to evaluate stability and the necessity for sub-surface drainage beneath the proposed fill embankment. The design team plans to leave concrete and asphalt flatwork in-place beneath the embankment. It has been suggested that, if groundwater drains are not incorporated at the base of the embankment above the flatwork, slope stability might be compromised. This memorandum evaluates stability of existing and future conditions, the necessity for embankment drainage, and discusses embankment settlement magnitude and effects.

### SOILS AND GROUNDWATER

**Existing Soils and Groundwater:**

Although Geotechnics has not yet performed geotechnical explorations at the site, others have completed borings and test pits and these are documented in a previous memorandum (Geotechnics, 2014). On the attached Partial Site Plan, Figure 1, we have plotted the locations of several borings by others (CH2M Hill – 1974 and Shaw – 2011) in the vicinity of the embankment. The following soils have been documented overlying site bedrock:

1) Fill: Fill soils at the site are highly variable. They have been described as:
   - *'sands and sandy silts with intermediate lenses of gray silts over silty sand with organic material – soft and highly compressible'* (CH2M 1974);
   - *'brown silt with green and orange-brown mottling and fine wood chips'* (CH2M, April 1981);
   - *'brown to gray silt, gravelly silt, sandy silt, and silty sand, containing local zones of debris, including wood chips, concrete blocks, boulders to 3-feet maximum dimension, logs and wood debris to 3 feet long, broken bricks, glass, wire, reinforcing bars, and miscellaneous other materials'* (CH2M, August 1981);
   - *'sands with various amounts of silts and clay, lean clays, and locally contains deleterious materials such as bricks, asphalt, concrete and woody debris'* (Shaw, 2011).

   Thickness of fill soils increases towards the river, from less than 20 feet to over 35 feet.

   From the document review, it is clear that the fill was placed in several episodes dating back to the early 1900's. From the above descriptions and our review of exploration logs, the fill soils appear to be uncompacted to poorly compacted and will experience compression upon future loading.

2) Alluvium: Underlying the fill soils are native alluvial floodplain deposits, typically consisting of medium dense silty sand. Other materials noted within the alluvium include soft to medium stiff, low-plasticity silt to sandy silt.

   Thickness of alluvial soils is on the order of 30 feet.

**Proposed Soils:**

The source of embankment fill soil will be the deep cut on the south central portion of the site. We assume soils will be placed as structural fill with removal of all debris, oversize materials, and compacted to approximately 90% of maximum dry density. To estimate the average composition of fill materials, we evaluated sample descriptions from borings performed in the area to be cut. We evaluated 25 samples from cut zones in borings B-1, B-2, B-3, B-4, B-8 (CH2M Hill, 1981), and GT-4 (Shaw, 2011). By breaking down the average component proportions (from lab results and verbal descriptions) statistically, we predict a representative fill soil consisting of 15% Gravel, 28% Sand, and 57% Silt. The resulting Unified Soil Classification System (USCS) description is **Sandy Silt with Gravel (ML)**.

## SLOPE STABILITY

We completed quantitative limit-equilibrium slope stability analyses at the approximate location of Cross Section A-A'. We chose this section as representative for evaluating the effects of proposed grading on riverfront stability. In this location, the existing steep riverfront slope will not be regraded. Locations further south on Figure 1 will involve flattening of the bank and thus these sections are not critical, with overall stability increasing. We may evaluate these sections in future work. Our analyses were completed with the computer software SLIDE 6.0 from Rocscience Inc. We utilized Spencer's method which evaluates both force and moment equilibrium. Seismic conditions were evaluated using pseudo-static methods.

Slope stability results are presented as a factor of safety (FS) against sliding. A FS of 1.0 reflects a condition where the resisting and driving forces are equal and a failure could occur from any changes in these forces. A greater factor of safety presents a more stable slope and a lower factor of safety a less stable slope. A FS below 1.0 means that the slope will theoretically fail, as the forces resisting failure are less than those driving it. Acceptable factors of safety will vary depending on the quality of the input data and the practitioner's confidence in this data. Input data includes topography, soil stratigraphy, groundwater levels, soil strength parameters, and loading conditions such as level of seismic shaking. Additionally, selection of an acceptable FS should consider the consequences of slope failure. Sometimes, remediating a site to a high FS is not economically justified and the potential consequences can be accepted.

Typically, for new construction such as a new embankment slope, minimum FS is approximately 1.5 for long-term static conditions and 1.1 to 1.2 for transient conditions such as seismic loading. For this preliminary memo, our criteria will be a minimum FS of 1.5 for static conditions and 1.1 for seismic conditions. These values will be applied to areas of proposed grading. For existing riverfront slopes that may have a lower current FS, we assume the team is not proposing any modifications. For such slopes, we will ensure that setbacks of proposed grading are sufficient such that proposed work does not reduce the current FS.

Our modeling included the following:

- Cross-section geometry using a topographic survey performed by AKS Engineering in 2010. The topography is based on a NAVD-88 datum.
- Subsurface soil conditions were interpreted from previous borings by others shown on the Site Plan, Figure 1.
- Groundwater levels were based primarily on findings from the recent Shaw report (2011) and a recent groundwater monitoring report by URS (URS, 2013).
- A horizontal seismic coefficient of 0.10 was used in the pseudo-static analyses. This value was taken as half the estimated peak ground acceleration of 0.20g for a 475-year event (10 percent exceedence in 50 years). This is consistent with the previous site work by Shaw (2011) and in our opinion, appropriate for a riverfront slope supporting no present or future structures.
- Soil strength was based on review of existing references and our experience in similar soils. The table below summarizes properties we used in our analyses.

| Soil Description | Wet Unit Weight (pcf) | Friction Angle (degrees) | Cohesion (psf) |
|---|---|---|---|
| Proposed Fill | 120 | 33 | 0 |
| Existing Fill | 110 | 32 | 0 |
| Alluvium | 110 | 30 | 0 |

Shaw performed limit-equilibrium stability analyses at the site (2011) and also assigned zero-cohesion, which is appropriate for uncompacted fill and normally consolidated alluvium. The Shaw friction angles were slightly higher (less conservative): 32 to 38 degrees for fill soils and 30 to 34 degrees for alluvium. We chose to use the lower end of these ranges for these preliminary analyses.

**Results:**

Attached to this memo are our calculation sheets summarizing the results of all preliminary slope stability analyses performed. Six of the 16 analyses are also presented as profiles that show the assumed stratigraphy along cross-section A-A' as well as the location of the critical failure location for the particular analysis. The calculations package includes our description of each analysis. A summary is provided below.

Existing Conditions:

We began by evaluating stability for existing conditions. A large number of circular surfaces were generated for varying conditions of river water level and groundwater level. Results show borderline stability/instability on the riverfront slope with a static FS of 1.1 and a seismic FS of 0.9. Results are shown on Figures S1 through S3.

Proposed Embankment:

We evaluated stability along the same A-A' section, again using a large number of randomly generated circular failure surfaces, but this time incorporating the proposed 40-foot high embankment. Results were the same as above, with the same low factor of safety and with the critical circular failure surfaces not intersecting the new embankment. Results show that embankment construction, with the planned setbacks, will have no impact on the stability of existing riverfront slopes.

As noted earlier, new graded slopes should be designed with an adequate factor of safety of at least 1.5. So, rather than doing a global search for the lowest FS along the entire cross section as above, we forced the failure circle to pass through the new embankment. Results show an adequate FS of 1.6 static and greater than 1.1 seismic. The static results are shown on Figure S4.

To evaluate stability of the embankment itself (completely separate from the riverfront slope), we also performed a circular search constraining the failure to pass only through the embankment. Results showed sufficient stability with static FS of 2.2 and seismic FS of 1.6. While it is generally a given that 3H:1V compacted fill slopes are stable, these results provide a point of comparison for the subsequent analyses below.

Proposed Embankment with in-place flatwork:

In the area of the proposed embankment, the existing ground surface is generally flat, with just a slight downward inclination of less than 1 percent towards the river. It is proposed to leave concrete and asphalt flatwork in-place, within the approximate boundary shown on Figure 1. The resulting smooth platform may serve as a lower strength slip-plane, reducing stability of the embankment. Additionally, leaving in-place a relatively impermeable barrier may allow hydrostatic pressures to build up and affect stability in the short-term.

We began by evaluating stability of a block failure, sliding along the slightly sloping concrete surface towards the river, and without groundwater buildup. The strength of the interface was modeled simply by using a typical frictional coefficient of 0.35 between concrete and overlying soil. Results showed a static FS of 1.9 and a seismic FS of 1.3, lower than the circular surface above, but still adequate.

We next evaluated the effect on stability caused by a buildup of water, or mounding, above the relatively impermeable flatwork. Above, we have described the typical anticipated fill material to be Sandy Silt with Gravel (ML). Such a material might have a permeability on the order of $10^{-4}$ cm/sec.

Modeling the flow through an unsaturated medium is difficult and involves many variables and assumptions. These include the ratio of runoff to infiltration, the extent of anisotropy (layering), and the degree of soil compaction. Additionally, the degree of groundwater mounding at the base of the embankment will be partially dependent on the impermeability of the left-in-place flatwork. Differential settlement as a result of embankment loading is anticipated (see below) with resultant inevitable cracking of flatwork. So this flatwork permeability will increase over time as infiltration increases through continually developing cracks. The first winter rainy season will thus be the most impermeable and most critical condition.

All that said, and based on a qualitative seepage evaluation, we modeled a mounding condition of 4 feet of groundwater along the base of the embankment. This is a conservative assumption and would be more than the annual rainfall of a wet season at this location. Groundwater pressures should dissipate completely during the summer months as lateral seepage. Results for this mounding condition, assuming the same block failure along the interface, are 1.8 static and 1.3 seismic. These values are only slightly lower than the block failure without groundwater mounding, and still have adequate factors of safety.

## SETTLEMENT

The primary concern with embankment settlement, as discussed in our memorandum of January 14th, was the potential impact on the existing culvert that conveys stormwater through the site. Plans for slip-lining of this culvert needed to accommodate the anticipating differential settlement. However, plans have changed since the time of that memo and the culvert will now be rerouted around the north side of the fill embankment. The existing culvert will be abandoned. The need to accurately predict, and perhaps monitor, future settlement is no longer essential, but still worthy of some discussion.

Existing fill soils are approximately 30 feet thick on average. These soils are uncompacted, may contain significant organics, and display relatively low blow counts, all which suggest high compressibility. Fill soils are underlain by alluvial sediments which are also soft in places, normally consolidated, and thus settlement prone. The proposed north-side fill embankment is very large in area, approximately 650 feet by 350 ft (over 5 acres). Thus, the effects of new loading will be felt in the deeper alluvial settlements in addition to the fill soils. The magnitude of loading resulting from 40 feet of new fill will be in the neighborhood of 5,000 pounds per square foot (psf).

CH2M Hill, in April 1981, made an attempt to evaluate the magnitude of settlement on the south portion of the site resulting from placing up to 13 feet of dredge fill soil. Fill was to be placed over older fills and compressible alluvium. They estimated that between 7 and 10 inches of settlement could occur over a 20 year period. In a subsequent report in October 1981, CH2M Hill concluded, "Because of the wide variation in fill depths and old fill composition, reliable settlement estimates cannot be made on the basis of laboratory testing and analytical methods." They recommended installation of settlement markers and monitoring of settlement following fill placement. In our research, we found no records of such monitoring.

We have not performed settlement analyses and agree with CH2M Hill that an analytical approach to predicting settlement is unreliable. However, based on review of the borings and our experience, we anticipate that the planned embankment loading will induce in excess of 18 inches of settlement beneath the center of the embankment, and possibly significantly more than 18 inches. Monitoring of settlement during and following construction could be implemented if necessary.

## SUMMARY

**Stability:**

- In our opinion, the existing riverfront slopes at the site are marginally stable to unstable for static conditions and during the design seismic event. However, proposed activities will not decrease stability of existing slopes. Except where slope flattening is proposed (and stability will increase), no development is proposed within the influence zone of these slopes. The status quo is acceptable and the armored riverfront slopes can remain as-is.
- The proposed embankment is stable for static and seismic conditions. 3H:1V is an appropriate slope inclination for all site fill embankments.
- Our analyses suggest that subsurface drains beneath the embankment will not be required for stability reasons. Even without drains, groundwater accumulating above the left-in-place flatwork should dissipate laterally before producing significant, harmful levels of hydrostatic pressure.

**Settlement:**

- Based on a qualitative evaluation, we predict greater than 18 inches of settlement beneath the center of the north fill embankment. Settlement at the toe of fill slopes will likely be minor, on the order of 1 to 3 inches.
- During final design, it will be possible to refine these very rough settlement estimates if the design team so desires. Since no structures are planned, the usefulness of such information might be limited.
- Monitoring of settlement during and after fill placement is possible. If this is necessary, Geotechnics is available to prepare an instrumentation / monitoring plan.

**Fill Placement and Compaction:**

- The contractor should be required to follow the general requirements of the OSSC, Appendix J, with minor modifications. While requiring compaction of fill soils is necessary, requiring compaction testing is not justified considering the project use and the anticipated settlement of underlying compressible soils. Furthermore, density testing is often unreliable and difficult to implement in highly variable fill soils containing significant gravel and cobble size particles.

  We instead recommend use of the observational method to ensure 1) compaction effort is applied to all soil lifts, 2) soils are placed at appropriate moisture content to achieve compaction, and 3) debris, wood, and other unsuitable materials are removed from the site and not incorporated in fill embankments. The observational method replaces the sometimes-unreliable nuclear gauge density testing with the discretion of the trained and experienced geotechnical professional.
- While large concrete debris is inappropriate for use in fills, the use of recycled concrete and/or recycled asphalt could be considered.

**Future Work:**

This memorandum is intended to support 50 percent design. In future, we will complete site explorations to supplement existing studies and will complete a comprehensive geotechnical report to support the final design level concept. Additional areas of work include expanding on the above issues and also include the following:

- Seismic issues including liquefaction and lateral spreading. Work to date has not considered soil strength loss due to seismic shaking and its implications for site settlement and slope instability.
- Dewatering. Site cuts may intersect the water table depending on the construction season. Geotechnics can assist with evaluating dewatering needs and methods.
- Surface preparation for grading and other earthwork issues.

## LIMITATIONS

We have prepared this memorandum for the exclusive use of RestorCap and their authorized agents for use in project planning only. The work herein is preliminary; recommendations should not be considered final. Our work was completed in general accordance with our services agreement dated March 24, 2014. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this memorandum was prepared. No warranty, expressed or implied, should be understood.

Document ID: LinntonMem2

Attachments:

| | |
|---|---|
| Figure 1: | Partial Site Plan – North |
| Slope Stability Calculations Notes, 3 pages | |
| Figures S1–S6: | Selected Slope Stability Profiles, Section A-A' |

# REFERENCES

CH2M Hill, 1981, *Supplemental Geotechnical Exploration, Linnton Plywood Association,* consultant report to Linnton Plywood Association, dated October 5, 1981.

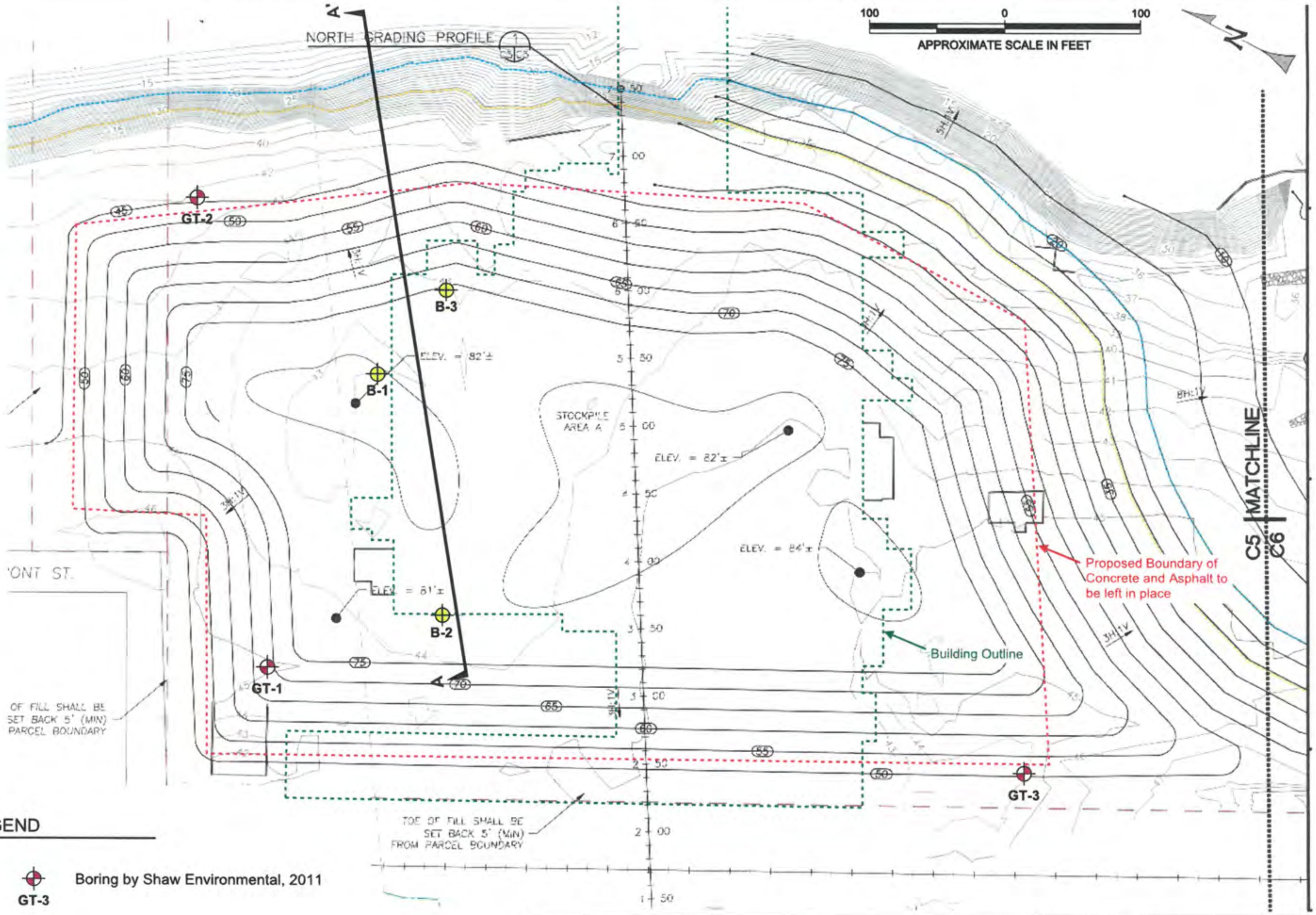
CH2M Hill, 1981, *Geotechnical Exploration, Linnton Plywood Association,* consultant report to Linnton Plywood Association, dated April 1, 1981.

CH2M Hill, 1974, *Foundation Investigation, New Dryer Building, Linnton Plywood Association,* consultant report to Linnton Plywood Association, dated February 25, 1974.

Geotechnics LLC, 2014, *Geotechnical Review and Issues Summary, 30% Design Support, Linnton Plywood Site Restoration, Portland Oregon*, memorandum to RestorCap dated January 14, 2014.

Shaw Environmental & Infrastructure, Inc., 2011, *Geotechnical Analysis, Site Development Alternatives, Linnton Plywood Restoration Project, Linnton, Oregon*, consultant report to Portland Harbor Holdings I LLC dated December 2, 2011.

URS Corporation, 2013, *2013 Annual Groundwater Monitoring Report, BP Bulk Terminal 22T, 9930 NW St. Helens Road, Portland, Oregon*, consultant report to Oregon Department of Environmental Quality, dated August 19, 2013.



## LEGEND

GT-3 Boring by Shaw Environmental, 2011

B-3 Boring by CH2M Hill, 1974

A A' Cross-Section Location and Designation

GEOTECHNICS LLC

## PARTIAL SITE PLAN - NORTH

Linnton Plywood Restoration
Portland, Oregon

Project No. 13-016-1

Figure 1

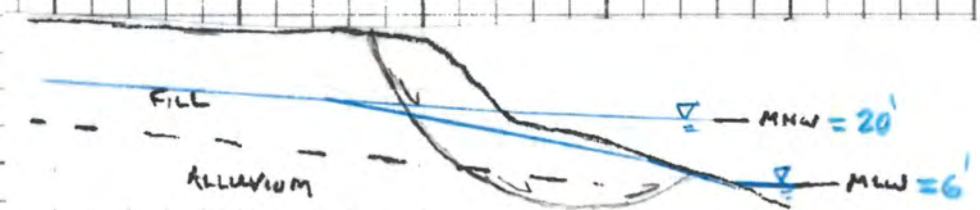
Linnton Plywood Restoration
Preliminary

ADM
4/2/14

1/3

SLOPE STABILITY - EXISTING CONDITIONS - A-A'

- Soil Cond'n's - per report. Soil Parameters - per report.
- GW - per report. Do high river level & low river level.
  MHW = 20'   MLW = 6'
- Schematic

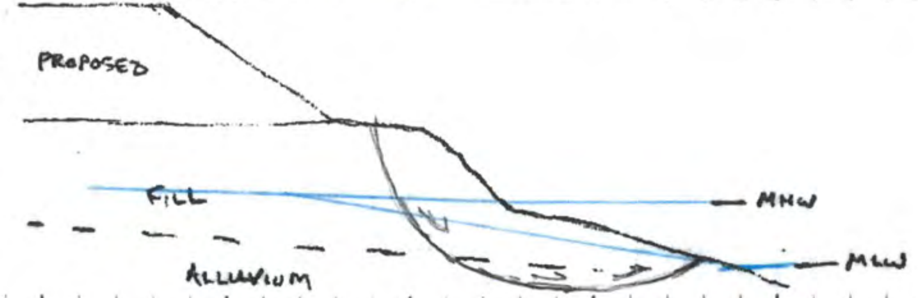


- Results: see printouts, Figs S1-S3

| EQUAKE | COND'N | FS | FILE | FIG |
|---|---|---|---|---|
| STATIC | High Water | 1.15 | LINN 1 | S1 |
| STATIC | Low Water | 1.23 | LINN 2 | S2 |
| SEISMIC | High Water | 0.87 | LINN 1b | S3 |
| SEISMIC | Low Water | 0.91 | LINN 2b. | |

SLOPE STABILITY - PROPOSED COND'N'S A-A'

- Do All Cond'n's Above. Allow failure surface option of going through new embankment.
- Schematic



| EQUAKE | COND'N | FS | FILE | FIG. |
|---|---|---|---|---|
| STATIC | High Water | 1.15 | LINN 3 | — |
| STATIC | Low Water | 1.24 | LINN 4 | — |
| SEISMIC | High Water | 0.88 | LINN 3b | — |
| SEISMIC | Low Water | 0.92 | LINN 4b | — |

Failure surface does not pass through new embankment.

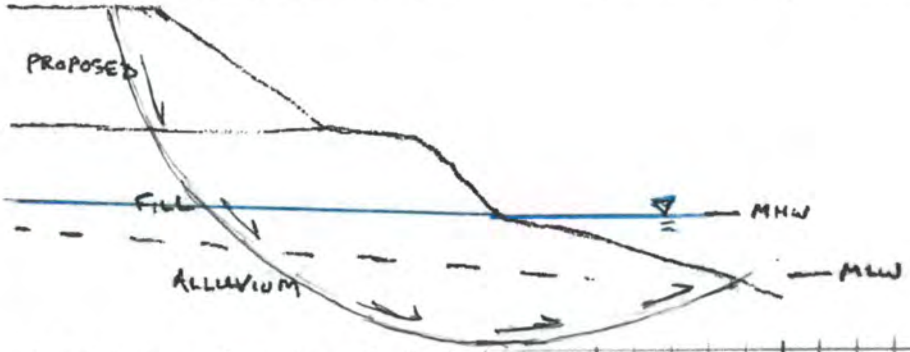
No Effect of Adding Embankment. Same FS, Same Failure Surfaces.

Linnton Plywood Restoration
Preliminary.

ADM
4/2/14

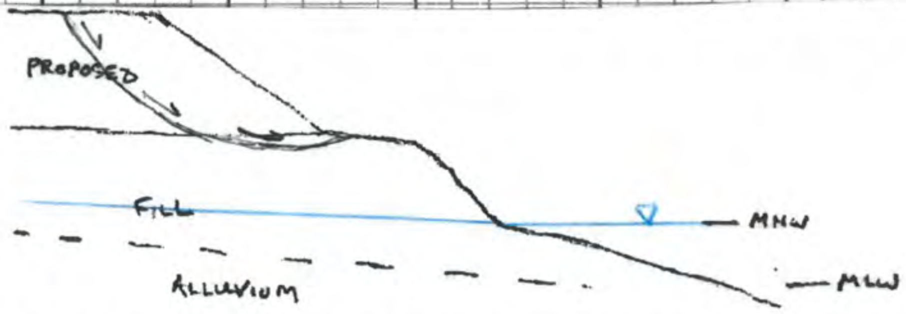
2/3

- SLOPE STABILITY - EVALUATE STABILITY THROUGH NEW EMBANKMENT, A-A'
  - Evaluate Stability of new embankment (force failure through embkmt)
  - Begin with file "LINN3", high water.
  - Schematic:



| EQUAKE | COND'N | FS | FILE | FIG. |
|---|---|---|---|---|
| STATIC | High water, thru embkmt, circular failure. | 1.61 | LINN5 | S4 |
| SEISMIC | " | 1.14 | LINN5b | – |

- Evaluate Stability of Only New Embankmt (toe through upper embankment)
- Schematic:



| EQUAKE | COND'N | FS | FILE | FIG |
|---|---|---|---|---|
| STATIC | UPPER EMBKMT ONLY, CIRCULAR | 2.23 | LINN6 | – |
| SEISMIC | " | 1.62 | LINN6b | – |

- Again evaluate new embankment only, with block failure on smooth, sloping concrete surface. Compare results to file LINN6.
- Model strength as frictional coeff of 0.35 multiplied by overburden (c = fN).
  Set program to "Vertical Stress Ratio" rather than "Mohr-Coulomb".
- Schematic:

Linnton Plywood Restoration
Preliminary

ADM
4/2/14

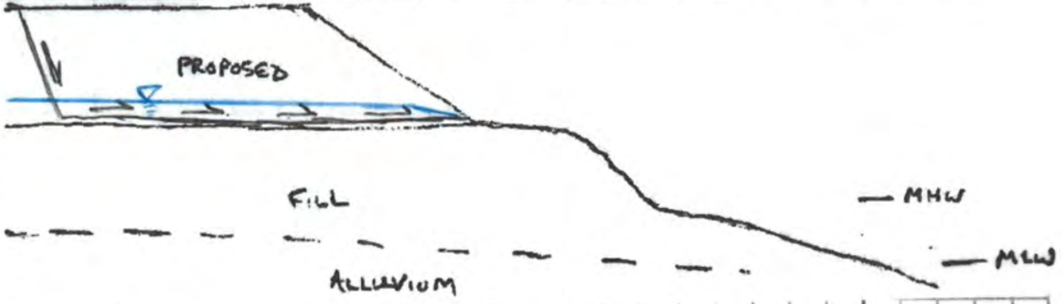
3/3

- EXISTING EMBKMT, CONT'D:

| EQUAKE | COND'N | FS | FILE | FIG. |
|---|---|---|---|---|
| STATIC | UPPER EMBKMT, BLOCK | 1.92 | LINN7 | S5 |
| SEISMIC | " , " | 1.34 | LINN7b | — |

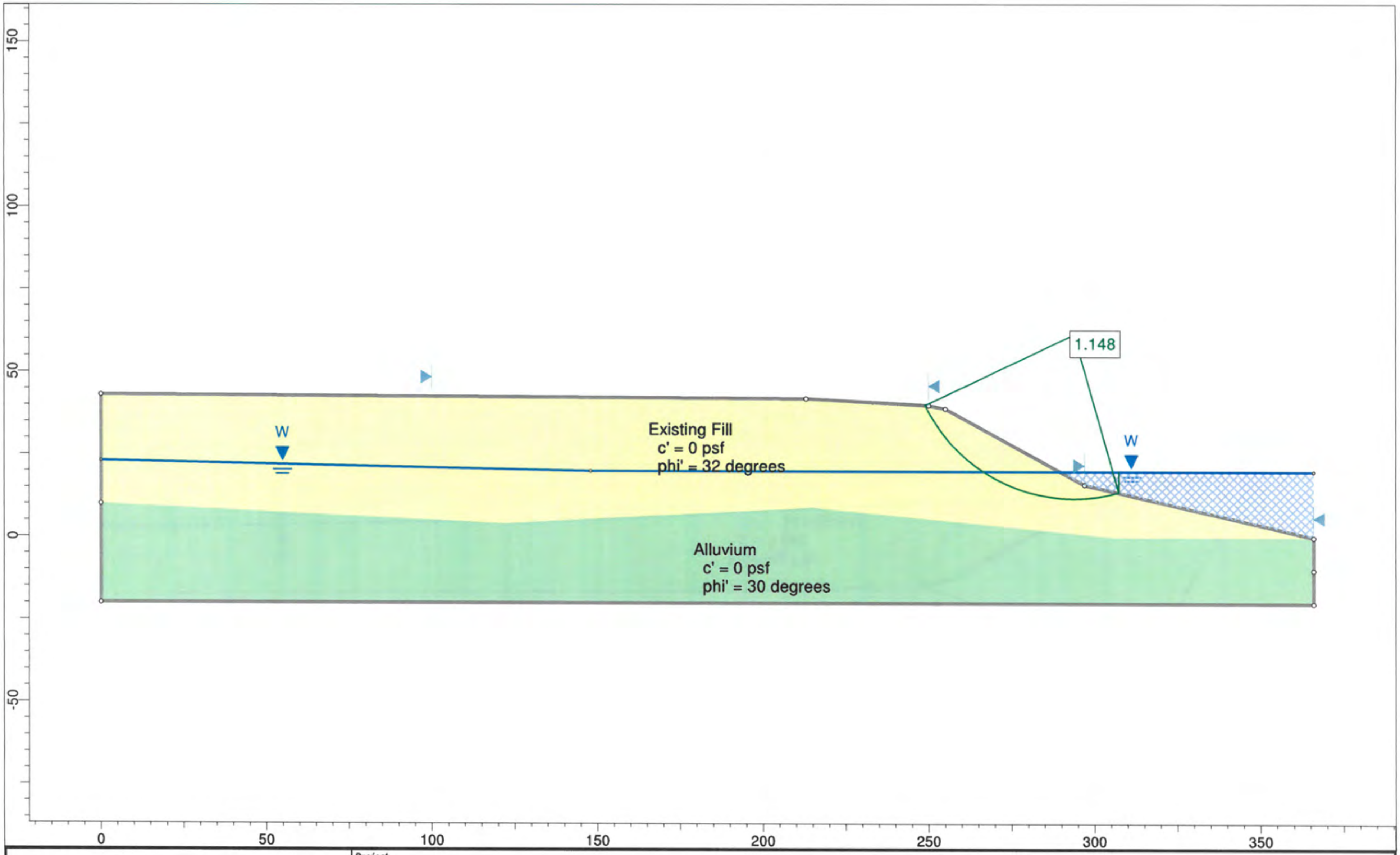
Slightly Lower FS, Block vs Circular (LINN7 vs. LINN6) —
1.92 2.23

- SLOPE STABILITY, NEW EMBANKMENT, WITH GROUNDWATER.
  - Assume groundwater mounding as per report discussion. Since block failure is the more critical, assume 48-inch layer of perched water accumulates above impermeable concrete, with block failure along concrete surface.
  - Schematic:

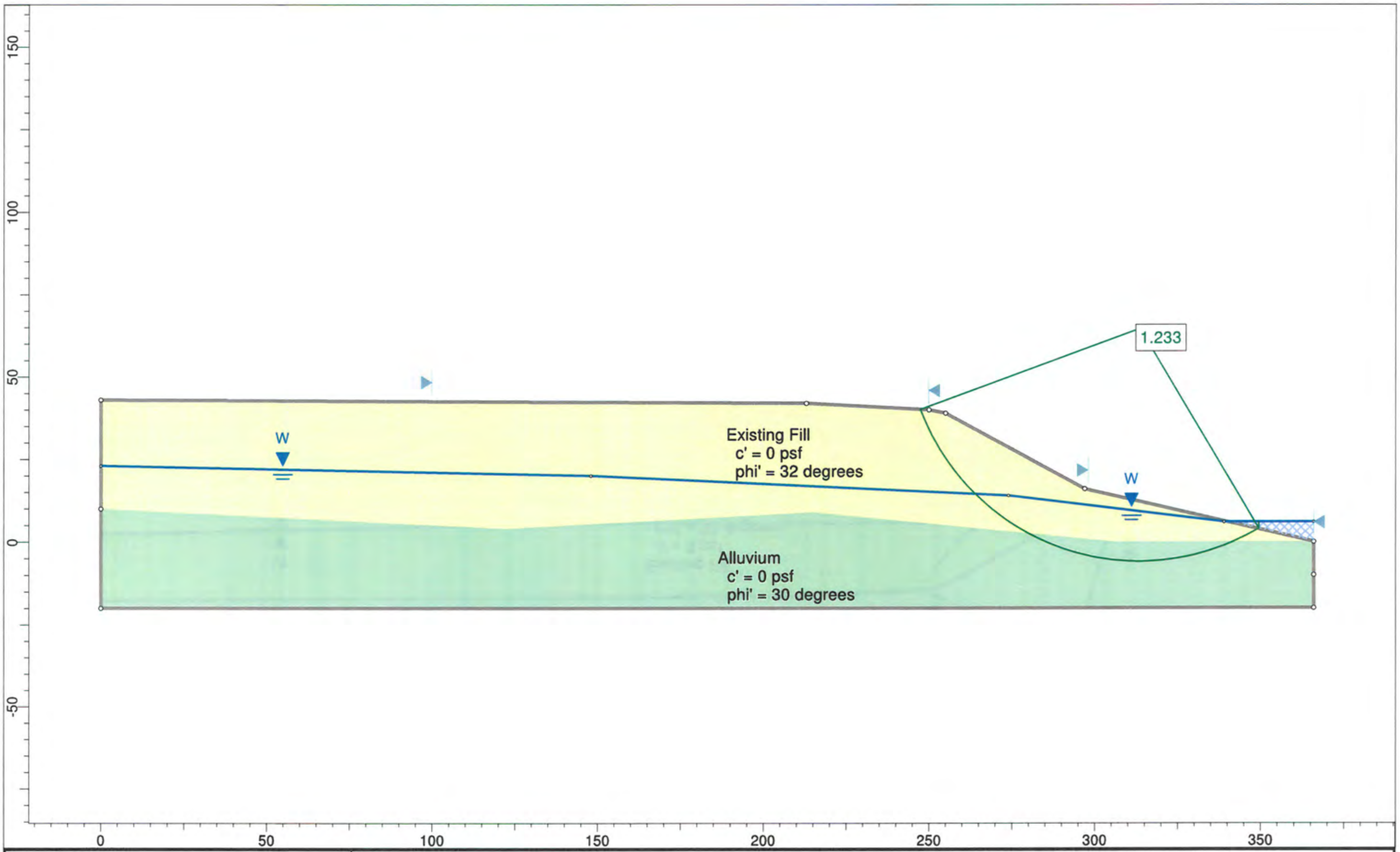


| EQUAKE | COND'N | FS | FILE | FIG |
|---|---|---|---|---|
| STATIC | UPPER EMBKMT, BLOCK W/ GW | 1.85 | LINN8 | S6 |
| SEISMIC | " | 1.28 | LINN8b | — |

So, the GW mounding does reduce factor of safety, but not to a critical level.



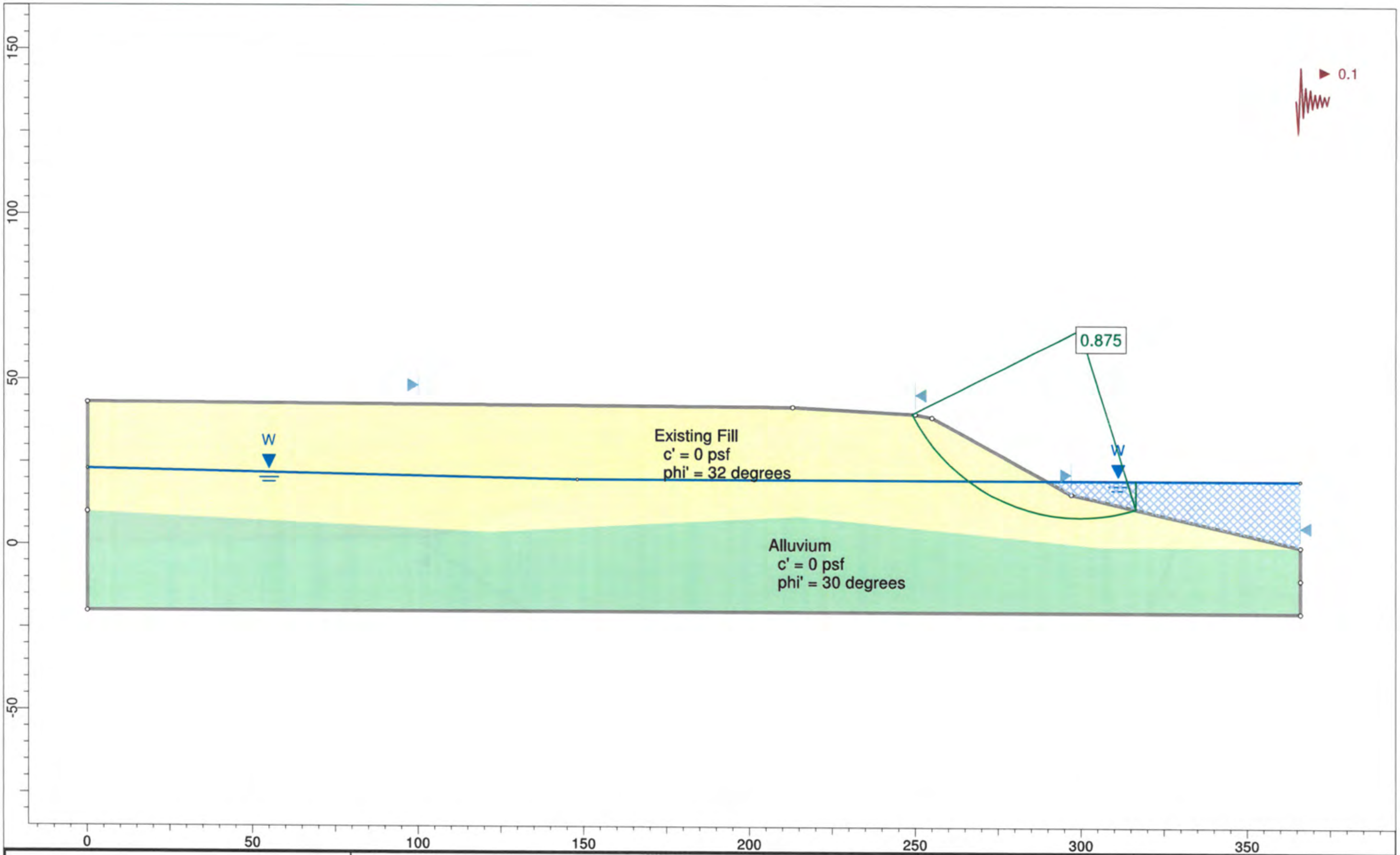
| | | | |
|---|---|---|---|
| GEOTECHNICS LLC | *Project* Linnton Plywood Restoration | | |
| | *Analysis Description* A-A', High Water, Static | | |
| | *Drawn By* ADM | *Scale* 1:480 | *Company* Geotechnics LLC |
| SLIDEINTERPRET 6.020 | *Date* 4/7/2014 | *File Name* Linn1.slim | Figure S1 |



GEOTECHNICS LLC

| | | | | | |
|---|---|---|---|---|---|
| *Project* | Linnton Plywood Restoration | | | | |
| *Analysis Description* | A-A', Low Water, Static | | | | |
| *Drawn By* | ADM | *Scale* | 1:480 | *Company* | Geotechnics LLC |
| *Date* | 4/7/2014 | *File Name* | Linn2.slim | | Figure S2 |

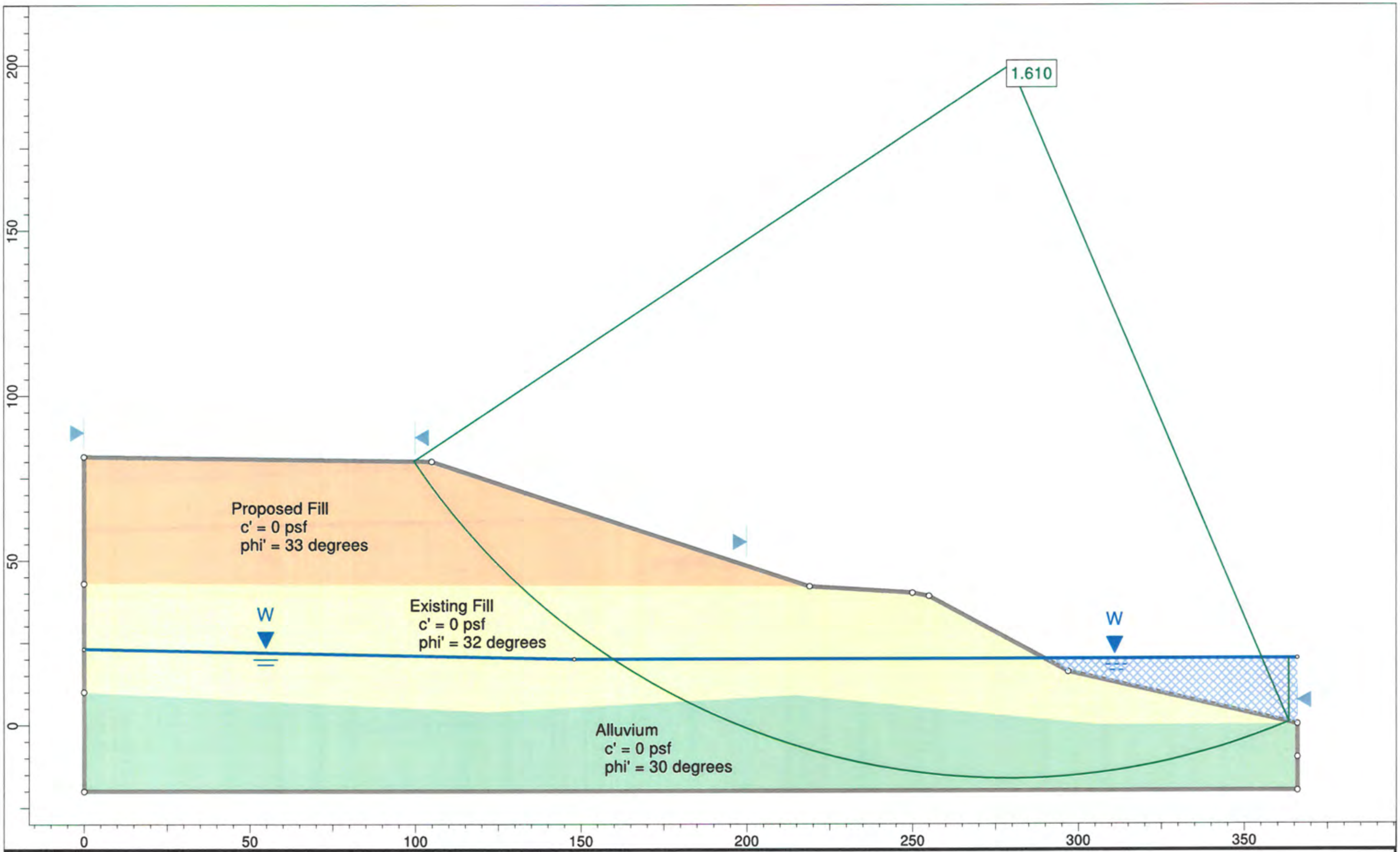
SLIDEINTERPRET 6.020



GEOTECHNICS LLC

SLIDEINTERPRET 6.020

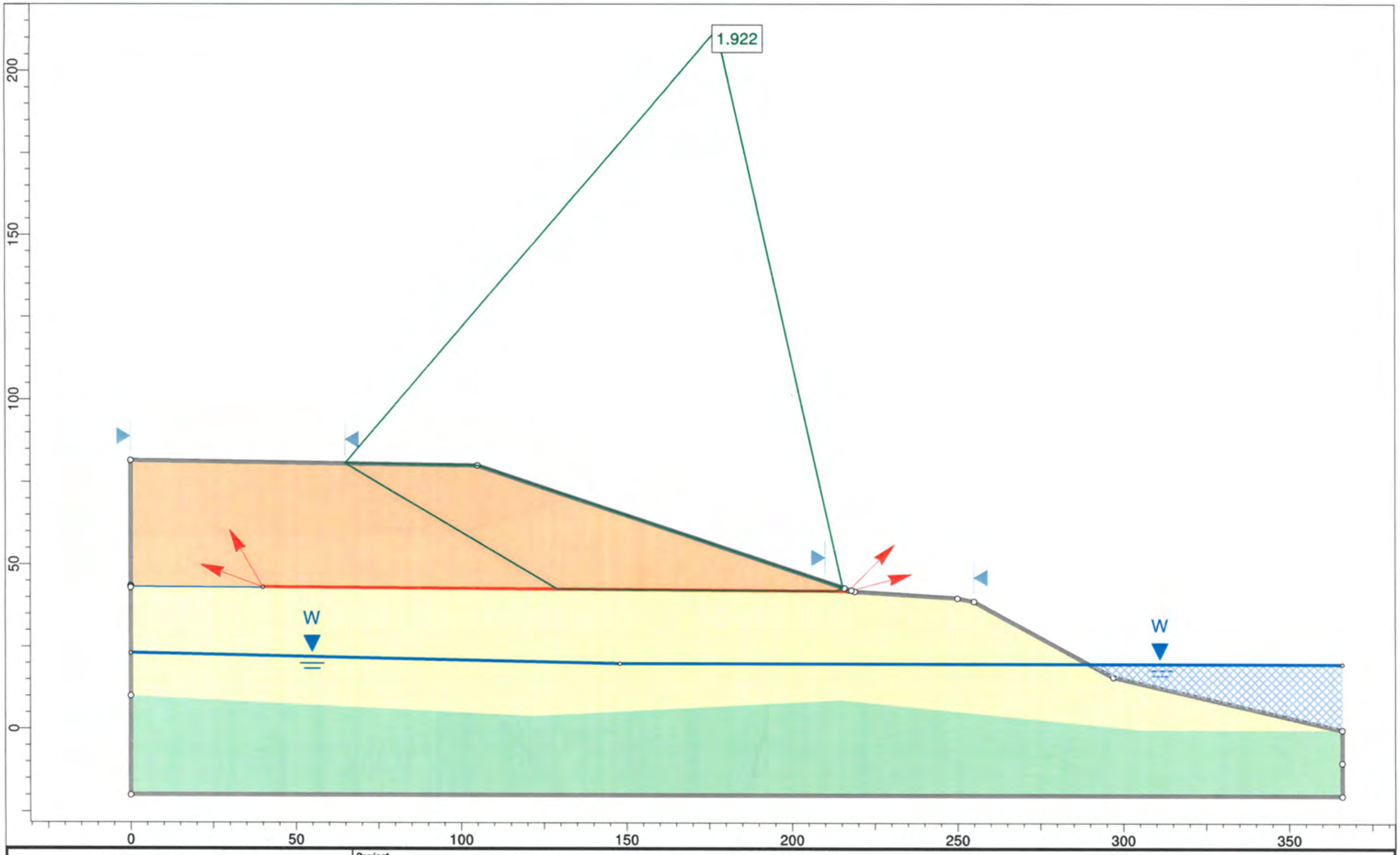
| | | | |
|---|---|---|---|
| *Project* | Linnton Plywood Restoration | | |
| *Analysis Description* | A-A', High Water, Seismic | | |
| *Drawn By* ADM | *Scale* 1:480 | *Company* Geotechnics LLC | |
| *Date* 4/7/2014 | | *File Name* Linn1b.slim | Figure S3 |



GEOTECHNICS LLC

| | | | |
|---|---|---|---|
| Project | Linnton Plywood Restoration | | |
| Analysis Description | High Water, through embankment, circular search, static | | |
| Drawn By ADM | Scale 1:480 | Company Geotechnics LLC | |
| Date 4/7/2014 | | File Name Linn5.slim | Figure S4 |

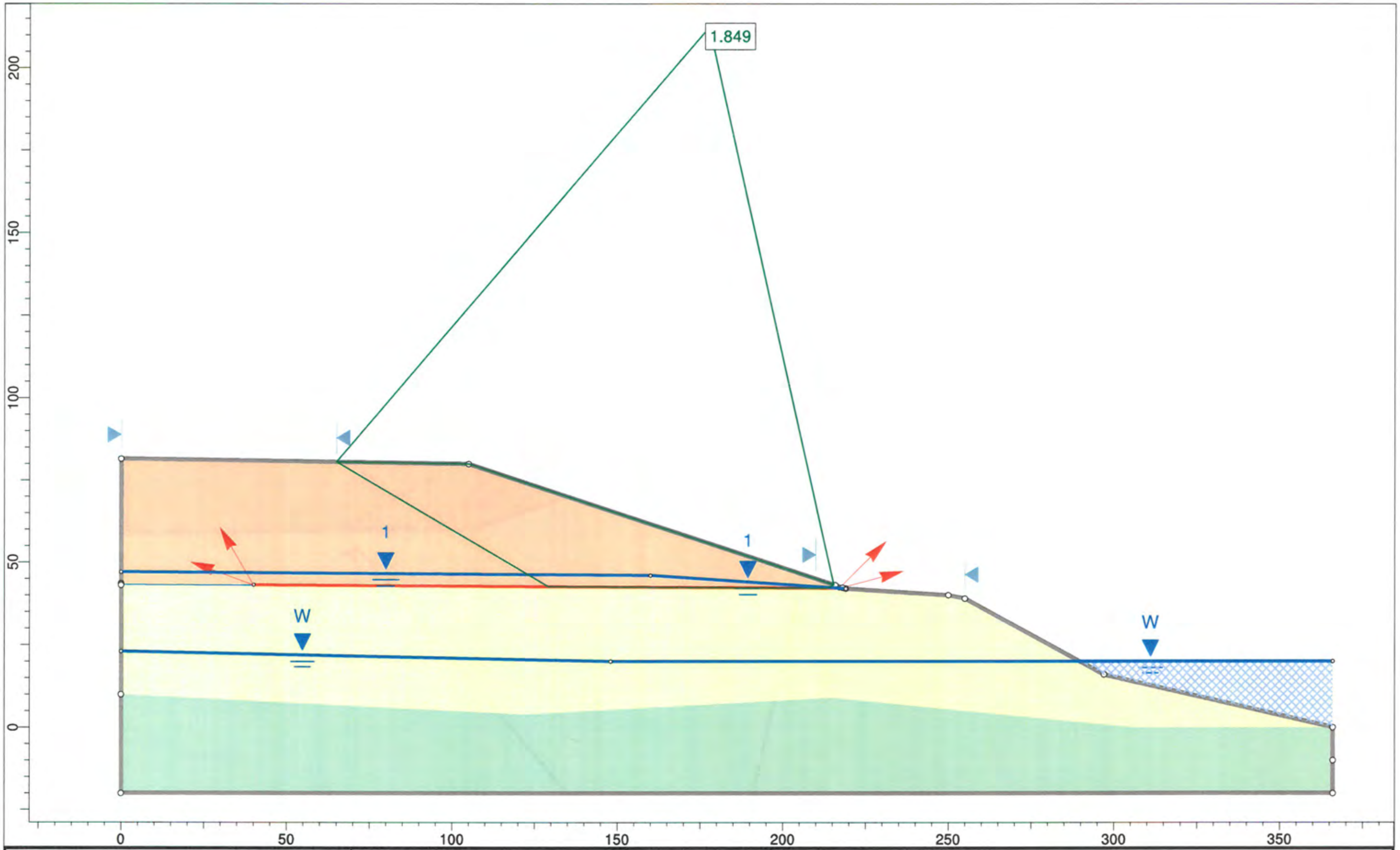
SLIDEINTERPRET 6.020



GEOTECHNICS LLC

| | | | |
|---|---|---|---|
| *Project* | Linnton Plywood Restoration | | |
| *Analysis Description* | Upper Embankment, block search, static | | |
| *Drawn By* ADM | *Scale* 1:480 | *Company* Geotechnics LLC | |
| *Date* 4/8/2014 | | *File Name* Linn7.slim | Figure S5 |

SLIDEINTERPRET 6.020



GEOTECHNICS LLC

Project
Linnton Plywood Restoration

Analysis Description
Upper Embankment, block search, static, with GW mounding

Drawn By
ADM

Scale
1:480

Company
Geotechnics LLC

Date
4/8/2014

File Name
Linn8.slim

Figure S6

SLIDEINTERPRET 6.020

# Exhibit G. Historical Data Compilation and Preliminary Stormwater Evaluation Results

EES
ENVIRONMENTAL CONSULTING, INC.
240 N. Broadway, Suite 203, Portland OR 97227
(503) 847-2740
www.ees-environmental.com

# Technical Memorandum

## Client Review Draft

| | |
|---|---|
| To: | Robert Marinai and Andrew Gregg, RESTORCAP |
| From: | Chris Rhea, RG and Craig Ware, RG |
| Date: | July 18, 2013 |
| Subject: | Historical Data Compilation and Preliminary Stormwater Evaluation Results<br>Linnton Plywood Site<br>DEQ ECSI Nos. 2373 and 2351<br>EES Project #4008-01 |

## INTRODUCTION

EES Environmental Consulting, Inc. (EES) is pleased to be of continued assistance to RESTORCAP in providing consulting services related to the Linnton Plywood Site (Site), located at 10504 NW St. Helens Road in Linnton, Oregon (Figure 1). Various efforts are currently being conducted in a step-wise manner, as part of RESTORCAP's due diligence for the property, to evaluate transformation of the property into a Natural Resource Damage (NRD) Restoration Site to provide habitat credits to offset NRD obligations in the Lower Willamette River. The proposed transformation includes excavation and re-grading of the property to create riparian and upland habitat, including a shallow water alcove/off channel habitat feature within the Riparian Zone.

Our current scope of work was conducted to develop preliminary conclusions in support of two components of the planned improvements, including: 1) stormwater quality at one conveyance system (WR102) from sources west of the property that may provide surface water contribution to the alcove/off channel habitat feature; and 2) soil characteristics at major planned excavation areas as related to both onsite reuse and anticipated conditions at the new exposed soil/sediment surface. Further, the preliminary findings are intended to inform supplemental investigation needs for both stormwater and soil, as warranted, to address data gaps or likely requirements for final planning and/or regulatory approvals.

The location of the property is shown on Figure 1.

## STORMWATER EVALUATION

One component of the Linnton Mill Site transformation includes an Open Water Habitat in the central portion of the property, with a cold water tributary developed by the capture and re-routing of surface water/stormwater runoff from existing sources west of the property. This proposed feature is shown on the Grette Associates figure titled *Linnton Mill Site Proposed Habitat - July 1, 2013*, which is included as Attachment A. Based on a review of City of Portland stormwater maps (Attachment B) and observations during Site reconnaissance in June 2013, the onsite storm sewer line (Outfall WR-102) appears to receive surface water from the properties listed below. Other stormwater systems are present at the Site; however, the focus of this preliminary stormwater quality assessment was specific to the conveyance system shown on Figure 2.

- Forest Park (predominantly undeveloped forestland, which occupies the majority of the acreage in the stormwater drainage basin).
- Residential properties approximately 300 feet west of the Site.
- Property owned by BP/Arco located west of the Site beyond the Union Pacific Railroad line.

There are three storm sewer manholes located on the Site in connection with the target conveyance system, and one is located at the access road west of the Site and the Portland and Western Railroad. Of these, the eastern-most manhole could not be located, and the western-most was observed to be full of sand. Manhole lid elevations, based on the AKS survey data, for the onsite manholes range from 46.63 to 47.37 feet. The base depth of the central onsite manhole (stormwater sample location SW-1)) was measured at approximately 25 feet below ground surface (bgs), with surveyed (AKS) inlet and outlet elevations of 21.92 and 21.84 feet, respectively. At the time of sampling, several inches of water were measured in the bottom of the manhole. An additional manhole, located in the access road to the west of the property, has a surveyed lid elevation of 43.82, with a surveyed inlet elevation of 33.32 feet.

Based on available information and our Site observations in June 2013, at least eight surface water catch basins are located west of the property, including: one west of Highway 30 at the base of Forest Park (where the surface channel draining Forest Park runs under Highway 30; at least three in the residential area west of the Site and north of the Forest Park surface drainage channel; and four on the BP/Arco property between Highway 30 and the railroad. In addition, the storm line daylights to a surface channel for a short distance (less than 20’) between Highway 30 and the BP Oil/Arco access road. Catch basins located on the BP Oil/Arco property were observed to have depths of approximately seven feet bgs. At the time of our sampling on June 12, 2013, water was observed to be flowing in the northern-most catch basin on the BP Oil/Arco property, receiving runoff from Forest Park. The two southern-most catch basins on the BP Oil/Arco property were observed to be dry on the sampling date.

Based on the above data and observations, stormwater from catch basins west of the property is directed to the manhole in the access road, where the piping extends easterly at a depth of 10 to 12 feet bgs beneath the railroad. The inlet and outlet elevations of the western-most manhole on the Site were not surveyed likely due to the presence of sand; however, the storm sewer pipe on the western side of the proper appears to be at an elevation ranging from about 26 to 28 feet, or about 19 to 21 feet bgs. From our review of the proposed topography for the cold water tributary and open water habitat areas, the stormwater piping entering the property (approximate elevation range of 26 to 28 feet) appears to be above the proposed elevations shown for the habitat improvements. However, the elevation of the conveyance piping on the western portion of the Site should be verified.

## STORMWATER SAMPLING

On June 12, 2013, EES personnel collected stormwater sample SW-1 from the centrally-located onsite manhole. As indicated above, stormwater present in the system was likely representative primarily of water flowing east from Forest Park, since catch basins on the BP Oil/Arco property were dry at the time of sampling. The sample was collected in laboratory provided containers using a peristaltic pump with new polyethylene tubing and subsequently placed in a cooler with ice and transported to the chemical analytical laboratory under standard chain-of-custody protocol.

## CHEMICAL ANALYTICAL RESULTS

Stormwater sample SW-1 was submitted to Apex Laboratories for the analyses listed below. For preliminary planning purposes, the chemical constituent results were compared to the published Portland Harbor Joint Source Control Strategy (JSCS) screening values. The chemical analytical results are presented on Tables 1 through 4. A copy of the laboratory analytical report is included in Attachment C.

- Chemical Constituents
    - Hydrocarbon identification by NWTPH-HCID
    - Volatile organic compounds (VOCs) by EPA 8260B
    - Semi-volatile organic compounds (SVOCs) by EPA 8270D
    - Polychlorinated biphenyls (PCBs) by EPA 8082A
    - Metals by EPA 6020A
    - Chloride, fluoride, and sulfate by EPA 300.0
    - Nitrate + nitrite nitrogen by EPA 353.2
    - Total cyanide by EPA 335.4
    - Residual chlorine by SM4500CL-G
- General Chemistry Parameters
    - pH and temperature by EPA 150.1
    - Biochemical oxygen demand (BOD) by SM 5210B

- Orthophosphate phosphorous by SM 4500 P E
- Turbidity by EPA 180.1
- Phosphorous by SM 4500 P B
- Total Suspended Solids (TSS) by SM 2540 D
- Total Dissolved Solids (TDS) by SM 2540 C
- Chemical oxygen demand (COD) by EPA 410.4
- Total organic carbon by SM 5310 B
- Total alkalinity, and bicarbonate and carbonate alkalinity by SM 2320 B
- Phenolics by EPA 420.4
- Ammonia as N by EPA 350.1
- Total Kjeldahl Nitrogen (TKN) by EPA 351.2

In general, chemical constituents were not detected in the sample above Method Reporting Limits (MRLs) or were detected at concentrations below JSCS stormwater screening levels for Human Health (fish consumption) and Ecological Receptors. Phenanthrene was the only organic chemical constituent detected in the sample, at a concentration of 0.0206 micrograms per liter (µg/L), slightly above the MRL 0.0192 µg/L. Phenanthrene was also detected in the method blank at a concentration below the MRL but above the Method Detection Limit, so the detection of Phenanthrene in the SW-1 sample was likely an artifact of the laboratory analyses and not reflective of Site conditions. JSCS screening values for Phenanthrene for Fish Consumption and Ecological Receptors have not been established.

Several metals were detected in the sample; with the exception of manganese, all were detected at concentrations below JSCS screening levels. Manganese was detected at a concentration of 75.3 µg/L, above the JSCS screening level value of 10 µg/L for Fish Consumption based on the current Portland Harbor risk calculations, but below both the EPA and DEQ Fish Consumption Water Quality Criteria of 100 µg/L (DEQ 2007). It should be noted that manganese is often found in both surface water and groundwater, and the concentration detected in the SW-1 sample is not expected to raise concerns over the suitability of the drainage for surface water input to the proposed lagoon.

The General Chemistry Parameters were detected at levels consistent with expectations for natural stormwater conditions in the area.

The stormwater results indicate it is unlikely that significant concentrations of contaminants were being released to the onsite stormwater conveyance system at the time that SW-1 was collected; however, this sample may not be representative of discharge conditions during other periods and it is prudent to re-evaluate water quality during peak stormwater discharge conditions when the associated catch basins are contributing to the network. We recommend that supplemental stormwater sampling be conducted during high rainfall conditions (typically during December, January, or February) for more adequate characterization.

# HISTORICAL DATA COMPILATION

Based on our understanding of the planned improvements, Site cuts and fills will be balanced to the extent possible to achieve the proposed grades (i.e., soils generated at Site cuts will be used elsewhere onsite at proposed fills). Offsite transport and disposal of soils would be limited to that volume necessary to balance the Site, or soils with contaminant levels that cannot be incorporated into the grading plan in a manner protective of future uses of the property (both human and ecological). The northern portion of the property will largely be filled (soil placed over existing grades to meet the proposed elevations). The proposed improvements also include soil mounding on the southern margin of the property adjoining the BP Oil Site. The balance of the southern half of the property will be excavated to meet proposed grades for the open water, emergent/shrub wetland, and riparian areas.

The property is considered protective in its current condition, as established in DEQ's No Further Action determination dated July 10, 2009. Overall objectives for soil management at the property in support of the improvements include:

- Identification and proper management of impacted soils that may be encountered during Site work and require specialized handling or disposal;
- Verification that fill placement soils (soils excavated from the Site and reworked as fill) are protective of human and ecological receptors, or are capped with 2 to 3 feet of clean fill (if warranted);
- Verification that soils, or the new sediment surface, at planned excavation areas are protective of human and ecological receptors;
- Minimization of construction delays associated with soil handling or unanticipated conditions; and
- Regulatory acceptance and closure consistent with provisions anticipated under the planned DEQ Prospective Purchaser Agreement (PPA).

Our preliminary scope of work included the compilation and mapping of existing soil analytical data at planned excavation areas to develop an initial understanding of soil characteristics in comparison to appropriate screening criteria, and to identify data gaps that may likely need to be evaluated to meet the objectives described above. With the exception of limited additional investigation in the vicinity of existing structures to identify potential hotspots of soil or areas of environmental impact not previously considered by DEQ, additional investigation at planned fill areas on the property is not contemplated. As such, we focused primarily on planned excavation or cut areas to review the existing body of data, develop a preliminary opinion of soil quality, and formulate an initial strategy for a design-level environmental investigation to meet the overall objectives.

The current and proposed topography are shown on Figures 3 and 4, respectively. Historic sample locations are shown on Figure 5. A plan view of the cross sections is shown on Figure 6. Cross sections are shown on Figures 7 through 10. Due to insufficient subsurface stratigraphic data, soil descriptions were not included on the cross sections.

## PRELIMINARY EVALUATION OF SOIL ANALYTICAL RESULTS

Available analytical results were compared to the JSCS Sediment Screening Levels for planned in-water or wetland areas. For upland areas, available analytical results were compared to DEQ's Occupational and Excavation Worker Soil Ingestion, Dermal Contact and Inhalation Risk Based Concentrations (RBCs) and DEQ Level II Screening Level Values for Plants, Invertebrates, and Wildlife Exposed to Soil. Further assessment and screening will be required, however, the above reference concentrations are considered to be reasonable likely receptor scenarios for the purpose of initial screening efforts. Historic analytical data for the area of the Site with proposed cuts in comparison to preliminary sediment screening values are presented on Table 5. Historic analytical data for the area of the Site with proposed cuts in comparison to preliminary upland soil screening values (human health and ecological) are presented on Table 6.

### PRELIMINARY SEDIMENT/INWATER/ECOLOGICAL SCREENING

Chemical analytes were either not detected at the MRLs or were below JSCS screening criteria, with the exception of several polynuclear aromatic hydrocarbons (PAHs) in sample S-2S-01 (collected from a depth of 10-12.5 feet) from transect D-D'. The detected PAH concentrations slightly exceeded the criteria for toxicity; however, these data do not reflect the elevation of the planned new exposed surface, and are located in areas that will be removed during the excavation work and relocated upland and therefore would not be representative of future ecological exposures. However, available soil data are lacking analysis for various metals which will be required to further characterize both soil quality and residual risk.

The available soil chemical data are from widely-spaced previous investigation locations at the property, with few data points at the variable new sediment or soil surface of planned excavation areas. With this consideration, the data provide a generalized understanding of the soil quality in comparison to likely applicable screening values for the new exposed surface. Available data, although sparse, generally appear to be below likely applicable screening criteria.

### PRELIMINARY UPLAND/HUMAN HEALTH SCREENING/ECOLOGICAL SCREENING

Chemical analytes were either not detected above the MRLs, or were below DEQ's Occupational and Excavation Worker Soil Ingestion, Dermal Contact and Inhalation RBCs and DEQ Level II Screening Level Values for Plants, Invertebrates, and Wildlife Exposed to Soil. These preliminary risk screening values contemplate potential exposure to an excavation worker involved in the Site grading operations, and to terrestrial ecological receptors likely present at upland areas on completion of the Site work. We understand that overall access to the property by human receptors will be limited, and could include Site workers involved in Site restoration and maintenance, and potentially a trespasser scenario. The preliminary human health risk screening included comparison to DEQ's Soil Ingestion, Dermal Contact and Inhalation RBCs for an occupational receptor, which typically have more conservative frequency and duration of exposure factors that than of a recreational trespasser population.

Similar to that presented above for the in-water preliminary screening discussion, available soil data are lacking analysis for various metals which will be required to further characterize both soil quality and residual risk to upland receptors. The available soil chemical data are from widely-spaced previous investigation locations at the property, and the potential exists in planned excavation areas that soils may be encountered which exceed final risk screening levels developed for the property.

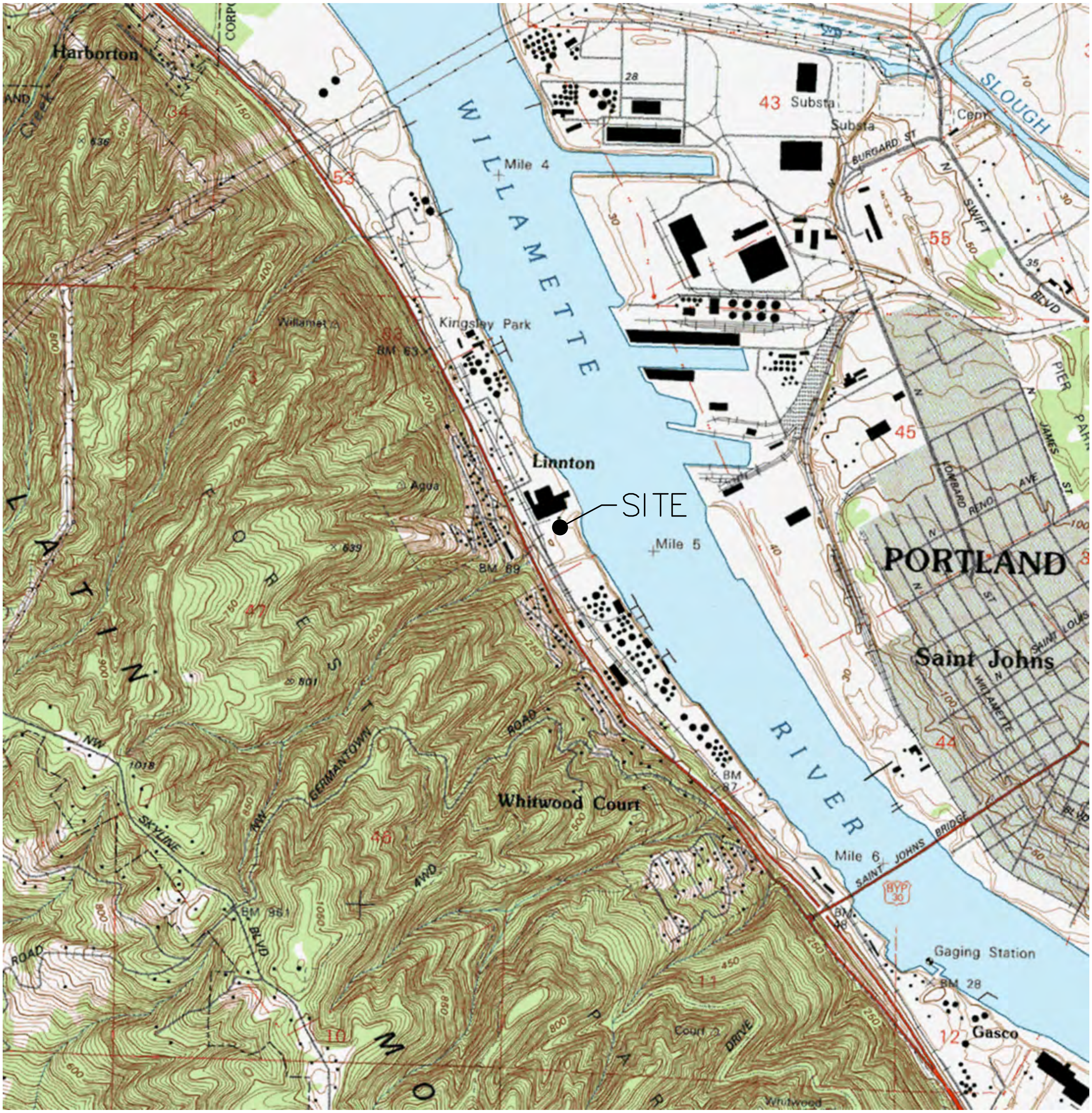
## CONCLUSIONS

The following conclusions are based on: 1) our research of the stormwater conveyance system, and one-time sampling and analysis of stormwater quality which may represent discharge to the planned cold water tributary and open water habitat; and 2) our review and evaluation of various existing Site data relative to preliminary human and ecological risk screening values for in-water and upland habitat:

- The existing stormwater conveyance system WR102 captures runoff from offsite sources to the west including Forest Park, residential properties, Highway 30, and property owned by BP/Arco. In general, chemical constituents were not detected in the sample above MRLs or were below JSCS screening levels for Human Health (fish consumption) and Ecological Receptors. The stormwater results indicate no significant concentrations of contaminants exceeding preliminary screening criteria were identified in this onsite stormwater conveyance system sample. However, supplemental stormwater sampling is recommended to further evaluate water quality during other stormwater discharge events, and when the associated catch basins are contributing runoff to the network.
- Available soil analytical results for the property were compared to either: JSCS Sediment Screening Levels for planned in-water or wetland areas, or DEQ's Occupational and Excavation Worker Soil Ingestion, Dermal Contact and Inhalation RBCs and DEQ Level II Screening Level Values for Plants, Invertebrates, and Wildlife Exposed to Soil for upland areas. The available soil chemical data are from widely-spaced previous investigation locations at the property, with few data points at the variable new sediment or soil surface, or within soils to be excavated and re-located. Available soil data do not include analysis for various metals which will be required to further characterize both soil quality and residual risk. Existing data are useful for general screening purposes and identified contaminant concentrations generally appear to be below likely applicable screening criteria for in-water and upland receptors.
- Additional characterization of design elevations will be required to target specific intervals within the planned excavation areas (upper 2 feet of the new exposed surface), and to further evaluate soils that will be excavated and re-located to upland areas. In the event that soil chemical data at the new exposed surfaces, both upland and in-water, do not meet applicable risk screening criteria, areas of exceedance would require placement of a clean fill cap or other protective surface to meet the project objectives.

- A Soil Management Plan should be developed for use by the earthwork contractor in the proper identification, management, handling, and placement of soils. Additional verification sampling and analysis and field screening may be required during fill removal and placement to identify areas with soil potentially exceeding final screening values established as appropriate for the project.

# FIGURES



*SOURCE:*
*USGS, LINNTON QUADRANGLE*
*OREGON*
*7.5 MINUTE SERIES (TOPOGRAPHIC)*

N

APPROXIMATE SCALE IN FEET

*0 1000 2000 4000*

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*VICINITY MAP*

*10504 NW ST. HELENS RD.*
*PORTLAND, OREGON*

| | | |
|---|---|---|
| *DATE:* | *7-2-13* | *PROJECT NO.*<br>*4008-01* |
| *FILE:* | *4008-01* | |
| *DRAWN:* | *JJT* | *FIGURE NO.*<br>*1* |
| *APPROVED:* | *CWW* | |

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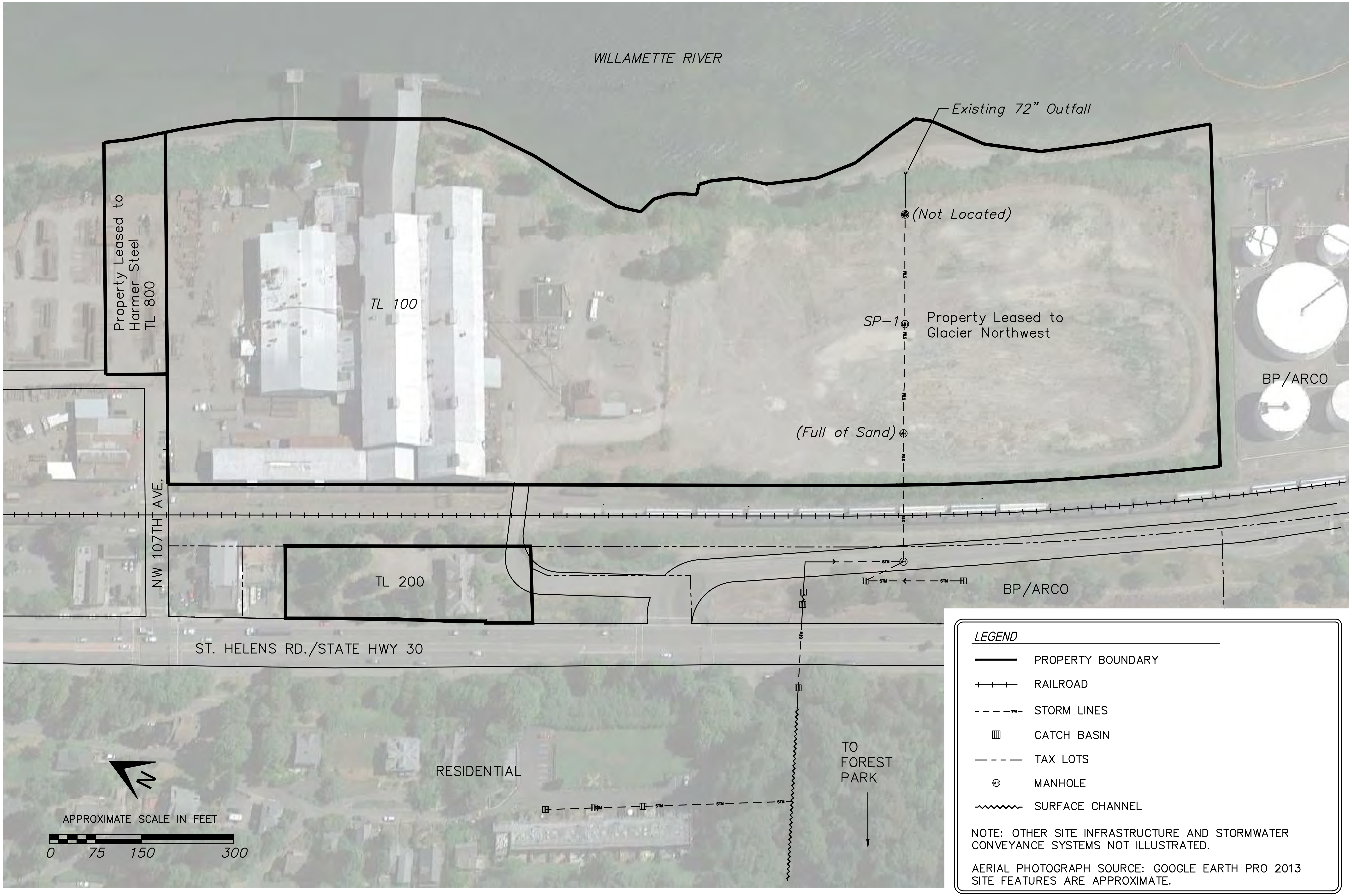

NOTE: OTHER SITE INFRASTRUCTURE AND STORMWATER CONVEYANCE SYSTEMS NOT ILLUSTRATED.

AERIAL PHOTOGRAPH SOURCE: GOOGLE EARTH PRO 2013
SITE FEATURES ARE APPROXIMATE.

PROJECT NO. 4008-01
FIGURE NO. 2

DATE: 7-2-13
FILE: 4008-01
DRAWN: JJT
APPROVED: CWW

SITE PLAN

LINNTON PLYWOOD ASSOCIATION
10504 NW ST. HELENS RD.
PORTLAND, OREGON

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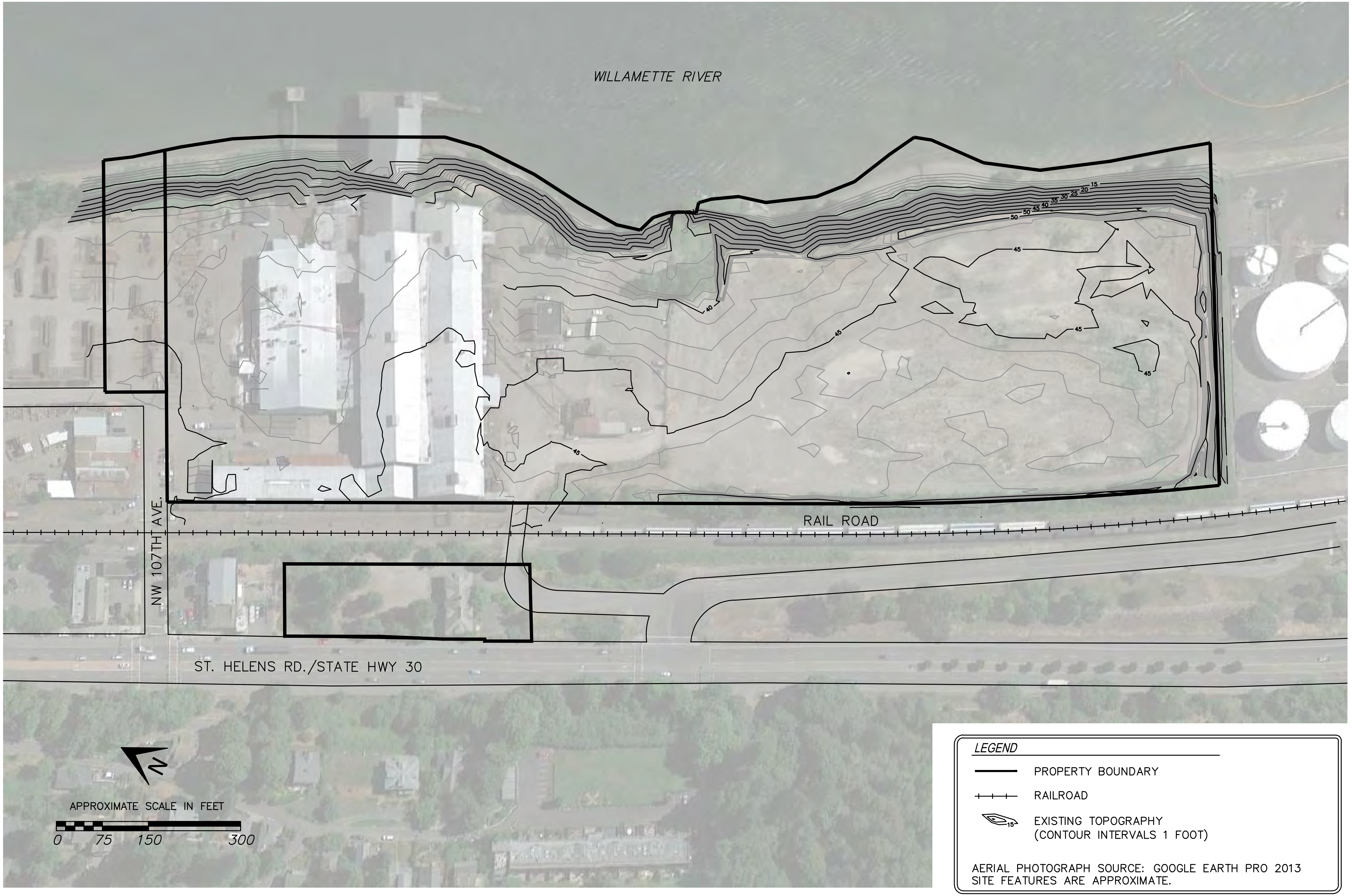

*LEGEND*

| | |
|---|---|
| ▬ | PROPERTY BOUNDARY |
| ┼┼┼┼ | RAILROAD |
| 15 | EXISTING TOPOGRAPHY<br>(CONTOUR INTERVALS 1 FOOT) |

AERIAL PHOTOGRAPH SOURCE: GOOGLE EARTH PRO 2013
SITE FEATURES ARE APPROXIMATE.

DATE: 7-2-13
FILE: 4008-01
DRAWN: JJT
APPROVED: CWW

PROJECT NO.
4008-01
FIGURE NO.
3

## EXISTING TOPOGRAPHY

LINNTON PLYWOOD ASSOCIATION
10504 NW ST. HELENS RD.
PORTLAND, OREGON

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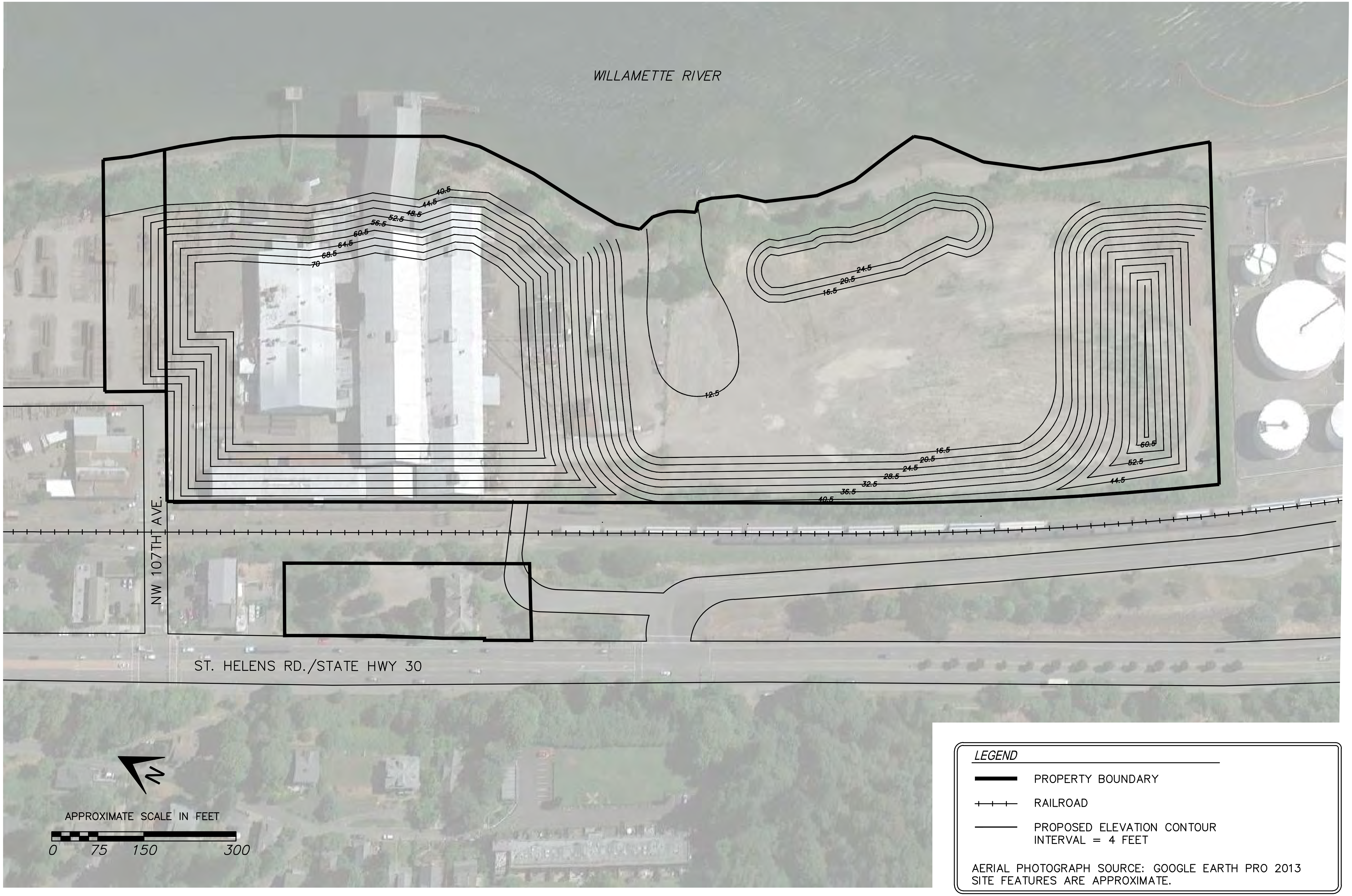

*LEGEND*

| | |
|---|---|
| ▬ | PROPERTY BOUNDARY |
| ┼┼┼┼ | RAILROAD |
| — | PROPOSED ELEVATION CONTOUR<br>INTERVAL = 4 FEET |

AERIAL PHOTOGRAPH SOURCE: GOOGLE EARTH PRO 2013
SITE FEATURES ARE APPROXIMATE.

| | |
|---|---|
| DATE: | 7-2-13 |
| FILE: | 4008-01 |
| DRAWN: | JJT |
| APPROVED: | CWW |
| PROJECT NO. | 4008-01 |
| FIGURE NO. | 4 |

PROPOSED TOPOGRAPHY

LINNTON PLYWOOD ASSOCIATION
10504 NW ST. HELENS RD.
PORTLAND, OREGON

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ENVIRONMENTAL CONSULTING, INC.
240 N Broadway #203, Portland, OR 97227
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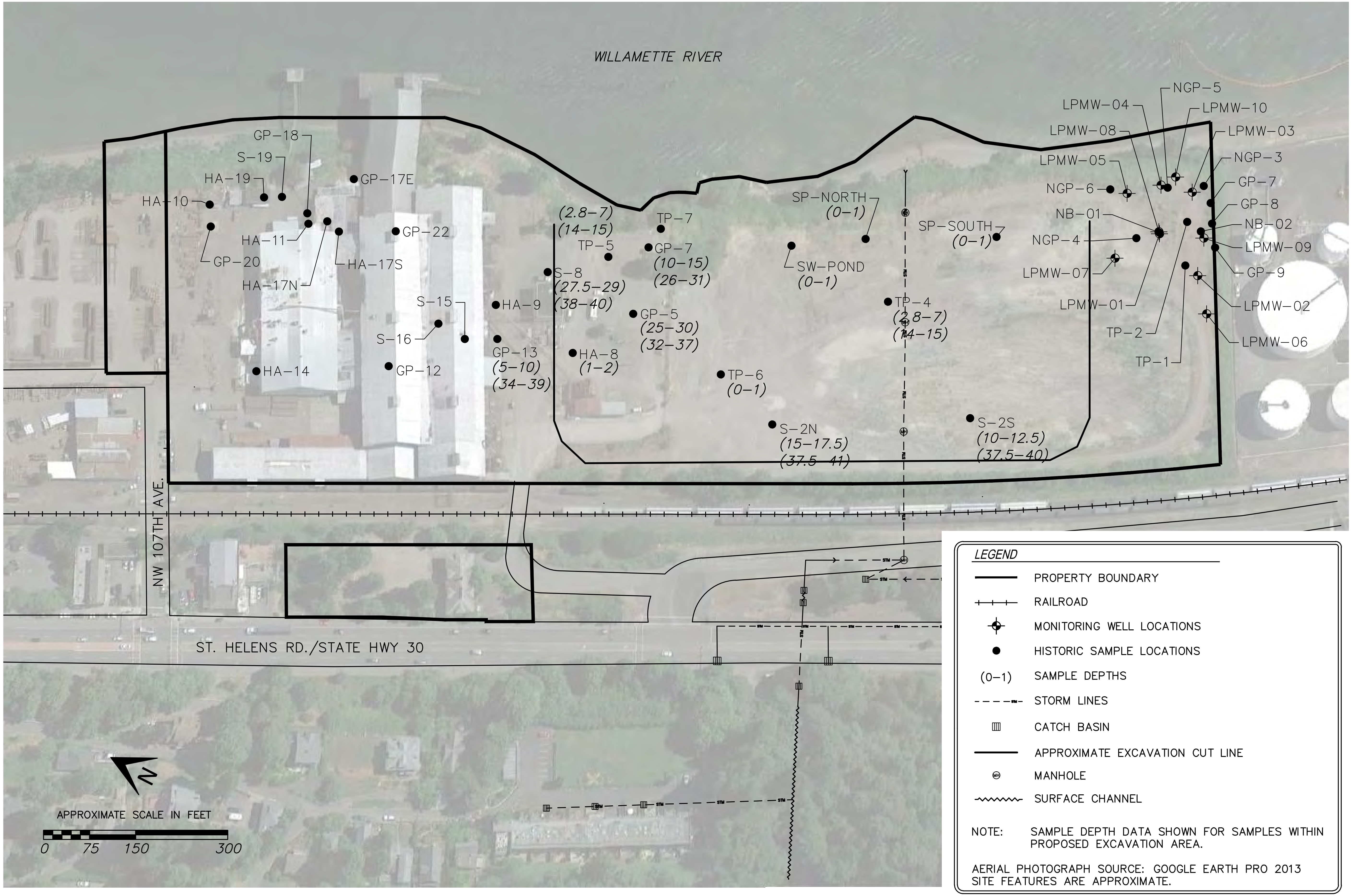

NOTE: SAMPLE DEPTH DATA SHOWN FOR SAMPLES WITHIN PROPOSED EXCAVATION AREA.

AERIAL PHOTOGRAPH SOURCE: GOOGLE EARTH PRO 2013
SITE FEATURES ARE APPROXIMATE.

DATE: 7-2-13
FILE: 4008-01
DRAWN: JJT
APPROVED: CWW
PROJECT NO. 4008-01
FIGURE NO. 5

SAMPLE LOCATIONS

LINNTON PLYWOOD ASSOCIATION
10504 NW ST. HELENS RD.
PORTLAND, OREGON

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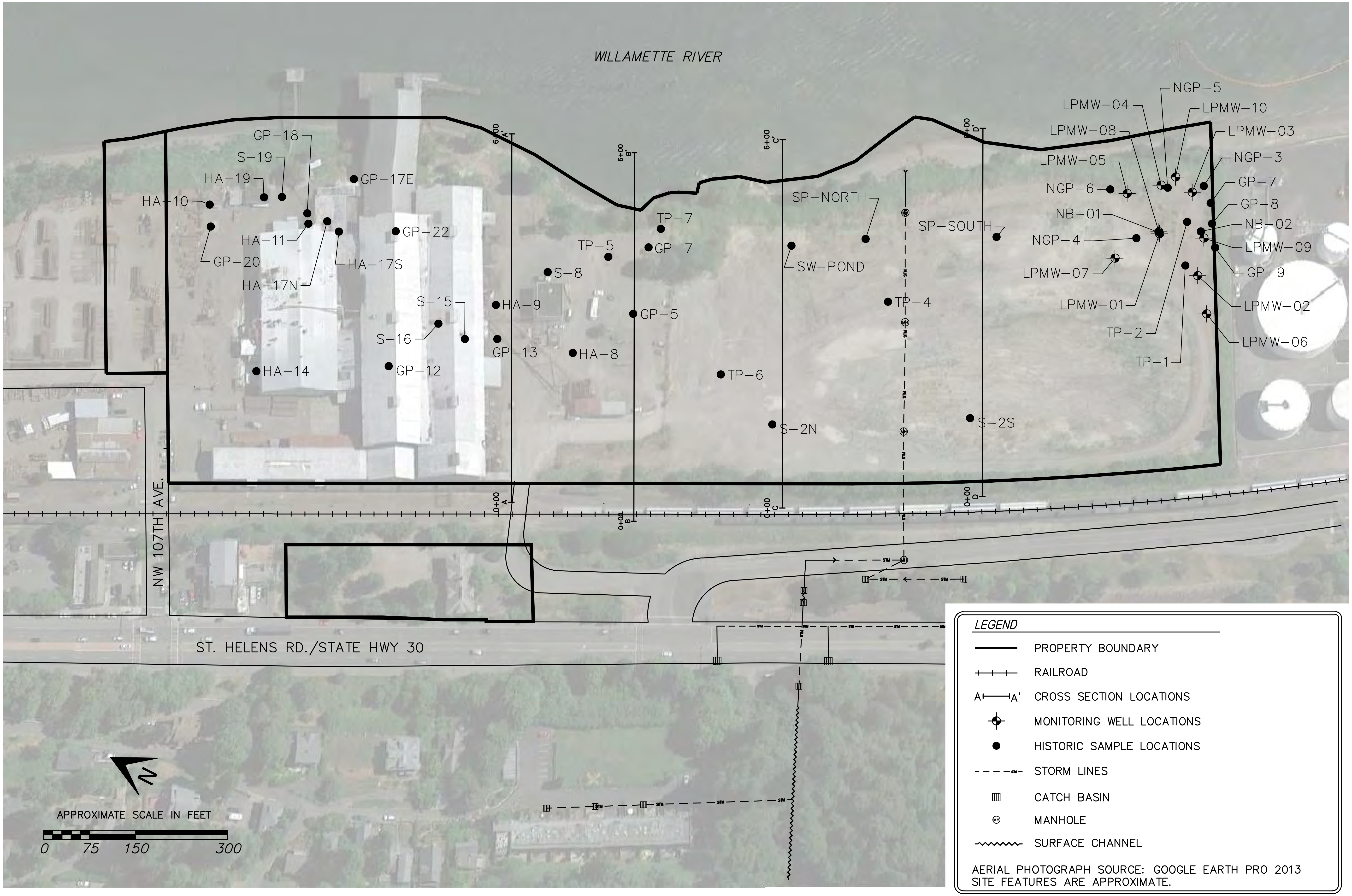
ENVIRONMENTAL CONSULTING, INC.
240 N Broadway #203, Portland, OR 97227
(503) 847-2740
www.ees-environmental.com

Z:\EES-Autocad\4008-01\June 2013\4008-01_BM.dwg, Sample Locations



AERIAL PHOTOGRAPH SOURCE: GOOGLE EARTH PRO 2013
SITE FEATURES ARE APPROXIMATE.

| | | |
|---|---|---|
| DATE: | 7–2–13 | PROJECT NO. 4008–01 |
| FILE: | 4008–01 | |
| DRAWN: | JJT | FIGURE NO. 6 |
| APPROVED: | CWW | |

## CROSS SECTION LOCATIONS

LINNTON PLYWOOD ASSOCIATION
10504 NW ST. HELENS RD.
PORTLAND, OREGON

EES
ENVIRONMENTAL CONSULTING, INC.
240 N Broadway #203, Portland, OR 97227
(503) 847-2740
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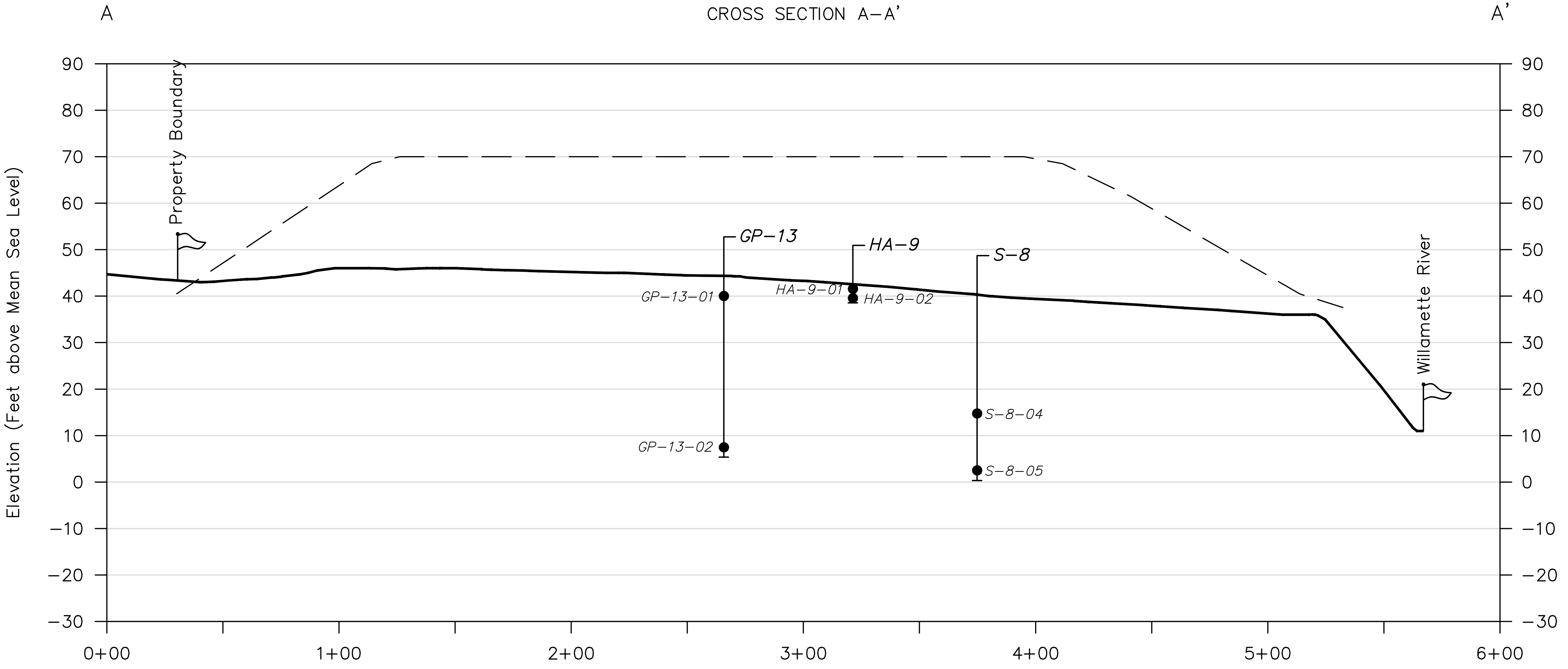
# CROSS SECTION A–A'



*LEGEND*

| | |
|---|---|
| — | *EXISTING GROUND SURFACE* |
| — — | *PROPOSED GROUND SURFACE* |
| ● | *SAMPLE INTERVAL* |

*HORIZONTAL SCALE – 1"=50'*
*VERTICAL SCALE – 1"=25'*

| | | | |
|---|---|---|---|
| DATE: | 7–2–13 | PROJECT NO. | 4008–01 |
| FILE: | 4008–01 | FIGURE NO. | 7 |
| DRAWN: | JJT | | |
| APPROVED: | CWW | | |

*CROSS SECTION A–A'*

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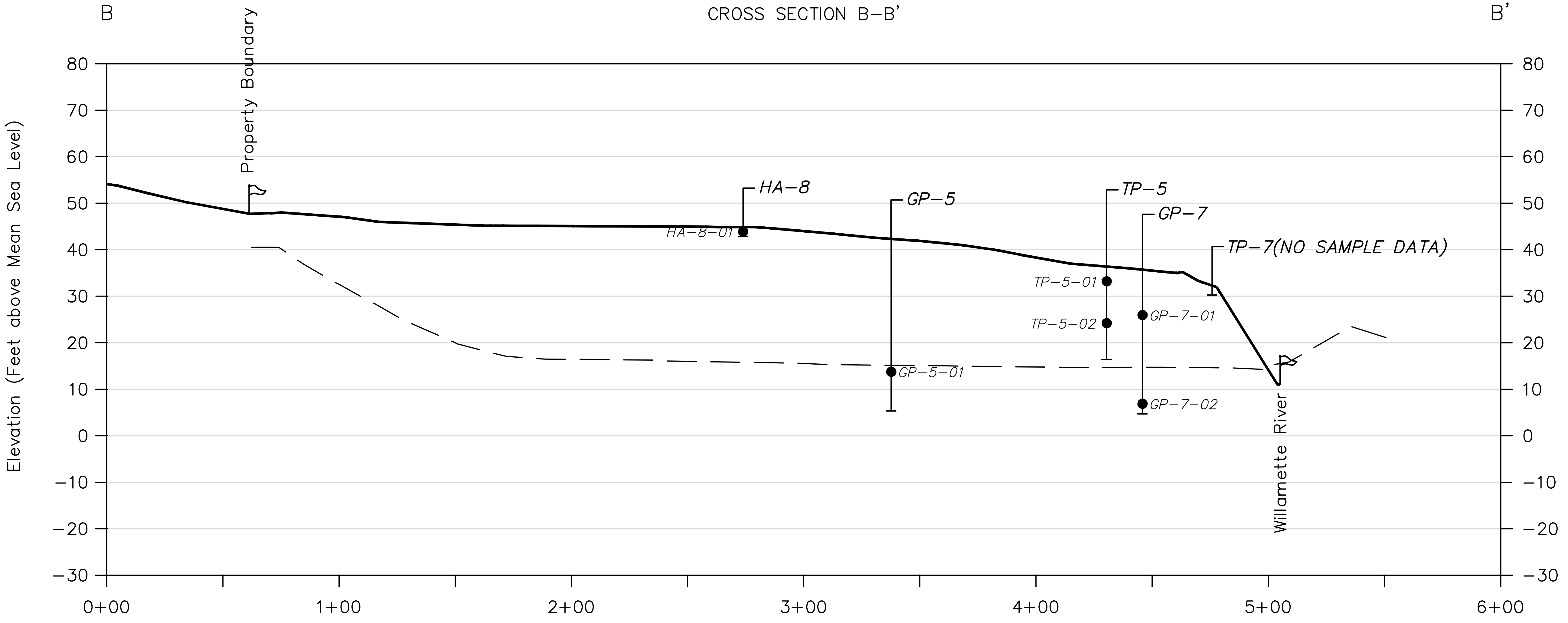
## CROSS SECTION B–B'



*LEGEND*

| | |
|---|---|
| ━━ | *EXISTING GROUND SURFACE* |
| — — | *PROPOSED GROUND SURFACE* |
| ● | *SAMPLE INTERVAL* |

*HORIZONTAL SCALE – 1"=50'*
*VERTICAL SCALE – 1"=25'*

| | | | |
|---|---|---|---|
| *DATE:* | *7–2–13* | *PROJECT NO.* | *4008–01* |
| *FILE:* | *4008–01* | | |
| *DRAWN:* | *JJT* | *FIGURE NO.* | *8* |
| *APPROVED:* | *CWW* | | |

*CROSS SECTION B–B'*

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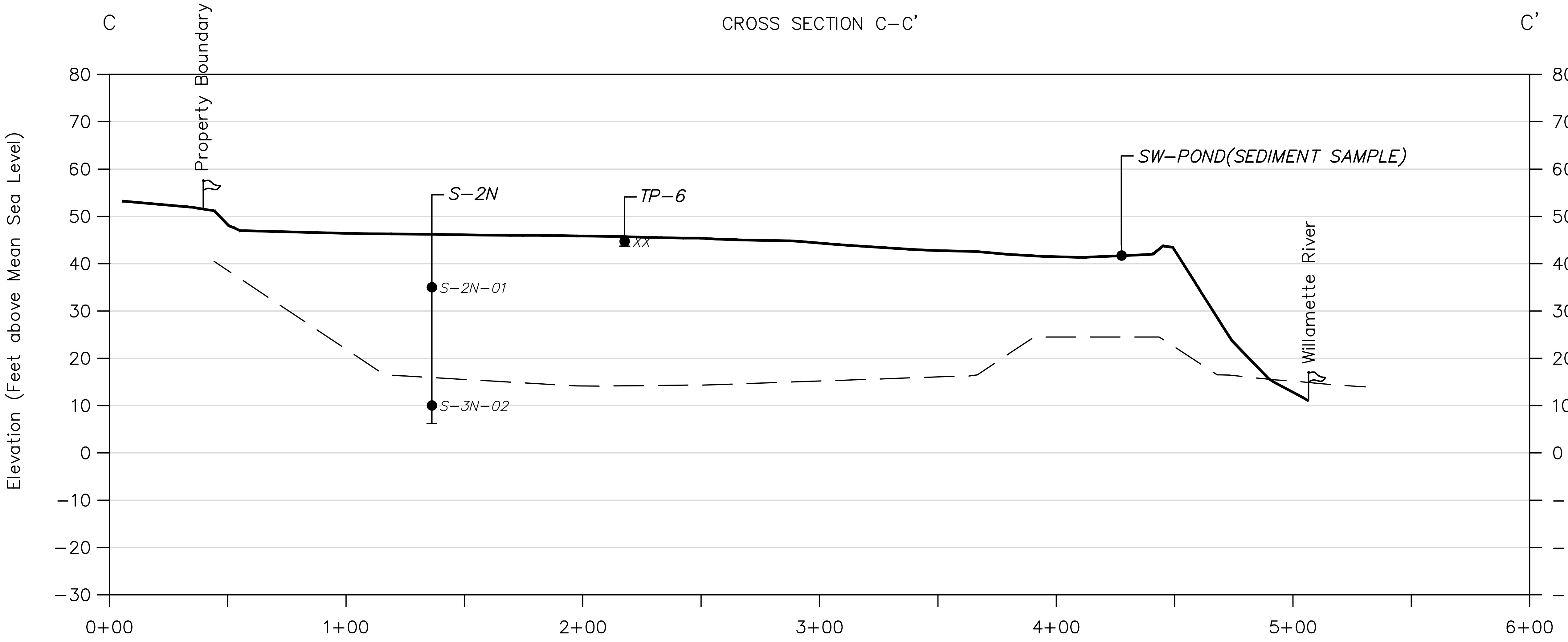

*LEGEND*

| | |
|---|---|
| ▬ | *EXISTING GROUND SURFACE* |
| — — | *PROPOSED GROUND SURFACE* |
| ● | *SAMPLE INTERVAL* |

*HORIZONTAL SCALE – 1"=50'*
*VERTICAL SCALE – 1"=25'*

| | |
|---|---|
| *DATE:* | *7–2–13* |
| *FILE:* | *4008–01* |
| *DRAWN:* | *JJT* |
| *APPROVED:* | *CWW* |
| *PROJECT NO.* | *4008–01* |
| *FIGURE NO.* | *9* |

*CROSS SECTION C–C'*

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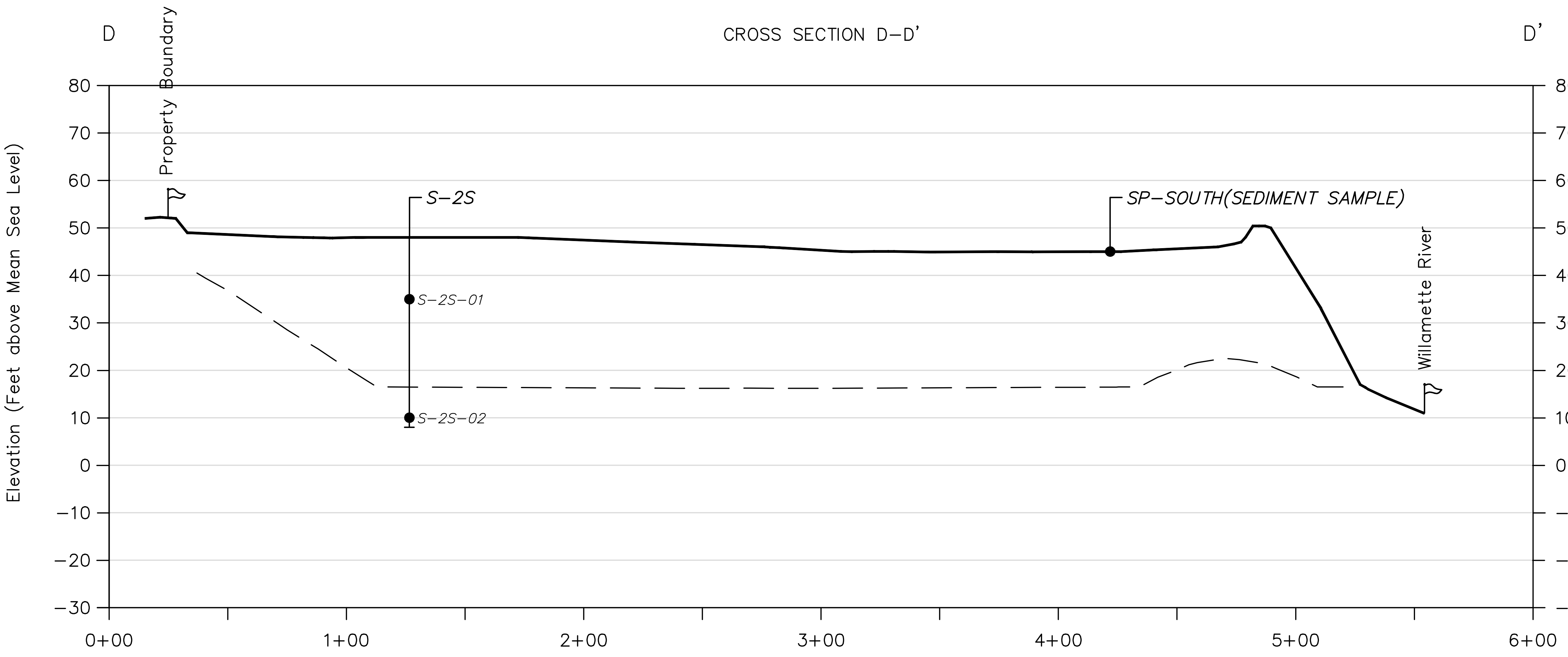

*LEGEND*

| | |
|---|---|
| ▬ | *EXISTING GROUND SURFACE* |
| — — | *PROPOSED GROUND SURFACE* |
| ● | *SAMPLE INTERVAL* |

*HORIZONTAL SCALE – 1"=50'*
*VERTICAL SCALE – 1"=25'*

| | |
|---|---|
| *DATE:* | *7–2–13* |
| *FILE:* | *4008–01* |
| *DRAWN:* | *JJT* |
| *APPROVED:* | *CWW* |
| *PROJECT NO.* | *4008–01* |
| *FIGURE NO.* | *10* |

*CROSS SECTION D–D'*

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# TABLES

# TABLE 1
## Stormwater Analytical Results - Volatile Organic Compounds (ug/L)
Restorcap - Linnton Plywood Site
Portland, Oregon

| Analyte | SW-1<br>6/12/2013 |
|---|---|
| Acetone | 20.0 U |
| Benzene | 0.250 U |
| Bromobenzene | 0.500 U |
| Bromochloromethane | 1.00 U |
| Bromodichloromethane | 1.00 U |
| Bromoform | 1.00 U |
| Bromomethane | 5.00 U |
| 2-Butanone (MEK) | 10.0 U |
| n-Butylbenzene | 1.00 U |
| sec-Butylbenzene | 1.00 U |
| tert-Butylbenzene | 1.00 U |
| Carbon tetrachloride | 0.500 U |
| Chlorobenzene | 0.500 U |
| Chloroethane | 5.00 U |
| Chloroform | 1.00 U |
| Chloromethane | 5.00 U |
| 2-Chlorotoluene | 1.00 U |
| 4-Chlorotoluene | 1.00 U |
| 1,2-Dibromo-3-chloropropane | 5.00 U |
| Dibromochloromethane | 1.00 U |
| 1,2-Dibromoethane (EDB) | 0.500 U |
| Dibromomethane | 1.00 U |
| 1,2-Dichlorobenzene | 0.500 U |
| 1,3-Dichlorobenzene | 0.500 U |
| 1,4-Dichlorobenzene | 0.500 U |
| Dichlorodifluoromethane | 1.00 U |
| 1,1-Dichloroethane | 0.500 U |
| 1,2-Dichloroethane (EDC) | 0.500 U |
| 1,1-Dichloroethene | 0.500 U |
| cis-1,2-Dichloroethene | 0.500 U |
| trans-1,2-Dichloroethene | 0.500 U |
| 1,2-Dichloropropane | 0.500 U |
| 1,3-Dichloropropane | 1.00 U |
| 2,2-Dichloropropane | 1.00 U |
| 1,1-Dichloropropene | 1.00 U |
| cis-1,3-Dichloropropene | 1.00 U |
| trans-1,3-Dichloropropene | 1.00 U |
| Ethylbenzene | 0.500 U |
| Hexachlorobutadiene | 5.00 U |
| 2-Hexanone | 10.0 U |
| Isopropylbenzene | 1.00 U |
| 4-Isopropyltoluene | 1.00 U |
| 4-Methyl-2-pentanone (MiBK) | 10.0 U |
| Methyl tert-butyl ether (MTBE) | 1.00 U |

# TABLE 1
## Stormwater Analytical Results - Volatile Organic Compounds (ug/L)
Restorcap - Linnton Plywood Site
Portland, Oregon

| Analyte | SW-1<br>6/12/2013 |
|---|---|
| Methylene chloride | 5.00 U |
| Naphthalene | 2.00 U |
| n-Propylbenzene | 0.500 U |
| Styrene | 1.00 U |
| 1,1,1,2-Tetrachloroethane | 0.500 U |
| 1,1,2,2-Tetrachloroethane | 0.500 U |
| Tetrachloroethene (PCE) | 0.500 U |
| Toluene | 1.00 U |
| 1,2,3-Trichlorobenzene | 2.00 U |
| 1,2,4-Trichlorobenzene | 2.00 U |
| 1,1,1-Trichloroethane | 0.500 U |
| 1,1,2-Trichloroethane | 1.00 U |
| Trichloroethene (TCE) | 0.500 U |
| Trichlorofluoromethane | 2.00 U |
| 1,2,3-Trichloropropane | 1.00 U |
| 1,2,4-Trimethylbenzene | 1.00 U |
| 1,3,5-Trimethylbenzene | 1.00 U |
| Vinyl chloride | 0.500 U |
| m,p-Xylene | 1.00 U |
| o-Xylene | 0.500 U |

**Notes:**

Volatile Organic Compounds by EPA Method 8260B

ug/L = Micrograms per liter

U = Undetected at method reporting limit shown

# TABLE 2
## Stormwater Analytical Results - Semivolatile Organic Compounds (ug/L)
Restorcap - Linnton Plywood Site
Portland, Oregon

| Analyte | SW-1<br>6/12/2013 | |
|---|---|---|
| Acenaphthene | 0.0192 | U |
| Acenaphthylene | 0.0192 | U |
| Anthracene | 0.0192 | U |
| Benz(a)anthracene | 0.0192 | U |
| Benzo(a)pyrene | 0.0288 | U |
| Benzo(b)fluoranthene | 0.0192 | U |
| Benzo(k)fluoranthene | 0.0192 | U |
| Benzo(g,h,i)perylene | 0.0192 | U |
| Chrysene | 0.0192 | U |
| Dibenz(a,h)anthracene | 0.0192 | U |
| Fluoranthene | 0.0192 | U |
| Fluorene | 0.0192 | U |
| Ideno(1,2,3-cd)pyrene | 0.0192 | U |
| 1-Methylnaphthalene | 0.0385 | U |
| 2-Methylnaphthalene | 0.0385 | U |
| Naphthalene | 0.0385 | U |
| Phenanthrene | 0.0206 | |
| Pyrene | 0.0192 | U |
| Carbazole | 0.0288 | U |
| Dibenzofuran | 0.0192 | U |
| 4-Chloro-3-methylphenol | 0.192 | U |
| 2-Chlorophenol | 0.0962 | U |
| 2,4-Dichlorophenol | 0.0962 | U |
| 2,4-Dimethylphenol | 0.0962 | U |
| 2,4-Dinitrophenol | 0.481 | U |
| 4,6-Dinitro-2-methylphenol | 0.481 | U |
| 2-Methylphenol | 0.0481 | U |
| 3+4-Methylphenol(s) | 0.0481 | U |
| 2-Nitrophenol | 0.192 | U |
| 4-Nitrophenol | 0.192 | U |
| Pentachlorophenol (PCP) | 0.385 | U |
| Phenol | 0.385 | U |
| 2,3,4,6-Tetrachlorophenol | 0.0962 | U |
| 2,4,5-Trichlorophenol | 0.0962 | U |
| 2,4,6-Trichlorophenol | 0.0962 | U |
| Bis(2-ethylhexyl)phthalate | 2.12 | U |
| Butyl benzyl phthalate | 2.88 | U |
| Diethylphthalate | 2.88 | U |
| Dimethylphthalate | 2.88 | U |
| Di-n-butylphthalate | 2.88 | U |
| Di-n-octylphthalate | 2.88 | U |
| N-Nitrosodimethylamine | 0.0481 | U |
| N-Nitroso-di-n-propylamine | 0.0481 | U |
| N-Nitrosodiphenylamine | 0.0481 | U |

## TABLE 2
## Stormwater Analytical Results - Semivolatile Organic Compounds (ug/L)
Restorcap - Linnton Plywood Site
Portland, Oregon

| Analyte | SW-1<br>6/12/2013 |
|---|---|
| Bis(2-Chloroethoxy)methane | 0.0481 U |
| Bis(2-Chloroethyl)ether | 0.0481 U |
| Bis(2-Chloroisopropyl)ether | 0.0481 U |
| Hexachlorobenzene | 0.0192 U |
| Hexachlorobutadiene | 0.0481 U |
| Hexachlorocyclopentadiene | 0.0962 U |
| Hexachloroethane | 0.0481 U |
| 2-Chloronaphthalene | 0.0192 U |
| 1,2-Dichlorobenzene | 0.0481 U |
| 1,3-Dichlorobenzene | 0.0481 U |
| 1,4-Dichlorobenzene | 0.0481 U |
| 1,2,4-Trichlorobenzene | 0.0481 U |
| 4-Bromophenyl phenyl ether | 0.0481 U |
| 4-Chlorophenyl phenyl ether | 0.0481 U |
| Aniline | 0.0962 U |
| 4-Chloroaniline | 0.0481 U |
| 2-Nitroaniline | 0.385 U |
| 3-Nitroaniline | 0.385 U |
| 4-Nitroaniline | 0.385 U |
| Nitrobenzene | 0.192 U |
| 2,4-Dinitrotoluene | 0.192 U |
| 2,6-Dinitrotoluene | 0.192 U |
| Benzoic acid | 2.40 U |
| Benyl alcohol | 0.192 U |
| Isophorone | 0.0481 U |
| 3,3'-Dichlorobenzidine | 0.192 U |

**Notes:**

Semivolatile Organic Compounds by EPA Method 8270D

ug/L = Micrograms per liter

U = Undetected at method reporting limit shown

# TABLE 3
## Stormwater Analytical Results - Polychlorinated Biphenyls (PCBs) (ug/L)
Restorcap - Linnton Plywood Site
Portland, Oregon

| Analyte | SW-1<br>6/12/2013 |
|---|---|
| Aroclor 1016 | 0.0980 U |
| Aroclor 1221 | 0.0980 U |
| Aroclor 1232 | 0.0980 U |
| Aroclor 1242 | 0.0980 U |
| Aroclor 1248 | 0.0980 U |
| Aroclor 1254 | 0.0980 U |
| Aroclor 1260 | 0.0980 U |

**Notes:**

Polychlorinated Biphenyls by EPA 8082A

ug/L = Micrograms per liter

U = Undetected at method reporting limit shown

# TABLE 4
## Stormwater Analytical Results - Fuels and Conventional Parameters
Restorcap - Linnton Plywood Site
Portland, Oregon

| Analyte | Method | Units | SW-1<br>6/12/2013 |
|---|---|---|---|
| Gasoline Range Hydrocarbons | NWTPH-HCID | ug/L | 94.3 U |
| Diesel Range Hydrocarbons | NWTPH-HCID | ug/L | 236 U |
| Oil Range Hydrocarbons | NWTPH-HCID | ug/L | 236 U |
| Oil & Grease | EPA 1664 | mg/L | 5.05 U |
| Chloride | EPA 300.0 | mg/L | 3.06 |
| Fluoride | EPA 300.0 | mg/L | 1.00 U |
| Sulfate | EPA 300.0 | mg/L | 5.08 |
| Nitrate + Nitrite Nitrogen | EPA 353.2 | mg/L | 1.22 |
| Total Cyanide | EPA 335.4 | mg/L | 0.005 U |
| Residual Chlorine | SM4500CL-G | mg/L | 0.030 |
| pH | EPA 150.1 | S.U. | 6.67 |
| Temperature | EPA 150.1 | degrees C | 21.7 |
| Biochemical Oxygen Demand (5 Day) | SM 5210B | mg/L | 4.0 U |
| Orthophosphate Phosphorous | SM4500 P E | mg/L | 0.020 |
| Turbidity | EPA 180.1 | NTU | 7.0 |
| Phosphorus | SM 4500 P B | mg/L | 0.100 U |
| Total Suspended Solids | SM 2540 D | mg/L | 5.0 U |
| Total Dissolved Solids | SM 2540 C | mg/L | 61.0 |
| Chemical Oxygen Demand | EPA 410.4 | mg/L | 10.0 U |
| Total Organic Carbon | SM 5310 B | mg/L | 2.27 |
| Conductivity | SM 2510 B | umhos/cm | 75.0 |
| Total Alkalinity | SM 2320 B | mg CaCO3/L | 20.2 |
| Bicarbonate Alkalinity | SM 2320 B | mg CaCO3/L | 20.2 |
| Carbonate Alkalinity | SM 2320 B | mg CaCO3/L | 17.5 U |
| Hydroxide Alkalinity | SM 2320 B | mg CaCO3/L | 17.5 U |
| Phenolics | EPA 420.4 | mg/L | 0.010 U |
| Ammonia as N | EPA 350.1 | mg/L | 0.10 U |
| Total Kjeldahl Nitrogen (TKN) | EPA 351.2 | mg/L | 0.10 U |
| Hardness | EPA 6020 (calc) | mg CaCO3/L | 24.2 |
| Aluminum | EPA 6020A | mg/L | 0.212 |
| Antimony | EPA 6020A | mg/L | 0.001 U |
| Arsenic | EPA 6020A | mg/L | 0.002 U |
| Barium | EPA 6020A | mg/L | 0.018 |
| Beryllium | EPA 6020A | mg/L | 0.001 U |
| Cadmium | EPA 6020A | mg/L | 0.001 U |
| Calcium | EPA 6020A | mg/L | 6.16 |
| Chromium | EPA 6020A | mg/L | 0.002 U |
| Cobalt | EPA 6020A | mg/L | 0.001 U |
| Copper | EPA 6020A | mg/L | 0.002 U |
| Iron | EPA 6020A | mg/L | 1.05 |
| Lead | EPA 6020A | mg/L | 0.001 U |
| Magnesium | EPA 6020A | mg/L | 2.14 |
| Manganese | EPA 6020A | mg/L | 0.0753 |
| Mercury | EPA 6020A | mg/L | 0.00008 U |
| Nickel | EPA 6020A | mg/L | 0.002 U |
| Potassium | EPA 6020A | mg/L | 0.927 |

# TABLE 4
## Stormwater Analytical Results - Fuels and Conventional Parameters
Restorcap - Linnton Plywood Site
Portland, Oregon

| Analyte | Method | Units | SW-1<br>6/12/2013 |
|---|---|---|---|
| Selenium | EPA 6020A | mg/L | 0.002 U |
| Silver | EPA 6020A | mg/L | 0.001 U |
| Thallium | EPA 6020A | mg/L | 0.001 U |
| Vanadium | EPA 6020A | mg/L | 0.002 U |
| Zinc | EPA 6020A | mg/L | 0.00464 |
| Sodium | EPA 6020A | mg/L | 4.27 |
| Temperature | Field measurement | degrees C | 13.76 |
| Dissolved Oxygen (DO) | Field measurement | mg/L | 9.45 |
| pH | Field measurement | S.U. | 6.04 |
| Oxidation Reduction Potential (ORP) | Field measurement | mV | 72.6 |
| Conductivity | Field measurement | u/cm | 0.062 |

**Notes:**

ug/L = Micrograms per liter

mg/L = Milligrams per liter

U = Undetected at method reporting limit shown

# TABLE 5
## Preliminary Sediment Screening
Linnton Plywood
Portland, Oregon

| | Sample | JSCS Screening Levels (7/16/07 revision) | | GP-13-01 | GP-13-02 (Deep) | HA-9-01 | HA-9-02 | S-8-04 | S-8-05 (Deep) | HA-8-01 | GP-5-01 | GP-5-02 (Deep) | TP-5-01 | TP-5-02 | GP-7-01 | GP-7-02 (Deep) | S-2N-01 | S-2N-02 (Deep) | TP-6-01 | TP-6-02 | SP-Pond | TP-4-01 | TP-4-02 | SP-North | S-2S-01 | S-2S-02 (Deep) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Depth (feet) | MacDonald PECs and other SQVs | DEQ 2007 Bioaccumulative Sediment SLVs | 5 to 10 | 34 to 39 | 0 to 1 | 1 to 2 | 27.5 to 29 | 38 to 40 | 1 to 2 | 25 to 30 | 32 to 37 | 2 to 7 | 14 to 15 | 10 to 15 | 26 to 31 | 15 to 17.5 | 37.5 to 41 | 1 | 1 | NA | 2.8 to 7 | 14 to 15 | NA | 10 to 12.5 | 37.5 to 40 |
| | Cross section | | | A-A' | A-A' | A-A' | A-A' | A-A' | A-A' | B-B' | B-B' | B-B' | B-B' | B-B' | B-B' | B-B' | C-C' | C-C' | C-C' | C-C' | C-C' | - | - | - | D-D' | D-D' |
| | Analyte | Toxicity | Bioaccumulation | | | | | | | | | | | | | | | | | | | | | | | |
| Metals | TCLP Arsenic | NA | NA | - | - | - | - | - | - | - | ND | ND | 19 J | ND | ND | ND | ND | ND | ND | ND | ND | - | - | ND | 19.5 J | ND |
| | TCLP Barium | NA | NA | - | - | - | - | - | - | - | 384 J | 341 J | 717 | 728 | 764 | 410 J | 601 | 29 J | 2,380 | 1,080 | 1,110 | - | - | 788 | 530 | 316 J |
| | TCLP Cadmium | NA | NA | - | - | - | - | - | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | 14 J | ND | ND |
| | TCLP Lead | NA | NA | - | - | - | - | - | - | - | ND | ND | 82.5 | 6 J | ND | ND | ND | ND | ND | ND | ND | - | - | ND | 9.50 J | ND |
| | Total Metals | varies | varies | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| PCBs | Aroclor 1254 | 300 | NA | ND | ND | - | - | ND | ND | ND | ND | ND | ND | ND | 3.33 J | ND | - | - | - | - | 33.7 | - | - | 46.4 | ND | ND |
| | Aroclor 1260 | 200 | NA | ND | ND | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | - | ND | - | - | ND | 27.2 | ND |
| | Total PCBs | 676 | 0.39 | ND | ND | - | - | ND | ND | ND | ND | ND | ND | ND | 3.33 J | ND | ND | ND | - | - | 33.7 | - | - | 46.4 | 27.2 | ND |
| VOCs | 1,2,4-Trimethylbenzene | NA | NA | - | - | - | - | 61.4 J | ND | ND | ND | ND | 72.7 J | ND | - | - | - | - | - | - | - | - | - | - | - | - |
| | Naphthalene | 561 | NA | - | - | - | - | ND | ND | ND | ND | ND | ND | ND | - | - | - | - | - | - | - | - | 112 J | - | - | - |
| | Benzene | NA | NA | - | - | - | - | ND | ND | ND | ND | ND | 18.4 J | ND | - | - | - | - | - | - | - | - | - | - | | |
| | Toluene | NA | NA | - | - | - | - | ND | ND | ND | ND | ND | ND | ND | - | - | - | - | - | - | - | - | - | - | - | - |
| | Other VOCs | varies | varies | - | - | - | - | ND | ND | ND | ND | ND | ND | ND | - | - | - | - | - | - | - | ND | ND | - | - | - |
| SVOCs | 3+4-Methylphenol(s) | NA | NA | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | ND | - | 208 J | ND |
| | Other SVOCs | varies | varies | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | ND | - | ND | ND |
| PAHs | 1-Methylnaphthalene | NA | NA | - | - | ND | Nd | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | ND | - | 97.7 J | ND |
| | 2-Methylnaphthalene | 200 | NA | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | ND | - | 221 | ND |
| | Acenaphthene | 300 | NA | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | ND | ND | ND | - | - | - | ND | ND | - | 313 | ND |
| | Acenapthylene | 200 | NA | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | ND | ND | ND | - | - | - | 8.59 J | 63.7 J | - | 64.9 J | ND |
| | Anthracene | 845 | NA | - | - | ND | 37.3 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | 59.9 J | - | 195 | ND |
| | Benzo(a)anthracene | 1,050 | NA | - | - | 173 J | 89.1 | ND | ND | 247 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 52.5 | 486 | - | 412 | ND |
| | Benzo(a)pyrene | 1,450 | NA | - | - | ND | 166 | ND | ND | 570 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 102 | 949 | - | 662 | ND |
| | Benzo(b)fluoranthene | NA | NA | - | - | ND | 161 | ND | ND | 592 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 109 | 1,120 | - | 578 | ND |
| | Benzo(k)fluoranthene | 13,000 | NA | - | - | ND | 50.9 J | ND | ND | 161 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 32.9 | 338 | - | 192 | ND |
| | Benzo(g,h,i)perylene | 300 | NA | - | - | ND | 180 | ND | ND | 703 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 121 | 1,160 | - | 552 | ND |
| | Chrysene | 1,290 | NA | - | - | ND | 127 | ND | ND | 501 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 84 | 647 | - | 572 | ND |
| | Dibenzo(a,h)anthracene | 1,300 | NA | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 14.1 J | 140 | - | 79.8 J | ND |
| | Fluoranthene | 2,230 | 37,000 | - | - | 206 J | 287 | 3.58 J | ND | 998 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 117 | 663 | - | 1,480 | ND |
| | Fluorene | 536 | NA | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | ND | ND | ND | - | - | - | ND | ND | - | 236 | ND |
| | Ideno(1,2,3-cd)pyrene | 100 | NA | - | - | ND | 125 | ND | ND | 507 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 101 | 942 | - | 434 | ND |
| | Naphthalene | 561 | NA | - | - | ND | 167 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | 112 | - | 489 | ND |
| | Phenanthrene | 1,170 | NA | - | - | 179 J | 239 | 3.49 J | ND | 616 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 43.5 | 250 | - | 1,510 | ND |
| | Pyrene | 1,520 | 1,900 | - | - | 227 J | 324 | 2.82 J | ND | 1,150 | ND | ND | ND | 18 | ND | ND | ND | ND | - | - | - | 154 | 882 | - | 1,680 | ND |
| | Other PAHs | varies | varies | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | ND | - | ND | ND |
| Phthalates | Phthalates | varies | varies | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | ND | - | ND | ND |
| Petroleum Hydrocarbons | Gasoline | NA | NA | - | - | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | ND | - | ND | ND |
| | Diesel | NA | NA | - | - | - | - | ND | ND | 25,000 | ND | ND | 581,000 J | ND | ND | ND | ND | ND | - | - | - | ND | 25,100 J | - | 124,000 | ND |
| | Heavy Oil | NA | NA | - | - | - | - | ND | ND | 239,000 | ND | ND | 4,040,000 | ND | ND | ND | ND | ND | - | - | - | ND | 412,000 | - | 345,000 | ND |

NOTES:
- = Not Analyzed
Units = ug/kg, except for TCLP metals which are in ug/L
NA = Not Available
ND = None detected

## TABLE 6
## Preliminary Upland Screening
Linnton Plywood
Portland, Oregon

| Sample | | Risk-Based Concentrations | | Level II Screening Levels | GP-13-01 | GP-13-02 (Deep) | HA-9-01 | HA-9-02 | S-8-04 | S-8-05 (Deep) | HA-8-01 | GP-5-01 | GP-5-02 (Deep) | TP-5-01 | TP-5-02 | GP-7-01 | GP-7-02 (Deep) | S-2N-01 | S-2N-02 (Deep) | TP-6-01 | TP-6-02 | SP-Pond | TP-4-01 | TP-4-02 | SP-North | S-2S-01 | S-2S-02 (Deep) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depth (feet) | | Soil Ingestion, Dermal Contact, and Inhalation | | | 5 to 10 | 34 to 39 | 0 to 1 | 1 to 2 | 27.5 to 29 | 38 to 40 | 1 to 2 | 25 to 30 | 32 to 37 | 2 to 7 | 14 to 15 | 10 to 15 | 26 to 31 | 15 to 17.5 | 37.5 to 41 | 1 | 1 | NA | 2.8 to 7 | 14 to 15 | NA | 10 to 12.5 | 37.5 to 40 |
| Cross section | | | | | A-A' | A-A' | A-A' | A-A' | A-A' | A-A' | B-B' | B-B' | B-B' | B-B' | B-B' | B-B' | B-B' | C-C' | C-C' | C-C' | C-C' | C-C' | - | - | - | D-D' | D-D' |
| | Analyte | Occupational[a] | Excavation Worker[b] | Terrestrial Receptors[c] | | | | | | | | | | | | | | | | | | | | | | | |
| Metals | TCLP Arsenic | - | - | - | - | - | - | - | - | - | - | ND | ND | 19 J | ND | ND | ND | ND | ND | ND | ND | ND | - | - | ND | 19.5 J | ND |
| | TCLP Barium | - | - | - | - | - | - | - | - | - | - | 384 J | 341 J | 717 | 728 | 764 | 410 J | 601 | 29 J | 2,380 | 1,080 | 1,110 | - | - | 788 | 530 | 316 J |
| | TCLP Cadmium | - | - | - | - | - | - | - | - | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | 14 J | ND | ND |
| | TCLP Lead | - | - | - | - | - | - | - | - | - | - | ND | ND | 82.5 | 6 J | ND | ND | ND | ND | ND | ND | ND | - | - | ND | 9.50 J | ND |
| | Total Metals | varies | varies | varies | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| PCBs | Aroclor 1254 | NA | NA | 700 | ND | ND | - | - | ND | ND | ND | ND | ND | ND | ND | 3.33 J | ND | - | - | - | - | 33.7 | - | - | 46.4 | ND | ND |
| | Aroclor 1260 | NA | NA | NA | ND | ND | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | - | ND | - | - | ND | 27.2 | ND |
| | Total PCBs | 560 | 120,000 | 4,000 | ND | ND | - | - | ND | ND | ND | ND | ND | ND | ND | 3.33 J | ND | ND | ND | - | - | 33.7 | - | - | 46.4 | 27.2 | ND |
| VOCs | 1,2,4-Trimethylbenzene | 2,000,000 | 54,000,000 | NA | - | - | - | - | 61.4 J | ND | ND | ND | ND | 72.7 J | ND | - | - | - | - | - | - | - | - | - | - | - | - |
| | Naphthalene | 23,000 | 16,000,000 | 10,000 | - | - | - | - | ND | ND | ND | ND | ND | ND | ND | - | - | - | - | - | - | - | - | 112 J | - | - | - |
| | Benzene | 34,000 | 9,500,000 | 3,300,000 | - | - | - | - | ND | ND | ND | ND | ND | 18.4 J | ND | - | - | - | - | - | - | - | - | - | - | | |
| | Toluene | 77,000,000 | 680,000,000 | 200,000 | - | - | - | - | ND | ND | ND | ND | ND | ND | ND | - | - | - | - | - | - | - | - | - | - | - | - |
| | Other VOCs | varies | varies | varies | - | - | - | - | ND | ND | ND | ND | ND | ND | ND | - | - | - | - | - | - | - | ND | ND | - | - | - |
| SVOCs | 3+4-Methylphenol(s) | NA | NA | NA | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | ND | - | 208 J | ND |
| | Other SVOCs | varies | varies | NA | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | ND | - | ND | ND |
| PAHs | 1-Methylnaphthalene | NA | NA | NA | - | - | ND | Nd | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | ND | - | 97.7 J | ND |
| | 2-Methylnaphthalene | NA | NA | NA | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | ND | - | 221 | ND |
| | Acenaphthene | 61,000,000 | 520,000,000 | 20,000 | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | ND | ND | ND | - | - | - | ND | ND | - | 313 | ND |
| | Acenapthylene | | | NA | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | ND | ND | ND | - | - | - | 8.59 J | 63.7 J | - | 64.9 J | ND |
| | Anthracene | 310,000,000 | >Max | NA | - | - | ND | 37.3 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | 59.9 J | - | 195 | ND |
| | Benz(a)anthracene | 2,700 | 590,000 | NA | - | - | 173 J | 89.1 | ND | ND | 247 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 52.5 | 486 | - | 412 | ND |
| | Benzo(a)pyrene | 270 | 59,000 | 125,000 | - | - | ND | 166 | ND | ND | 570 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 102 | 949 | - | 662 | ND |
| | Benzo(b)fluoranthene | 2,700 | 590,000 | NA | - | - | ND | 161 | ND | ND | 592 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 109 | 1,120 | - | 578 | ND |
| | Benzo(k)fluoranthene | 27,000 | 5,900,000 | NA | - | - | ND | 50.9 J | ND | ND | 161 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 32.9 | 338 | - | 192 | ND |
| | Benzo(g,h,i)perylene | NA | NA | NA | - | - | ND | 180 | ND | ND | 703 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 121 | 1,160 | - | 552 | ND |
| | Chrysene | 250,000 | 57,000,000 | NA | - | - | ND | 127 | ND | ND | 501 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 84 | 647 | - | 572 | ND |
| | Dibenz(a,h)anthracene | 270 | 59,000 | NA | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 14.1 J | 140 | - | 79.8 J | ND |
| | Fluoranthene | 29,000,000 | 250,000,000 | NA | - | - | 206 J | 287 | 3.58 J | ND | 998 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 117 | 663 | - | 1,480 | ND |
| | Fluorene | 41,000,000 | 340,000,000 | 30,000 | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | ND | ND | ND | - | - | - | ND | ND | - | 236 | ND |
| | Ideno(1,2,3-cd)pyrene | 2,700 | 590,000 | NA | - | - | ND | 125 | ND | ND | 507 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 101 | 942 | - | 434 | ND |
| | Naphthalene | 23,000 | 16,000,000 | 10,000 | - | - | ND | 167 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | 112 | - | 489 | ND |
| | Phenanthrene | NA | NA | NA | - | - | 179 J | 239 | 3.49 J | ND | 616 | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | 43.5 | 250 | - | 1,510 | ND |
| | Pyrene | 21,000 | 190,000 | NA | - | - | 227 J | 324 | 2.82 J | ND | 1,150 | ND | ND | ND | 18 | ND | ND | ND | ND | - | - | - | 154 | 882 | - | 1,680 | ND |
| | Other PAHs | varies | varies | varies | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | ND | - | ND | ND |
| Phthalates | Phthalates | varies | varies | varies | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | ND | - | ND | ND |
| Petroleum Hydrocarbons | Gasoline | 20,000,000 | >Max | NA | - | - | - | - | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | - | - | - | ND | ND | - | ND | ND |
| | Diesel | 14,000,000 | >Max | NA | - | - | - | - | ND | ND | 25,000 | ND | ND | 581,000 J | ND | ND | ND | ND | ND | - | - | - | ND | 25,100 J | - | 124,000 | ND |
| | Heavy Oil | 14,000,000 | >Max | NA | - | - | - | - | ND | ND | 239,000 | ND | ND | 4,040,000 | ND | ND | ND | ND | ND | - | - | - | ND | 412,000 | - | 345,000 | ND |

**NOTES:**

[a] = Department of Environmental Quality (DEQ), Risk-Based Concentrations (RBCs) for Soil ingestion, dermal contact, and inhalation in an occupational setting (revised June 7, 2012)

[b] = DEQ, RBCs for Soil ingestion, dermal contact, and inhalation for an excavation worker (revised June 7, 2012)

[c] = DEQ, Level II Screening Levels, Guidance for Ecological Risk Assessment, terrestrial receptors lowest value, Table 1 (December 2001)

- = Not Analyzed
Units = ug/kg, except for TCLP metals which are in ug/L
NA = Not Available
ND = None Detected

# Attachment A

## Linnton Mill Site Proposed Habitat - July 1, 2013 (Grette Associates)

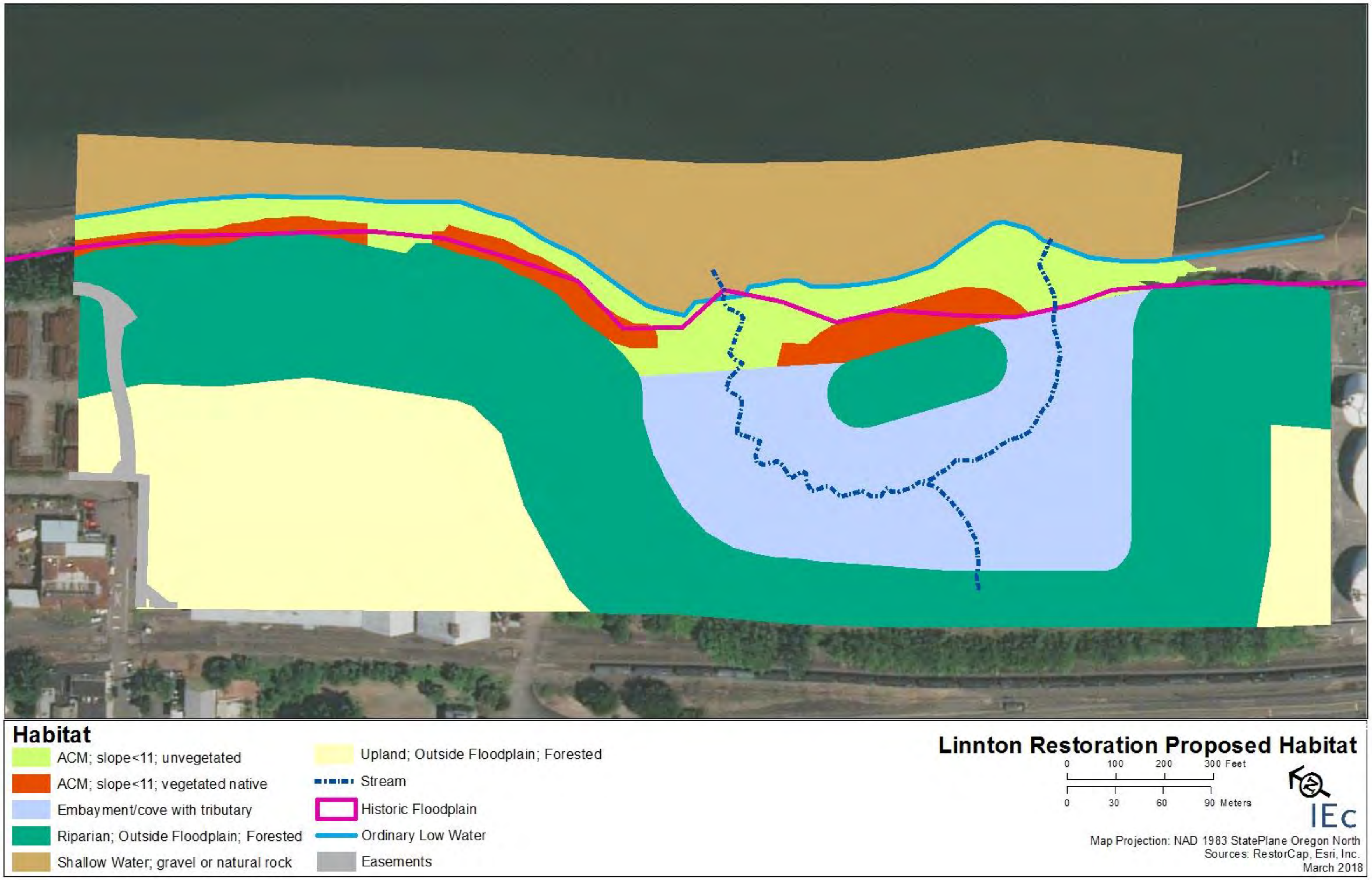

**Figure 2b. Linnton Mill Site Habitat Restored Conditions**

# Attachment B

## City of Portland Stormwater Maps

PortlandMaps

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**10504 NW ST HELENS RD - LINNTON - PORTLAND**

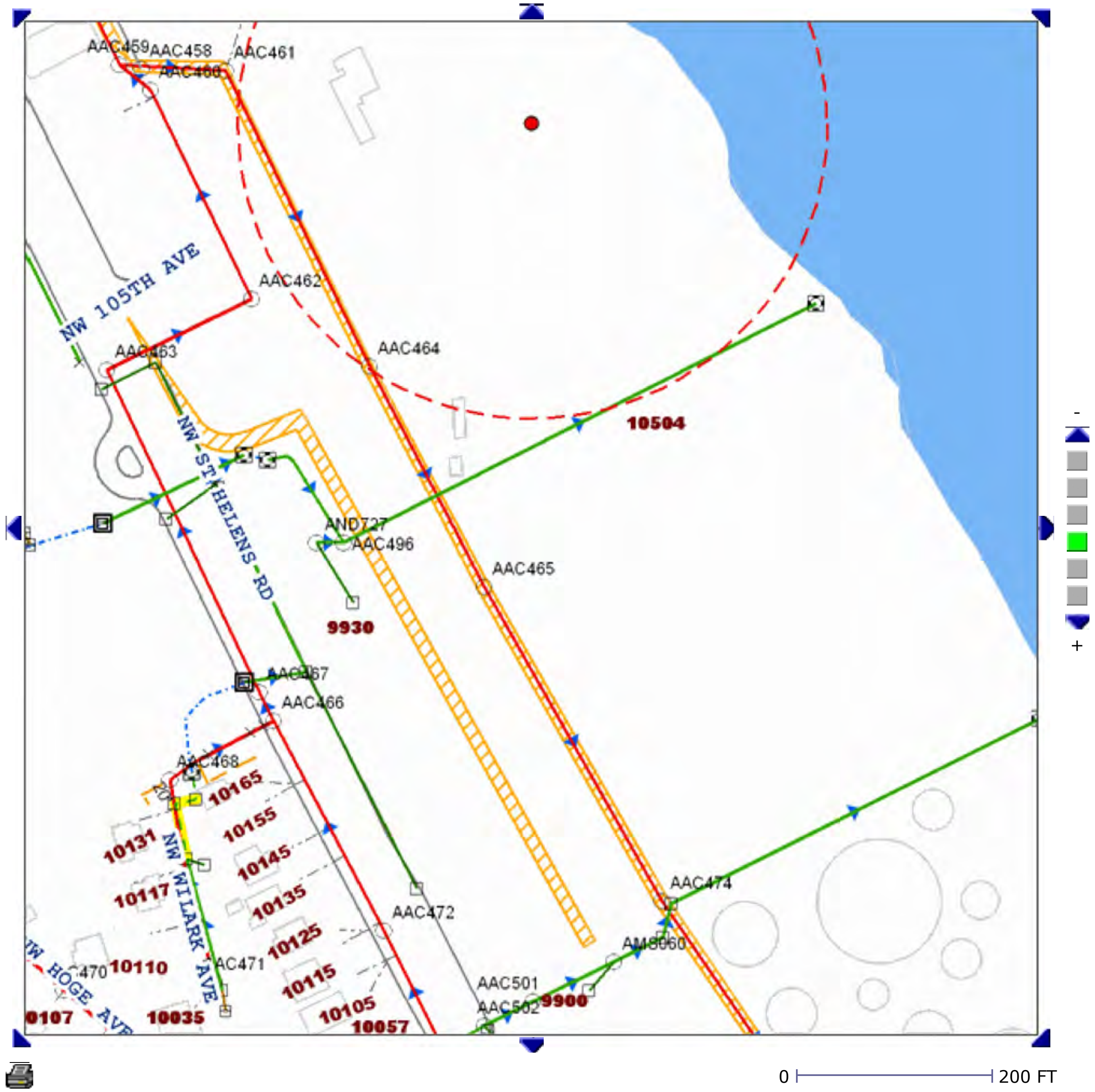
Explorer | Property | Maps | Projects | Crime | Census | **Environmental** | Transportation

**Sewer** | Natural Resources | Stormwater Incentives | Stormwater Management | Watershed

## Sewer Assets

Contact the Bureau of Environmental Services

Long -122.78241 Lat 45.59745



- 🏭 TREATMENT PLANTS
- ⊠ PUMP STATIONS
- ● CLEANOUTS
- ○ MANHOLES
- ⊠ DISCHARGE POINTS
- ◉ DIVERSIONS
- ☐ INLETS
- ⊕ OUTFALL
- ◎ SEDIMENTATION MANHOLES
- ▣ STORAGE
- ⊞ SUMPS
- ▤ TRASH RACK
- ⊡ WATERWAY FEATURES
- ◇ FLOW CONTROL
- ✕ NO ACCESS POINTS
- 🟥 SANITARY GRAVITY MAIN
- 🟪 COMBINED GRAVITY MAIN
- 🟩 STORM GRAVITY MAIN
- SANITARY PRESSURE MAIN
- COMBINED PRESSURE MAIN
- STORM PRESSURE MAIN
- INLETS
- INLET LEADS
- CULVERT
- CONSTRUCTED CHANNEL
- FRENCH DRAIN
- DITCH
- NATURAL CHANNEL
- POLLUTION REDUCTION FAC.
- CONNECTION
- LATERALS
- ABANDONED MAIN
- 🟨 ★ Note - All pipes which have this yellow undertone are under construction and not as-built
- EASEMENTS

Assets (5) | As-Builts (1) | Easements (1) | SEWPER (0) | Historic Sewer Boards (3)

Sewer Nodes

| ID | Description | System | File(s) | Distance |
|---|---|---|---|---|
| XXXXXX | JOB NUMBER | MISC | | 269' |
| AAC464 | MANHOLES | SEWER | | 346' |

Sewer Segments

| ID | Description | System | File(s) | Distance |
|---|---|---|---|---|
| AAC461 AAC464 | SANITARY GRAVITY MAIN | SEWER | | 300' |
| AAC496 AAC497 | STORM GRAVITY MAIN | STORM | | 359' |
| AAC464 AAC465 | SANITARY GRAVITY MAIN | SEWER | | 436' |

City of Portland, Corporate GIS 7/1/2013

THE GIS APPLICATIONS ACCESSED THROUGH THIS WEB SITE PROVIDE A VISUAL DISPLAY OF DATA FOR YOUR CONVENIENCE. EVERY REASONABLE EFFORT HAS BEEN MADE TO ASSURE THE ACCURACY OF THE MAPS AND ASSOCIATED DATA. THE CITY OF PORTLAND MAKES NO WARRANTY, REPRESENTATION OR GUARANTEE AS TO THE CONTENT, SEQUENCE, ACCURACY, TIMELINESS OR COMPLETENESS OF ANY OF THE DATA PROVIDED HEREIN. THE USER OF THESE APPLICATIONS SHOULD NOT RELY ON THE DATA PROVIDED HEREIN FOR ANY REASON. THE CITY OF PORTLAND EXPLICITLY DISCLAIMS ANY REPRESENTATIONS AND WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE CITY OF PORTLAND SHALL ASSUME NO LIABILITY FOR ANY ERRORS, OMISSIONS, OR INACCURACIES IN THE INFORMATION PROVIDED REGARDLESS OF HOW CAUSED. THE CITY OF PORTLAND SHALL ASSUME NO LIABILITY FOR ANY DECISIONS MADE OR ACTIONS TAKEN OR NOT TAKEN BY THE USER OF THE APPLICATIONS IN RELIANCE UPON ANY INFORMATION OR DATA FURNISHED HEREUNDER. FOR UPDATED INFORMATION ABOUT THE MAP DATA ON PORTLANDMAPS PLEASE REFER TO CITY'S METADATA. FOR QUESTIONS ABOUT ASSESSMENT INFORMATION PLEASE CONTACT THE COUNTY ASSESSORS OFFICE IN YOUR COUNTY.

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**10504 NW ST HELENS RD - LINNTON - PORTLAND**

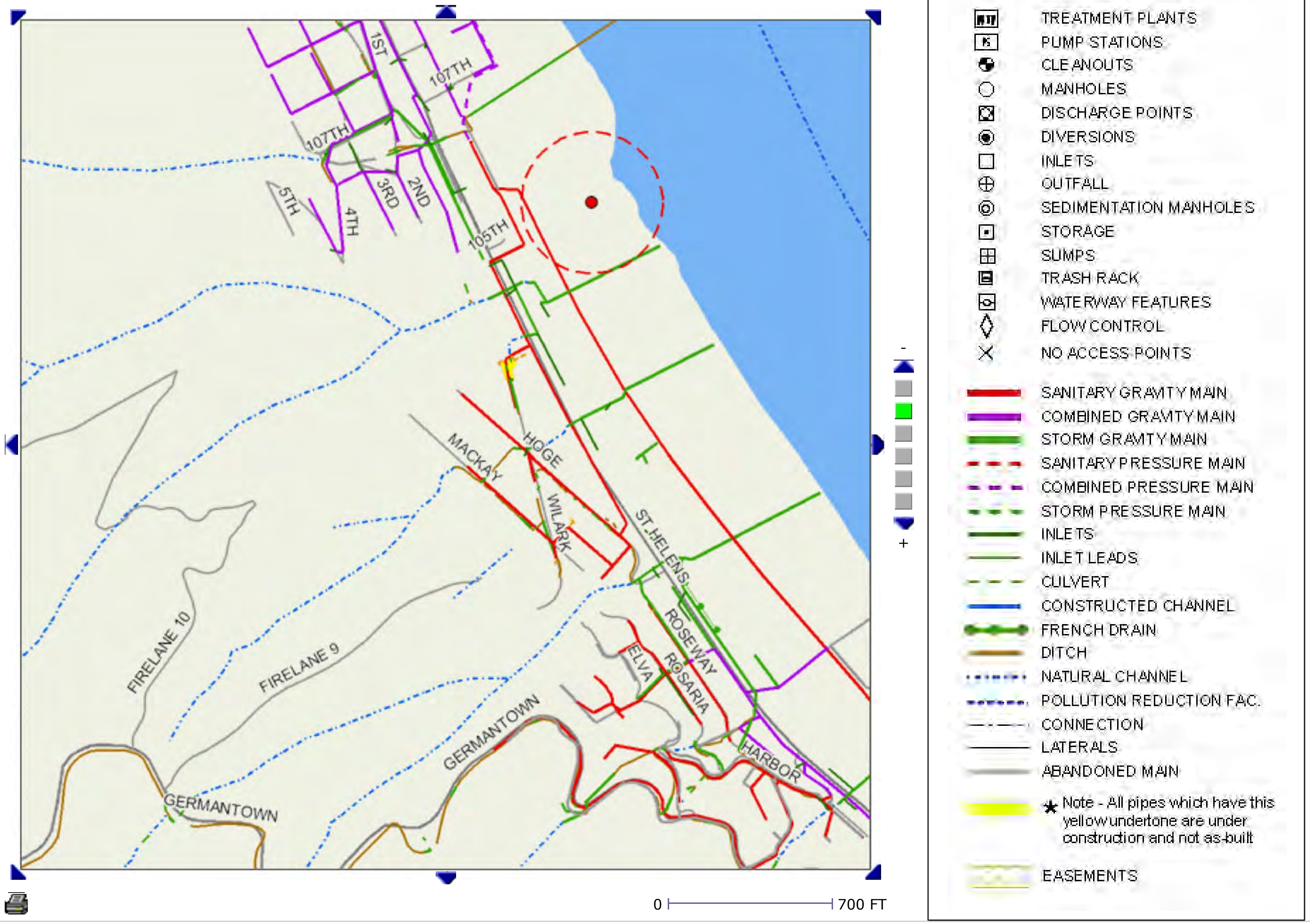
Explorer | Property | Maps | Projects | Crime | Census | **Environmental** | Transportation

**Sewer** | Natural Resources | Stormwater Incentives | Stormwater Management | Watershed

## Sewer Assets

Contact the Bureau of Environmental Services

Long -122.78241 Lat 45.59745



Assets (5) | As-Builts (1) | Easements (1) | SEWPER (0) | Historic Sewer Boards (3)

Sewer Nodes

| ID | Description | System | File(s) | Distance |
|---|---|---|---|---|
| XXXXXX | JOB NUMBER | MISC | | 269' |
| AAC464 | MANHOLES | SEWER | | 346' |

Sewer Segments

| ID | Description | System | File(s) | Distance |
|---|---|---|---|---|
| AAC461 AAC464 | SANITARY GRAVITY MAIN | SEWER |  | 300' |
| AAC496 AAC497 | STORM GRAVITY MAIN | STORM |  | 359' |
| AAC464 AAC465 | SANITARY GRAVITY MAIN | SEWER |  | 436' |

City of Portland, Corporate GIS
7/1/2013

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# Attachment C

## Laboratory Analytical Report

Apex Labs

**12232 S.W. Garden Place**
**Tigard, OR 97223**
**503-718-2323 Phone**
**503-718-0333 Fax**

Monday, July 1, 2013

Chris Rhea
EES Environmental Inc
240 N Broadway Ste 203
Portland, OR 97227

RE: Restorcap / 4008-01

Enclosed are the results of analyses for work order A3F0244, which was received by the laboratory on 6/12/2013 at 1:00:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| **SW-1** | A3F0244-01 | Water | 06/12/13 10:50 | 06/12/13 13:00 |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## ANALYTICAL SAMPLE RESULTS

### Hydrocarbon Identification Screen by NWTPH-HCID

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01)** | | | **Matrix: Water** | | **Batch: 3060396** | | | |
| Gasoline Range Organics | ND | --- | 0.0943 | mg/L | 1 | 06/14/13 22:50 | NWTPH-HCID | |
| Diesel Range Organics | ND | --- | 0.236 | " | " | " | " | |
| Oil Range Organics | ND | --- | 0.236 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 96 %* | *Limits: 50-150 %* | " | " | " | |

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Philip Nerenberg

Philip Nerenberg, Lab Director

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## ANALYTICAL SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01)** | | | **Matrix: Water** | | **Batch: 3060390** | | | |
| Acetone | ND | --- | 20.0 | ug/L | 1 | 06/14/13 16:06 | EPA 8260B | |
| Benzene | ND | --- | 0.250 | " | " | " | " | |
| Bromobenzene | ND | --- | 0.500 | " | " | " | " | |
| Bromochloromethane | ND | --- | 1.00 | " | " | " | " | |
| Bromodichloromethane | ND | --- | 1.00 | " | " | " | " | |
| Bromoform | ND | --- | 1.00 | " | " | " | " | |
| Bromomethane | ND | --- | 5.00 | " | " | " | " | ESTa |
| 2-Butanone (MEK) | ND | --- | 10.0 | " | " | " | " | |
| n-Butylbenzene | ND | --- | 1.00 | " | " | " | " | |
| sec-Butylbenzene | ND | --- | 1.00 | " | " | " | " | |
| tert-Butylbenzene | ND | --- | 1.00 | " | " | " | " | |
| Carbon tetrachloride | ND | --- | 0.500 | " | " | " | " | |
| Chlorobenzene | ND | --- | 0.500 | " | " | " | " | |
| Chloroethane | ND | --- | 5.00 | " | " | " | " | |
| Chloroform | ND | --- | 1.00 | " | " | " | " | |
| Chloromethane | ND | --- | 5.00 | " | " | " | " | |
| 2-Chlorotoluene | ND | --- | 1.00 | " | " | " | " | |
| 4-Chlorotoluene | ND | --- | 1.00 | " | " | " | " | |
| 1,2-Dibromo-3-chloropropane | ND | --- | 5.00 | " | " | " | " | |
| Dibromochloromethane | ND | --- | 1.00 | " | " | " | " | |
| 1,2-Dibromoethane (EDB) | ND | --- | 0.500 | " | " | " | " | |
| Dibromomethane | ND | --- | 1.00 | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | --- | 0.500 | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | --- | 0.500 | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | --- | 0.500 | " | " | " | " | |
| Dichlorodifluoromethane | ND | --- | 1.00 | " | " | " | " | |
| 1,1-Dichloroethane | ND | --- | 0.500 | " | " | " | " | |
| 1,2-Dichloroethane (EDC) | ND | --- | 0.500 | " | " | " | " | |
| 1,1-Dichloroethene | ND | --- | 0.500 | " | " | " | " | |
| cis-1,2-Dichloroethene | ND | --- | 0.500 | " | " | " | " | |
| trans-1,2-Dichloroethene | ND | --- | 0.500 | " | " | " | " | |
| 1,2-Dichloropropane | ND | --- | 0.500 | " | " | " | " | |
| 1,3-Dichloropropane | ND | --- | 1.00 | " | " | " | " | |
| 2,2-Dichloropropane | ND | --- | 1.00 | " | " | " | " | |
| 1,1-Dichloropropene | ND | --- | 1.00 | " | " | " | " | |
| cis-1,3-Dichloropropene | ND | --- | 1.00 | " | " | " | " | |
| trans-1,3-Dichloropropene | ND | --- | 1.00 | " | " | " | " | |

## ANALYTICAL SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01)** | | | **Matrix: Water** | | **Batch: 3060390** | | | |
| Ethylbenzene | ND | --- | 0.500 | ug/L | 1 | " | EPA 8260B | |
| Hexachlorobutadiene | ND | --- | 5.00 | " | " | " | " | |
| 2-Hexanone | ND | --- | 10.0 | " | " | " | " | |
| Isopropylbenzene | ND | --- | 1.00 | " | " | " | " | |
| 4-Isopropyltoluene | ND | --- | 1.00 | " | " | " | " | |
| 4-Methyl-2-pentanone (MiBK) | ND | --- | 10.0 | " | " | " | " | |
| Methyl tert-butyl ether (MTBE) | ND | --- | 1.00 | " | " | " | " | |
| Methylene chloride | ND | --- | 5.00 | " | " | " | " | |
| Naphthalene | ND | --- | 2.00 | " | " | " | " | |
| n-Propylbenzene | ND | --- | 0.500 | " | " | " | " | |
| Styrene | ND | --- | 1.00 | " | " | " | " | |
| 1,1,1,2-Tetrachloroethane | ND | --- | 0.500 | " | " | " | " | |
| 1,1,2,2-Tetrachloroethane | ND | --- | 0.500 | " | " | " | " | |
| Tetrachloroethene (PCE) | ND | --- | 0.500 | " | " | " | " | |
| Toluene | ND | --- | 1.00 | " | " | " | " | |
| 1,2,3-Trichlorobenzene | ND | --- | 2.00 | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | --- | 2.00 | " | " | " | " | |
| 1,1,1-Trichloroethane | ND | --- | 0.500 | " | " | " | " | |
| 1,1,2-Trichloroethane | ND | --- | 1.00 | " | " | " | " | |
| Trichloroethene (TCE) | ND | --- | 0.500 | " | " | " | " | |
| Trichlorofluoromethane | ND | --- | 2.00 | " | " | " | " | |
| 1,2,3-Trichloropropane | ND | --- | 1.00 | " | " | " | " | |
| 1,2,4-Trimethylbenzene | ND | --- | 1.00 | " | " | " | " | |
| 1,3,5-Trimethylbenzene | ND | --- | 1.00 | " | " | " | " | |
| Vinyl chloride | ND | --- | 0.500 | " | " | " | " | |
| m,p-Xylene | ND | --- | 1.00 | " | " | " | " | |
| o-Xylene | ND | --- | 0.500 | " | " | " | " | |
| *Surrogate: Dibromofluoromethane (Surr)* | | | *Recovery: 98 %* | *Limits: 80-120 %* | " | " | " | |
| *1,4-Difluorobenzene (Surr)* | | | *93 %* | *Limits: 80-120 %* | " | " | " | |
| *Toluene-d8 (Surr)* | | | *94 %* | *Limits: 80-120 %* | " | " | " | |
| *4-Bromofluorobenzene (Surr)* | | | *111 %* | *Limits: 80-120 %* | " | " | " | |

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## ANALYTICAL SAMPLE RESULTS

### Polychlorinated Biphenyls by EPA 8082A

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01)** | | | **Matrix: Water** | | **Batch: 3060515** | | | C-07 |
| Aroclor 1016 | ND | --- | 0.0980 | ug/L | 1 | 06/20/13 14:29 | EPA 8082A | |
| Aroclor 1221 | ND | --- | 0.0980 | " | " | " | " | |
| Aroclor 1232 | ND | --- | 0.0980 | " | " | " | " | |
| Aroclor 1242 | ND | --- | 0.0980 | " | " | " | " | |
| Aroclor 1248 | ND | --- | 0.0980 | " | " | " | " | |
| Aroclor 1254 | ND | --- | 0.0980 | " | " | " | " | |
| Aroclor 1260 | ND | --- | 0.0980 | " | " | " | " | |
| *Surrogate: Decachlorobiphenyl (Surr)* | | | *Recovery: 86 %* | *Limits: 40-135 %* | " | " | " | |

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## ANALYTICAL SAMPLE RESULTS

### Anions by EPA 300.0/9056A (Ion Chromatography)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01)** | | | **Matrix: Water** | | | | | |
| Batch: 3060475 | | | | | | | | |
| **Chloride** | **3.06** | --- | 1.00 | mg/L | 1 | 06/18/13 17:56 | EPA 300.0 | |
| Fluoride | ND | --- | 1.00 | " | " | " | " | |
| **Sulfate** | **5.08** | --- | 1.00 | " | " | 06/19/13 16:25 | " | |

Philip Nerenberg

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## ANALYTICAL SAMPLE RESULTS

### Nitrate + Nitrite by EPA 353.2

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01)** | | | **Matrix: Water** | | | | | |
| Batch: 3060429 | | | | | | | | |
| **Nitrate+Nitrite Nitrogen** | **1.22** | --- | 0.0200 | mg/L | 1 | 06/17/13 13:32 | EPA 353.2 | |

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## ANALYTICAL SAMPLE RESULTS

### Cyanide - Total (Aqueous)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01)** | | | **Matrix: Water** | | **Batch: 3060341** | | | |
| Cyanide, Total | ND | --- | 0.00500 | mg/L | 1 | 06/13/13 13:31 | EPA 335.4 | |

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## ANALYTICAL SAMPLE RESULTS

### Residual Chlorine Screen by SM4500CL-G (mod)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01)** | | | **Matrix: Water** | | **Batch: 3060326** | | | |
| **Residual Chlorine** | **30.0** | --- | 20.0 | ug/L | 1 | 06/12/13 16:34 | SM4500CL-G | |

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## ANALYTICAL SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01RE2)** | | | **Matrix: Water** | | **Batch: 3060448** | | | |
| Acenaphthene | ND | --- | 0.0192 | ug/L | 1 | 06/19/13 19:09 | EPA 8270D | |
| Acenaphthylene | ND | --- | 0.0192 | " | " | " | " | |
| Anthracene | ND | --- | 0.0192 | " | " | " | " | |
| Benz(a)anthracene | ND | --- | 0.0192 | " | " | " | " | |
| Benzo(a)pyrene | ND | --- | 0.0288 | " | " | " | " | |
| Benzo(b)fluoranthene | ND | --- | 0.0192 | " | " | " | " | |
| Benzo(k)fluoranthene | ND | --- | 0.0192 | " | " | " | " | |
| Benzo(g,h,i)perylene | ND | --- | 0.0192 | " | " | " | " | |
| Chrysene | ND | --- | 0.0192 | " | " | " | " | |
| Dibenz(a,h)anthracene | ND | --- | 0.0192 | " | " | " | " | |
| Fluoranthene | ND | --- | 0.0192 | " | " | " | " | |
| Fluorene | ND | --- | 0.0192 | " | " | " | " | |
| Indeno(1,2,3-cd)pyrene | ND | --- | 0.0192 | " | " | " | " | |
| 1-Methylnaphthalene | ND | --- | 0.0385 | " | " | " | " | |
| 2-Methylnaphthalene | ND | --- | 0.0385 | " | " | " | " | |
| Naphthalene | ND | --- | 0.0385 | " | " | " | " | |
| **Phenanthrene** | **0.0206** | --- | 0.0192 | " | " | " | " | B-02 |
| Pyrene | ND | --- | 0.0192 | " | " | " | " | |
| Carbazole | ND | --- | 0.0288 | " | " | " | " | |
| Dibenzofuran | ND | --- | 0.0192 | " | " | " | " | |
| 4-Chloro-3-methylphenol | ND | --- | 0.192 | " | " | " | " | |
| 2-Chlorophenol | ND | --- | 0.0962 | " | " | " | " | |
| 2,4-Dichlorophenol | ND | --- | 0.0962 | " | " | " | " | |
| 2,4-Dimethylphenol | ND | --- | 0.0962 | " | " | " | " | |
| 2,4-Dinitrophenol | ND | --- | 0.481 | " | " | " | " | |
| 4,6-Dinitro-2-methylphenol | ND | --- | 0.481 | " | " | " | " | |
| 2-Methylphenol | ND | --- | 0.0481 | " | " | " | " | |
| 3+4-Methylphenol(s) | ND | --- | 0.0481 | " | " | " | " | |
| 2-Nitrophenol | ND | --- | 0.192 | " | " | " | " | |
| 4-Nitrophenol | ND | --- | 0.192 | " | " | " | " | |
| Pentachlorophenol (PCP) | ND | --- | 0.385 | " | " | " | " | |
| Phenol | ND | --- | 0.385 | " | " | " | " | |
| 2,3,4,6-Tetrachlorophenol | ND | --- | 0.0962 | " | " | " | " | |
| 2,4,5-Trichlorophenol | ND | --- | 0.0962 | " | " | " | " | |
| 2,4,6-Trichlorophenol | ND | --- | 0.0962 | " | " | " | " | |
| Bis(2-ethylhexyl)phthalate | ND | --- | 2.12 | " | " | " | " | |
| Butyl benzyl phthalate | ND | --- | 2.88 | " | " | " | " | |

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Philip Nerenberg, Lab Director

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| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## ANALYTICAL SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01RE2)** | | | **Matrix: Water** | | **Batch: 3060448** | | | |
| Diethylphthalate | ND | --- | 2.88 | ug/L | 1 | " | EPA 8270D | |
| Dimethylphthalate | ND | --- | 2.88 | " | " | " | " | |
| Di-n-butylphthalate | ND | --- | 2.88 | " | " | " | " | |
| Di-n-octyl phthalate | ND | --- | 2.88 | " | " | " | " | |
| N-Nitrosodimethylamine | ND | --- | 0.0481 | " | " | " | " | |
| N-Nitroso-di-n-propylamine | ND | --- | 0.0481 | " | " | " | " | |
| N-Nitrosodiphenylamine | ND | --- | 0.0481 | " | " | " | " | |
| Bis(2-Chloroethoxy) methane | ND | --- | 0.0481 | " | " | " | " | |
| Bis(2-Chloroethyl) ether | ND | --- | 0.0481 | " | " | " | " | |
| Bis(2-Chloroisopropyl) ether | ND | --- | 0.0481 | " | " | " | " | |
| Hexachlorobenzene | ND | --- | 0.0192 | " | " | " | " | |
| Hexachlorobutadiene | ND | --- | 0.0481 | " | " | " | " | |
| Hexachlorocyclopentadiene | ND | --- | 0.0962 | " | " | " | " | |
| Hexachloroethane | ND | --- | 0.0481 | " | " | " | " | |
| 2-Chloronaphthalene | ND | --- | 0.0192 | " | " | " | " | |
| 1,2-Dichlorobenzene | ND | --- | 0.0481 | " | " | " | " | |
| 1,3-Dichlorobenzene | ND | --- | 0.0481 | " | " | " | " | |
| 1,4-Dichlorobenzene | ND | --- | 0.0481 | " | " | " | " | |
| 1,2,4-Trichlorobenzene | ND | --- | 0.0481 | " | " | " | " | |
| 4-Bromophenyl phenyl ether | ND | --- | 0.0481 | " | " | " | " | |
| 4-Chlorophenyl phenyl ether | ND | --- | 0.0481 | " | " | " | " | |
| Aniline | ND | --- | 0.0962 | " | " | " | " | |
| 4-Chloroaniline | ND | --- | 0.0481 | " | " | " | " | |
| 2-Nitroaniline | ND | --- | 0.385 | " | " | " | " | |
| 3-Nitroaniline | ND | --- | 0.385 | " | " | " | " | |
| 4-Nitroaniline | ND | --- | 0.385 | " | " | " | " | |
| Nitrobenzene | ND | --- | 0.192 | " | " | " | " | |
| 2,4-Dinitrotoluene | ND | --- | 0.192 | " | " | " | " | |
| 2,6-Dinitrotoluene | ND | --- | 0.192 | " | " | " | " | |
| Benzoic acid | ND | --- | 2.40 | " | " | " | " | |
| Benzyl alcohol | ND | --- | 0.192 | " | " | " | " | |
| Isophorone | ND | --- | 0.0481 | " | " | " | " | |
| 3,3'-Dichlorobenzidine | ND | --- | 0.192 | " | " | " | " | |
| *Surrogate: Nitrobenzene-d5 (Surr)* | | | *Recovery: 49 %* | *Limits: 35-120 %* | " | " | " | |
| *2-Fluorobiphenyl (Surr)* | | | *50 %* | *Limits: 30-120 %* | " | " | " | |
| *Phenol-d6 (Surr)* | | | *13 %* | *Limits: 10-120 %* | " | " | " | |
| *p-Terphenyl-d14 (Surr)* | | | *87 %* | *Limits: 30-125 %* | " | " | " | |

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240 N Broadway Ste 203
Portland, OR 97227

Project: **Restorcap**
Project Number: 4008-01
Project Manager: Chris Rhea

**Reported:**
07/01/13 16:40

## ANALYTICAL SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01RE2)** | | | **Matrix: Water** | | **Batch: 3060448** | | | |
| *Surrogate: 2-Fluorophenol (Surr)* | | | *Recovery: 24 %* | *Limits: 15-120 %* | 1 | " | EPA 8270D | |
| *2,4,6-Tribromophenol (Surr)* | | | *79 %* | *Limits: 35-125 %* | " | " | " | |

Philip Nerenberg

Philip Nerenberg, Lab Director

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## ANALYTICAL SAMPLE RESULTS

### Total Hardness (Calculated) by EPA 6020

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01)** | | | **Matrix: Water** | | **Batch: [CALC]** | | | |
| **Hardness (Calc by 6020)** | **24.2** | --- | 0.456 | mg CaCO3/L | 1 | 06/26/13 15:19 | 6020 Calc | |

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## ANALYTICAL SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

**SW-1 (A3F0244-01)** — **Matrix: Water**

Batch: 3060663

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **Aluminum** | **212** | --- | 50.0 | ug/L | 1 | 06/28/13 11:07 | EPA 6020A | |
| Antimony | ND | --- | 1.00 | " | " | 06/26/13 15:19 | " | |
| Arsenic | ND | --- | 2.00 | " | " | " | " | |
| **Barium** | **18.0** | --- | 1.00 | " | " | " | " | |
| Beryllium | ND | --- | 1.00 | " | " | " | " | |
| Cadmium | ND | --- | 1.00 | " | " | " | " | |
| **Calcium** | **6160** | --- | 100 | " | " | " | " | |
| Chromium | ND | --- | 2.00 | " | " | " | " | |
| Cobalt | ND | --- | 1.00 | " | " | " | " | |
| Copper | ND | --- | 2.00 | " | " | " | " | |
| **Iron** | **1050** | --- | 50.0 | " | " | " | " | |
| Lead | ND | --- | 1.00 | " | " | " | " | |
| **Magnesium** | **2140** | --- | 50.0 | " | " | " | " | |
| **Manganese** | **75.3** | --- | 1.00 | " | " | " | " | |
| Mercury | ND | --- | 0.0800 | " | " | " | " | |
| Nickel | ND | --- | 2.00 | " | " | " | " | |
| **Potassium** | **927** | --- | 100 | " | " | " | " | |
| Selenium | ND | --- | 2.00 | " | " | " | " | |
| Silver | ND | --- | 1.00 | " | " | " | " | |
| Thallium | ND | --- | 1.00 | " | " | " | " | |
| Vanadium | ND | --- | 2.00 | " | " | " | " | |
| **Zinc** | **4.64** | --- | 4.00 | " | " | " | " | |

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## ANALYTICAL SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01RE1)** | | | **Matrix: Water** | | | | | |
| Batch: 3060663 | | | | | | | | |
| **Sodium** | **4270** | --- | 100 | ug/L | 1 | 07/01/13 14:58 | EPA 6020A | |

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Project: **Restorcap**
Project Number: 4008-01
Project Manager: Chris Rhea

**Reported:**
07/01/13 16:40

## ANALYTICAL SAMPLE RESULTS

### Conventional Chemistry Parameters

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01)** | | | **Matrix: Water** | | | | | |
| Batch: 3060307 | | | | | | | | |
| **pH** | **6.67** | --- | | pH Units | 1 | 06/12/13 17:14 | EPA 150.1 | |
| **pH Temperature (deg C)** | **21.7** | --- | | " | " | " | " | |
| Batch: 3060363 | | | | | | | | |
| Biochemical Oxygen Demand (5 Day) | ND | --- | 4.00 | mg/L | " | 06/18/13 12:34 | SM 5210 B | |
| Batch: 3060378 | | | | | | | | |
| **Orthophosphate Phosphorous** | **0.020** | --- | 0.020 | " | " | 06/13/13 17:59 | SM 4500 P E | |
| Batch: 3060391 | | | | | | | | |
| **Turbidity** | **7.0** | --- | 0.10 | NTU | " | 06/14/13 10:13 | EPA 180.1 | |
| Batch: 3060392 | | | | | | | | |
| Phosphorus | ND | --- | 0.100 | mg/L | " | 06/14/13 16:29 | SM 4500 P B | |
| Batch: 3060423 | | | | | | | | |
| Total Suspended Solids | ND | --- | 5.00 | " | " | 06/17/13 16:50 | SM 2540 D | |
| Batch: 3060424 | | | | | | | | |
| **Total Dissolved Solids** | **61.0** | --- | 10.0 | " | " | 06/19/13 11:41 | SM 2540 C | |
| Batch: 3060525 | | | | | | | | |
| Chemical Oxygen Demand | ND | --- | 10.0 | " | " | 06/20/13 16:02 | EPA 410.4 | |
| Batch: 3060531 | | | | | | | | |
| **Total Organic Carbon** | **2.27** | --- | 1.00 | " | " | 06/24/13 15:02 | SM 5310 B | |
| Batch: 3060562 | | | | | | | | |
| **Total Alkalinity** | **20.2** | --- | 17.5 | mg CaCO3/L | " | 06/21/13 14:35 | SM 2320 B | |
| **Bicarbonate Alkalinity** | **20.2** | --- | 17.5 | " | " | " | " | |
| Carbonate Alkalinity | ND | --- | 17.5 | " | " | " | " | |
| Hydroxide Alkalinity | ND | --- | 17.5 | " | " | " | " | |
| Batch: 3060612 | | | | | | | | |
| HEM (Oil and Grease) | ND | --- | 5.05 | mg/L | " | 06/26/13 10:41 | EPA 1664 | O-01 |
| Batch: 3060674 | | | | | | | | |
| **Conductivity** | **75.0** | --- | 2.50 | umhos/cm | " | 06/26/13 14:20 | SM 2510 B | |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## Weck Laboratories, Inc

## ANALYTICAL SAMPLE RESULTS (Subcontracted)

### Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **SW-1 (A3F0244-01)** | | | **Matrix: Water** | | **Batch: W3F0851** | | | |
| Batch: W3F0851 | | | | | | | | |
| Phenolics | ND | --- | 0.010 | mg/l | 1 | 06/21/13 12:51 | EPA 420.4 | |
| Batch: W3F0854 | | | | | | | | |
| Ammonia as N | ND | --- | 0.10 | " | " | 06/19/13 17:25 | EPA 350.1 | |
| Batch: W3F0979 | | | | | | | | |
| TKN | ND | --- | 0.10 | " | " | 06/24/13 12:06 | EPA 351.2 | |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Hydrocarbon Identification Screen by NWTPH-HCID

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060396 - EPA 3510C (Acid Extraction)** | | | | | | | **Water** | | | | | |
| **Blank (3060396-BLK1)** | | | | | | Prepared: 06/14/13 10:37 | Analyzed: 06/14/13 21:37 | | | | | |
| **NWTPH-HCID** | | | | | | | | | | | | |
| Gasoline Range Organics | ND | --- | 0.0909 | mg/L | 1 | --- | --- | --- | --- | --- | --- | |
| Diesel Range Organics | ND | --- | 0.227 | " | " | --- | --- | --- | --- | --- | --- | |
| Oil Range Organics | ND | --- | 0.227 | " | " | --- | --- | --- | --- | --- | --- | |

*Surr: o-Terphenyl (Surr) Recovery: 99 % Limits: 50-150 % Dilution: 1x*

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

**Batch 3060390 - EPA 5030B** — **Water**

**Blank (3060390-BLK1)** Prepared: 06/14/13 10:00 Analyzed: 06/14/13 12:19

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EPA 8260B** | | | | | | | | | | | | |
| Acetone | ND | --- | 20.0 | ug/L | 1 | --- | --- | --- | --- | --- | --- | |
| Benzene | ND | --- | 0.250 | " | " | --- | --- | --- | --- | --- | --- | |
| Bromobenzene | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| Bromochloromethane | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Bromodichloromethane | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Bromoform | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Bromomethane | ND | --- | 5.00 | " | " | --- | --- | --- | --- | --- | --- | ESTa |
| 2-Butanone (MEK) | ND | --- | 10.0 | " | " | --- | --- | --- | --- | --- | --- | |
| n-Butylbenzene | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| sec-Butylbenzene | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| tert-Butylbenzene | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Carbon tetrachloride | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| Chlorobenzene | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| Chloroethane | ND | --- | 5.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Chloroform | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Chloromethane | ND | --- | 5.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 2-Chlorotoluene | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Chlorotoluene | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,2-Dibromo-3-chloropropane | ND | --- | 5.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Dibromochloromethane | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,2-Dibromoethane (EDB) | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| Dibromomethane | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,2-Dichlorobenzene | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,3-Dichlorobenzene | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,4-Dichlorobenzene | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| Dichlorodifluoromethane | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,1-Dichloroethane | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,2-Dichloroethane (EDC) | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,1-Dichloroethene | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| cis-1,2-Dichloroethene | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| trans-1,2-Dichloroethene | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,2-Dichloropropane | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,3-Dichloropropane | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 2,2-Dichloropropane | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |

Philip Nerenberg

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

**Batch 3060390 - EPA 5030B** — **Water**

**Blank (3060390-BLK1)** Prepared: 06/14/13 10:00 Analyzed: 06/14/13 12:19

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,1-Dichloropropene | ND | --- | 1.00 | ug/L | " | --- | --- | --- | --- | --- | --- | |
| cis-1,3-Dichloropropene | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| trans-1,3-Dichloropropene | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Ethylbenzene | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| Hexachlorobutadiene | ND | --- | 5.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 2-Hexanone | ND | --- | 10.0 | " | " | --- | --- | --- | --- | --- | --- | |
| Isopropylbenzene | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Isopropyltoluene | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Methyl-2-pentanone (MiBK) | ND | --- | 10.0 | " | " | --- | --- | --- | --- | --- | --- | |
| Methyl tert-butyl ether (MTBE) | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Methylene chloride | ND | --- | 5.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Naphthalene | ND | --- | 2.00 | " | " | --- | --- | --- | --- | --- | --- | |
| n-Propylbenzene | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| Styrene | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,1,1,2-Tetrachloroethane | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,1,2,2-Tetrachloroethane | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| Tetrachloroethene (PCE) | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| Toluene | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,2,3-Trichlorobenzene | ND | --- | 2.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,2,4-Trichlorobenzene | ND | --- | 2.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,1,1-Trichloroethane | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,1,2-Trichloroethane | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Trichloroethene (TCE) | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| Trichlorofluoromethane | ND | --- | 2.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,2,3-Trichloropropane | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,2,4-Trimethylbenzene | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,3,5-Trimethylbenzene | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Vinyl chloride | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |
| m,p-Xylene | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| o-Xylene | ND | --- | 0.500 | " | " | --- | --- | --- | --- | --- | --- | |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Surr:* | *Dibromofluoromethane (Surr)* | *Recovery:* *101 %* | *Limits:* | *80-120 %* | *Dilution:* | *1x* |
| | *1,4-Difluorobenzene (Surr)* | *94 %* | | *80-120 %* | | *"* |
| | *Toluene-d8 (Surr)* | *96 %* | | *80-120 %* | | *"* |
| | *4-Bromofluorobenzene (Surr)* | *111 %* | | *80-120 %* | | *"* |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

**Batch 3060390 - EPA 5030B** — **Water**

**LCS (3060390-BS1)** Prepared: 06/14/13 10:00 Analyzed: 06/14/13 11:26

**EPA 8260B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetone | 36.7 | --- | 20.0 | ug/L | 1 | 40.0 | --- | 92 | 70-130% | --- | --- | |
| Benzene | 18.8 | --- | 0.250 | " | " | 20.0 | --- | 94 | " | --- | --- | |
| Bromobenzene | 22.2 | --- | 0.500 | " | " | " | --- | 111 | " | --- | --- | |
| Bromochloromethane | 20.8 | --- | 1.00 | " | " | " | --- | 104 | " | --- | --- | |
| Bromodichloromethane | 17.6 | --- | 1.00 | " | " | " | --- | 88 | " | --- | --- | |
| Bromoform | 23.8 | --- | 1.00 | " | " | " | --- | 119 | " | --- | --- | |
| Bromomethane | 10.7 | --- | 5.00 | " | " | " | --- | 54 | " | --- | --- | ESTa |
| 2-Butanone (MEK) | 46.0 | --- | 10.0 | " | " | 40.0 | --- | 115 | " | --- | --- | |
| n-Butylbenzene | 19.0 | --- | 1.00 | " | " | 20.0 | --- | 95 | " | --- | --- | |
| sec-Butylbenzene | 21.0 | --- | 1.00 | " | " | " | --- | 105 | " | --- | --- | |
| tert-Butylbenzene | 19.2 | --- | 1.00 | " | " | " | --- | 96 | " | --- | --- | |
| Carbon tetrachloride | 23.2 | --- | 0.500 | " | " | " | --- | 116 | " | --- | --- | |
| Chlorobenzene | 22.1 | --- | 0.500 | " | " | " | --- | 110 | " | --- | --- | |
| Chloroethane | 19.7 | --- | 5.00 | " | " | " | --- | 98 | " | --- | --- | |
| Chloroform | 18.7 | --- | 1.00 | " | " | " | --- | 93 | " | --- | --- | |
| Chloromethane | 15.6 | --- | 5.00 | " | " | " | --- | 78 | " | --- | --- | |
| 2-Chlorotoluene | 22.0 | --- | 1.00 | " | " | " | --- | 110 | " | --- | --- | |
| 4-Chlorotoluene | 18.7 | --- | 1.00 | " | " | " | --- | 93 | " | --- | --- | |
| 1,2-Dibromo-3-chloropropane | 21.0 | --- | 5.00 | " | " | " | --- | 105 | " | --- | --- | |
| Dibromochloromethane | 22.7 | --- | 1.00 | " | " | " | --- | 114 | " | --- | --- | |
| 1,2-Dibromoethane (EDB) | 22.4 | --- | 0.500 | " | " | " | --- | 112 | " | --- | --- | |
| Dibromomethane | 20.7 | --- | 1.00 | " | " | " | --- | 103 | " | --- | --- | |
| 1,2-Dichlorobenzene | 21.7 | --- | 0.500 | " | " | " | --- | 108 | " | --- | --- | |
| 1,3-Dichlorobenzene | 22.3 | --- | 0.500 | " | " | " | --- | 112 | " | --- | --- | |
| 1,4-Dichlorobenzene | 21.4 | --- | 0.500 | " | " | " | --- | 107 | " | --- | --- | |
| Dichlorodifluoromethane | 14.1 | --- | 1.00 | " | " | " | --- | 71 | " | --- | --- | |
| 1,1-Dichloroethane | 22.1 | --- | 0.500 | " | " | " | --- | 110 | " | --- | --- | |
| 1,2-Dichloroethane (EDC) | 21.1 | --- | 0.500 | " | " | " | --- | 105 | " | --- | --- | |
| 1,1-Dichloroethene | 20.5 | --- | 0.500 | " | " | " | --- | 102 | " | --- | --- | |
| cis-1,2-Dichloroethene | 19.8 | --- | 0.500 | " | " | " | --- | 99 | " | --- | --- | |
| trans-1,2-Dichloroethene | 20.3 | --- | 0.500 | " | " | " | --- | 102 | " | --- | --- | |
| 1,2-Dichloropropane | 20.7 | --- | 0.500 | " | " | " | --- | 103 | " | --- | --- | |
| 1,3-Dichloropropane | 19.7 | --- | 1.00 | " | " | " | --- | 98 | " | --- | --- | |
| 2,2-Dichloropropane | 18.3 | --- | 1.00 | " | " | " | --- | 91 | " | --- | --- | |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060390 - EPA 5030B** | | | | | | | **Water** | | | | | |
| **LCS (3060390-BS1)** | | | | | Prepared: 06/14/13 10:00 | | Analyzed: 06/14/13 11:26 | | | | | |
| 1,1-Dichloropropene | 17.3 | --- | 1.00 | ug/L | " | " | --- | 86 | " | --- | --- | |
| cis-1,3-Dichloropropene | 17.1 | --- | 1.00 | " | " | " | --- | 85 | " | --- | --- | |
| trans-1,3-Dichloropropene | 18.5 | --- | 1.00 | " | " | " | --- | 92 | " | --- | --- | |
| Ethylbenzene | 20.1 | --- | 0.500 | " | " | " | --- | 100 | " | --- | --- | |
| Hexachlorobutadiene | 28.0 | --- | 5.00 | " | " | " | --- | 140 | " | --- | --- | EST |
| 2-Hexanone | 48.9 | --- | 10.0 | " | " | 40.0 | --- | 122 | " | --- | --- | |
| Isopropylbenzene | 22.1 | --- | 1.00 | " | " | 20.0 | --- | 111 | " | --- | --- | |
| 4-Isopropyltoluene | 21.9 | --- | 1.00 | " | " | " | --- | 109 | " | --- | --- | |
| 4-Methyl-2-pentanone (MiBK) | 45.5 | --- | 10.0 | " | " | 40.0 | --- | 114 | " | --- | --- | |
| Methyl tert-butyl ether (MTBE) | 17.4 | --- | 1.00 | " | " | 20.0 | --- | 87 | " | --- | --- | |
| Methylene chloride | 18.0 | --- | 5.00 | " | " | " | --- | 90 | " | --- | --- | |
| Naphthalene | 20.5 | --- | 2.00 | " | " | " | --- | 102 | " | --- | --- | |
| n-Propylbenzene | 19.3 | --- | 0.500 | " | " | " | --- | 96 | " | --- | --- | |
| Styrene | 21.4 | --- | 1.00 | " | " | " | --- | 107 | " | --- | --- | |
| 1,1,1,2-Tetrachloroethane | 23.2 | --- | 0.500 | " | " | " | --- | 116 | " | --- | --- | |
| 1,1,2,2-Tetrachloroethane | 17.9 | --- | 0.500 | " | " | " | --- | 89 | " | --- | --- | |
| Tetrachloroethene (PCE) | 24.7 | --- | 0.500 | " | " | " | --- | 123 | " | --- | --- | |
| Toluene | 19.2 | --- | 1.00 | " | " | " | --- | 96 | " | --- | --- | |
| 1,2,3-Trichlorobenzene | 21.6 | --- | 2.00 | " | " | " | --- | 108 | " | --- | --- | |
| 1,2,4-Trichlorobenzene | 23.1 | --- | 2.00 | " | " | " | --- | 115 | " | --- | --- | |
| 1,1,1-Trichloroethane | 20.7 | --- | 0.500 | " | " | " | --- | 104 | " | --- | --- | |
| 1,1,2-Trichloroethane | 19.8 | --- | 1.00 | " | " | " | --- | 99 | " | --- | --- | |
| Trichloroethene (TCE) | 22.9 | --- | 0.500 | " | " | " | --- | 114 | " | --- | --- | |
| Trichlorofluoromethane | 24.0 | --- | 2.00 | " | " | " | --- | 120 | " | --- | --- | |
| 1,2,3-Trichloropropane | 22.2 | --- | 1.00 | " | " | " | --- | 111 | " | --- | --- | |
| 1,2,4-Trimethylbenzene | 20.5 | --- | 1.00 | " | " | " | --- | 102 | " | --- | --- | |
| 1,3,5-Trimethylbenzene | 21.0 | --- | 1.00 | " | " | " | --- | 105 | " | --- | --- | |
| Vinyl chloride | 16.8 | --- | 0.500 | " | " | " | --- | 84 | " | --- | --- | |
| m,p-Xylene | 40.2 | --- | 1.00 | " | " | 40.0 | --- | 101 | " | --- | --- | |
| o-Xylene | 19.4 | --- | 0.500 | " | " | 20.0 | --- | 97 | " | --- | --- | |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Surr:* | *Dibromofluoromethane (Surr)* | *Recovery:* | *101 %* | *Limits:* *80-120 %* | *Dilution:* | *1x* |
| | *1,4-Difluorobenzene (Surr)* | | *97 %* | *80-120 %* | | *"* |
| | *Toluene-d8 (Surr)* | | *95 %* | *80-120 %* | | *"* |
| | *4-Bromofluorobenzene (Surr)* | | *109 %* | *80-120 %* | | *"* |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

**Batch 3060390 - EPA 5030B** **Water**

**Duplicate (3060390-DUP1)** Prepared: 06/14/13 16:00 Analyzed: 06/14/13 18:50

**QC Source Sample: Other (A3F0339-01)**

**EPA 8260B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetone | ND | --- | 20.0 | ug/L | 1 | --- | ND | --- | --- | --- | 30% | |
| Benzene | ND | --- | 0.250 | " | " | --- | ND | --- | --- | --- | 30% | |
| Bromobenzene | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| Bromochloromethane | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| Bromodichloromethane | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| Bromoform | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| Bromomethane | ND | --- | 5.00 | " | " | --- | ND | --- | --- | --- | 30% | ESTa |
| 2-Butanone (MEK) | ND | --- | 10.0 | " | " | --- | ND | --- | --- | --- | 30% | |
| n-Butylbenzene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| sec-Butylbenzene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| tert-Butylbenzene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| Carbon tetrachloride | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| Chlorobenzene | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| Chloroethane | ND | --- | 5.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| Chloroform | ND | --- | 1.00 | " | " | --- | 0.720 | --- | --- | *** | 30% | |
| Chloromethane | ND | --- | 5.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 2-Chlorotoluene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 4-Chlorotoluene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,2-Dibromo-3-chloropropane | ND | --- | 5.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| Dibromochloromethane | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,2-Dibromoethane (EDB) | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| Dibromomethane | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,2-Dichlorobenzene | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,3-Dichlorobenzene | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,4-Dichlorobenzene | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| Dichlorodifluoromethane | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,1-Dichloroethane | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,2-Dichloroethane (EDC) | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,1-Dichloroethene | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| cis-1,2-Dichloroethene | **10.7** | --- | 0.500 | " | " | --- | 10.6 | --- | --- | 2 | 30% | |
| trans-1,2-Dichloroethene | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,2-Dichloropropane | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,3-Dichloropropane | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |

**EES Environmental Inc**
240 N Broadway Ste 203
Portland, OR 97227

Project: **Restorcap**
Project Number: 4008-01
Project Manager: Chris Rhea

**Reported:**
07/01/13 16:40

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

**Batch 3060390 - EPA 5030B** **Water**

**Duplicate (3060390-DUP1)** Prepared: 06/14/13 16:00 Analyzed: 06/14/13 18:50

**QC Source Sample: Other (A3F0339-01)**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,2-Dichloropropane | ND | --- | 1.00 | ug/L | " | --- | ND | --- | --- | --- | 30% | |
| 1,1-Dichloropropene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| cis-1,3-Dichloropropene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| trans-1,3-Dichloropropene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| Ethylbenzene | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| Hexachlorobutadiene | ND | --- | 5.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 2-Hexanone | ND | --- | 10.0 | " | " | --- | ND | --- | --- | --- | 30% | |
| Isopropylbenzene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 4-Isopropyltoluene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 4-Methyl-2-pentanone (MiBK) | ND | --- | 10.0 | " | " | --- | ND | --- | --- | --- | 30% | |
| Methyl tert-butyl ether (MTBE) | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| Methylene chloride | ND | --- | 5.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| Naphthalene | ND | --- | 2.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| n-Propylbenzene | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| Styrene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,1,1,2-Tetrachloroethane | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,1,2,2-Tetrachloroethane | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| Tetrachloroethene (PCE) | **62.6** | --- | 0.500 | " | " | --- | 63.2 | --- | --- | 1 | 30% | |
| Toluene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,2,3-Trichlorobenzene | ND | --- | 2.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,2,4-Trichlorobenzene | ND | --- | 2.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,1,1-Trichloroethane | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,1,2-Trichloroethane | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| Trichloroethene (TCE) | **7.45** | --- | 0.500 | " | " | --- | 7.68 | --- | --- | 3 | 30% | |
| Trichlorofluoromethane | ND | --- | 2.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,2,3-Trichloropropane | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,2,4-Trimethylbenzene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| 1,3,5-Trimethylbenzene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| Vinyl chloride | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |
| m,p-Xylene | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 30% | |
| o-Xylene | ND | --- | 0.500 | " | " | --- | ND | --- | --- | --- | 30% | |

*Surr: Dibromofluoromethane (Surr) Recovery: 101 % Limits: 80-120 % Dilution: 1x*
*1,4-Difluorobenzene (Surr) 92 % 80-120 % "*
*Toluene-d8 (Surr) 93 % 80-120 % "*

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

**Batch 3060390 - EPA 5030B** **Water**

**Duplicate (3060390-DUP1)** Prepared: 06/14/13 16:00 Analyzed: 06/14/13 18:50

**QC Source Sample: Other (A3F0339-01)**

*Surr: 4-Bromofluorobenzene (Surr)* *Recovery: 107 %* *Limits: 80-120 %* *Dilution: 1x*

**Matrix Spike (3060390-MS1)** Prepared: 06/14/13 10:00 Analyzed: 06/14/13 14:46

**QC Source Sample: Other (A3F0321-01)**

**EPA 8260B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetone | 22.4 | --- | 20.0 | ug/L | 1 | 40.0 | ND | 56 | 70-130% | --- | --- | Q-01 |
| Benzene | 17.2 | --- | 0.250 | " | " | 20.0 | ND | 86 | " | --- | --- | |
| Bromobenzene | 22.1 | --- | 0.500 | " | " | " | ND | 110 | " | --- | --- | |
| Bromochloromethane | 18.0 | --- | 1.00 | " | " | " | ND | 90 | " | --- | --- | |
| Bromodichloromethane | 15.7 | --- | 1.00 | " | " | " | ND | 79 | " | --- | --- | |
| Bromoform | 23.3 | --- | 1.00 | " | " | " | ND | 117 | " | --- | --- | |
| Bromomethane | 10.1 | --- | 5.00 | " | " | " | ND | 50 | " | --- | --- | ESTa |
| 2-Butanone (MEK) | 31.6 | --- | 10.0 | " | " | 40.0 | ND | 79 | " | --- | --- | |
| n-Butylbenzene | 18.3 | --- | 1.00 | " | " | 20.0 | ND | 92 | " | --- | --- | |
| sec-Butylbenzene | 20.2 | --- | 1.00 | " | " | " | ND | 101 | " | --- | --- | |
| tert-Butylbenzene | 19.1 | --- | 1.00 | " | " | " | ND | 95 | " | --- | --- | |
| Carbon tetrachloride | 22.4 | --- | 0.500 | " | " | " | ND | 112 | " | --- | --- | |
| Chlorobenzene | 21.6 | --- | 0.500 | " | " | " | ND | 108 | " | --- | --- | |
| Chloroethane | 17.3 | --- | 5.00 | " | " | " | ND | 87 | " | --- | --- | |
| Chloroform | 16.8 | --- | 1.00 | " | " | " | ND | 84 | " | --- | --- | |
| Chloromethane | 13.5 | --- | 5.00 | " | " | " | ND | 67 | " | --- | --- | Q-01 |
| 2-Chlorotoluene | 22.1 | --- | 1.00 | " | " | " | ND | 110 | " | --- | --- | |
| 4-Chlorotoluene | 17.7 | --- | 1.00 | " | " | " | ND | 89 | " | --- | --- | |
| 1,2-Dibromo-3-chloropropane | 21.3 | --- | 5.00 | " | " | " | ND | 107 | " | --- | --- | |
| Dibromochloromethane | 21.7 | --- | 1.00 | " | " | " | ND | 108 | " | --- | --- | |
| 1,2-Dibromoethane (EDB) | 21.4 | --- | 0.500 | " | " | " | ND | 107 | " | --- | --- | |
| Dibromomethane | 18.7 | --- | 1.00 | " | " | " | ND | 93 | " | --- | --- | |
| 1,2-Dichlorobenzene | 21.2 | --- | 0.500 | " | " | " | ND | 106 | " | --- | --- | |
| 1,3-Dichlorobenzene | 21.6 | --- | 0.500 | " | " | " | ND | 108 | " | --- | --- | |
| 1,4-Dichlorobenzene | 20.6 | --- | 0.500 | " | " | " | ND | 103 | " | --- | --- | |
| Dichlorodifluoromethane | 13.3 | --- | 1.00 | " | " | " | ND | 66 | " | --- | --- | Q-01 |
| 1,1-Dichloroethane | 19.5 | --- | 0.500 | " | " | " | ND | 98 | " | --- | --- | |
| 1,2-Dichloroethane (EDC) | 18.6 | --- | 0.500 | " | " | " | ND | 93 | " | --- | --- | |
| 1,1-Dichloroethene | 19.0 | --- | 0.500 | " | " | " | ND | 95 | " | --- | --- | |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

**Batch 3060390 - EPA 5030B** — **Water**

**Matrix Spike (3060390-MS1)** Prepared: 06/14/13 10:00 Analyzed: 06/14/13 14:46

**QC Source Sample: Other (A3F0321-01)**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 17.2 | --- | 0.500 | ug/L | " | " | ND | 86 | " | --- | --- | |
| trans-1,2-Dichloroethene | 18.7 | --- | 0.500 | " | " | " | ND | 94 | " | --- | --- | |
| 1,2-Dichloropropane | 18.6 | --- | 0.500 | " | " | " | ND | 93 | " | --- | --- | |
| 1,3-Dichloropropane | 18.6 | --- | 1.00 | " | " | " | ND | 93 | " | --- | --- | |
| 2,2-Dichloropropane | 16.6 | --- | 1.00 | " | " | " | ND | 83 | " | --- | --- | |
| 1,1-Dichloropropene | 16.0 | --- | 1.00 | " | " | " | ND | 80 | " | --- | --- | |
| cis-1,3-Dichloropropene | 15.8 | --- | 1.00 | " | " | " | ND | 79 | " | --- | --- | |
| trans-1,3-Dichloropropene | 17.4 | --- | 1.00 | " | " | " | ND | 87 | " | --- | --- | |
| Ethylbenzene | 19.4 | --- | 0.500 | " | " | " | ND | 97 | " | --- | --- | |
| Hexachlorobutadiene | 28.5 | --- | 5.00 | " | " | " | ND | 143 | " | --- | --- | EST |
| 2-Hexanone | 37.4 | --- | 10.0 | " | " | 40.0 | ND | 93 | " | --- | --- | |
| Isopropylbenzene | 21.9 | --- | 1.00 | " | " | 20.0 | ND | 109 | " | --- | --- | |
| 4-Isopropyltoluene | 21.7 | --- | 1.00 | " | " | " | ND | 108 | " | --- | --- | |
| 4-Methyl-2-pentanone (MiBK) | 40.3 | --- | 10.0 | " | " | 40.0 | ND | 101 | " | --- | --- | |
| Methyl tert-butyl ether (MTBE) | 15.8 | --- | 1.00 | " | " | 20.0 | ND | 79 | " | --- | --- | |
| Methylene chloride | 16.4 | --- | 5.00 | " | " | " | ND | 82 | " | --- | --- | |
| Naphthalene | 19.4 | --- | 2.00 | " | " | " | ND | 97 | " | --- | --- | |
| n-Propylbenzene | 19.5 | --- | 0.500 | " | " | " | ND | 98 | " | --- | --- | |
| Styrene | 20.8 | --- | 1.00 | " | " | " | ND | 104 | " | --- | --- | |
| 1,1,1,2-Tetrachloroethane | 22.8 | --- | 0.500 | " | " | " | ND | 114 | " | --- | --- | |
| 1,1,2,2-Tetrachloroethane | 16.9 | --- | 0.500 | " | " | " | ND | 85 | " | --- | --- | |
| Tetrachloroethene (PCE) | 25.2 | --- | 0.500 | " | " | " | ND | 126 | " | --- | --- | |
| Toluene | 18.5 | --- | 1.00 | " | " | " | ND | 92 | " | --- | --- | |
| 1,2,3-Trichlorobenzene | 21.1 | --- | 2.00 | " | " | " | ND | 105 | " | --- | --- | |
| 1,2,4-Trichlorobenzene | 23.0 | --- | 2.00 | " | " | " | ND | 115 | " | --- | --- | |
| 1,1,1-Trichloroethane | 19.2 | --- | 0.500 | " | " | " | ND | 96 | " | --- | --- | |
| 1,1,2-Trichloroethane | 18.7 | --- | 1.00 | " | " | " | ND | 94 | " | --- | --- | |
| Trichloroethene (TCE) | 21.7 | --- | 0.500 | " | " | " | ND | 109 | " | --- | --- | |
| Trichlorofluoromethane | 22.2 | --- | 2.00 | " | " | " | ND | 111 | " | --- | --- | |
| 1,2,3-Trichloropropane | 20.8 | --- | 1.00 | " | " | " | ND | 104 | " | --- | --- | |
| 1,2,4-Trimethylbenzene | 19.6 | --- | 1.00 | " | " | " | ND | 98 | " | --- | --- | |
| 1,3,5-Trimethylbenzene | 20.2 | --- | 1.00 | " | " | " | ND | 101 | " | --- | --- | |
| Vinyl chloride | 15.1 | --- | 0.500 | " | " | " | ND | 75 | " | --- | --- | |
| m,p-Xylene | 37.9 | --- | 1.00 | " | " | 40.0 | ND | 95 | " | --- | --- | |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Volatile Organic Compounds by EPA 8260B

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060390 - EPA 5030B** | | | | | | | **Water** | | | | | |
| **Matrix Spike (3060390-MS1)** | | | | | | Prepared: 06/14/13 10:00 | Analyzed: 06/14/13 14:46 | | | | | |
| **QC Source Sample: Other (A3F0321-01)** | | | | | | | | | | | | |
| o-Xylene | 18.5 | --- | 0.500 | ug/L | " | 20.0 | ND | 92 | " | --- | --- | |
| *Surr: Dibromofluoromethane (Surr)* | | | *Recovery: 97 %* | *Limits: 80-120 %* | | *Dilution: 1x* | | | | | | |
| *1,4-Difluorobenzene (Surr)* | | | *92 %* | *80-120 %* | | *"* | | | | | | |
| *Toluene-d8 (Surr)* | | | *93 %* | *80-120 %* | | *"* | | | | | | |
| *4-Bromofluorobenzene (Surr)* | | | *114 %* | *80-120 %* | | *"* | | | | | | |

**EES Environmental Inc**
240 N Broadway Ste 203
Portland, OR 97227

Project: **Restorcap**
Project Number: 4008-01
Project Manager: Chris Rhea

**Reported:**
07/01/13 16:40

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Polychlorinated Biphenyls by EPA 8082A

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060515 - EPA 3510C (Neutral pH)** | | | | | | | **Water** | | | | | |
| **Blank (3060515-BLK1)** | | | | | Prepared: 06/20/13 07:05 | | Analyzed: 06/20/13 12:23 | | | | | C-07 |
| **EPA 8082A** | | | | | | | | | | | | |
| Aroclor 1016 | ND | --- | 0.0909 | ug/L | 1 | --- | --- | --- | --- | --- | --- | |
| Aroclor 1221 | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| Aroclor 1232 | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| Aroclor 1242 | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| Aroclor 1248 | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| Aroclor 1254 | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| Aroclor 1260 | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| *Surr: Decachlorobiphenyl (Surr)* | | | *Recovery: 86 %* | *Limits: 40-135 %* | | | *Dilution: 1x* | | | | | |
| **LCS (3060515-BS1)** | | | | | Prepared: 06/20/13 07:05 | | Analyzed: 06/20/13 12:41 | | | | | C-07 |
| **EPA 8082A** | | | | | | | | | | | | |
| Aroclor 1016 | 1.94 | --- | 0.100 | ug/L | 1 | 2.50 | --- | 77 | 40-140% | --- | --- | |
| Aroclor 1260 | 1.75 | --- | 0.100 | " | " | " | --- | 70 | " | --- | --- | |
| *Surr: Decachlorobiphenyl (Surr)* | | | *Recovery: 79 %* | *Limits: 40-135 %* | | | *Dilution: 1x* | | | | | |
| **LCS Dup (3060515-BSD1)** | | | | | Prepared: 06/20/13 07:05 | | Analyzed: 06/20/13 12:59 | | | | | C-07, Q-19 |
| **EPA 8082A** | | | | | | | | | | | | |
| Aroclor 1016 | 1.92 | --- | 0.100 | ug/L | 1 | 2.50 | --- | 77 | 40-140% | 0.8 | 30% | |
| Aroclor 1260 | 1.73 | --- | 0.100 | " | " | " | --- | 69 | " | 1 | 30% | |
| *Surr: Decachlorobiphenyl (Surr)* | | | *Recovery: 80 %* | *Limits: 40-135 %* | | | *Dilution: 1x* | | | | | |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Anions by EPA 300.0/9056A (Ion Chromatography)

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060475 - Method Prep: Aq** | | | | | | | **Water** | | | | | |
| **Blank (3060475-BLK1)** | | | | | | Prepared: 06/18/13 14:37 | Analyzed: 06/18/13 15:33 | | | | | |
| **EPA 300.0** | | | | | | | | | | | | |
| Chloride | ND | --- | 1.00 | mg/L | 1 | --- | --- | --- | --- | --- | --- | |
| Fluoride | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| **Blank (3060475-BLK2)** | | | | | | Prepared: 06/18/13 14:37 | Analyzed: 06/19/13 14:03 | | | | | |
| **EPA 300.0** | | | | | | | | | | | | |
| Sulfate | ND | --- | 1.00 | mg/L | 1 | --- | --- | --- | --- | --- | --- | Q-16 |
| **LCS (3060475-BS1)** | | | | | | Prepared: 06/18/13 14:37 | Analyzed: 06/18/13 15:54 | | | | | |
| **EPA 300.0** | | | | | | | | | | | | |
| Chloride | 3.83 | --- | 1.00 | mg/L | 1 | 4.00 | --- | 96 | 90-110% | --- | --- | |
| Fluoride | 4.08 | --- | 1.00 | " | " | " | --- | 102 | " | --- | --- | |
| **LCS (3060475-BS2)** | | | | | | Prepared: 06/18/13 14:37 | Analyzed: 06/19/13 14:23 | | | | | |
| **EPA 300.0** | | | | | | | | | | | | |
| Sulfate | 8.50 | --- | 1.00 | mg/L | 1 | 8.00 | --- | 106 | 90-110% | --- | --- | Q-16 |
| **Duplicate (3060475-DUP1)** | | | | | | Prepared: 06/18/13 14:37 | Analyzed: 06/18/13 16:35 | | | | | |
| **QC Source Sample: Other (A3F0389-01)** | | | | | | | | | | | | |
| **EPA 300.0** | | | | | | | | | | | | |
| Chloride | **9.67** | --- | 1.00 | mg/L | 1 | --- | 9.66 | --- | --- | 0.01 | 15% | |
| Fluoride | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 15% | |
| **Duplicate (3060475-DUP2)** | | | | | | Prepared: 06/18/13 14:37 | Analyzed: 06/19/13 15:04 | | | | | |
| **QC Source Sample: Other (A3F0389-01)** | | | | | | | | | | | | |
| **EPA 300.0** | | | | | | | | | | | | |
| Sulfate | **10.0** | --- | 1.00 | mg/L | 1 | --- | 10.1 | --- | --- | 0.4 | 15% | Q-16 |
| **Matrix Spike (3060475-MS1)** | | | | | | Prepared: 06/18/13 14:37 | Analyzed: 06/18/13 16:55 | | | | | |
| **QC Source Sample: Other (A3F0389-01)** | | | | | | | | | | | | |
| **EPA 300.0** | | | | | | | | | | | | |
| Chloride | 14.1 | --- | 1.11 | mg/L | 1 | 4.44 | 9.66 | 100 | 80-120% | --- | --- | |
| Fluoride | 4.81 | --- | 1.11 | " | " | " | ND | 108 | " | --- | --- | |
| **Matrix Spike (3060475-MS2)** | | | | | | Prepared: 06/18/13 14:37 | Analyzed: 06/19/13 15:24 | | | | | |
| **QC Source Sample: Other (A3F0389-01)** | | | | | | | | | | | | |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Anions by EPA 300.0/9056A (Ion Chromatography)

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060475 - Method Prep: Aq** | | | | | | | Water | | | | | |
| **Matrix Spike (3060475-MS2)** | | | | | | Prepared: 06/18/13 14:37 | Analyzed: 06/19/13 15:24 | | | | | |
| **QC Source Sample: Other (A3F0389-01)** | | | | | | | | | | | | |
| **EPA 300.0** | | | | | | | | | | | | |
| Sulfate | 20.4 | --- | 1.25 | mg/L | 1 | 10.0 | 10.1 | 104 | 80-120% | --- | --- | Q-16 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Nitrate + Nitrite by EPA 353.2

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060429 - Method Prep: Aq** | | | | | | | **Water** | | | | | |
| **Blank (3060429-BLK1)** | | | | | | Prepared: 06/17/13 10:40 | Analyzed: 06/17/13 13:26 | | | | | |
| **EPA 353.2** | | | | | | | | | | | | |
| Nitrate+Nitrite Nitrogen | ND | --- | 0.0200 | mg/L | 1 | --- | --- | --- | --- | --- | --- | |
| **LCS (3060429-BS1)** | | | | | | Prepared: 06/17/13 10:40 | Analyzed: 06/17/13 13:27 | | | | | |
| **EPA 353.2** | | | | | | | | | | | | |
| Nitrate+Nitrite Nitrogen | 0.380 | --- | 0.0200 | mg/L | 1 | 0.375 | --- | 101 | 90-110% | --- | --- | |
| **Duplicate (3060429-DUP1)** | | | | | | Prepared: 06/17/13 10:40 | Analyzed: 06/17/13 13:30 | | | | | |
| **QC Source Sample: Other (A3F0138-01)** | | | | | | | | | | | | |
| **EPA 353.2** | | | | | | | | | | | | |
| Nitrate+Nitrite Nitrogen | **0.110** | --- | 0.0200 | mg/L | 1 | --- | 0.120 | --- | --- | 9 | 10% | |
| **Matrix Spike (3060429-MS1)** | | | | | | Prepared: 06/17/13 10:40 | Analyzed: 06/17/13 13:31 | | | | | |
| **QC Source Sample: Other (A3F0138-01)** | | | | | | | | | | | | |
| **EPA 353.2** | | | | | | | | | | | | |
| Nitrate+Nitrite Nitrogen | 0.530 | --- | 0.0208 | mg/L | 1 | 0.390 | 0.120 | 105 | 90-110% | --- | --- | |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Cyanide - Total (Aqueous)

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060341 - Method Prep: Aq** | | | | | | | **Water** | | | | | |
| **Blank (3060341-BLK1)** | | | | | | Prepared: 06/13/13 10:33 | Analyzed: 06/13/13 13:25 | | | | | |
| **EPA 335.4** | | | | | | | | | | | | |
| Cyanide, Total | ND | --- | 0.00500 | mg/L | 1 | --- | --- | --- | --- | --- | --- | |
| **LCS (3060341-BS1)** | | | | | | Prepared: 06/13/13 10:33 | Analyzed: 06/13/13 12:49 | | | | | |
| **EPA 335.4** | | | | | | | | | | | | |
| Cyanide, Total | 0.266 | --- | 0.00500 | mg/L | 1 | 0.250 | --- | 106 | 85-115% | --- | --- | |
| **Duplicate (3060341-DUP1)** | | | | | | Prepared: 06/13/13 10:33 | Analyzed: 06/13/13 12:53 | | | | | |
| **QC Source Sample: Other (A3F0234-01)** | | | | | | | | | | | | |
| **EPA 335.4** | | | | | | | | | | | | |
| Cyanide, Total | **0.00680** | --- | 0.00500 | mg/L | 1 | --- | ND | --- | --- | | 10% | |
| **Matrix Spike (3060341-MS1)** | | | | | | Prepared: 06/13/13 10:33 | Analyzed: 06/13/13 12:55 | | | | | |
| **QC Source Sample: Other (A3F0234-01)** | | | | | | | | | | | | |
| **EPA 335.4** | | | | | | | | | | | | |
| Cyanide, Total | 0.269 | --- | 0.00500 | mg/L | 1 | 0.250 | ND | 107 | 80-120% | --- | --- | |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Residual Chlorine Screen by SM4500CL-G (mod)

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060326 - Method Prep: Aq** | | | | | | | **Water** | | | | | |
| **Blank (3060326-BLK1)** | | | | | | Prepared: 06/12/13 16:13 | Analyzed: 06/12/13 16:34 | | | | | |
| **SM4500CL-G** | | | | | | | | | | | | |
| Residual Chlorine | ND | --- | 20.0 | ug/L | 1 | --- | --- | --- | --- | --- | --- | |
| **LCS (3060326-BS1)** | | | | | | Prepared: 06/12/13 16:13 | Analyzed: 06/12/13 16:34 | | | | | |
| **SM4500CL-G** | | | | | | | | | | | | |
| Residual Chlorine | 93.0 | --- | 20.0 | ug/L | 1 | 100 | --- | 93 | 85-115% | --- | --- | |
| **Duplicate (3060326-DUP1)** | | | | | | Prepared: 06/12/13 16:13 | Analyzed: 06/12/13 16:34 | | | | | |
| **QC Source Sample: SW-1 (A3F0244-01)** | | | | | | | | | | | | |
| **SM4500CL-G** | | | | | | | | | | | | |
| Residual Chlorine | **31.0** | --- | 20.0 | ug/L | 1 | --- | 30.0 | --- | --- | 3 | 20% | |
| **Matrix Spike (3060326-MS1)** | | | | | | Prepared: 06/12/13 16:13 | Analyzed: 06/12/13 16:34 | | | | | |
| **QC Source Sample: SW-1 (A3F0244-01)** | | | | | | | | | | | | |
| **SM4500CL-G** | | | | | | | | | | | | |
| Residual Chlorine | 30.2 | --- | 20.1 | ug/L | 1 | 101 | 30.0 | 0.1 | 80-120% | --- | --- | Q-02 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

**Batch 3060409 - EPA 3510C (Acid/Base Neutral)** — **Water**

**Blank (3060409-BLK1)** Prepared: 06/14/13 14:17 Analyzed: 06/17/13 09:25

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EPA 8270D** | | | | | | | | | | | | |
| Acenaphthene | ND | --- | 0.0182 | ug/L | 1 | --- | --- | --- | --- | --- | --- | |
| Acenaphthylene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Anthracene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Benz(a)anthracene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(a)pyrene | ND | --- | 0.0273 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(b)fluoranthene | ND | --- | 0.0273 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(k)fluoranthene | ND | --- | 0.0273 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(b+k)fluoranthene(s) | ND | --- | 0.0545 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(g,h,i)perylene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Chrysene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Dibenz(a,h)anthracene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Fluoranthene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Fluorene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Indeno(1,2,3-cd)pyrene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| 1-Methylnaphthalene | ND | --- | 0.0364 | " | " | --- | --- | --- | --- | --- | --- | |
| 2-Methylnaphthalene | ND | --- | 0.0364 | " | " | --- | --- | --- | --- | --- | --- | |
| Naphthalene | ND | --- | 0.0364 | " | " | --- | --- | --- | --- | --- | --- | |
| Phenanthrene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Pyrene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Carbazole | ND | --- | 0.0273 | " | " | --- | --- | --- | --- | --- | --- | |
| Dibenzofuran | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Chloro-3-methylphenol | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |
| 2-Chlorophenol | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| 2,4-Dichlorophenol | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| 2,4-Dimethylphenol | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| 2,4-Dinitrophenol | ND | --- | 0.455 | " | " | --- | --- | --- | --- | --- | --- | |
| 4,6-Dinitro-2-methylphenol | ND | --- | 0.455 | " | " | --- | --- | --- | --- | --- | --- | |
| 2-Methylphenol | **0.278** | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | B |
| 3+4-Methylphenol(s) | **0.284** | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | B, M-02 |
| 2-Nitrophenol | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Nitrophenol | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |
| Pentachlorophenol (PCP) | ND | --- | 0.364 | " | " | --- | --- | --- | --- | --- | --- | |
| Phenol | **4.41** | --- | 0.364 | " | " | --- | --- | --- | --- | --- | --- | B, Q-29 |
| 2,3,4,6-Tetrachlorophenol | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

**Batch 3060409 - EPA 3510C (Acid/Base Neutral)** **Water**

**Blank (3060409-BLK1)** Prepared: 06/14/13 14:17 Analyzed: 06/17/13 09:25

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | ND | --- | 0.0909 | ug/L | " | --- | --- | --- | --- | --- | --- | |
| 2,4,6-Trichlorophenol | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| Bis(2-ethylhexyl)phthalate | ND | --- | 2.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Butyl benzyl phthalate | ND | --- | 2.73 | " | " | --- | --- | --- | --- | --- | --- | |
| Diethylphthalate | ND | --- | 2.73 | " | " | --- | --- | --- | --- | --- | --- | |
| Dimethylphthalate | ND | --- | 2.73 | " | " | --- | --- | --- | --- | --- | --- | |
| Di-n-butylphthalate | ND | --- | 2.73 | " | " | --- | --- | --- | --- | --- | --- | |
| Di-n-octyl phthalate | ND | --- | 2.73 | " | " | --- | --- | --- | --- | --- | --- | |
| N-Nitrosodimethylamine | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| N-Nitroso-di-n-propylamine | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| N-Nitrosodiphenylamine | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| Bis(2-Chloroethoxy) methane | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| Bis(2-Chloroethyl) ether | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| Bis(2-Chloroisopropyl) ether | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| Hexachlorobenzene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Hexachlorobutadiene | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| Hexachlorocyclopentadiene | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| Hexachloroethane | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 2-Chloronaphthalene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,2-Dichlorobenzene | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,3-Dichlorobenzene | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,4-Dichlorobenzene | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,2,4-Trichlorobenzene | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Bromophenyl phenyl ether | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Chlorophenyl phenyl ether | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| Aniline | ND | --- | 0.164 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Chloroaniline | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 2-Nitroaniline | ND | --- | 0.364 | " | " | --- | --- | --- | --- | --- | --- | |
| 3-Nitroaniline | ND | --- | 0.364 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Nitroaniline | ND | --- | 0.364 | " | " | --- | --- | --- | --- | --- | --- | |
| Nitrobenzene | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |
| 2,4-Dinitrotoluene | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |
| 2,6-Dinitrotoluene | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzoic acid | ND | --- | 2.27 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzyl alcohol | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |

**EES Environmental Inc**
240 N Broadway Ste 203
Portland, OR 97227

Project: **Restorcap**
Project Number: 4008-01
Project Manager: Chris Rhea

**Reported:**
07/01/13 16:40

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060409 - EPA 3510C (Acid/Base Neutral)** | | | | | | | **Water** | | | | | |
| **Blank (3060409-BLK1)** | | | | | Prepared: 06/14/13 14:17 | | Analyzed: 06/17/13 09:25 | | | | | |
| Isophorone | ND | --- | 0.0455 | ug/L | " | --- | --- | --- | --- | --- | --- | |
| 3,3'-Dichlorobenzidine | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |
| *Surr: Nitrobenzene-d5 (Surr)* | | | *Recovery: 72 %* | *Limits: 35-120 %* | | | *Dilution: 1x* | | | | | |
| *2-Fluorobiphenyl (Surr)* | | | *70 %* | *30-120 %* | | | *"* | | | | | |
| *Phenol-d6 (Surr)* | | | *27 %* | *10-120 %* | | | *"* | | | | | |
| *p-Terphenyl-d14 (Surr)* | | | *87 %* | *30-125 %* | | | *"* | | | | | |
| *2-Fluorophenol (Surr)* | | | *41 %* | *15-120 %* | | | *"* | | | | | |
| *2,4,6-Tribromophenol (Surr)* | | | *79 %* | *35-125 %* | | | *"* | | | | | |
| **LCS (3060409-BS1)** | | | | | Prepared: 06/14/13 14:17 | | Analyzed: 06/17/13 10:02 | | | | | |
| **EPA 8270D** | | | | | | | | | | | | |
| Acenaphthene | 3.01 | --- | 0.0200 | ug/L | 1 | 4.00 | --- | 75 | 45-125% | --- | --- | |
| Acenaphthylene | 3.28 | --- | 0.0200 | " | " | " | --- | 82 | 50-125% | --- | --- | |
| Anthracene | 3.49 | --- | 0.0200 | " | " | " | --- | 87 | 55-125% | --- | --- | |
| Benz(a)anthracene | 3.80 | --- | 0.0200 | " | " | " | --- | 95 | " | --- | --- | |
| Benzo(a)pyrene | 3.84 | --- | 0.0300 | " | " | " | --- | 96 | " | --- | --- | |
| Benzo(b)fluoranthene | 4.35 | --- | 0.0300 | " | " | " | --- | 109 | 45-125% | --- | --- | |
| Benzo(k)fluoranthene | 4.16 | --- | 0.0300 | " | " | " | --- | 104 | " | --- | --- | |
| Benzo(b+k)fluoranthene(s) | 8.48 | --- | 0.0600 | " | " | 8.00 | --- | 106 | " | --- | --- | |
| Benzo(g,h,i)perylene | 3.77 | --- | 0.0200 | " | " | 4.00 | --- | 94 | 40-125% | --- | --- | |
| Chrysene | 3.75 | --- | 0.0200 | " | " | " | --- | 94 | 55-125% | --- | --- | |
| Dibenz(a,h)anthracene | 3.72 | --- | 0.0200 | " | " | " | --- | 93 | 40-125% | --- | --- | |
| Fluoranthene | 4.03 | --- | 0.0200 | " | " | " | --- | 101 | 55-125% | --- | --- | |
| Fluorene | 3.24 | --- | 0.0200 | " | " | " | --- | 81 | 50-125% | --- | --- | |
| Indeno(1,2,3-cd)pyrene | 3.75 | --- | 0.0200 | " | " | " | --- | 94 | 45-125% | --- | --- | |
| 1-Methylnaphthalene | 2.74 | --- | 0.0400 | " | " | " | --- | 68 | 45-120% | --- | --- | |
| 2-Methylnaphthalene | 2.80 | --- | 0.0400 | " | " | " | --- | 70 | " | --- | --- | |
| Naphthalene | 2.64 | --- | 0.0400 | " | " | " | --- | 66 | 40-125% | --- | --- | |
| Phenanthrene | 3.36 | --- | 0.0200 | " | " | " | --- | 84 | 50-125% | --- | --- | |
| Pyrene | 3.98 | --- | 0.0200 | " | " | " | --- | 100 | " | --- | --- | |
| Carbazole | 3.02 | --- | 0.0300 | " | " | " | --- | 76 | " | --- | --- | |
| Dibenzofuran | 3.18 | --- | 0.0200 | " | " | " | --- | 79 | 55-125% | --- | --- | |
| 4-Chloro-3-methylphenol | 3.51 | --- | 0.200 | " | " | " | --- | 88 | 45-120% | --- | --- | |
| 2-Chlorophenol | 3.11 | --- | 0.100 | " | " | " | --- | 78 | 35-120% | --- | --- | |
| 2,4-Dichlorophenol | 3.67 | --- | 0.100 | " | " | " | --- | 92 | 50-120% | --- | --- | |
| 2,4-Dimethylphenol | 3.21 | --- | 0.100 | " | " | " | --- | 80 | 30-120% | --- | --- | |

Apex Labs

**12232 S.W. Garden Place**
**Tigard, OR 97223**
**503-718-2323 Phone**
**503-718-0333 Fax**

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060409 - EPA 3510C (Acid/Base Neutral)** | | | | | | | **Water** | | | | | |
| **LCS (3060409-BS1)** | | | | | Prepared: 06/14/13 14:17 | | Analyzed: 06/17/13 10:02 | | | | | |
| 2,4-Dinitrophenol | 4.04 | --- | 0.500 | ug/L | " | " | --- | 101 | 15-130% | --- | --- | |
| 4,6-Dinitro-2-methylphenol | 4.19 | --- | 0.500 | " | " | " | --- | 105 | 40-135% | --- | --- | |
| 2-Methylphenol | 3.63 | --- | 0.0500 | " | " | " | --- | 91 | 40-120% | --- | --- | B |
| 3+4-Methylphenol(s) | 3.54 | --- | 0.0500 | " | " | " | --- | 88 | 30-120% | --- | --- | B |
| 2-Nitrophenol | 3.25 | --- | 0.200 | " | " | " | --- | 81 | 40-120% | --- | --- | |
| 4-Nitrophenol | 1.30 | --- | 0.200 | " | " | " | --- | 33 | 10-140% | --- | --- | |
| Pentachlorophenol (PCP) | 3.59 | --- | 0.400 | " | " | " | --- | 90 | 40-125% | --- | --- | |
| Phenol | 13.5 | --- | 0.400 | " | " | " | --- | 338 | 10-120% | --- | --- | B, Q-29 |
| 2,3,4,6-Tetrachlorophenol | 3.59 | --- | 0.100 | " | " | " | --- | 90 | 40-120% | --- | --- | |
| 2,4,5-Trichlorophenol | 3.46 | --- | 0.100 | " | " | " | --- | 86 | 50-120% | --- | --- | |
| 2,4,6-Trichlorophenol | 3.39 | --- | 0.100 | " | " | " | --- | 85 | " | --- | --- | |
| Bis(2-ethylhexyl)phthalate | 4.11 | --- | 2.20 | " | " | " | --- | 103 | 40-125% | --- | --- | |
| Butyl benzyl phthalate | 4.38 | --- | 3.00 | " | " | " | --- | 110 | 45-125% | --- | --- | |
| Diethylphthalate | 3.80 | --- | 3.00 | " | " | " | --- | 95 | 40-125% | --- | --- | |
| Dimethylphthalate | 3.60 | --- | 3.00 | " | " | " | --- | 90 | 25-125% | --- | --- | |
| Di-n-butylphthalate | 4.60 | --- | 3.00 | " | " | " | --- | 115 | 55-125% | --- | --- | |
| Di-n-octyl phthalate | 4.39 | --- | 3.00 | " | " | " | --- | 110 | 35-125% | --- | --- | |
| N-Nitrosodimethylamine | 1.89 | --- | 0.0500 | " | " | " | --- | 47 | 25-120% | --- | --- | |
| N-Nitroso-di-n-propylamine | 2.94 | --- | 0.0500 | " | " | " | --- | 73 | 35-120% | --- | --- | |
| N-Nitrosodiphenylamine | 3.46 | --- | 0.0500 | " | " | " | --- | 87 | 50-120% | --- | --- | |
| Bis(2-Chloroethoxy) methane | 3.00 | --- | 0.0500 | " | " | " | --- | 75 | 45-125% | --- | --- | |
| Bis(2-Chloroethyl) ether | 2.82 | --- | 0.0500 | " | " | " | --- | 70 | 35-125% | --- | --- | |
| Bis(2-Chloroisopropyl) ether | 2.22 | --- | 0.0500 | " | " | " | --- | 55 | 25-125% | --- | --- | |
| Hexachlorobenzene | 3.51 | --- | 0.0200 | " | " | " | --- | 88 | 50-120% | --- | --- | |
| Hexachlorobutadiene | 2.57 | --- | 0.0500 | " | " | " | --- | 64 | 25-120% | --- | --- | |
| Hexachlorocyclopentadiene | 2.51 | --- | 0.100 | " | " | " | --- | 63 | 30-120% | --- | --- | |
| Hexachloroethane | 2.31 | --- | 0.0500 | " | " | " | --- | 58 | " | --- | --- | |
| 2-Chloronaphthalene | 2.89 | --- | 0.0200 | " | " | " | --- | 72 | 50-120% | --- | --- | |
| 1,2-Dichlorobenzene | 2.27 | --- | 0.0500 | " | " | " | --- | 57 | 35-120% | --- | --- | |
| 1,3-Dichlorobenzene | 2.21 | --- | 0.0500 | " | " | " | --- | 55 | 30-120% | --- | --- | |
| 1,4-Dichlorobenzene | 2.23 | --- | 0.0500 | " | " | " | --- | 56 | " | --- | --- | |
| 1,2,4-Trichlorobenzene | 2.57 | --- | 0.0500 | " | " | " | --- | 64 | 35-120% | --- | --- | |
| 4-Bromophenyl phenyl ether | 3.49 | --- | 0.0500 | " | " | " | --- | 87 | 50-120% | --- | --- | |
| 4-Chlorophenyl phenyl ether | 3.25 | --- | 0.0500 | " | " | " | --- | 81 | " | --- | --- | |
| Aniline | 2.17 | --- | 0.180 | " | " | " | --- | 54 | 40-120% | --- | --- | |

**EES Environmental Inc**
240 N Broadway Ste 203
Portland, OR 97227

Project: **Restorcap**
Project Number: 4008-01
Project Manager: Chris Rhea

**Reported:**
07/01/13 16:40

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

**Batch 3060409 - EPA 3510C (Acid/Base Neutral)** **Water**

**LCS (3060409-BS1)** Prepared: 06/14/13 14:17 Analyzed: 06/17/13 10:02

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4-Chloroaniline | 2.10 | --- | 0.0500 | ug/L | " | " | --- | 52 | 15-120% | --- | --- | |
| 2-Nitroaniline | 3.34 | --- | 0.400 | " | " | " | --- | 83 | 50-120% | --- | --- | |
| 3-Nitroaniline | 2.35 | --- | 0.400 | " | " | " | --- | 59 | 20-120% | --- | --- | |
| 4-Nitroaniline | 2.31 | --- | 0.400 | " | " | " | --- | 58 | 35-120% | --- | --- | |
| Nitrobenzene | 3.11 | --- | 0.200 | " | " | " | --- | 78 | 45-120% | --- | --- | |
| 2,4-Dinitrotoluene | 3.79 | --- | 0.200 | " | " | " | --- | 95 | 50-120% | --- | --- | |
| 2,6-Dinitrotoluene | 3.86 | --- | 0.200 | " | " | " | --- | 96 | " | --- | --- | |
| Benzoic acid | 3.47 | --- | 2.50 | " | " | 8.00 | --- | 43 | 10-120% | --- | --- | |
| Benzyl alcohol | 3.00 | --- | 0.200 | " | " | 4.00 | --- | 75 | 30-125% | --- | --- | |
| Isophorone | 3.14 | --- | 0.0500 | " | " | " | --- | 79 | 45-120% | --- | --- | |
| 3,3'-Dichlorobenzidine | 7.76 | --- | 0.200 | " | " | 8.00 | --- | 97 | 10-130% | --- | --- | Q-41 |
| *Surr: Nitrobenzene-d5 (Surr)* | | *Recovery:* | *77 %* | *Limits:* | *35-120 %* | *Dilution:* | *1x* | | | | | |
| *2-Fluorobiphenyl (Surr)* | | | *81 %* | | *30-120 %* | | *"* | | | | | |
| *Phenol-d6 (Surr)* | | | *31 %* | | *10-120 %* | | *"* | | | | | |
| *p-Terphenyl-d14 (Surr)* | | | *86 %* | | *30-125 %* | | *"* | | | | | |
| *2-Fluorophenol (Surr)* | | | *46 %* | | *15-120 %* | | *"* | | | | | |
| *2,4,6-Tribromophenol (Surr)* | | | *92 %* | | *35-125 %* | | *"* | | | | | |

**LCS Dup (3060409-BSD1)** Prepared: 06/14/13 14:18 Analyzed: 06/17/13 10:39 Q-19

**EPA 8270D**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 3.19 | --- | 0.0200 | ug/L | 1 | 4.00 | --- | 80 | 45-125% | 6 | 30% | |
| Acenaphthylene | 3.46 | --- | 0.0200 | " | " | " | --- | 86 | 50-125% | 5 | 30% | |
| Anthracene | 3.59 | --- | 0.0200 | " | " | " | --- | 90 | 55-125% | 3 | 30% | |
| Benz(a)anthracene | 3.98 | --- | 0.0200 | " | " | " | --- | 100 | " | 5 | 30% | |
| Benzo(a)pyrene | 4.00 | --- | 0.0300 | " | " | " | --- | 100 | " | 4 | 30% | |
| Benzo(b)fluoranthene | 4.64 | --- | 0.0300 | " | " | " | --- | 116 | 45-125% | 6 | 30% | |
| Benzo(k)fluoranthene | 4.30 | --- | 0.0300 | " | " | " | --- | 107 | " | 3 | 30% | |
| Benzo(b+k)fluoranthene(s) | 8.91 | --- | 0.0600 | " | " | 8.00 | --- | 111 | " | 5 | 30% | |
| Benzo(g,h,i)perylene | 3.91 | --- | 0.0200 | " | " | 4.00 | --- | 98 | 40-125% | 4 | 30% | |
| Chrysene | 3.91 | --- | 0.0200 | " | " | " | --- | 98 | 55-125% | 4 | 30% | |
| Dibenz(a,h)anthracene | 3.86 | --- | 0.0200 | " | " | " | --- | 97 | 40-125% | 4 | 30% | |
| Fluoranthene | 4.21 | --- | 0.0200 | " | " | " | --- | 105 | 55-125% | 4 | 30% | |
| Fluorene | 3.36 | --- | 0.0200 | " | " | " | --- | 84 | 50-125% | 4 | 30% | |
| Indeno(1,2,3-cd)pyrene | 3.94 | --- | 0.0200 | " | " | " | --- | 98 | 45-125% | 5 | 30% | |
| 1-Methylnaphthalene | 3.09 | --- | 0.0400 | " | " | " | --- | 77 | 45-120% | 12 | 30% | |
| 2-Methylnaphthalene | 3.16 | --- | 0.0400 | " | " | " | --- | 79 | " | 12 | 30% | |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060409 - EPA 3510C (Acid/Base Neutral)** | | | | | | | **Water** | | | | | |
| **LCS Dup (3060409-BSD1)** | | | | | | Prepared: 06/14/13 14:18 | Analyzed: 06/17/13 10:39 | | | | | Q-19 |
| Naphthalene | 2.98 | --- | 0.0400 | ug/L | " | " | --- | 74 | 40-125% | 12 | 30% | |
| Phenanthrene | 3.47 | --- | 0.0200 | " | " | " | --- | 87 | 50-125% | 3 | 30% | |
| Pyrene | 4.17 | --- | 0.0200 | " | " | " | --- | 104 | " | 5 | 30% | |
| Carbazole | 3.26 | --- | 0.0300 | " | " | " | --- | 81 | " | 8 | 30% | |
| Dibenzofuran | 3.35 | --- | 0.0200 | " | " | " | --- | 84 | 55-125% | 5 | 30% | |
| 4-Chloro-3-methylphenol | 3.60 | --- | 0.200 | " | " | " | --- | 90 | 45-120% | 2 | 30% | |
| 2-Chlorophenol | 3.11 | --- | 0.100 | " | " | " | --- | 78 | 35-120% | 0.2 | 30% | |
| 2,4-Dichlorophenol | 3.75 | --- | 0.100 | " | " | " | --- | 94 | 50-120% | 2 | 30% | |
| 2,4-Dimethylphenol | 3.08 | --- | 0.100 | " | " | " | --- | 77 | 30-120% | 4 | 30% | |
| 2,4-Dinitrophenol | 4.20 | --- | 0.500 | " | " | " | --- | 105 | 15-130% | 4 | 30% | |
| 4,6-Dinitro-2-methylphenol | 4.38 | --- | 0.500 | " | " | " | --- | 110 | 40-135% | 5 | 30% | |
| 2-Methylphenol | 3.36 | --- | 0.0500 | " | " | " | --- | 84 | 40-120% | 7 | 30% | B |
| 3+4-Methylphenol(s) | 3.27 | --- | 0.0500 | " | " | " | --- | 82 | 30-120% | 8 | 30% | B |
| 2-Nitrophenol | 3.37 | --- | 0.200 | " | " | " | --- | 84 | 40-120% | 4 | 30% | |
| 4-Nitrophenol | 1.32 | --- | 0.200 | " | " | " | --- | 33 | 10-140% | 1 | 30% | |
| Pentachlorophenol (PCP) | 3.69 | --- | 0.400 | " | " | " | --- | 92 | 40-125% | 3 | 30% | |
| Phenol | 10.5 | --- | 0.400 | " | " | " | --- | 263 | 10-120% | 25 | 30% | B, Q-29 |
| 2,3,4,6-Tetrachlorophenol | 3.69 | --- | 0.100 | " | " | " | --- | 92 | 40-120% | 3 | 30% | |
| 2,4,5-Trichlorophenol | 3.49 | --- | 0.100 | " | " | " | --- | 87 | 50-120% | 0.9 | 30% | |
| 2,4,6-Trichlorophenol | 3.48 | --- | 0.100 | " | " | " | --- | 87 | " | 2 | 30% | |
| Bis(2-ethylhexyl)phthalate | 4.34 | --- | 2.20 | " | " | " | --- | 108 | 40-125% | 6 | 30% | |
| Butyl benzyl phthalate | 4.60 | --- | 3.00 | " | " | " | --- | 115 | 45-125% | 5 | 30% | |
| Diethylphthalate | 3.95 | --- | 3.00 | " | " | " | --- | 99 | 40-125% | 4 | 30% | |
| Dimethylphthalate | 3.68 | --- | 3.00 | " | " | " | --- | 92 | 25-125% | 2 | 30% | |
| Di-n-butylphthalate | 4.87 | --- | 3.00 | " | " | " | --- | 122 | 55-125% | 6 | 30% | |
| Di-n-octyl phthalate | 4.62 | --- | 3.00 | " | " | " | --- | 116 | 35-125% | 5 | 30% | |
| N-Nitrosodimethylamine | 1.89 | --- | 0.0500 | " | " | " | --- | 47 | 25-120% | 0.2 | 30% | |
| N-Nitroso-di-n-propylamine | 2.97 | --- | 0.0500 | " | " | " | --- | 74 | 35-120% | 1 | 30% | |
| N-Nitrosodiphenylamine | 3.57 | --- | 0.0500 | " | " | " | --- | 89 | 50-120% | 3 | 30% | |
| Bis(2-Chloroethoxy) methane | 3.05 | --- | 0.0500 | " | " | " | --- | 76 | 45-125% | 2 | 30% | |
| Bis(2-Chloroethyl) ether | 2.90 | --- | 0.0500 | " | " | " | --- | 72 | 35-125% | 3 | 30% | |
| Bis(2-Chloroisopropyl) ether | 2.32 | --- | 0.0500 | " | " | " | --- | 58 | 25-125% | 5 | 30% | |
| Hexachlorobenzene | 3.63 | --- | 0.0200 | " | " | " | --- | 91 | 50-120% | 3 | 30% | |
| Hexachlorobutadiene | 3.19 | --- | 0.0500 | " | " | " | --- | 80 | 25-120% | 21 | 30% | |
| Hexachlorocyclopentadiene | 2.93 | --- | 0.100 | " | " | " | --- | 73 | 30-120% | 15 | 30% | |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

**Batch 3060409 - EPA 3510C (Acid/Base Neutral)** **Water**

**LCS Dup (3060409-BSD1)** Prepared: 06/14/13 14:18 Analyzed: 06/17/13 10:39 Q-19

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hexachloroethane | 2.87 | --- | 0.0500 | ug/L | " | " | --- | 72 | " | 22 | 30% | |
| 2-Chloronaphthalene | 3.17 | --- | 0.0200 | " | " | " | --- | 79 | 50-120% | 9 | 30% | |
| 1,2-Dichlorobenzene | 2.73 | --- | 0.0500 | " | " | " | --- | 68 | 35-120% | 19 | 30% | |
| 1,3-Dichlorobenzene | 2.63 | --- | 0.0500 | " | " | " | --- | 66 | 30-120% | 18 | 30% | |
| 1,4-Dichlorobenzene | 2.65 | --- | 0.0500 | " | " | " | --- | 66 | " | 17 | 30% | |
| 1,2,4-Trichlorobenzene | 3.08 | --- | 0.0500 | " | " | " | --- | 77 | 35-120% | 18 | 30% | |
| 4-Bromophenyl phenyl ether | 3.60 | --- | 0.0500 | " | " | " | --- | 90 | 50-120% | 3 | 30% | |
| 4-Chlorophenyl phenyl ether | 3.41 | --- | 0.0500 | " | " | " | --- | 85 | " | 5 | 30% | |
| Aniline | 2.20 | --- | 0.180 | " | " | " | --- | 55 | 40-120% | 1 | 30% | |
| 4-Chloroaniline | 2.41 | --- | 0.0500 | " | " | " | --- | 60 | 15-120% | 14 | 30% | |
| 2-Nitroaniline | 3.50 | --- | 0.400 | " | " | " | --- | 88 | 50-120% | 5 | 30% | |
| 3-Nitroaniline | 2.49 | --- | 0.400 | " | " | " | --- | 62 | 20-120% | 6 | 30% | |
| 4-Nitroaniline | 2.39 | --- | 0.400 | " | " | " | --- | 60 | 35-120% | 4 | 30% | |
| Nitrobenzene | 3.11 | --- | 0.200 | " | " | " | --- | 78 | 45-120% | 0.04 | 30% | |
| 2,4-Dinitrotoluene | 3.94 | --- | 0.200 | " | " | " | --- | 98 | 50-120% | 4 | 30% | |
| 2,6-Dinitrotoluene | 3.91 | --- | 0.200 | " | " | " | --- | 98 | " | 1 | 30% | |
| Benzoic acid | 3.43 | --- | 2.50 | " | " | 8.00 | --- | 43 | 10-120% | 1 | 30% | |
| Benzyl alcohol | 2.99 | --- | 0.200 | " | " | 4.00 | --- | 75 | 30-125% | 0.5 | 30% | |
| Isophorone | 3.22 | --- | 0.0500 | " | " | " | --- | 80 | 45-120% | 2 | 30% | |
| 3,3'-Dichlorobenzidine | 8.54 | --- | 0.200 | " | " | 8.00 | --- | 107 | 10-130% | 10 | 30% | Q-41 |

| Surr: | Recovery: | Limits: | Dilution: |
|---|---|---|---|
| *Nitrobenzene-d5 (Surr)* | *77 %* | *35-120 %* | *1x* |
| *2-Fluorobiphenyl (Surr)* | *83 %* | *30-120 %* | *"* |
| *Phenol-d6 (Surr)* | *32 %* | *10-120 %* | *"* |
| *p-Terphenyl-d14 (Surr)* | *91 %* | *30-125 %* | *"* |
| *2-Fluorophenol (Surr)* | *47 %* | *15-120 %* | *"* |
| *2,4,6-Tribromophenol (Surr)* | *95 %* | *35-125 %* | *"* |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

**Batch 3060448 - EPA 3510C (Acid/Base Neutral)** **Water**

**Blank (3060448-BLK1)** Prepared: 06/18/13 07:12 Analyzed: 06/19/13 10:35

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EPA 8270D** | | | | | | | | | | | | |
| Acenaphthene | ND | --- | 0.0182 | ug/L | 1 | --- | --- | --- | --- | --- | --- | |
| Acenaphthylene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Anthracene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Benz(a)anthracene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(a)pyrene | ND | --- | 0.0273 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(b)fluoranthene | ND | --- | 0.0273 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(k)fluoranthene | ND | --- | 0.0273 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(b+k)fluoranthene(s) | ND | --- | 0.0545 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(g,h,i)perylene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Chrysene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Dibenz(a,h)anthracene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Fluoranthene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Fluorene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Indeno(1,2,3-cd)pyrene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| 1-Methylnaphthalene | ND | --- | 0.0364 | " | " | --- | --- | --- | --- | --- | --- | |
| 2-Methylnaphthalene | ND | --- | 0.0364 | " | " | --- | --- | --- | --- | --- | --- | |
| Naphthalene | ND | --- | 0.0364 | " | " | --- | --- | --- | --- | --- | --- | |
| Phenanthrene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | B-02 |
| Pyrene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Carbazole | ND | --- | 0.0273 | " | " | --- | --- | --- | --- | --- | --- | |
| Dibenzofuran | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Chloro-3-methylphenol | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |
| 2-Chlorophenol | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| 2,4-Dichlorophenol | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| 2,4-Dimethylphenol | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| 2,4-Dinitrophenol | ND | --- | 0.455 | " | " | --- | --- | --- | --- | --- | --- | |
| 4,6-Dinitro-2-methylphenol | ND | --- | 0.455 | " | " | --- | --- | --- | --- | --- | --- | |
| 2-Methylphenol | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 3+4-Methylphenol(s) | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 2-Nitrophenol | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Nitrophenol | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |
| Pentachlorophenol (PCP) | ND | --- | 0.364 | " | " | --- | --- | --- | --- | --- | --- | |
| Phenol | ND | --- | 0.364 | " | " | --- | --- | --- | --- | --- | --- | |
| 2,3,4,6-Tetrachlorophenol | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |

Philip Nerenberg

Philip Nerenberg, Lab Director

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

**Batch 3060448 - EPA 3510C (Acid/Base Neutral)** **Water**

**Blank (3060448-BLK1)** Prepared: 06/18/13 07:12 Analyzed: 06/19/13 10:35

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,4,5-Trichlorophenol | ND | --- | 0.0909 | ug/L | " | --- | --- | --- | --- | --- | --- | |
| 2,4,6-Trichlorophenol | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| Bis(2-ethylhexyl)phthalate | ND | --- | 2.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Butyl benzyl phthalate | ND | --- | 2.73 | " | " | --- | --- | --- | --- | --- | --- | |
| Diethylphthalate | ND | --- | 2.73 | " | " | --- | --- | --- | --- | --- | --- | |
| Dimethylphthalate | ND | --- | 2.73 | " | " | --- | --- | --- | --- | --- | --- | |
| Di-n-butylphthalate | ND | --- | 2.73 | " | " | --- | --- | --- | --- | --- | --- | |
| Di-n-octyl phthalate | ND | --- | 2.73 | " | " | --- | --- | --- | --- | --- | --- | |
| N-Nitrosodimethylamine | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| N-Nitroso-di-n-propylamine | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| N-Nitrosodiphenylamine | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| Bis(2-Chloroethoxy) methane | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| Bis(2-Chloroethyl) ether | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| Bis(2-Chloroisopropyl) ether | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| Hexachlorobenzene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| Hexachlorobutadiene | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| Hexachlorocyclopentadiene | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| Hexachloroethane | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 2-Chloronaphthalene | ND | --- | 0.0182 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,2-Dichlorobenzene | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,3-Dichlorobenzene | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,4-Dichlorobenzene | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 1,2,4-Trichlorobenzene | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Bromophenyl phenyl ether | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Chlorophenyl phenyl ether | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| Aniline | ND | --- | 0.0909 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Chloroaniline | ND | --- | 0.0455 | " | " | --- | --- | --- | --- | --- | --- | |
| 2-Nitroaniline | ND | --- | 0.364 | " | " | --- | --- | --- | --- | --- | --- | |
| 3-Nitroaniline | ND | --- | 0.364 | " | " | --- | --- | --- | --- | --- | --- | |
| 4-Nitroaniline | ND | --- | 0.364 | " | " | --- | --- | --- | --- | --- | --- | |
| Nitrobenzene | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |
| 2,4-Dinitrotoluene | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |
| 2,6-Dinitrotoluene | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzoic acid | ND | --- | 2.27 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzyl alcohol | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

**Batch 3060448 - EPA 3510C (Acid/Base Neutral)** — **Water**

**Blank (3060448-BLK1)** Prepared: 06/18/13 07:12 Analyzed: 06/19/13 10:35

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Isophorone | ND | --- | 0.0455 | ug/L | " | --- | --- | --- | --- | --- | --- | |
| 3,3'-Dichlorobenzidine | ND | --- | 0.182 | " | " | --- | --- | --- | --- | --- | --- | |

| Surr: | Recovery: | Limits: | Dilution: |
|---|---|---|---|
| *Nitrobenzene-d5 (Surr)* | *74 %* | *35-120 %* | *1x* |
| *2-Fluorobiphenyl (Surr)* | *77 %* | *30-120 %* | *"* |
| *Phenol-d6 (Surr)* | *22 %* | *10-120 %* | *"* |
| *p-Terphenyl-d14 (Surr)* | *94 %* | *30-125 %* | *"* |
| *2-Fluorophenol (Surr)* | *40 %* | *15-120 %* | *"* |
| *2,4,6-Tribromophenol (Surr)* | *89 %* | *35-125 %* | *"* |

**LCS (3060448-BS1)** Prepared: 06/18/13 07:12 Analyzed: 06/19/13 11:11

**EPA 8270D**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 3.44 | --- | 0.0200 | ug/L | 1 | 4.00 | --- | 86 | 45-125% | --- | --- | |
| Acenaphthylene | 3.68 | --- | 0.0200 | " | " | " | --- | 92 | 50-125% | --- | --- | |
| Anthracene | 3.82 | --- | 0.0200 | " | " | " | --- | 96 | 55-125% | --- | --- | |
| Benz(a)anthracene | 4.07 | --- | 0.0200 | " | " | " | --- | 102 | " | --- | --- | |
| Benzo(a)pyrene | 4.10 | --- | 0.0300 | " | " | " | --- | 103 | " | --- | --- | |
| Benzo(b)fluoranthene | 4.69 | --- | 0.0300 | " | " | " | --- | 117 | 45-125% | --- | --- | |
| Benzo(k)fluoranthene | 4.36 | --- | 0.0300 | " | " | " | --- | 109 | " | --- | --- | |
| Benzo(b+k)fluoranthene(s) | 9.01 | --- | 0.0600 | " | " | 8.00 | --- | 113 | " | --- | --- | |
| Benzo(g,h,i)perylene | 3.95 | --- | 0.0200 | " | " | 4.00 | --- | 99 | 40-125% | --- | --- | |
| Chrysene | 4.02 | --- | 0.0200 | " | " | " | --- | 101 | 55-125% | --- | --- | |
| Dibenz(a,h)anthracene | 4.03 | --- | 0.0200 | " | " | " | --- | 101 | 40-125% | --- | --- | |
| Fluoranthene | 4.34 | --- | 0.0200 | " | " | " | --- | 109 | 55-125% | --- | --- | |
| Fluorene | 3.59 | --- | 0.0200 | " | " | " | --- | 90 | 50-125% | --- | --- | |
| Indeno(1,2,3-cd)pyrene | 3.97 | --- | 0.0200 | " | " | " | --- | 99 | 45-125% | --- | --- | |
| 1-Methylnaphthalene | 3.36 | --- | 0.0400 | " | " | " | --- | 84 | 45-120% | --- | --- | |
| 2-Methylnaphthalene | 3.46 | --- | 0.0400 | " | " | " | --- | 86 | " | --- | --- | |
| Naphthalene | 3.15 | --- | 0.0400 | " | " | " | --- | 79 | 40-125% | --- | --- | |
| Phenanthrene | 3.63 | --- | 0.0200 | " | " | " | --- | 91 | 50-125% | --- | --- | B-02 |
| Pyrene | 4.32 | --- | 0.0200 | " | " | " | --- | 108 | " | --- | --- | |
| Carbazole | 3.77 | --- | 0.0300 | " | " | " | --- | 94 | " | --- | --- | |
| Dibenzofuran | 3.57 | --- | 0.0200 | " | " | " | --- | 89 | 55-125% | --- | --- | |
| 4-Chloro-3-methylphenol | 3.88 | --- | 0.200 | " | " | " | --- | 97 | 45-120% | --- | --- | |
| 2-Chlorophenol | 3.15 | --- | 0.100 | " | " | " | --- | 79 | 35-120% | --- | --- | |
| 2,4-Dichlorophenol | 3.92 | --- | 0.100 | " | " | " | --- | 98 | 50-120% | --- | --- | |
| 2,4-Dimethylphenol | 3.52 | --- | 0.100 | " | " | " | --- | 88 | 30-120% | --- | --- | |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

**Batch 3060448 - EPA 3510C (Acid/Base Neutral)** — **Water**

**LCS (3060448-BS1)** Prepared: 06/18/13 07:12 Analyzed: 06/19/13 11:11

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,4-Dinitrophenol | 4.43 | --- | 0.500 | ug/L | " | " | --- | 111 | 15-130% | --- | --- | |
| 4,6-Dinitro-2-methylphenol | 4.56 | --- | 0.500 | " | " | " | --- | 114 | 40-135% | --- | --- | Q-41 |
| 2-Methylphenol | 2.74 | --- | 0.0500 | " | " | " | --- | 68 | 40-120% | --- | --- | |
| 3+4-Methylphenol(s) | 2.57 | --- | 0.0500 | " | " | " | --- | 64 | 30-120% | --- | --- | |
| 2-Nitrophenol | 3.55 | --- | 0.200 | " | " | " | --- | 89 | 40-120% | --- | --- | |
| 4-Nitrophenol | 1.29 | --- | 0.200 | " | " | " | --- | 32 | 10-140% | --- | --- | |
| Pentachlorophenol (PCP) | 3.84 | --- | 0.400 | " | " | " | --- | 96 | 40-125% | --- | --- | |
| Phenol | 1.45 | --- | 0.400 | " | " | " | --- | 36 | 10-120% | --- | --- | |
| 2,3,4,6-Tetrachlorophenol | 3.97 | --- | 0.100 | " | " | " | --- | 99 | 40-120% | --- | --- | |
| 2,4,5-Trichlorophenol | 3.86 | --- | 0.100 | " | " | " | --- | 96 | 50-120% | --- | --- | |
| 2,4,6-Trichlorophenol | 3.73 | --- | 0.100 | " | " | " | --- | 93 | " | --- | --- | |
| Bis(2-ethylhexyl)phthalate | 4.35 | --- | 2.20 | " | " | " | --- | 109 | 40-125% | --- | --- | |
| Butyl benzyl phthalate | 4.62 | --- | 3.00 | " | " | " | --- | 116 | 45-125% | --- | --- | |
| Diethylphthalate | 4.04 | --- | 3.00 | " | " | " | --- | 101 | 40-125% | --- | --- | |
| Dimethylphthalate | 3.94 | --- | 3.00 | " | " | " | --- | 99 | 25-125% | --- | --- | |
| Di-n-butylphthalate | 4.87 | --- | 3.00 | " | " | " | --- | 122 | 55-125% | --- | --- | |
| Di-n-octyl phthalate | 4.42 | --- | 3.00 | " | " | " | --- | 110 | 35-125% | --- | --- | |
| N-Nitrosodimethylamine | 1.89 | --- | 0.0500 | " | " | " | --- | 47 | 25-120% | --- | --- | |
| N-Nitroso-di-n-propylamine | 3.16 | --- | 0.0500 | " | " | " | --- | 79 | 35-120% | --- | --- | |
| N-Nitrosodiphenylamine | 3.85 | --- | 0.0500 | " | " | " | --- | 96 | 50-120% | --- | --- | |
| Bis(2-Chloroethoxy) methane | 3.21 | --- | 0.0500 | " | " | " | --- | 80 | 45-125% | --- | --- | |
| Bis(2-Chloroethyl) ether | 3.12 | --- | 0.0500 | " | " | " | --- | 78 | 35-125% | --- | --- | |
| Bis(2-Chloroisopropyl) ether | 2.34 | --- | 0.0500 | " | " | " | --- | 58 | 25-125% | --- | --- | Q-31 |
| Hexachlorobenzene | 3.85 | --- | 0.0200 | " | " | " | --- | 96 | 50-120% | --- | --- | |
| Hexachlorobutadiene | 3.42 | --- | 0.0500 | " | " | " | --- | 86 | 25-120% | --- | --- | |
| Hexachlorocyclopentadiene | 3.29 | --- | 0.100 | " | " | " | --- | 82 | 30-120% | --- | --- | |
| Hexachloroethane | 3.13 | --- | 0.0500 | " | " | " | --- | 78 | " | --- | --- | |
| 2-Chloronaphthalene | 3.43 | --- | 0.0200 | " | " | " | --- | 86 | 50-120% | --- | --- | |
| 1,2-Dichlorobenzene | 2.91 | --- | 0.0500 | " | " | " | --- | 73 | 35-120% | --- | --- | |
| 1,3-Dichlorobenzene | 2.87 | --- | 0.0500 | " | " | " | --- | 72 | 30-120% | --- | --- | |
| 1,4-Dichlorobenzene | 2.85 | --- | 0.0500 | " | " | " | --- | 71 | " | --- | --- | |
| 1,2,4-Trichlorobenzene | 3.29 | --- | 0.0500 | " | " | " | --- | 82 | 35-120% | --- | --- | |
| 4-Bromophenyl phenyl ether | 3.87 | --- | 0.0500 | " | " | " | --- | 97 | 50-120% | --- | --- | |
| 4-Chlorophenyl phenyl ether | 3.65 | --- | 0.0500 | " | " | " | --- | 91 | " | --- | --- | |
| Aniline | 2.70 | --- | 0.100 | " | " | " | --- | 68 | 40-120% | --- | --- | Q-31 |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060448 - EPA 3510C (Acid/Base Neutral)** | | | | | | | **Water** | | | | | |
| **LCS (3060448-BS1)** | | | | | | Prepared: 06/18/13 07:12 | Analyzed: 06/19/13 11:11 | | | | | |
| 4-Chloroaniline | 3.27 | --- | 0.0500 | ug/L | " | " | --- | 82 | 15-120% | --- | --- | |
| 2-Nitroaniline | 3.83 | --- | 0.400 | " | " | " | --- | 96 | 50-120% | --- | --- | |
| 3-Nitroaniline | 3.71 | --- | 0.400 | " | " | " | --- | 93 | 20-120% | --- | --- | |
| 4-Nitroaniline | 3.48 | --- | 0.400 | " | " | " | --- | 87 | 35-120% | --- | --- | |
| Nitrobenzene | 3.13 | --- | 0.200 | " | " | " | --- | 78 | 45-120% | --- | --- | |
| 2,4-Dinitrotoluene | 4.18 | --- | 0.200 | " | " | " | --- | 104 | 50-120% | --- | --- | |
| 2,6-Dinitrotoluene | 4.22 | --- | 0.200 | " | " | " | --- | 105 | " | --- | --- | |
| Benzoic acid | 3.41 | --- | 2.50 | " | " | 8.00 | --- | 43 | 10-120% | --- | --- | |
| Benzyl alcohol | 2.99 | --- | 0.200 | " | " | 4.00 | --- | 75 | 30-125% | --- | --- | |
| Isophorone | 3.43 | --- | 0.0500 | " | " | " | --- | 86 | 45-120% | --- | --- | |
| 3,3'-Dichlorobenzidine | 13.2 | --- | 0.200 | " | " | 8.00 | --- | 165 | 10-130% | --- | --- | Q-29, Q-41 |
| *Surr: Nitrobenzene-d5 (Surr)* | | *Recovery:* | *77 %* | *Limits:* | *35-120 %* | *Dilution:* | *1x* | | | | | |
| *2-Fluorobiphenyl (Surr)* | | | *85 %* | | *30-120 %* | | *"* | | | | | |
| *Phenol-d6 (Surr)* | | | *29 %* | | *10-120 %* | | *"* | | | | | |
| *p-Terphenyl-d14 (Surr)* | | | *92 %* | | *30-125 %* | | *"* | | | | | |
| *2-Fluorophenol (Surr)* | | | *43 %* | | *15-120 %* | | *"* | | | | | |
| *2,4,6-Tribromophenol (Surr)* | | | *99 %* | | *35-125 %* | | *"* | | | | | |
| **LCS Dup (3060448-BSD1)** | | | | | | Prepared: 06/18/13 07:13 | Analyzed: 06/19/13 11:48 | | | | | Q-19 |
| **EPA 8270D** | | | | | | | | | | | | |
| Acenaphthene | 3.31 | --- | 0.0200 | ug/L | 1 | 4.00 | --- | 83 | 45-125% | 4 | 30% | |
| Acenaphthylene | 3.58 | --- | 0.0200 | " | " | " | --- | 89 | 50-125% | 3 | 30% | |
| Anthracene | 3.72 | --- | 0.0200 | " | " | " | --- | 93 | 55-125% | 3 | 30% | |
| Benz(a)anthracene | 4.05 | --- | 0.0200 | " | " | " | --- | 101 | " | 0.5 | 30% | |
| Benzo(a)pyrene | 4.07 | --- | 0.0300 | " | " | " | --- | 102 | " | 0.8 | 30% | |
| Benzo(b)fluoranthene | 4.64 | --- | 0.0300 | " | " | " | --- | 116 | 45-125% | 1 | 30% | |
| Benzo(k)fluoranthene | 4.29 | --- | 0.0300 | " | " | " | --- | 107 | " | 2 | 30% | |
| Benzo(b+k)fluoranthene(s) | 8.88 | --- | 0.0600 | " | " | 8.00 | --- | 111 | " | 1 | 30% | |
| Benzo(g,h,i)perylene | 3.84 | --- | 0.0200 | " | " | 4.00 | --- | 96 | 40-125% | 3 | 30% | |
| Chrysene | 3.97 | --- | 0.0200 | " | " | " | --- | 99 | 55-125% | 1 | 30% | |
| Dibenz(a,h)anthracene | 3.89 | --- | 0.0200 | " | " | " | --- | 97 | 40-125% | 3 | 30% | |
| Fluoranthene | 4.35 | --- | 0.0200 | " | " | " | --- | 109 | 55-125% | 0.05 | 30% | |
| Fluorene | 3.43 | --- | 0.0200 | " | " | " | --- | 86 | 50-125% | 4 | 30% | |
| Indeno(1,2,3-cd)pyrene | 3.86 | --- | 0.0200 | " | " | " | --- | 96 | 45-125% | 3 | 30% | |
| 1-Methylnaphthalene | 3.24 | --- | 0.0400 | " | " | " | --- | 81 | 45-120% | 4 | 30% | |
| 2-Methylnaphthalene | 3.31 | --- | 0.0400 | " | " | " | --- | 83 | " | 4 | 30% | |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060448 - EPA 3510C (Acid/Base Neutral)** | | | | | | | **Water** | | | | | |
| **LCS Dup (3060448-BSD1)** | | | | | | Prepared: 06/18/13 07:13 | Analyzed: 06/19/13 11:48 | | | | | Q-19 |
| Naphthalene | 3.02 | --- | 0.0400 | ug/L | " | " | --- | 76 | 40-125% | 4 | 30% | |
| Phenanthrene | 3.55 | --- | 0.0200 | " | " | " | --- | 89 | 50-125% | 2 | 30% | B-02 |
| Pyrene | 4.27 | --- | 0.0200 | " | " | " | --- | 107 | " | 1 | 30% | |
| Carbazole | 3.84 | --- | 0.0300 | " | " | " | --- | 96 | " | 2 | 30% | |
| Dibenzofuran | 3.45 | --- | 0.0200 | " | " | " | --- | 86 | 55-125% | 4 | 30% | |
| 4-Chloro-3-methylphenol | 3.69 | --- | 0.200 | " | " | " | --- | 92 | 45-120% | 5 | 30% | |
| 2-Chlorophenol | 3.00 | --- | 0.100 | " | " | " | --- | 75 | 35-120% | 5 | 30% | |
| 2,4-Dichlorophenol | 3.78 | --- | 0.100 | " | " | " | --- | 94 | 50-120% | 4 | 30% | |
| 2,4-Dimethylphenol | 3.24 | --- | 0.100 | " | " | " | --- | 81 | 30-120% | 8 | 30% | |
| 2,4-Dinitrophenol | 4.42 | --- | 0.500 | " | " | " | --- | 110 | 15-130% | 0.2 | 30% | |
| 4,6-Dinitro-2-methylphenol | 4.55 | --- | 0.500 | " | " | " | --- | 114 | 40-135% | 0.2 | 30% | Q-41 |
| 2-Methylphenol | 2.52 | --- | 0.0500 | " | " | " | --- | 63 | 40-120% | 8 | 30% | |
| 3+4-Methylphenol(s) | 2.38 | --- | 0.0500 | " | " | " | --- | 59 | 30-120% | 8 | 30% | |
| 2-Nitrophenol | 3.47 | --- | 0.200 | " | " | " | --- | 87 | 40-120% | 2 | 30% | |
| 4-Nitrophenol | 1.27 | --- | 0.200 | " | " | " | --- | 32 | 10-140% | 1 | 30% | |
| Pentachlorophenol (PCP) | 3.81 | --- | 0.400 | " | " | " | --- | 95 | 40-125% | 0.8 | 30% | |
| Phenol | 1.37 | --- | 0.400 | " | " | " | --- | 34 | 10-120% | 6 | 30% | |
| 2,3,4,6-Tetrachlorophenol | 3.88 | --- | 0.100 | " | " | " | --- | 97 | 40-120% | 2 | 30% | |
| 2,4,5-Trichlorophenol | 3.72 | --- | 0.100 | " | " | " | --- | 93 | 50-120% | 4 | 30% | |
| 2,4,6-Trichlorophenol | 3.60 | --- | 0.100 | " | " | " | --- | 90 | " | 4 | 30% | |
| Bis(2-ethylhexyl)phthalate | 4.24 | --- | 2.20 | " | " | " | --- | 106 | 40-125% | 3 | 30% | |
| Butyl benzyl phthalate | 4.42 | --- | 3.00 | " | " | " | --- | 111 | 45-125% | 4 | 30% | |
| Diethylphthalate | 3.93 | --- | 3.00 | " | " | " | --- | 98 | 40-125% | 3 | 30% | |
| Dimethylphthalate | 3.79 | --- | 3.00 | " | " | " | --- | 95 | 25-125% | 4 | 30% | |
| Di-n-butylphthalate | 4.77 | --- | 3.00 | " | " | " | --- | 119 | 55-125% | 2 | 30% | |
| Di-n-octyl phthalate | 4.37 | --- | 3.00 | " | " | " | --- | 109 | 35-125% | 1 | 30% | |
| N-Nitrosodimethylamine | 1.84 | --- | 0.0500 | " | " | " | --- | 46 | 25-120% | 2 | 30% | |
| N-Nitroso-di-n-propylamine | 3.04 | --- | 0.0500 | " | " | " | --- | 76 | 35-120% | 4 | 30% | |
| N-Nitrosodiphenylamine | 3.72 | --- | 0.0500 | " | " | " | --- | 93 | 50-120% | 3 | 30% | |
| Bis(2-Chloroethoxy) methane | 3.12 | --- | 0.0500 | " | " | " | --- | 78 | 45-125% | 3 | 30% | |
| Bis(2-Chloroethyl) ether | 2.93 | --- | 0.0500 | " | " | " | --- | 73 | 35-125% | 6 | 30% | |
| Bis(2-Chloroisopropyl) ether | 2.28 | --- | 0.0500 | " | " | " | --- | 57 | 25-125% | 2 | 30% | Q-31 |
| Hexachlorobenzene | 3.74 | --- | 0.0200 | " | " | " | --- | 93 | 50-120% | 3 | 30% | |
| Hexachlorobutadiene | 3.27 | --- | 0.0500 | " | " | " | --- | 82 | 25-120% | 5 | 30% | |
| Hexachlorocyclopentadiene | 3.07 | --- | 0.100 | " | " | " | --- | 77 | 30-120% | 7 | 30% | |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Semivolatile Organic Compounds by EPA 8270D

**Batch 3060448 - EPA 3510C (Acid/Base Neutral)** **Water**

**LCS Dup (3060448-BSD1)** Prepared: 06/18/13 07:13 Analyzed: 06/19/13 11:48 Q-19

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hexachloroethane | 2.94 | --- | 0.0500 | ug/L | " | " | --- | 74 | " | 6 | 30% | |
| 2-Chloronaphthalene | 3.28 | --- | 0.0200 | " | " | " | --- | 82 | 50-120% | 4 | 30% | |
| 1,2-Dichlorobenzene | 2.78 | --- | 0.0500 | " | " | " | --- | 69 | 35-120% | 5 | 30% | |
| 1,3-Dichlorobenzene | 2.75 | --- | 0.0500 | " | " | " | --- | 69 | 30-120% | 4 | 30% | |
| 1,4-Dichlorobenzene | 2.75 | --- | 0.0500 | " | " | " | --- | 69 | " | 4 | 30% | |
| 1,2,4-Trichlorobenzene | 3.17 | --- | 0.0500 | " | " | " | --- | 79 | 35-120% | 4 | 30% | |
| 4-Bromophenyl phenyl ether | 3.79 | --- | 0.0500 | " | " | " | --- | 95 | 50-120% | 2 | 30% | |
| 4-Chlorophenyl phenyl ether | 3.45 | --- | 0.0500 | " | " | " | --- | 86 | " | 6 | 30% | |
| Aniline | 2.65 | --- | 0.100 | " | " | " | --- | 66 | 40-120% | 2 | 30% | Q-31 |
| 4-Chloroaniline | 3.22 | --- | 0.0500 | " | " | " | --- | 81 | 15-120% | 1 | 30% | |
| 2-Nitroaniline | 3.73 | --- | 0.400 | " | " | " | --- | 93 | 50-120% | 3 | 30% | |
| 3-Nitroaniline | 3.68 | --- | 0.400 | " | " | " | --- | 92 | 20-120% | 1 | 30% | |
| 4-Nitroaniline | 3.64 | --- | 0.400 | " | " | " | --- | 91 | 35-120% | 5 | 30% | |
| Nitrobenzene | 3.00 | --- | 0.200 | " | " | " | --- | 75 | 45-120% | 4 | 30% | |
| 2,4-Dinitrotoluene | 4.15 | --- | 0.200 | " | " | " | --- | 104 | 50-120% | 0.7 | 30% | |
| 2,6-Dinitrotoluene | 4.06 | --- | 0.200 | " | " | " | --- | 102 | " | 4 | 30% | |
| Benzoic acid | 3.22 | --- | 2.50 | " | " | 8.00 | --- | 40 | 10-120% | 6 | 30% | |
| Benzyl alcohol | 2.84 | --- | 0.200 | " | " | 4.00 | --- | 71 | 30-125% | 5 | 30% | |
| Isophorone | 3.32 | --- | 0.0500 | " | " | " | --- | 83 | 45-120% | 3 | 30% | |
| 3,3'-Dichlorobenzidine | 13.3 | --- | 0.200 | " | " | 8.00 | --- | 166 | 10-130% | 0.9 | 30% | Q-29, Q-41 |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Surr:* | *Nitrobenzene-d5 (Surr)* | *Recovery:* | *74 %* | *Limits:* | *35-120 %* | *Dilution: 1x* |
| | *2-Fluorobiphenyl (Surr)* | | *82 %* | | *30-120 %* | *"* |
| | *Phenol-d6 (Surr)* | | *27 %* | | *10-120 %* | *"* |
| | *p-Terphenyl-d14 (Surr)* | | *91 %* | | *30-125 %* | *"* |
| | *2-Fluorophenol (Surr)* | | *40 %* | | *15-120 %* | *"* |
| | *2,4,6-Tribromophenol (Surr)* | | *96 %* | | *35-125 %* | *"* |

|  |  |  |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** |  |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060663 - EPA 3015A** |  |  |  |  |  |  | **Water** |  |  |  |  |  |
| **Blank (3060663-BLK1)** |  |  |  |  |  | Prepared: 06/26/13 11:06 | Analyzed: 06/26/13 15:09 |  |  |  |  |  |
| **EPA 6020A** |  |  |  |  |  |  |  |  |  |  |  |  |
| Antimony | ND | --- | 1.00 | ug/L | 1 | --- | --- | --- | --- | --- | --- |  |
| Arsenic | ND | --- | 2.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| Barium | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| Beryllium | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| Cadmium | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| Calcium | ND | --- | 100 | " | " | --- | --- | --- | --- | --- | --- |  |
| Chromium | ND | --- | 2.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| Cobalt | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| Copper | ND | --- | 2.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| Iron | ND | --- | 50.0 | " | " | --- | --- | --- | --- | --- | --- |  |
| Lead | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| Magnesium | ND | --- | 50.0 | " | " | --- | --- | --- | --- | --- | --- |  |
| Manganese | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| Mercury | ND | --- | 0.0800 | " | " | --- | --- | --- | --- | --- | --- |  |
| Nickel | ND | --- | 2.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| Potassium | ND | --- | 100 | " | " | --- | --- | --- | --- | --- | --- |  |
| Selenium | ND | --- | 2.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| Silver | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| Thallium | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| Vanadium | ND | --- | 2.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| Zinc | ND | --- | 4.00 | " | " | --- | --- | --- | --- | --- | --- |  |
| **Blank (3060663-BLK2)** |  |  |  |  |  | Prepared: 06/26/13 11:06 | Analyzed: 06/27/13 09:46 |  |  |  |  |  |
| **EPA 6020A** |  |  |  |  |  |  |  |  |  |  |  |  |
| Aluminum | ND | --- | 50.0 | ug/L | 1 | --- | --- | --- | --- | --- | --- | Q-16 |
| **Blank (3060663-BLK4)** |  |  |  |  |  | Prepared: 06/26/13 11:06 | Analyzed: 07/01/13 14:52 |  |  |  |  |  |
| **EPA 6020A** |  |  |  |  |  |  |  |  |  |  |  |  |
| Sodium | ND | --- | 100 | ug/L | 1 | --- | --- | --- | --- | --- | --- | Q-16 |
| **LCS (3060663-BS1)** |  |  |  |  |  | Prepared: 06/26/13 11:06 | Analyzed: 06/26/13 15:15 |  |  |  |  |  |
| **EPA 6020A** |  |  |  |  |  |  |  |  |  |  |  |  |
| Antimony | 26.4 | --- | 1.00 | ug/L | 1 | 27.8 | --- | 95 | 80-120% | --- | --- |  |
| Arsenic | 51.4 | --- | 2.00 | " | " | 55.6 | --- | 92 | 85-115% | --- | --- |  |
| Barium | 53.8 | --- | 1.00 | " | " | " | --- | 97 | 80-120% | --- | --- |  |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060663 - EPA 3015A** | | | | | | | **Water** | | | | | |
| **LCS (3060663-BS1)** | | | | | | Prepared: 06/26/13 11:06 | Analyzed: 06/26/13 15:15 | | | | | |
| Beryllium | 25.9 | --- | 1.00 | ug/L | " | 27.8 | --- | 93 | " | --- | --- | |
| Cadmium | 52.6 | --- | 1.00 | " | " | 55.6 | --- | 95 | " | --- | --- | |
| Calcium | 5370 | --- | 100 | " | " | 5560 | --- | 97 | " | --- | --- | |
| Chromium | 55.0 | --- | 2.00 | " | " | 55.6 | --- | 99 | " | --- | --- | |
| Cobalt | 56.3 | --- | 1.00 | " | " | " | --- | 101 | " | --- | --- | |
| Copper | 54.5 | --- | 2.00 | " | " | " | --- | 98 | " | --- | --- | |
| Iron | 5510 | --- | 50.0 | " | " | 5560 | --- | 99 | " | --- | --- | |
| Lead | 55.1 | --- | 1.00 | " | " | 55.6 | --- | 99 | " | --- | --- | |
| Magnesium | 5450 | --- | 50.0 | " | " | 5560 | --- | 98 | " | --- | --- | |
| Manganese | 57.4 | --- | 1.00 | " | " | 55.6 | --- | 103 | " | --- | --- | |
| Mercury | 1.03 | --- | 0.0800 | " | " | 1.11 | --- | 93 | " | --- | --- | |
| Nickel | 53.5 | --- | 2.00 | " | " | 55.6 | --- | 96 | " | --- | --- | |
| Potassium | 5230 | --- | 100 | " | " | 5560 | --- | 94 | " | --- | --- | |
| Selenium | 25.9 | --- | 2.00 | " | " | 27.8 | --- | 93 | " | --- | --- | |
| Silver | 27.3 | --- | 1.00 | " | " | " | --- | 98 | " | --- | --- | |
| Thallium | 27.5 | --- | 1.00 | " | " | " | --- | 99 | " | --- | --- | |
| Vanadium | 56.5 | --- | 2.00 | " | " | 55.6 | --- | 102 | " | --- | --- | |
| Zinc | 51.8 | --- | 4.00 | " | " | " | --- | 93 | " | --- | --- | |
| **LCS (3060663-BS2)** | | | | | | Prepared: 06/26/13 11:06 | Analyzed: 06/27/13 09:49 | | | | | |
| **EPA 6020A** | | | | | | | | | | | | |
| Aluminum | 5210 | --- | 50.0 | ug/L | 1 | 5560 | --- | 94 | 80-120% | --- | --- | Q-16 |
| **LCS (3060663-BS4)** | | | | | | Prepared: 06/26/13 11:06 | Analyzed: 07/01/13 14:55 | | | | | |
| **EPA 6020A** | | | | | | | | | | | | |
| Sodium | 5770 | --- | 100 | ug/L | 1 | 5560 | --- | 104 | 80-120% | --- | --- | Q-16 |
| **Duplicate (3060663-DUP1)** | | | | | | Prepared: 06/26/13 11:06 | Analyzed: 06/26/13 15:25 | | | | | |
| **QC Source Sample: Other (A3F0431-02)** | | | | | | | | | | | | |
| **EPA 6020A** | | | | | | | | | | | | |
| Antimony | **4.32** | --- | 1.00 | ug/L | 1 | --- | 4.30 | --- | --- | 0.5 | 20% | |
| Barium | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 20% | |
| Beryllium | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 20% | |
| Cadmium | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 20% | |
| Calcium | **3970** | --- | 100 | " | " | --- | 4010 | --- | --- | 0.9 | 20% | |
| Lead | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 20% | |

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|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** |  |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060663 - EPA 3015A** |  |  |  |  |  |  | **Water** |  |  |  |  |  |
| **Duplicate (3060663-DUP1)** |  |  |  |  | Prepared: 06/26/13 11:06 |  | Analyzed: 06/26/13 15:25 |  |  |  |  |  |
| **QC Source Sample: Other (A3F0431-02)** |  |  |  |  |  |  |  |  |  |  |  |  |
| Magnesium | **480** | --- | 50.0 | ug/L | " | --- | 468 | --- | --- | 2 | 20% |  |
| Mercury | ND | --- | 0.0800 | " | " | --- | ND | --- | --- | --- | 20% |  |
| Potassium | **17800** | --- | 100 | " | " | --- | 17600 | --- | --- | 1 | 20% |  |
| Silver | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 20% |  |
| Thallium | ND | --- | 1.00 | " | " | --- | ND | --- | --- | --- | 20% |  |
| **Duplicate (3060663-DUP2)** |  |  |  |  | Prepared: 06/26/13 11:06 |  | Analyzed: 06/26/13 15:52 |  |  |  |  |  |
| **QC Source Sample: Other (A3F0431-02)** |  |  |  |  |  |  |  |  |  |  |  |  |
| **EPA 6020A** |  |  |  |  |  |  |  |  |  |  |  |  |
| Arsenic | ND | --- | 10.0 | ug/L | 5 | --- | 1.61 | --- | --- | *** | 20% | Q-16 |
| Chromium | ND | --- | 10.0 | " | " | --- | ND | --- | --- | --- | 20% | Q-16 |
| Cobalt | ND | --- | 5.00 | " | " | --- | ND | --- | --- | --- | 20% | Q-16 |
| Copper | ND | --- | 10.0 | " | " | --- | 2.13 | --- | --- | *** | 20% | Q-16 |
| Iron | ND | --- | 250 | " | " | --- | 69.4 | --- | --- | *** | 20% | Q-16 |
| Manganese | ND | --- | 5.00 | " | " | --- | 0.889 | --- | --- | *** | 20% | Q-16 |
| Nickel | ND | --- | 10.0 | " | " | --- | 1.88 | --- | --- | *** | 20% | Q-16 |
| Selenium | ND | --- | 10.0 | " | " | --- | ND | --- | --- | --- | 20% | Q-16 |
| Vanadium | ND | --- | 10.0 | " | " | --- | ND | --- | --- | --- | 20% | Q-16 |
| Zinc | ND | --- | 20.0 | " | " | --- | 2.24 | --- | --- | *** | 20% | Q-16 |
| **Duplicate (3060663-DUP3)** |  |  |  |  | Prepared: 06/26/13 11:06 |  | Analyzed: 06/27/13 10:01 |  |  |  |  |  |
| **QC Source Sample: Other (A3F0431-02)** |  |  |  |  |  |  |  |  |  |  |  |  |
| **EPA 6020A** |  |  |  |  |  |  |  |  |  |  |  |  |
| Aluminum | **122** | --- | 50.0 | ug/L | 1 | --- | 119 | --- | --- | 3 | 20% | Q-16 |
| **Duplicate (3060663-DUP5)** |  |  |  |  | Prepared: 06/26/13 11:06 |  | Analyzed: 07/01/13 15:09 |  |  |  |  |  |
| **QC Source Sample: Other (A3F0431-02)** |  |  |  |  |  |  |  |  |  |  |  |  |
| **EPA 6020A** |  |  |  |  |  |  |  |  |  |  |  |  |
| Sodium | **689000** | --- | 5000 | ug/L | 50 | --- | 687000 | --- | --- | 0.3 | 20% | Q-16 |
| **Matrix Spike (3060663-MS1)** |  |  |  |  | Prepared: 06/26/13 11:06 |  | Analyzed: 06/26/13 15:55 |  |  |  |  |  |
| **QC Source Sample: Other (A3F0431-02)** |  |  |  |  |  |  |  |  |  |  |  |  |
| **EPA 6020A** |  |  |  |  |  |  |  |  |  |  |  |  |
| Antimony | 32.7 | --- | 5.00 | ug/L | 5 | 27.8 | 4.30 | 102 | 75-125% | --- | --- |  |

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060663 - EPA 3015A** | | | | | | | **Water** | | | | | |
| **Matrix Spike (3060663-MS1)** | | | | | | Prepared: 06/26/13 11:06 | Analyzed: 06/26/13 15:55 | | | | | |
| **QC Source Sample: Other (A3F0431-02)** | | | | | | | | | | | | |
| Arsenic | 55.3 | --- | 10.0 | ug/L | " | 55.6 | 1.61 | 97 | 70-130% | --- | --- | |
| Barium | 57.2 | --- | 5.00 | " | " | " | ND | 103 | 75-125% | --- | --- | |
| Beryllium | 27.2 | --- | 5.00 | " | " | 27.8 | ND | 98 | " | --- | --- | |
| Cadmium | 55.8 | --- | 5.00 | " | " | 55.6 | ND | 100 | " | --- | --- | |
| Calcium | 9480 | --- | 500 | " | " | 5560 | 4010 | 98 | " | --- | --- | |
| Chromium | 56.1 | --- | 10.0 | " | " | 55.6 | ND | 101 | " | --- | --- | |
| Cobalt | 54.9 | --- | 5.00 | " | " | " | ND | 99 | " | --- | --- | |
| Copper | 56.2 | --- | 10.0 | " | " | " | 2.13 | 97 | " | --- | --- | |
| Iron | 5450 | --- | 250 | " | " | 5560 | 69.4 | 97 | " | --- | --- | |
| Lead | 54.1 | --- | 5.00 | " | " | 55.6 | ND | 97 | " | --- | --- | |
| Magnesium | 6080 | --- | 250 | " | " | 5560 | 468 | 101 | " | --- | --- | |
| Manganese | 56.6 | --- | 5.00 | " | " | 55.6 | 0.889 | 100 | " | --- | --- | |
| Mercury | 1.10 | --- | 0.400 | " | " | 1.11 | ND | 99 | " | --- | --- | |
| Nickel | 56.1 | --- | 10.0 | " | " | 55.6 | 1.88 | 98 | " | --- | --- | |
| Potassium | 22500 | --- | 500 | " | " | 5560 | 17600 | 88 | " | --- | --- | |
| Selenium | 27.3 | --- | 10.0 | " | " | 27.8 | ND | 98 | " | --- | --- | |
| Silver | 27.9 | --- | 5.00 | " | " | " | ND | 101 | " | --- | --- | |
| Thallium | 27.3 | --- | 5.00 | " | " | " | ND | 98 | " | --- | --- | Q-23 |
| Vanadium | 56.7 | --- | 10.0 | " | " | 55.6 | ND | 102 | " | --- | --- | |
| Zinc | 55.2 | --- | 20.0 | " | " | " | 2.24 | 95 | " | --- | --- | |
| **Matrix Spike (3060663-MS2)** | | | | | | Prepared: 06/26/13 11:06 | Analyzed: 06/27/13 15:15 | | | | | |
| **QC Source Sample: Other (A3F0563-01)** | | | | | | | | | | | | |
| **EPA 6020A** | | | | | | | | | | | | |
| Aluminum | 23800 | --- | 1120 | ug/L | 5 | 25000 | 667 | 93 | 75-125% | --- | --- | |
| Antimony | 111 | --- | 22.5 | " | " | 125 | ND | 89 | " | --- | --- | |
| Arsenic | 326 | --- | 45.0 | " | " | 250 | 140 | 74 | 70-130% | --- | --- | |
| Barium | 294 | --- | 22.5 | " | " | " | 40.8 | 101 | 75-125% | --- | --- | |
| Beryllium | 120 | --- | 22.5 | " | " | 125 | ND | 96 | " | --- | --- | |
| Cadmium | 256 | --- | 22.5 | " | " | 250 | ND | 102 | " | --- | --- | |
| Calcium | 46400 | --- | 2250 | " | " | 25000 | 19900 | 106 | " | --- | --- | |
| Chromium | 360 | --- | 45.0 | " | " | 250 | 116 | 97 | " | --- | --- | |
| Cobalt | 268 | --- | 22.5 | " | " | " | 22.2 | 98 | " | --- | --- | |
| Copper | 447 | --- | 45.0 | " | " | " | 210 | 95 | " | --- | --- | |

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|---|---|---|---|
| **EES Environmental Inc** | Project: | **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: | 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: | Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060663 - EPA 3015A** | | | | | | | **Water** | | | | | |
| **Matrix Spike (3060663-MS2)** | | | | | | Prepared: 06/26/13 11:06 | Analyzed: 06/27/13 15:15 | | | | | |
| **QC Source Sample: Other (A3F0563-01)** | | | | | | | | | | | | |
| Iron | 268000 | --- | 1120 | ug/L | " | 25000 | 250000 | 74 | " | --- | --- | Q-03 |
| Lead | 602 | --- | 22.5 | " | " | 250 | 341 | 105 | " | --- | --- | |
| Magnesium | 27600 | --- | 1120 | " | " | 25000 | 2680 | 100 | " | --- | --- | |
| Manganese | 3340 | --- | 22.5 | " | " | 250 | 3120 | 89 | " | --- | --- | |
| Mercury | 7.20 | --- | 1.80 | " | " | 5.00 | 2.35 | 97 | " | --- | --- | |
| Nickel | 420 | --- | 45.0 | " | " | 250 | 175 | 98 | " | --- | --- | |
| Potassium | 25600 | --- | 2250 | " | " | 25000 | 1380 | 97 | " | --- | --- | |
| Selenium | 46.0 | --- | 45.0 | " | " | 125 | ND | 37 | " | --- | --- | Q-01 |
| Silver | 128 | --- | 22.5 | " | " | " | ND | 102 | " | --- | --- | |
| Thallium | 132 | --- | 22.5 | " | " | " | ND | 105 | " | --- | --- | |
| Vanadium | 251 | --- | 45.0 | " | " | 250 | ND | 100 | " | --- | --- | |
| Zinc | 662 | --- | 180 | " | " | " | 385 | 111 | " | --- | --- | |
| **Matrix Spike (3060663-MS3)** | | | | | | Prepared: 06/26/13 11:06 | Analyzed: 06/27/13 10:05 | | | | | |
| **QC Source Sample: Other (A3F0431-02)** | | | | | | | | | | | | |
| **EPA 6020A** | | | | | | | | | | | | |
| Aluminum | 5490 | --- | 50.0 | ug/L | 1 | 5560 | 119 | 97 | 75-125% | --- | --- | Q-16 |
| **Matrix Spike (3060663-MS5)** | | | | | | Prepared: 06/26/13 11:06 | Analyzed: 07/01/13 15:12 | | | | | |
| **QC Source Sample: Other (A3F0431-02)** | | | | | | | | | | | | |
| **EPA 6020A** | | | | | | | | | | | | |
| Sodium | 684000 | --- | 5000 | ug/L | 50 | 5560 | 687000 | -60 | 75-125% | --- | --- | PS-03, Q-16 |
| **Post Spike (3060663-PS1)** | | | | | | Prepared: 06/28/13 11:15 | Analyzed: 06/28/13 12:00 | | | | | |
| **QC Source Sample: Post Spike (A3F0563-01)** | | | | | | | | | | | | |
| **EPA 6020A** | | | | | | | | | | | | |
| Iron | 95100 | --- | | ug/L | 5 | 47200 | 47100 | 102 | 80-120% | | --- | |
| Selenium | 97.8 | --- | | " | " | 94.3 | -0.142 | 104 | " | | --- | |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060307 - Method Prep: Aq** | | | | | | | **Water** | | | | | |
| **Duplicate (3060307-DUP1)** | | | | | | Prepared: 06/12/13 16:42 | Analyzed: 06/12/13 17:15 | | | | | |
| **QC Source Sample: SW-1 (A3F0244-01)** | | | | | | | | | | | | |
| **EPA 150.1** | | | | | | | | | | | | |
| pH | **6.72** | --- | | pH Units | 1 | --- | 6.67 | --- | --- | 0.7 | 10% | |
| pH Temperature (deg C) | **21.4** | --- | | " | " | --- | 21.7 | --- | --- | 1 | 30% | |
| **Reference (3060307-SRM1)** | | | | | | Prepared: 06/12/13 09:30 | Analyzed: 06/12/13 09:39 | | | | | |
| **EPA 150.1** | | | | | | | | | | | | |
| pH | 6.02 | --- | | pH Units | 1 | 6.00 | | 100 | 98.4-101.7% | --- | --- | |
| **Reference (3060307-SRM2)** | | | | | | Prepared: 06/12/13 09:30 | Analyzed: 06/12/13 09:40 | | | | | |
| **EPA 150.1** | | | | | | | | | | | | |
| pH | 7.98 | --- | | pH Units | 1 | 8.00 | | 100 | 98.4-101.7% | --- | --- | |
| **Reference (3060307-SRM3)** | | | | | | Prepared: 06/12/13 14:15 | Analyzed: 06/12/13 14:15 | | | | | |
| **EPA 150.1** | | | | | | | | | | | | |
| pH | 5.98 | --- | | pH Units | 1 | 6.00 | | 100 | 98.4-101.7% | --- | --- | |
| **Reference (3060307-SRM4)** | | | | | | Prepared: 06/12/13 16:42 | Analyzed: 06/12/13 17:09 | | | | | |
| **EPA 150.1** | | | | | | | | | | | | |
| pH | 6.00 | --- | | pH Units | 1 | 6.00 | | 100 | 98.4-101.7% | --- | --- | |
| **Reference (3060307-SRM5)** | | | | | | Prepared: 06/12/13 16:42 | Analyzed: 06/12/13 17:16 | | | | | |
| **EPA 150.1** | | | | | | | | | | | | |
| pH | 7.97 | --- | | pH Units | 1 | 8.00 | | 100 | 98.4-101.7% | --- | --- | |

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| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060363 - Method Prep: Aq** | | | | | | | **Water** | | | | | |
| **Blank (3060363-BLK1)** | | | | | | Prepared: 06/13/13 15:05 | Analyzed: 06/18/13 12:34 | | | | | |
| **SM 5210 B** | | | | | | | | | | | | |
| Biochemical Oxygen Demand (5 Day) | ND | --- | 2.00 | mg/L | 1 | --- | --- | --- | --- | --- | --- | |
| **Duplicate (3060363-DUP1)** | | | | | | Prepared: 06/13/13 15:05 | Analyzed: 06/18/13 12:34 | | | | | |
| **QC Source Sample: Other (A3F0246-01)** | | | | | | | | | | | | |
| **SM 5210 B** | | | | | | | | | | | | |
| Biochemical Oxygen Demand (5 Day) | **199** | --- | 40.0 | mg/L | 1 | --- | 183 | --- | --- | 8 | 20% | |
| **Duplicate (3060363-DUP2)** | | | | | | Prepared: 06/13/13 17:30 | Analyzed: 06/18/13 12:34 | | | | | |
| **QC Source Sample: SW-1 (A3F0244-01)** | | | | | | | | | | | | |
| **SM 5210 B** | | | | | | | | | | | | |
| Biochemical Oxygen Demand (5 Day) | ND | --- | 4.00 | mg/L | 1 | --- | ND | --- | --- | --- | 20% | |
| **Reference (3060363-SRM1)** | | | | | | Prepared: 06/13/13 15:05 | Analyzed: 06/18/13 12:34 | | | | | |
| **SM 5210 B** | | | | | | | | | | | | |
| Biochemical Oxygen Demand (5 Day) | 212 | --- | | mg/L | 1 | 198 | | 107 | 84.6-115.4% | --- | --- | |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060378 - Method Prep: Aq** | | | | | | | **Water** | | | | | |
| **Blank (3060378-BLK1)** | | | | | Prepared: 06/13/13 17:47 | | Analyzed: 06/13/13 17:59 | | | | | |
| **SM 4500 P E** | | | | | | | | | | | | |
| Orthophosphate Phosphorous | ND | --- | 0.020 | mg/L | 1 | --- | --- | --- | --- | --- | --- | |
| **LCS (3060378-BS1)** | | | | | Prepared: 06/13/13 17:47 | | Analyzed: 06/13/13 17:59 | | | | | |
| **SM 4500 P E** | | | | | | | | | | | | |
| Orthophosphate Phosphorous | 0.274 | --- | 0.020 | mg/L | 1 | 0.261 | --- | 105 | 85-115% | --- | --- | |
| **Duplicate (3060378-DUP1)** | | | | | Prepared: 06/13/13 17:47 | | Analyzed: 06/13/13 17:59 | | | | | |
| **QC Source Sample: SW-1 (A3F0244-01)** | | | | | | | | | | | | |
| **SM 4500 P E** | | | | | | | | | | | | |
| Orthophosphate Phosphorous | **0.021** | --- | 0.020 | mg/L | 1 | --- | 0.020 | --- | --- | 5 | 20% | |
| **Matrix Spike (3060378-MS1)** | | | | | Prepared: 06/13/13 17:47 | | Analyzed: 06/13/13 17:59 | | | | | |
| **QC Source Sample: SW-1 (A3F0244-01)** | | | | | | | | | | | | |
| **SM 4500 P E** | | | | | | | | | | | | |
| Orthophosphate Phosphorous | 0.297 | --- | 0.020 | mg/L | 1 | 0.261 | 0.020 | 106 | 75-125% | --- | --- | |

Apex Labs

**12232 S.W. Garden Place**
**Tigard, OR 97223**
**503-718-2323 Phone**
**503-718-0333 Fax**

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|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060391 - Method Prep: Aq** | | | | | | | **Water** | | | | | |
| **Blank (3060391-BLK1)** | | | | | | Prepared: 06/14/13 09:55 | Analyzed: 06/14/13 10:10 | | | | | |
| **EPA 180.1** | | | | | | | | | | | | |
| Turbidity | ND | --- | 0.10 | NTU | 1 | --- | --- | --- | --- | --- | --- | |
| **LCS (3060391-BS1)** | | | | | | Prepared: 06/14/13 09:55 | Analyzed: 06/14/13 10:11 | | | | | |
| **EPA 180.1** | | | | | | | | | | | | |
| Turbidity | 18.6 | --- | 0.10 | NTU | 1 | 20.0 | --- | 93 | 90-110% | --- | --- | |
| **Duplicate (3060391-DUP1)** | | | | | | Prepared: 06/14/13 09:55 | Analyzed: 06/14/13 10:15 | | | | | |
| **QC Source Sample: SW-1 (A3F0244-01)** | | | | | | | | | | | | |
| **EPA 180.1** | | | | | | | | | | | | |
| Turbidity | **6.95** | --- | 0.10 | NTU | 1 | --- | 7.03 | --- | --- | 1 | 20% | |

Philip Nerenberg

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|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060392 - Method Prep: Aq** | | | | | | | **Water** | | | | | |
| **Blank (3060392-BLK1)** | | | | | | Prepared: 06/14/13 10:25 | Analyzed: 06/14/13 16:29 | | | | | |
| **SM 4500 P B** | | | | | | | | | | | | |
| Phosphorus | ND | --- | 0.100 | mg/L | 1 | --- | --- | --- | --- | --- | --- | |
| **LCS (3060392-BS1)** | | | | | | Prepared: 06/14/13 10:25 | Analyzed: 06/14/13 16:29 | | | | | |
| **SM 4500 P B** | | | | | | | | | | | | |
| Phosphorus | 1.32 | --- | 0.100 | mg/L | 1 | 1.30 | --- | 101 | 85-115% | --- | --- | |
| **Duplicate (3060392-DUP1)** | | | | | | Prepared: 06/14/13 10:25 | Analyzed: 06/14/13 16:29 | | | | | |
| **QC Source Sample: Other (A3F0138-01)** | | | | | | | | | | | | |
| **SM 4500 P B** | | | | | | | | | | | | |
| Phosphorus | ND | --- | 0.100 | mg/L | 1 | --- | 0.0180 | --- | --- | *** | 25% | |
| **Matrix Spike (3060392-MS1)** | | | | | | Prepared: 06/14/13 10:25 | Analyzed: 06/14/13 16:29 | | | | | |
| **QC Source Sample: Other (A3F0138-01)** | | | | | | | | | | | | |
| **SM 4500 P B** | | | | | | | | | | | | |
| Phosphorus | 1.38 | --- | 0.100 | mg/L | 1 | 1.30 | 0.0180 | 104 | 75-125% | --- | --- | |

Philip Nerenberg

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060423 - Total Suspended Solids** | | | | | | | **Water** | | | | | |
| **Blank (3060423-BLK1)** | | | | | | Prepared: 06/17/13 13:00 | Analyzed: 06/17/13 16:50 | | | | | |
| **SM 2540 D** | | | | | | | | | | | | |
| Total Suspended Solids | ND | --- | 2.00 | mg/L | 1 | --- | --- | --- | --- | --- | --- | |
| **Duplicate (3060423-DUP1)** | | | | | | Prepared: 06/17/13 13:00 | Analyzed: 06/17/13 16:50 | | | | | |
| **QC Source Sample: Other (A3F0272-01)** | | | | | | | | | | | | |
| **SM 2540 D** | | | | | | | | | | | | |
| Total Suspended Solids | **17.0** | --- | 5.00 | mg/L | 1 | --- | 15.0 | --- | --- | 12 | 20% | |
| **Duplicate (3060423-DUP2)** | | | | | | Prepared: 06/17/13 13:00 | Analyzed: 06/17/13 16:50 | | | | | |
| **QC Source Sample: Other (A3F0316-01)** | | | | | | | | | | | | |
| **SM 2540 D** | | | | | | | | | | | | |
| Total Suspended Solids | **10.0** | --- | 5.00 | mg/L | 1 | --- | 10.0 | --- | --- | 0 | 20% | |
| **Reference (3060423-SRM1)** | | | | | | Prepared: 06/17/13 13:00 | Analyzed: 06/17/13 16:50 | | | | | |
| **SM 2540 D** | | | | | | | | | | | | |
| Total Suspended Solids | 96.0 | --- | | mg/L | 1 | 100 | | 96 | 90-110% | --- | --- | |

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| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060424 - Total Suspended Solids** | | | | | | | **Water** | | | | | |
| **Blank (3060424-BLK1)** | | | | | | Prepared: 06/17/13 13:00 | Analyzed: 06/19/13 11:41 | | | | | |
| **SM 2540 C** | | | | | | | | | | | | |
| Total Dissolved Solids | ND | --- | 10.0 | mg/L | 1 | --- | --- | --- | --- | --- | --- | |
| **Duplicate (3060424-DUP1)** | | | | | | Prepared: 06/17/13 13:00 | Analyzed: 06/19/13 11:41 | | | | | |
| **QC Source Sample: Other (A3F0272-01)** | | | | | | | | | | | | |
| **SM 2540 C** | | | | | | | | | | | | |
| Total Dissolved Solids | **825** | --- | 10.0 | mg/L | 1 | --- | 863 | --- | --- | 5 | 20% | |
| **Reference (3060424-SRM1)** | | | | | | Prepared: 06/17/13 13:00 | Analyzed: 06/19/13 11:41 | | | | | |
| **SM 2540 C** | | | | | | | | | | | | |
| Total Dissolved Solids | 1010 | --- | | mg/L | 1 | 1000 | | 101 | 90-110% | --- | --- | |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060525 - Method Prep: Aq** | | | | | | | **Water** | | | | | |
| **Blank (3060525-BLK1)** | | | | | | Prepared: 06/20/13 10:08 | Analyzed: 06/20/13 16:02 | | | | | |
| **EPA 410.4** | | | | | | | | | | | | |
| Chemical Oxygen Demand | ND | --- | 10.0 | mg/L | 1 | --- | --- | --- | --- | --- | --- | |
| **LCS (3060525-BS1)** | | | | | | Prepared: 06/20/13 10:08 | Analyzed: 06/20/13 16:02 | | | | | |
| **EPA 410.4** | | | | | | | | | | | | |
| Chemical Oxygen Demand | 51.2 | --- | 10.0 | mg/L | 1 | 50.0 | --- | 102 | 90-110% | --- | --- | |
| **Duplicate (3060525-DUP1)** | | | | | | Prepared: 06/20/13 10:08 | Analyzed: 06/20/13 16:02 | | | | | |
| **QC Source Sample: SW-1 (A3F0244-01)** | | | | | | | | | | | | |
| **EPA 410.4** | | | | | | | | | | | | |
| Chemical Oxygen Demand | ND | --- | 10.0 | mg/L | 1 | --- | ND | --- | --- | --- | 10% | |
| **Matrix Spike (3060525-MS1)** | | | | | | Prepared: 06/20/13 10:08 | Analyzed: 06/20/13 16:02 | | | | | |
| **QC Source Sample: SW-1 (A3F0244-01)** | | | | | | | | | | | | |
| **EPA 410.4** | | | | | | | | | | | | |
| Chemical Oxygen Demand | 52.3 | --- | 11.1 | mg/L | 1 | 55.6 | ND | 94 | 90-110% | --- | --- | |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060531 - Method Prep: Aq** | | | | | | | **Water** | | | | | |
| **Blank (3060531-BLK1)** | | | | | Prepared: 06/20/13 13:08 | | Analyzed: 06/24/13 14:14 | | | | | |
| **SM 5310 B** | | | | | | | | | | | | |
| Total Organic Carbon | ND | --- | 1.00 | mg/L | 1 | --- | --- | --- | --- | --- | --- | |
| **LCS (3060531-BS1)** | | | | | Prepared: 06/20/13 13:08 | | Analyzed: 06/24/13 14:38 | | | | | |
| **SM 5310 B** | | | | | | | | | | | | |
| Total Organic Carbon | 10.3 | --- | 1.00 | mg/L | 1 | 10.0 | --- | 103 | 85-115% | --- | --- | |
| **Duplicate (3060531-DUP1)** | | | | | Prepared: 06/20/13 13:08 | | Analyzed: 06/24/13 15:26 | | | | | |
| **QC Source Sample: SW-1 (A3F0244-01)** | | | | | | | | | | | | |
| **SM 5310 B** | | | | | | | | | | | | |
| Total Organic Carbon | **2.15** | --- | 1.00 | mg/L | 1 | --- | 2.27 | --- | --- | 5 | 20% | |
| **Matrix Spike (3060531-MS1)** | | | | | Prepared: 06/20/13 13:08 | | Analyzed: 06/24/13 15:50 | | | | | |
| **QC Source Sample: SW-1 (A3F0244-01)** | | | | | | | | | | | | |
| **SM 5310 B** | | | | | | | | | | | | |
| Total Organic Carbon | 12.4 | --- | 1.00 | mg/L | 1 | 10.0 | 2.27 | 102 | 75-125% | --- | --- | |

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| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060562 - Method Prep: Aq** | | | | | | **Water** | | | | | | |
| **Blank (3060562-BLK1)** | | | | | | Prepared: 06/21/13 10:59 | Analyzed: 06/21/13 14:35 | | | | | |
| **SM 2320 B** | | | | | | | | | | | | |
| Total Alkalinity | ND | --- | 20.0 | mg CaCO3/L | 1 | --- | --- | --- | --- | --- | --- | |
| Bicarbonate Alkalinity | ND | --- | 20.0 | " | " | --- | --- | --- | --- | --- | --- | |
| Carbonate Alkalinity | ND | --- | 20.0 | " | " | --- | --- | --- | --- | --- | --- | |
| Hydroxide Alkalinity | ND | --- | 20.0 | " | " | --- | --- | --- | --- | --- | --- | |
| **LCS (3060562-BS1)** | | | | | | Prepared: 06/21/13 10:59 | Analyzed: 06/21/13 14:35 | | | | | |
| **SM 2320 B** | | | | | | | | | | | | |
| Total Alkalinity | 188 | --- | 20.0 | mg CaCO3/L | 1 | 191 | --- | 98 | 85-115% | --- | --- | |
| **Duplicate (3060562-DUP1)** | | | | | | Prepared: 06/21/13 10:59 | Analyzed: 06/21/13 14:35 | | | | | |
| **QC Source Sample: SW-1 (A3F0244-01)** | | | | | | | | | | | | |
| **SM 2320 B** | | | | | | | | | | | | |
| Total Alkalinity | **24.0** | --- | 20.0 | mg CaCO3/L | 1 | --- | 20.2 | --- | --- | 17 | 20% | |
| Bicarbonate Alkalinity | **24.0** | --- | 20.0 | " | " | --- | 20.2 | --- | --- | 17 | 20% | |
| Carbonate Alkalinity | ND | --- | 20.0 | " | " | --- | ND | --- | --- | --- | 20% | |
| Hydroxide Alkalinity | ND | --- | 20.0 | " | " | --- | ND | --- | --- | --- | 20% | |

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| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060612 - EPA 1664** | | | | | | | **Water** | | | | | |
| **Blank (3060612-BLK1)** | | | | | | Prepared: 06/25/13 07:07 | Analyzed: 06/26/13 10:41 | | | | | |
| **EPA 1664** | | | | | | | | | | | | |
| HEM (Oil and Grease) | ND | --- | 4.55 | mg/L | 1 | --- | --- | --- | --- | --- | --- | |
| **Blank (3060612-BLK2)** | | | | | | Prepared: 06/25/13 07:07 | Analyzed: 06/26/13 14:31 | | | | | |
| **EPA 1664-SGT** | | | | | | | | | | | | |
| SGT-HEM (Non-polar Material) | ND | --- | 4.55 | mg/L | 1 | --- | --- | --- | --- | --- | --- | |
| **LCS (3060612-BS1)** | | | | | | Prepared: 06/25/13 07:07 | Analyzed: 06/26/13 10:41 | | | | | |
| **EPA 1664** | | | | | | | | | | | | |
| HEM (Oil and Grease) | 40.1 | --- | | mg/L | 1 | 40.0 | --- | 100 | 78-114% | --- | --- | |
| **LCS (3060612-BS2)** | | | | | | Prepared: 06/25/13 07:07 | Analyzed: 06/26/13 14:31 | | | | | |
| **EPA 1664-SGT** | | | | | | | | | | | | |
| SGT-HEM (Non-polar Material) | 17.7 | --- | | mg/L | 1 | 20.0 | --- | 88 | 64-132% | --- | --- | |
| **Matrix Spike (3060612-MS1)** | | | | | | Prepared: 06/25/13 07:07 | Analyzed: 06/26/13 10:41 | | | | | |
| **QC Source Sample: SW-1 (A3F0244-01)** | | | | | | | | | | | | |
| **EPA 1664** | | | | | | | | | | | | |
| HEM (Oil and Grease) | 35.9 | --- | | mg/L | 1 | 38.8 | 1.01 | 90 | 78-114% | --- | --- | |

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry Parameters

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 3060674 - Method Prep: Aq** | | | | | | | **Water** | | | | | |
| **Blank (3060674-BLK1)** | | | | | | Prepared: 06/26/13 13:48 | Analyzed: 06/26/13 14:20 | | | | | |
| **SM 2510 B** | | | | | | | | | | | | |
| Conductivity | ND | --- | 2.50 | umhos/cm | 1 | --- | --- | --- | --- | --- | --- | |
| **Blank (3060674-BLK2)** | | | | | | Prepared: 06/26/13 13:48 | Analyzed: 06/26/13 14:20 | | | | | |
| **SM 2510 B** | | | | | | | | | | | | |
| Conductivity | ND | --- | 2.50 | umhos/cm | 1 | --- | --- | --- | --- | --- | --- | |
| **Duplicate (3060674-DUP1)** | | | | | | Prepared: 06/26/13 13:48 | Analyzed: 06/26/13 14:20 | | | | | |
| **QC Source Sample: SW-1 (A3F0244-01)** | | | | | | | | | | | | |
| **SM 2510 B** | | | | | | | | | | | | |
| Conductivity | **75.5** | --- | 2.50 | umhos/cm | 1 | --- | 75.0 | --- | --- | 0.7 | 10% | |
| **Reference (3060674-SRM1)** | | | | | | Prepared: 06/26/13 13:48 | Analyzed: 06/26/13 14:20 | | | | | |
| **SM 2510 B** | | | | | | | | | | | | |
| Conductivity | 149 | --- | | umhos/cm | 1 | 147 | | 101 | 95-105% | --- | --- | |
| **Reference (3060674-SRM2)** | | | | | | Prepared: 06/26/13 13:48 | Analyzed: 06/26/13 14:20 | | | | | |
| **SM 2510 B** | | | | | | | | | | | | |
| Conductivity | 14.9 | --- | | umhos/cm | 1 | 14.9 | | 100 | 95-105% | --- | --- | |

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| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## Weck Laboratories, Inc

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch W3F0851 - General Preparation** | | | | | | **Water** | | | | | | |
| **Blank (W3F0851-BLK1)** | | | | | | Prepared: 06/19/13 11:05 Analyzed: 06/21/13 12:49 | | | | | | |
| **EPA 420.4** | | | | | | | | | | | | |
| Phenolics | ND | --- | 0.010 | mg/l | 1 | --- | --- | --- | --- | --- | --- | |
| **LCS (W3F0851-BS1)** | | | | | | Prepared: 06/19/13 11:05 Analyzed: 06/21/13 12:48 | | | | | | |
| **EPA 420.4** | | | | | | | | | | | | |
| Phenolics | 0.101 | --- | 0.010 | mg/l | 1 | 0.100 | --- | 101 | 90-110% | --- | --- | |
| **Matrix Spike (W3F0851-MS1)** | | | | | | Prepared: 06/19/13 11:05 Analyzed: 06/21/13 12:52 | | | | | | |
| **QC Source Sample: A3F0244-01 (A3F0244-01)** | | | | | | | | | | | | |
| **EPA 420.4** | | | | | | | | | | | | |
| Phenolics | 0.269 | --- | 0.010 | mg/l | 1 | 0.250 | 0.00786 | 104 | 90-110% | --- | --- | |
| **Matrix Spike Dup (W3F0851-MSD1)** | | | | | | Prepared: 06/19/13 11:05 Analyzed: 06/21/13 12:53 | | | | | | |
| **QC Source Sample: A3F0244-01 (A3F0244-01)** | | | | | | | | | | | | |
| **EPA 420.4** | | | | | | | | | | | | |
| Phenolics | 0.274 | --- | 0.010 | mg/l | 1 | 0.250 | 0.00786 | 107 | 90-110% | 2 | 20% | |

Philip Nerenberg

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| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## Weck Laboratories, Inc

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch W3F0854 - General Preparation** | | | | | | | **Water** | | | | | |
| **Blank (W3F0854-BLK1)** | | | | | | Prepared: 06/19/13 11:40 | Analyzed: 06/19/13 17:25 | | | | | |
| **EPA 350.1** | | | | | | | | | | | | |
| Ammonia as N | ND | --- | 0.10 | mg/l | 1 | --- | --- | --- | --- | --- | --- | |
| **LCS (W3F0854-BS1)** | | | | | | Prepared: 06/19/13 11:40 | Analyzed: 06/19/13 17:25 | | | | | |
| **EPA 350.1** | | | | | | | | | | | | |
| Ammonia as N | 0.268 | --- | 0.10 | mg/l | 1 | 0.250 | --- | 107 | 90-110% | --- | --- | |
| **Matrix Spike (W3F0854-MS1)** | | | | | | Prepared: 06/19/13 11:40 | Analyzed: 06/19/13 17:25 | | | | | |
| **QC Source Sample: Other (3F17005-01)** | | | | | | | | | | | | |
| **EPA 350.1** | | | | | | | | | | | | |
| Ammonia as N | 0.226 | --- | 0.10 | mg/l | 1 | 0.250 | ND | 91 | 90-110% | --- | --- | |
| **Matrix Spike Dup (W3F0854-MSD1)** | | | | | | Prepared: 06/19/13 11:40 | Analyzed: 06/19/13 17:25 | | | | | |
| **QC Source Sample: Other (3F17005-01)** | | | | | | | | | | | | |
| **EPA 350.1** | | | | | | | | | | | | |
| Ammonia as N | 0.224 | --- | 0.10 | mg/l | 1 | 0.250 | ND | 90 | 90-110% | 1 | 15% | |

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## Weck Laboratories, Inc

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch W3F0979 - General Preparation** | | | | | | | **Water** | | | | | |
| **Blank (W3F0979-BLK1)** | | | | | Prepared: 06/21/13 12:48 Analyzed: 06/24/13 12:06 | | | | | | | |
| **EPA 351.2** | | | | | | | | | | | | |
| TKN | ND | --- | 0.10 | mg/l | 1 | --- | --- | --- | --- | --- | --- | |
| **Blank (W3F0979-BLK2)** | | | | | Prepared: 06/21/13 12:48 Analyzed: 06/24/13 12:06 | | | | | | | |
| **EPA 351.2** | | | | | | | | | | | | |
| TKN | ND | --- | 0.10 | mg/l | 1 | --- | --- | --- | --- | --- | --- | |
| **LCS (W3F0979-BS1)** | | | | | Prepared: 06/21/13 12:48 Analyzed: 06/24/13 12:06 | | | | | | | |
| **EPA 351.2** | | | | | | | | | | | | |
| TKN | 1.08 | --- | 0.10 | mg/l | 1 | 1.00 | --- | 108 | 90-110% | --- | --- | |
| **LCS (W3F0979-BS2)** | | | | | Prepared: 06/21/13 12:48 Analyzed: 06/24/13 12:06 | | | | | | | |
| **EPA 351.2** | | | | | | | | | | | | |
| TKN | 0.988 | --- | 0.10 | mg/l | 1 | 1.00 | --- | 99 | 90-110% | --- | --- | |
| **Matrix Spike (W3F0979-MS1)** | | | | | Prepared: 06/21/13 12:48 Analyzed: 06/24/13 12:06 | | | | | | | |
| **QC Source Sample: Other (3F11095-01)** | | | | | | | | | | | | |
| **EPA 351.2** | | | | | | | | | | | | |
| TKN | 1.29 | --- | 0.10 | mg/l | 1 | 1.00 | 0.261 | 103 | 90-110% | --- | --- | |
| **Matrix Spike (W3F0979-MS2)** | | | | | Prepared: 06/21/13 12:48 Analyzed: 06/24/13 12:06 | | | | | | | |
| **QC Source Sample: Other (3F11096-01)** | | | | | | | | | | | | |
| **EPA 351.2** | | | | | | | | | | | | |
| TKN | 1.16 | --- | 0.10 | mg/l | 1 | 1.00 | 0.206 | 95 | 90-110% | --- | --- | |
| **Matrix Spike Dup (W3F0979-MSD1)** | | | | | Prepared: 06/21/13 12:48 Analyzed: 06/24/13 12:06 | | | | | | | |
| **QC Source Sample: Other (3F11095-01)** | | | | | | | | | | | | |
| **EPA 351.2** | | | | | | | | | | | | |
| TKN | 1.29 | --- | 0.10 | mg/l | 1 | 1.00 | 0.261 | 103 | 90-110% | 0.1 | 15% | |
| **Matrix Spike Dup (W3F0979-MSD2)** | | | | | Prepared: 06/21/13 12:48 Analyzed: 06/24/13 12:06 | | | | | | | |
| **QC Source Sample: Other (3F11096-01)** | | | | | | | | | | | | |
| **EPA 351.2** | | | | | | | | | | | | |
| TKN | 1.14 | --- | 0.10 | mg/l | 1 | 1.00 | 0.206 | 94 | 90-110% | 1 | 15% | |

## SAMPLE PREPARATION INFORMATION

### Hydrocarbon Identification Screen by NWTPH-HCID

**Prep: EPA 3510C (Acid Extraction)**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 3060396 | | | | | | | |
| A3F0244-01 | Water | NWTPH-HCID | 06/12/13 10:50 | 06/14/13 13:32 | 1060mL/5mL | 1000mL/5mL | 0.94 |

### Volatile Organic Compounds by EPA 8260B

**Prep: EPA 5030B**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 3060390 | | | | | | | |
| A3F0244-01 | Water | EPA 8260B | 06/12/13 10:50 | 06/14/13 10:00 | 5mL/5mL | 5mL/5mL | 1.00 |

### Polychlorinated Biphenyls by EPA 8082A

**Prep: EPA 3510C (Neutral pH)**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 3060515 | | | | | | | |
| A3F0244-01 | Water | EPA 8082A | 06/12/13 10:50 | 06/20/13 07:05 | 1020mL/5mL | 1000mL/5mL | 0.98 |

### Anions by EPA 300.0/9056A (Ion Chromatography)

**Prep: Method Prep: Aq**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 3060475 | | | | | | | |
| A3F0244-01 | Water | EPA 300.0 | 06/12/13 10:50 | 06/18/13 14:37 | 10mL/10mL | 10mL/10mL | 1.00 |

### Nitrate + Nitrite by EPA 353.2

**Prep: Method Prep: Aq**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 3060429 | | | | | | | |
| A3F0244-01 | Water | EPA 353.2 | 06/12/13 10:50 | 06/17/13 10:40 | 4mL/4mL | 4mL/4mL | 1.00 |

### Cyanide - Total (Aqueous)

**Prep: Method Prep: Aq**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 3060341 | | | | | | | |

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## SAMPLE PREPARATION INFORMATION

### Cyanide - Total (Aqueous)

**Prep: Method Prep: Aq**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| A3F0244-01 | Water | EPA 335.4 | 06/12/13 10:50 | 06/13/13 10:33 | 6mL/6mL | 6mL/6mL | 1.00 |

### Residual Chlorine Screen by SM4500CL-G (mod)

**Prep: Method Prep: Aq**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 3060326 | | | | | | | |
| A3F0244-01 | Water | SM4500CL-G | 06/12/13 10:50 | 06/12/13 16:13 | 25mL/25mL | 25mL/25mL | 1.00 |

### Semivolatile Organic Compounds by EPA 8270D

**Prep: EPA 3510C (Acid/Base Neutral)**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 3060448 | | | | | | | |
| A3F0244-01RE2 | Water | EPA 8270D | 06/12/13 10:50 | 06/18/13 07:12 | 1040mL/1mL | 1000mL/1mL | 0.96 |

### Total Metals by EPA 6020 (ICPMS)

**Prep: EPA 3015A**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 3060663 | | | | | | | |
| A3F0244-01 | Water | EPA 6020A | 06/12/13 10:50 | 06/26/13 11:06 | 45mL/50mL | 45mL/50mL | 1.00 |
| A3F0244-01RE1 | Water | EPA 6020A | 06/12/13 10:50 | 06/26/13 11:06 | 45mL/50mL | 45mL/50mL | 1.00 |

### Conventional Chemistry Parameters

**Prep: EPA 1664**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 3060612 | | | | | | | |
| A3F0244-01 | Water | EPA 1664 | 06/12/13 10:50 | 06/25/13 07:07 | 1N/A/1N/A | 1N/A/1N/A | NA |

**Prep: Method Prep: Aq**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 3060307 | | | | | | | |
| A3F0244-01 | Water | EPA 150.1 | 06/12/13 10:50 | 06/12/13 16:42 | 20mL/20mL | 20mL/20mL | NA |

Philip Nerenberg

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry Parameters

**Prep: Method Prep: Aq**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 3060363 | | | | | | | |
| A3F0244-01 | Water | SM 5210 B | 06/12/13 10:50 | 06/13/13 17:30 | 150mL/300mL | 150mL/300mL | NA |
| Batch: 3060378 | | | | | | | |
| A3F0244-01 | Water | SM 4500 P E | 06/12/13 10:50 | 06/13/13 17:47 | 25mL/25mL | 25mL/25mL | 1.00 |
| Batch: 3060391 | | | | | | | |
| A3F0244-01 | Water | EPA 180.1 | 06/12/13 10:50 | 06/14/13 09:55 | 30mL/30mL | 30mL/30mL | 1.00 |
| Batch: 3060392 | | | | | | | |
| A3F0244-01 | Water | SM 4500 P B | 06/12/13 10:50 | 06/14/13 10:25 | 25mL/50mL | 25mL/50mL | 1.00 |
| Batch: 3060525 | | | | | | | |
| A3F0244-01 | Water | EPA 410.4 | 06/12/13 10:50 | 06/20/13 10:08 | 2mL/2mL | 2mL/2mL | 1.00 |
| Batch: 3060531 | | | | | | | |
| A3F0244-01 | Water | SM 5310 B | 06/12/13 10:50 | 06/20/13 13:08 | 40mL/40mL | 1mL/1mL | 1.00 |
| Batch: 3060562 | | | | | | | |
| A3F0244-01 | Water | SM 2320 B | 06/12/13 10:50 | 06/21/13 10:59 | 57mL/50mL | 50mL/50mL | NA |
| Batch: 3060674 | | | | | | | |
| A3F0244-01 | Water | SM 2510 B | 06/12/13 10:50 | 06/26/13 13:48 | 40mL/40mL | 40mL/40mL | NA |

**Prep: Total Suspended Solids**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 3060423 | | | | | | | |
| A3F0244-01 | Water | SM 2540 D | 06/12/13 10:50 | 06/17/13 13:00 | 1N/A/1N/A | 1N/A/1N/A | NA |
| Batch: 3060424 | | | | | | | |
| A3F0244-01 | Water | SM 2540 C | 06/12/13 10:50 | 06/17/13 13:00 | 1N/A/1N/A | 1N/A/1N/A | NA |

Philip Nerenberg

| | | |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

## Weck Laboratories, Inc

## SAMPLE PREPARATION INFORMATION

### Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

**Prep: General Preparation**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: W3F0851 | | | | | | | |
| A3F0244-01 | Water | EPA 420.4 | 06/12/13 10:50 | 06/19/13 11:05 | 50ml/50ml | 50ml/50ml | 1.00 |
| Batch: W3F0854 | | | | | | | |
| A3F0244-01 | Water | EPA 350.1 | 06/12/13 10:50 | 06/19/13 11:40 | 50ml/50ml | 50ml/50ml | 1.00 |
| Batch: W3F0979 | | | | | | | |
| A3F0244-01 | Water | EPA 351.2 | 06/12/13 10:50 | 06/21/13 12:48 | 20ml/20ml | 20ml/20ml | NA |

Philip Nerenberg

Philip Nerenberg, Lab Director

## Notes and Definitions

Qualifiers:

| | |
|---|---|
| B | Analyte detected in an associated blank at a level above the MRL. (See Notes and Conventions below.) |
| B-02 | Analyte detected in an associated blank at a level between one-half the MRL and the MRL. (See Notes and Conventions below.) |
| C-07 | Extract has undergone Sulfuric Acid Cleanup by EPA 3665A, Sulfur Cleanup by EPA 3660B, and Florisil Cleanup by EPA 3620B in order to minimize matrix interference. |
| EST | Result reported as an Estimated Value. Recovery for Lab Control Spike (LCS) is above the upper control limit. Data may be biased high. |
| ESTa | Result reported as an Estimated Value. Recovery for Lab Control Spike (LCS) is below the lower control limit. Data may be biased low. |
| M-02 | Due to matrix interference, this analyte cannot be accurately quantified. The reported result is estimated. |
| O-01 | Result for total Hexane Extractable Material (HEM) is below reporting level for this sample. Silica Gel Treatment (HEM-SGT) analysis was therefore not performed. |
| PS-03 | Percent recovery is outside control limits due to the high concentration of analyte present in the sample. Post spike is not performed. |
| Q-01 | Spike recovery and/or RPD is outside acceptance limits. |
| Q-02 | Spike recovery is outside of established control limits due to matrix interference. |
| Q-03 | Spike recovery and/or RPD is outside control limits due to the high concentration of analyte present in the sample. |
| Q-16 | Reanalysis of an original Batch QC sample. |
| Q-19 | Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis. |
| Q-23 | Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Data is likely biased high. |
| Q-29 | Recovery for Lab Control Spike (LCS) is above the upper control limit. Data may be biased high. |
| Q-31 | Estimated Results. Recovery of Continuing Calibration Verification sample below lower control limit for this analyte. Results are likely biased low. |
| Q-41 | Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high. |

Notes and Conventions:

| | |
|---|---|
| DET | Analyte DETECTED |
| ND | Analyte NOT DETECTED at or above the reporting limit |
| NR | Not Reported |
| dry | Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry'designation are not dry weight corrected. |
| RPD | Relative Percent Difference |
| MDL | If MDL is not listed, data has been evaluated to the Method Reporting Limit only. |
| WMSC | Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C. |
| Batch QC | In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis. |

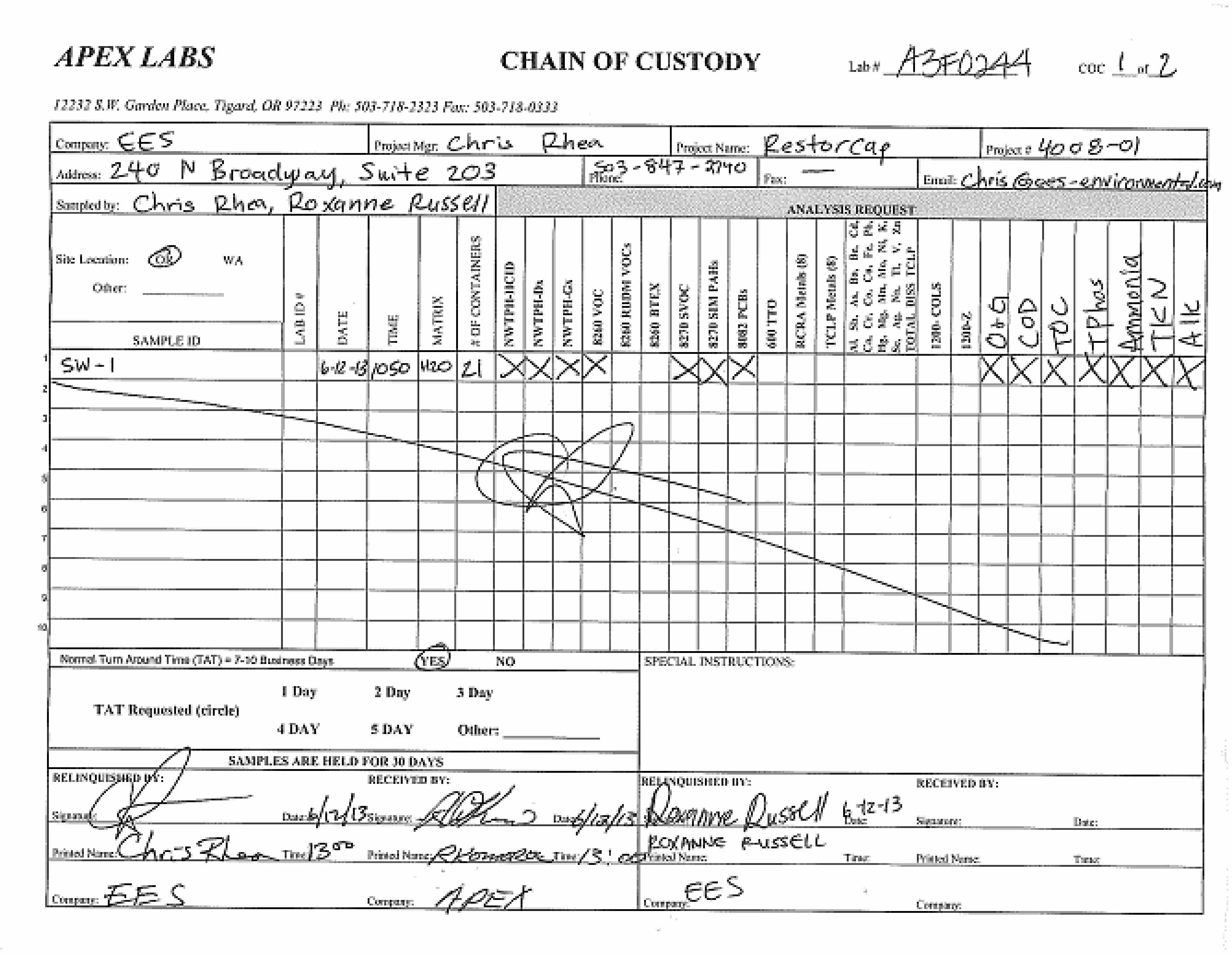
|  |  |  |
|---|---|---|
| **EES Environmental Inc** | Project: **Restorcap** | |
| 240 N Broadway Ste 203 | Project Number: 4008-01 | **Reported:** |
| Portland, OR 97227 | Project Manager: Chris Rhea | 07/01/13 16:40 |

| | |
|---|---|
| Blank Policy | Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.<br>For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.<br>Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL. |
| --- | QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc. |
| *** | Used to indicate a possible discrepency with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND). |

**EES Environmental Inc**
240 N Broadway Ste 203
Portland, OR 97227

Project: **Restorcap**
Project Number: 4008-01
Project Manager: Chris Rhea

**Reported:**
07/01/13 16:40



**APEX LABS** **CHAIN OF CUSTODY** Lab # A3F0244 COC 1 of 2

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: EES
Project Mgr: Chris Rhea
Project Name: Restorcap
Project # 4008-01
Address: 240 N Broadway, Suite 203
Phone: 503-847-2740
Fax: —
Email: Chris@ees-environmental.com
Sampled by: Chris Rhea, Roxanne Russell
Site Location: [✓ OR] WA
Other: ______

ANALYSIS REQUEST

| | SAMPLE ID | LAB ID # | DATE | TIME | MATRIX | # OF CONTAINERS | NWTPH-HCID | NWTPH-Dx | NWTPH-Gx | 8260 VOC | 8260 RBDM VOCs | 8260 BTEX | 8270 SVOC | 8270 SIM PAHs | 8082 PCBs | 600 TTO | RCRA Metals (8) | TCLP Metals (8) | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS TCLP | 1300-COLS | 1300-Z | O+G | COD | TOC | TPhos | Ammonia | TKN | Alk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SW-1 | | 6-12-13 | 1050 | H2O | 21 | X | X | X | X | | | X | X | X | | | | | | | X | X | X | X | X | X | X |
| 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Normal Turn Around Time (TAT) = 7-10 Business Days [✓ YES] NO

TAT Requested (circle) 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: ______

SPECIAL INSTRUCTIONS:

SAMPLES ARE HELD FOR 30 DAYS

| RELINQUISHED BY: | RECEIVED BY: | RELINQUISHED BY: | RECEIVED BY: |
|---|---|---|---|
| Signature: Date: 6/12/13 | Signature: Date: 6/12/13 | Signature: Roxanne Russell Date: 6-12-13 | Signature: Date: |
| Printed Name: Chris Rhea Time: 1300 | Printed Name: [illegible] Time: 13:00 | Printed Name: ROXANNE RUSSELL Time: | Printed Name: Time: |
| Company: EES | Company: APEX | Company: EES | Company: |

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

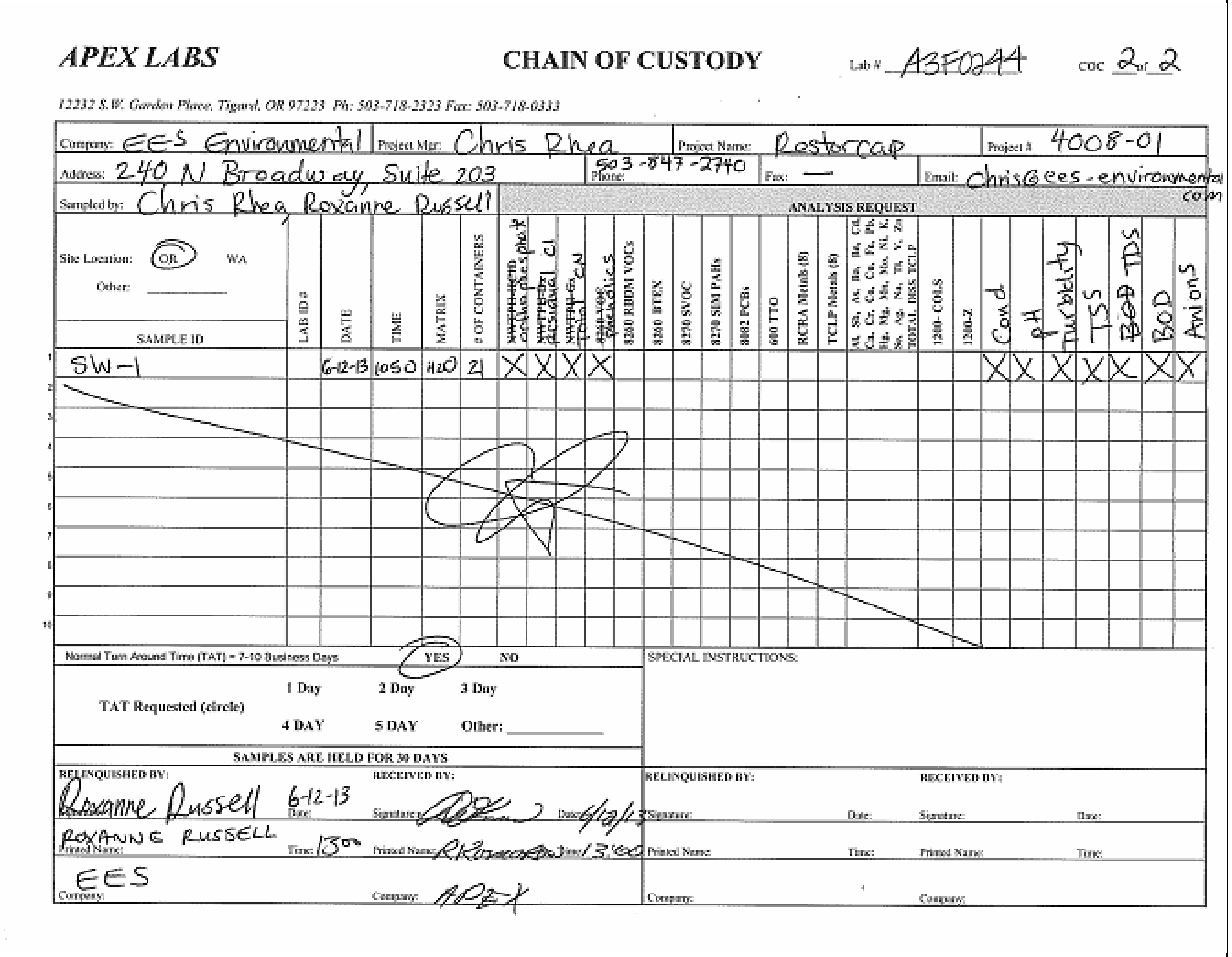
# Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

**EES Environmental Inc**
240 N Broadway Ste 203
Portland, OR 97227

Project: **Restorcap**
Project Number: 4008-01
Project Manager: Chris Rhea

**Reported:**
07/01/13 16:40



**APEX LABS** **CHAIN OF CUSTODY** Lab # A3F0244 COC 2 of 2

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: EES Environmental
Project Mgr: Chris Rhea
Project Name: Restorcap
Project #: 4008-01
Address: 240 N Broadway, Suite 203
Phone: 503-847-2740
Fax: —
Email: chris@ees-environmental.com
Sampled by: Chris Rhea, Roxanne Russell
Site Location: [✓ OR] WA
Other: ______

ANALYSIS REQUEST

| | SAMPLE ID | LAB ID # | DATE | TIME | MATRIX | # OF CONTAINERS | ~~NWTPH-HCID~~ ortho phosphate | ~~NWTPH-Dx~~ Residual Cl | ~~NWTPH-Gx~~ Total CN | ~~8260 VOC~~ Phenolics | 8260 RBDM VOCs | 8260 BTEX | 8270 SVOC | 8270 SIM PAHs | 8082 PCBs | 600 TTO | RCRA Metals (8) | TCLP Metals (8) | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS TCLP | 1200-COLS | 1200-Z | Cond | pH | Turbidity | TSS | BOD TDS | BOD | Anions |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | SW-1 | | 6-12-13 | 1050 | H2O | 21 | X | X | X | X | | | | | | | | | | | | X | X | X | X | X | X | X |
| 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Normal Turn Around Time (TAT) = 7-10 Business Days [✓ YES] NO

TAT Requested (circle) 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: ______

SPECIAL INSTRUCTIONS:

SAMPLES ARE HELD FOR 30 DAYS

| RELINQUISHED BY: | RECEIVED BY: | RELINQUISHED BY: | RECEIVED BY: |
|---|---|---|---|
| Signature: Roxanne Russell Date: 6-12-13 | Signature: Date: 6/12/13 | Signature: Date: | Signature: Date: |
| Printed Name: ROXANNE RUSSELL Time: 1300 | Printed Name: Time: 13:00 | Printed Name: Time: | Printed Name: Time: |
| Company: EES | Company: APEX | Company: | Company: |

Apex Laboratories

Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

# Exhibit H. New Exposed Surface Investigation Report (Farallon Consulting)

# NEW EXPOSED SURFACE INVESTIGATION REPORT

## LINNTON MILL SITE RESTORATION
## 10504 NORTHWEST SAINT HELENS ROAD
## PORTLAND, OREGON

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# 1.0 INTRODUCTION

Farallon Consulting, L.L.C. (Farallon) has prepared this New Exposed Subsurface Investigation Report (Report) on behalf of Linnton Water Credits, LLC (LWC) to present the results from the new exposed surface investigation (upland investigation) conducted at the former Linnton Plywood Association (LPA) plywood mill site at 10504 Northwest Saint Helens Road in Portland, Oregon (herein referred to as the Site) (Figure 1). The Site is a former lumber and plywood mill adjacent to the west bank of the Lower Willamette River near River Mile (RM) 5, which is within the boundary of Portland Harbor Superfund Site (PHSS) sediment Area of Potential Concern 7. The Report has been prepared in accordance with the New Exposed Subsurface Investigation Work Plan developed by Farallon (2016) (upland Work Plan) and approved by the Oregon Department of Environmental Quality (DEQ) (2016) on June 13, 2016.

Previous site investigations identified soil impacts associated with mill operations, and groundwater impacts in the southeastern portion of the Site associated with releases at the south-adjacent BP/ARCO Bulk Terminal 22T (Terminal 22T). Limited soil removal actions were performed at the Site in 2003. Monitoring wells associated with releases at Terminal 22T have been installed in the southeastern portion of the Site. DEQ issued a Source Control Decision on May 7, 2004 and a No Further Action (NFA) determination on July 10, 2009 for the Site. The Source Control Decision indicated that the upland portion of the Site was not a current source of contamination to the PHSS. The NFA indicated that limited soil contamination may remain at the Site. Because the soil does not pose an unacceptable risk to human health or the environment under existing conditions, the soil can remain in-place. The NFA did not apply to the known groundwater contamination associated with releases at Terminal 22T. The Source Control Decision and NFA conditions applied to only the upland portion of the Site, which is defined as landward of the vertical projection of the ordinary high water mark (OHWM) for Willamette River RM 5, which is 20.1 feet above mean sea level (USACE 2004)[1], and did not apply to the known groundwater impacts associated with releases at Terminal 22T, or to the portion of the Site riverward of the vertical projection of the OHWM.

LWC entered into a Prospective Purchaser Agreement with DEQ under Oregon Revised Statute 465.327 in 2014. LWC has since conducted various due diligence efforts and developed design plans for restoration of the Site to provide habitat credits to offset Natural Resource Damages obligations in the Lower Willamette River. Planned Site restoration activities include demolition of existing buildings and infrastructure on the northern portion of the Site, and construction of habitat improvements on the southern portion of the Site. Proposed habitat improvements include a series of open-water, emergent wetland, and forested riparian areas. Excavation and grading to construct the habitat improvements will result in new exposed surfaces at nearly all areas of the Site below and above the OHWM. LWC agreed to perform additional remedial activities for the Site under a Consent Judgment to ensure that the restoration is protective of public health, safety,

[1] Elevations in this Report are based on National Geodetic Survey High Accuracy Reference Network benchmark RD4218 "Helen" with a North American Vertical Datum 88 elevation of 79.346 feet. To convert to National Geodetic Vertical Datum 29, subtract 3.475 (approximately); to convert to the Columbia River Datum, subtract 5.32 (approximately).

and welfare, and the environment. The remedial activities were summarized in an August 7, 2014 letter prepared by Farallon (2014) to DEQ regarding Remedial Scope of Work for Consent Judgment (SOW Letter). The remedial activities included but were not limited to performing the upland investigation. The objectives of the upland investigation were to evaluate soil conditions landward of the vertical projection of the OHWM. Specifically, as described in the upland Work Plan, the objectives were to:

- Determine whether concentrations of contaminants of interest (COIs) in soil at the planned finished grade of the restoration area, if detected, may pose an unacceptable risk to potential human and ecological receptors;
- Identify areas where modification of planned earthwork activities (e.g., additional excavation, placement of additional fill material) will be necessary to mitigate unacceptable risk to potential receptors; and
- Provide information for development of an Environmental Media Management Plan (EMMP), which will provide direction in the management, handling, and disposal of contaminated or potentially contaminated soil at the Site.

## 1.1 PURPOSE

The purpose of this Report is to present the results from the upland investigation, and findings with respect to the characterization of subsurface conditions, potential risk assessment of human and ecological risks, impacts to the restoration design, and management of earthwork activities. Data included in this Report will be used to inform the EMMP for use by contractors during Site demolition and restoration activities.

## 1.2 DOCUMENT ORGANIZATION

The Report generally includes the report content and follows the report format recommended by DEQ (2002) for remedial investigation/feasibility studies. The Report is organized into the following sections:

- **Section 2—Background** provides a summary of the Site setting, history, and current features; regional and Site-specific geology and hydrogeology; historical investigations and remedial activities performed at the Site; and the restoration activities planned for the Site.
- **Section 3—Conceptual Site Model** presents a conceptual site model (CSM) for the Site that describes potential receptors and exposure pathways during restoration construction activities and after the restoration has been completed.
- **Section 4—Investigation Activities** describes the upland investigation strategy and scope of work, and the subsurface conditions observed during drilling activities; and presents analytical results and a data quality assessment summary.
- **Section 5—Data Evaluation** presents an evaluation of the analytical data presented in Section 4 to determine whether COIs in the planned new exposed soil surfaces and excavated soil to be used on the Site as upland fill pose an unacceptable risk to potential

human and ecological receptors, and whether follow-up activities such as modification of the restoration design and further sampling and analysis during excavation may be warranted.

- **Section 6—Summary and Conclusions** presents a summary of the upland investigation, and conclusions regarding the portions of the restoration area that may pose a risk to potential human and ecological receptors. This section also presents a description of proposed follow-up activities to mitigate risks and promote long-term viability of the restoration area.
- **Section 7—References**. This section lists the documents cited in this Report.
- **Section 8—Limitations** presents Farallon's standard limitations with respect to the Report.

# 2.0 BACKGROUND

This section provides a summary of the Site setting, history, and features; regional and Site-specific geology and hydrogeology; historical investigations and remedial activities performed at the Site; and restoration activities planned for the Site.

## 2.1 SITE SETTING

The Site encompasses approximately 24 acres adjacent to the west bank of the Lower Willamette River near RM 5, which is within the boundary of the PHSS.

## 2.2 SITE HISTORY AND DEVELOPMENT

The Site operated as a lumber mill beginning in approximately 1894. As early as 1908, lumber piles covered the majority of the northern portion of the Site, and mill operations that included a saw mill, a planing mill, a grading and sorting table, a drying kiln, and a machine shop were conducted on the southern portion of the Site. Operations on the Site included staging of logs in the Willamette River, and lumber cutting, planing, and storage. The lumber mill operated until it was partially destroyed by fire in 1947. From 1951 to 2001, LPA conducted operations in the main mill complex buildings on the northern portion of the Site, which included log sawing and peeling, milling, lumber and veneer drying, and plywood manufacturing. Beginning in the 1980s, an aggregate processing facility was operated by Columbia River Sand and Gravel on the southern portion of the Site. Aggregate processing operations included off-loading (sand pumping) of Columbia River dredge spoils via spud barge into settling and dewatering ponds on the Site. LPA ceased operations in December 2001, and mill decommissioning and equipment salvage operations began in 2002.

## 2.3 SITE FEATURES AND CURRENT CONDITIONS

The main mill complex occupies the northern portion of the Site and includes a dock and a green end conveyor, the green end building, the pressing and finishing building, the green veneer building, the steam dryer building and adjacent gas dryer building, a covered loading area, a maintenance shop, a boiler house, caustic/resin tanks, a hog fuel bin, and a sander dust bin. The LPA office and storage building is west of the main mill complex. Ten monitoring wells associated with a groundwater contamination plume originating from the south-adjacent Terminal 22T facility are located on the southern portion of the Site, which is undeveloped, with the exception of storm sewer infrastructure, settling ponds, and dewatering ponds. The Site layout is shown on Figure 2.

## 2.4 GEOLOGY AND HYDROGEOLOGY

The following sections provide a brief description of regional and Site geology and hydrogeology.

### 2.4.1 Regional Geology and Hydrogeology

The Site and surrounding areas lie within the western margin of the Portland Basin, a major northwest-southeast-trending sediment-filled structural depression in the northern portion of the Willamette River Valley, bounded by the Tualatin Mountains to the south and southwest, and by the Willamette River to the north. The Tualatin Mountains are composed of the Tertiary Columbia River Basalts Group. The Portland Basin is filled with recent alluvium, Pleistocene cataclysmic flood deposits, and Miocene to Holocene non-marine sedimentary rocks, and is underlain by Eocene to Miocene volcanic and sedimentary rocks.

Three major hydrogeological units have been mapped in the area surrounding the Site. The oldest unit is composed of older volcanic and marine sedimentary rocks. Overlying these deposits and containing the next hydrogeologic unit are the Sandy River Mudstone and Troutdale Formations. The Troutdale Formation, which overlies the Sandy River Mudstone Formation, is composed of flood and overbank deposits, and ranges in depth from 59 to 65 feet below ground surface (bgs) (Farallon 2015).

### 2.4.2 Site Geology and Hydrogeology

The native material in the shallow subsurface of the Site is composed of unconsolidated alluvial deposits ranging from silty to clayey silts, with some sands and gravels. Previous investigations have indicated that portions of the Site subsurface are composed of fill material ranging in depth from 5 to 27 feet bgs. Most of the fill material is sandy or silty in character (Farallon 2015). In the 1970s, approximately 275,000 cubic yards of Columbia River dredge material was placed on the Site. Other fill material used at the Site prior to 1980 included wood chips, dimensional lumber, concrete blocks, boulders, broken brick, glass, wire, and reinforcing bars. In 1981, an additional 90,000 cubic yards of dredge material was placed on the southern portion of the Site in an effort to level the Site for future development.

Based on the Site geology, topography, and proximity to the Willamette River, groundwater at the Site is expected to flow east to northeast toward the river. The depth to groundwater varies seasonally with precipitation and river stage, and ranges from 19 to 30 feet bgs (Farallon 2015).

## 2.5 HISTORICAL INVESTIGATIONS AND REMEDIAL ACTIVITIES

The following sections summarize investigations and remedial activities conducted at the Site to evaluate and mitigate impacts associated with mill operations, and groundwater impacts in the southeastern portion of the Site associated with releases at Terminal 22T.

### 2.5.1 Petroleum Releases and Remediation

An aboveground release of 40 to 50 gallons of form release oil from piping associated with a 5,000-gallon underground storage tank (UST) was reported in May 1989. Approximately 200 cubic yards of petroleum-contaminated soil was excavated and transported off the Site for disposal. DEQ issued an NFA determination for this release incident in October 1989 (Leaking Underground Storage Tank (LUST) No. 26-89-01210). A release from three gasoline USTs was reported in 1994, and the USTs and 80 cubic yards of contaminated soil were excavated. DEQ issued an NFA determination for this release incident in September 1994 (LUST No. 26-94-019).

### 2.5.2 Environmental Assessment

LPA entered the DEQ Voluntary Cleanup Program in 1999 based primarily on the presence of polycyclic aromatic hydrocarbons (PAHs) in Willamette River sediment samples collected near the Site by the U.S. Environmental Protection Agency (EPA) in 1997. LPA signed a Voluntary Agreement for Source Control with DEQ dated June 5, 2000 to evaluate the Site as a potential upland source of contamination to the PHSS. Several investigations were performed at the Site under the voluntary agreement, described in the *Linnton Plywood Association Environmental Assessment* report dated August 2007 prepared by CH2M Hill (2007). None of these investigations indicated that conditions at the Site represented a potentially unacceptable risk to the Willamette River.

### 2.5.3 Phase II Investigation

A Phase II investigation was conducted at the Site by Shaw Environmental, Inc. in 2011 to investigate the recognized environmental conditions the firm identified in a 2011 Phase I Environmental Site Assessment report (Shaw Environmental, Inc. 2011), including a 1995 release of approximately 55 gallons of pale oil (lubricating oil) onto the ground surface; storage of drums and buckets of assorted oils in the auto repair shop and in the southeastern corner of the pressing and finishing building; an empty 10,000-gallon hydraulic oil steel tank in the boiler house; the groundwater contamination plume migrating from the Terminal 22T property; potentially asbestos-containing material on pipe insulation throughout Site buildings; and polychlorinated biphenyl (PCB) contamination associated with transformers.

Although the Phase II Investigation concluded that localized areas of impact in the vicinity of the mill building foundation may require additional assessment or action, the Phase II Investigation concluded in general that additional assessment in the vicinity of the building foundations did not appear warranted based on the following: 1) residual impacts to soil would be capped with a minimum of 5 feet of soil, protective of human and ecological receptors; 2) existing data indicated that analyte concentrations were less than applicable DEQ Risk-Based Concentrations (RBCs) for relevant receptor pathways, and overall groundwater quality did not pose a significant risk to human or ecological receptors; and 3) once completed, restrictions would be recorded to prohibit disturbance of the improvements (e.g., drilling, excavation, other similar activities that could adversely affect the improvements as constructed).

### 2.5.4 Electrical Transformer Evaluation

EES Environmental Consulting, Inc. (EES) conducted an evaluation of nine pole-mounted and six pad-mounted electrical transformers on the Site in March 2013. PCBs were detected at concentrations ranging from 9.07 to 65.5 parts per million in five of the six samples of transformer oil collected at the six pad-mounted transformers. Leakage reportedly was observed beneath Transformer 2, possible staining was observed beneath Transformers 3 and 4C, and staining was observed beneath Transformers 4A and 4B. Based on the laboratory analytical results for oil sampled from Transformer 2, EES concluded that Transformer 2 was classified as PCB-contaminated, and would require special handling and disposal. EES recommended that these transformers be properly managed, and disposed of if removed from the Site. Based on the staining observed in the vicinity of the pad-mounted transformers, EES concluded that it was possible that PCB oil had been released from the transformers, and that building materials and surfaces should be sampled for disposal characterization prior to any future demolition.

### 2.5.5 Groundwater Remediation and Monitoring

BP-affiliated Atlantic Richfield Company (BP/ARC) has conducted various remedial investigation and cleanup actions at Terminal 22T and the Site related to the releases that resulted in the petroleum hydrocarbon plume that extends northerly onto the Site. In 2005, BP/ARC completed upgrades to a hydraulic source control measure that includes a series of hydraulic control and extraction wells to reverse the groundwater gradient from the seawall toward the center of Terminal 22T, and to recover and treat liquid petroleum hydrocarbon (LPH) and groundwater. In 2007, the original concrete seawall was replaced with a new steel sheet pile wall to provide a seismic upgrade at Terminal 22T, and enhance efforts to prevent migration of LPH and dissolved-phase contaminants to the Willamette River. The new seawall extends northerly to the southeastern property boundary between Terminal 22T and the Site. Annual groundwater monitoring on the Site related to the petroleum hydrocarbon plume originating at Terminal 22T has been ongoing since 2008 (Farallon 2014), and includes sampling and analysis of groundwater from the 10 monitoring wells located on the southeastern portion of the Site. Recent groundwater monitoring results indicate that the groundwater contamination plume extends to the southeastern portion of the Site (Farallon 2014).

In July 2013, BP/ARC submitted a Groundwater Modeling Report to DEQ. The results from the groundwater and constituent fate and transport modeling were used to further evaluate the potential for recontamination of sediments by groundwater migration to the Willamette River. Results from the numerical groundwater flow modeling identified the potential for a limited area of migration of groundwater from the shallow groundwater zone around the northern end of the seawall at the Terminal 22T boundary. The modeling results indicated that contaminants from Terminal 22T migrating in groundwater did not have the potential to increase contaminants in sediments to concentrations exceeding human health or ecological receptor screening levels (Farallon 2014). Conclusions presented in the Groundwater Modeling Report indicated that additional source control measures were being considered to ensure that shallow groundwater is adequately captured near the northern end of the seawall. Based on the results from the modeling, URS Corporation (2014) prepared an Interim Remedial Measure Work Plan in 2014 to eliminate potential off-Site migration of contaminated groundwater by expanding the existing groundwater pump and treat system, and to remove contaminant mass on the Site using sorption-based product to capture dissolved-phase petroleum constituents and to enhance biodegradation of petroleum hydrocarbons. URS proceeded in 2015 to implement the DEQ-approved remediation scope of work at the southeastern portion of the Site. Based on BP/ARC final post-remediation monitoring requirements, LWC will coordinate existing well abandonments and new well installations as warranted, and access agreements to facilitate ongoing performance and compliance monitoring as required by DEQ.

## 2.6 PLANNED RESTORATION ACTIVITIES

The restoration will be performed in two phases: 1) demolition and utility abandonment; and 2) site regrading and habitat construction. Because the restoration plan is subject to the review and approval of numerous stakeholders and regulatory agencies, the final design details may differ from those presented in the restoration plan. The general restoration approach and the scope of work for each phase of restoration construction presented in the restoration plan and described below are not anticipated to change significantly.

### 2.6.1 Demolition and Utility Abandonment

The first phase of Site restoration involves the following demolition and utility abandonment activities:

- Demolition of all man-made aboveground features within the Site boundary, including but not limited to structures, pipes, concrete walls and curbs, timber pilings, mechanical and electrical equipment, utility and light poles, and fences.
- Removal of all concrete rubble adjacent to the Willamette River shoreline and within the Site boundary.
- Demolition of select paved surfaces.
- Demolition of all belowground pipes and conduit within the project boundary to a minimum of 3 feet bgs, and filling all piping and conduit deeper than 3 feet bgs with controlled low-strength material or sand.
- Demolition of a manhole adjacent to the southwestern corner of the main mill building complex, and installation of a plug in the pipe connection to the manhole directly to the west.
- Realignment of the buried stormwater piping to Outfall 6 to feed the planned boulder plunge pool outfall on the Willamette River.
- Demolition and removal of portions of the stormwater culvert and associated manholes on the southern portion of the Site.
- Decommissioning of 10 monitoring wells associated with the groundwater contamination plume originating from Terminal 22T. The wells will be replaced following completion of the restoration construction.

### 2.6.2 Site Regrading and Habitat Construction

The second phase of restoration will involve creation of upland and shallow-water habitat by conducting the following earthwork activities:

- Implementation of sediment and erosion control best management practices in accordance with the National Pollutant Discharge Elimination System General Permit 1200-C for the Site;
- Construction of two temporary berms on the southern portion of the Site to allow for excavation, and construction of aquatic habitat features;
- Diversion of water flowing from Linnton Creek around the excavation area into the Willamette River during excavation activities; and
- Excavation, filling, and grading of soil on the northern and southern portions of the Site to create upland habitat.

Existing surface elevations and the surface elevations proposed for the restoration construction are shown on Figure 3. It is anticipated that excavated soil will be used to construct the upland restoration features. Additional fill material may be brought onto the Site to construct upland and aquatic restoration features.

# 3.0 CONCEPTUAL SITE MODEL

This section presents a CSM for the Site. The CSM describes potential receptors and exposure pathways during restoration construction activities and after the restoration has been completed.

## 3.1 RECEPTORS

Potential receptors for the new exposed soil include construction and excavation workers during restoration earthwork activities (i.e., excavation, filling, grading, planting vegetation), and terrestrial and aquatic ecological receptors that will inhabit the upland and aquatic wildlife habitat after construction has been completed.

## 3.2 EXPOSURE PATHWAYS

The potential pathways by which construction and excavation workers and/or ecological receptors may be exposed to COIs include:

- Release of volatile COIs from soil into air.
- Ingestion of, dermal contact with, or inhalation of COIs in soil by construction and excavation workers.
- Transport of nonvolatile COIs from soil via fugitive dust.
- Leaching, infiltration, or percolation of water-soluble COIs from soil into groundwater. COIs that leach into groundwater may be transported to surface water at a surface discharge point (e.g., seep, spring, surface water recharge area).
- Leaching, infiltration, or percolation of water-soluble COIs from soil into stormwater runoff, or direct discharge to surface water.
- Re-suspension and transportation of COIs from soil into surface runoff.
- Ingestion of COIs by benthic invertebrates or bottom-dwelling fish via direct ingestion of sediments, or partitioning into water column sediments.
- Exposure of ecological receptors via ingestion of COIs that are capable of bioaccumulation and/or biomagnification within the food chain.

The scope of work described in Section 4, Investigation Activities, evaluates risks to potential construction and excavation workers and/or ecological receptors from exposure to COIs via these pathways.

# 4.0 INVESTIGATION ACTIVITIES

This section describes the upland investigation strategy and scope of work, variations from the scope of work presented in the upland Work Plan, and subsurface conditions observed during drilling activities; and presents analytical results and a data quality assessment summary.

## 4.1 INVESTIGATION STRATEGY

For the purpose of the upland investigation, the southern portion of the Site was divided into the aquatic restoration area (ARA) and the upland restoration area (URA). The ARA will be restored as aquatic habitat below the elevation of the OHWM. The URA will be restored as upland habitat above the elevation of the OHWM (20.1 feet). The approximate boundaries of the ARA and the URA are shown on Figure 4. To achieve the objectives of the upland investigation, the ARA and the URA were divided into the following three decision units:

- **Excavated soil unit**—includes soil that will be excavated from the ARA and the URA, and potentially placed in the URA as part of restoration construction;
- **ARA surface soil unit**—includes soil in the ARA that will be exposed at the completion of planned restoration activities; and
- **URA surface soil unit**—includes soil in the URA that will be exposed at the completion of planned restoration activities.

The strategy for the upland investigation was to characterize soil in each decision unit on an "area-wide" basis using a systematic random sampling approach. A grid with 165 fifty-foot-square cells was superimposed on the ARA and URA, of which 101 cells are primarily in the ARA, and 64 cells are primarily in the URA. The grid layout is shown on Figure 4. As described in the upland Work Plan, a data quality objective (DQO) of the upland investigation was to sample a minimum of 25 percent of the grid cells in each soil decision unit. The grid cells targeted for sampling were listed in Table 1 of the SAP, which is Appendix B of the upland Work Plan, and included 31 grid cells in the ARA and 18 grid cells in the URA.

Due to field conditions, the scope of work for the upland investigation was modified as follows:

- The boring planned for grid cell F9 was relocated to H9 due to misalignment of the sampling grid. Specifically, F9 was outside the planned restoration area, whereas H9 is within the planned restoration area.
- Borings planned for advancement in grid cells L3, O3, and R3 were relocated to L4, O4, and R4, and the boring planned for advancement in grid cell I3 was eliminated due to interferences from riverbank riprap and potential slope instability.
- The boring planned for grid cell H8 was relocated to I8 to increase the number of samples collected from the ARA.

As modified, the scope of work included advancement of borings in 27 grid cells in the ARA, and 22 grid cells in the URA. These grid cells compose approximately 27 percent of the total number of grid cells in the ARA, and approximately 34 percent of the total number of grid cells in the URA. A list of the grid cells sampled as part of the upland investigation is included in Table 1.

The following sections describe the boring advancement and soil sampling activities, and subsurface conditions observed during drilling activities, and present the analytical results and a data quality assessment.

### 4.1.1 Boring Advancement

A boring was advanced using a direct-push drill rig at the approximate center of each of 27 grid cells in the ARA and the 22 grid cells in the URA. The borings were advanced to a depth 2 feet greater than the approximate excavation depth planned for the cell. The approximate excavation depth and the depth of each boring are listed in Table 1. The boring locations are shown on Figure 4; select borings are shown on the cross-sections on Figures 5 through 10. The subsurface lithology and observations during drilling are summarized in the boring logs provided in Appendix A. Groundwater was detected in numerous borings at depths ranging from 6 to 27 feet bgs, which corresponds to an elevation range of approximately 11.1 to 38.9 feet above mean sea level. Depth to groundwater and groundwater elevation data are presented in Table 1.

At the time of the upland investigation, subsurface conditions observed from the ground surface to the maximum depth explored of 35 feet bgs included a non-stratified mixture of gravels, silty sands, sandy silts, and anthropogenic fill. These subsurface conditions are consistent with those documented for previous investigations (Farallon 2015). The gravel, sands, and silts likely represent emplaced dredge material. Anthropogenic fill materials, including brick, concrete, and wood debris, were observed in varying amounts and at varying depths in most of the borings. Due to the non-stratified nature of the subsurface, lithological information is not presented on the cross-sections on Figures 5 through 10.

### 4.1.2 Soil Sampling

During drilling activities, soil was field-screened for potential contamination at approximately 5-foot intervals from the ground surface to the total depth of the boring using visual and olfactory indications and a photoionization detector. Soil samples from the borings were collected in accordance with the standard operating procedures (SOPs) included in the upland Work Plan.

The following soil samples were collected from each boring to characterize the three decision units:

- Excavation composite samples: A composite sample comprised of soils in the excavated soil unit extending from the existing ground surface to the design elevation (planned excavation depth) of the new exposed surface was collected to provide information for development of the EMMP.
- New surface samples: A composite sample comprised of the upper 2 feet of the new soil surface was collected to determine whether concentrations of COIs in soil at the planned finished grade soil in the ARA or the URA may pose an unacceptable risk to potential

human and ecological receptors, and to identify areas where modification of the planned earthwork activities will be necessary to mitigate unacceptable risk to potential receptors.

- Additional composite samples: Composite samples were collected from soils in the excavated soil unit at intervals of 10 feet or less, extending from the ground surface to the design elevation of the new exposed surface to further inform the development of the EMMP. Specifically, the samples were collected to further discretize the distribution of COIs in cells that may pose an unacceptable risk to potential human and ecological receptors.

No potentially impacted samples were collected because no field indications of contamination were observed. Sample B10-062116-2.5-7.5 was collected from boring B10 as a representative wood waste sample. Visual and olfactory field notations indicated that the wood waste sample was unburned and had a slight organic-like odor.

### 4.1.3 Investigation-Derived Waste

Non-dedicated field sampling equipment was cleaned and decontaminated prior to use, between samples, and prior to demobilizing from the Site. Decontamination wash water was contained on the Site in labeled 55-gallon drums. Soil cuttings were stockpiled on and covered with plastic sheeting pending waste profiling and proper disposal.

### 4.1.4 Laboratory Analysis

Excavation composite and new surface soil samples were submitted under standard chain-of-custody protocols to Apex Laboratories, LLC of Tigard, Oregon for analysis for the following COIs identified in the upland Work Plan:

- Total petroleum hydrocarbons as gasoline-range organics (GRO) by Northwest Method NWTPH-Gx;
- Total petroleum hydrocarbons as diesel-range organics (DRO) and as oil-range organics (ORO) by Northwest Method NWTPH-Dx using silica gel cleanup treatment; and
- Resource Conservation and Recovery Act (RCRA) 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) and copper by EPA Method 200.8/7471.

Soil samples in which GRO was detected were analyzed for additional COIs, including volatile petroleum hydrocarbons (VPH) by Northwest Method NWVPH. Although not described in the upland Work Plan, soil samples in which GRO was detected were analyzed also for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8260 to provide supplemental data to evaluate potential risk to receptors. Soil samples in which DRO and/or ORO were detected were analyzed for additional COIs, including PAHs by EPA Method 8270B, and for PCBs as Aroclors by EPA Method 8082.

Additional composite samples collected in the excavated soil unit were retained for possible analysis in the event that COI concentrations in the excavation composite samples posed an unacceptable risk to potential human and ecological receptors based on comparison with the investigation screening criteria. The excavated soil unit does not pose an unacceptable risk to potential human and ecological receptors (see Section 5.1); accordingly, the additional composite samples were not analyzed and will not be used inform future work at the property.

Although not included in the scope of work described in the upland Work Plan, new surface soil samples collected from the ARA were analyzed also for selected organochlorine pesticides, including 2,4' and 4,4' isomers of dichlorodiphenyltrichloroethane (DDT), dichlorodiphenyldichloroethylene (DDE), and dichlorodiphenyldichloroethane (DDD) by EPA Method 8081B. The purpose of the analysis for organochlorine pesticides was to inform the upcoming sediment investigation. The additional composite samples collected from 10-foot intervals were not analyzed for COIs. Soil samples collected from boring B21 and the excavation composite sample collected from boring B43 inadvertently were not analyzed due to chain-of-custody error. A total of 58 samples collected from the excavated soil unit were analyzed. A total of 27 and 26 samples collected from the ARA and URA surface soil units, respectively, were analyzed.

### 4.1.5 Analytical Results

Soil analytical results are summarized in Tables 2 through 6 and described below. The laboratory analytical reports are provided in Appendix B; a table listing the soil samples that were collected and analyzed, and samples collected and not analyzed is included in Appendix C.

**GRO:** GRO was not detected at concentrations exceeding method reporting limits (MRLs) in excavation composite or new surface soil samples, or in the wood waste sample collected from boring B10, with the exception of ARA new surface samples collected from borings B15 and B44. VPH aromatic hydrocarbons in the C10-C12 range were detected in the ARA new surface sample collected from boring B15. VPH aliphatic hydrocarbons in the C8-C10 and C1-C12 ranges, and aromatic hydrocarbons in the C8-C10 and C10-C12 ranges were detected in the ARA new surface sample collected from boring B44. BTEX constituents were not detected at concentrations exceeding the laboratory MRLs in the ARA new surface samples collected from borings B15 or B44. Analytical results for GRO are provided in Table 2.

**DRO:** DRO was not detected at concentrations exceeding MRLs in excavation composite or new surface soil samples collected from the ARA or the URA, or in the wood waste sample collected from boring B10. Analytical results for DRO are provided in Table 2.

**ORO:** ORO was detected at concentrations exceeding MRLs in numerous excavation composite and new surface soil samples collected from the ARA and the URA, and in the wood waste samples collected from boring B10. Analytical results for ORO are provided in Table 2.

**Metals:** RCRA 8 metals and copper were detected at concentrations exceeding laboratory MRLs in all of the excavation composite and new surface soil samples collected from the ARA and the URA, and in the wood waste samples collected from boring B10. Analytical results for RCRA 8 metals and copper are provided in Table 3.

**PAHs:** Both non-carcinogenic and carcinogenic PAHs (cPAHs) were detected at concentrations exceeding laboratory MRLs in the excavation composite and new surface soil samples collected from the ARA and the URA, and in the wood waste samples collected from boring B10. Analytical results for non-carcinogenic PAHs and cPAHs are provided in Table 4.

**PCBs:** PCBs as Aroclors were not detected at concentrations exceeding laboratory MRLs in soil samples, with the exception of Aroclors 1254 and/or 1260 detected in excavation composite samples collected from borings B1, B13, B17, B29, B31, B44, and B47; in the ARA new surface samples collected from boring B24; in the URA new surface samples collected from borings B9, B31, and B50; and in the wood waste samples collected from boring B10. Analytical results for PCBs as Aroclors are provided in Table 5.

**Organochlorine Pesticides.** Organochlorine pesticides were not detected at concentrations exceeding MRLs in the new surface soil samples, with the exception of 4,4'-DDD, 4,4'-DDE, 2,4'-DDT, and/or 4,4'-DDT detected in ARA new surface samples collected from borings B2, B18, and B24. Analytical results for organochlorine pesticides are provided in Table 6.

### 4.1.6 Data Quality Assessment

The QA/QC review was performed in accordance with the QAPP to determine whether the field activities and laboratory analyses were of sufficient quality and quantity to meet the DQOs described in the QAPP, which included quantitation limits, precision, accuracy, representativeness, completeness, and comparability. The QA/QC review results are presented in the Quality Assurance/Quality Control Summary Report provided in Appendix C. All DQOs for the New Exposed Surface Investigation have been met. A sufficient number of representative samples were collected; the precision, accuracy, and completeness of the resulting analytical data were sufficient to support the purpose of the New Exposed Surface Investigation; and the data used in the New Exposed Surface Investigation were deemed valid.

# 5.0 DATA EVALUATION

This section presents the results from the evaluation conducted on the analytical data presented in Section 4.1.5, Analytical Results. Detected concentrations of COIs were compared with the applicable screening levels for each decision unit. Where appropriate, the 90 percent upper confidence limit (UCL) of the arithmetic mean of the concentrations of COIs in each decision unit was calculated using EPA ProUCL Release Version 5.1 software (ProUCL).[2] When the 90 percent UCL was calculated, the Sample Sizes module of ProUCL[3] was used to confirm that the number of samples in each decision unit provides reasonable precision around estimated mean concentrations. The comparison results were then used to evaluate whether COIs in the planned new exposed soil surfaces and excavated soil to be used as on-Site upland fill pose an unacceptable risk to potential human and ecological receptors, and whether follow-up activities such as modification of the restoration design, and further sampling and analysis during excavation may be warranted.

## 5.1 EXCAVATED SOIL UNIT

As defined in the upland Work Plan, the applicable screening levels for the excavated soil unit are DEQ RBCs for excavation and construction workers; DEQ Level II Screening Level Values (SLVs) for plants, invertebrates, and wildlife exposed to soil (Level II SLVs); and DEQ Level II SLVs and Portland Harbor Joint Source Control Strategy (JSCS) SLVs for catch basin solids and erodible soil. Metals concentrations were compared with default background metals concentrations for soil in the Portland Basin established by DEQ (2013) (default background concentrations). These SLVs are presented in Tables 2 through 6. Neither GRO nor DRO was detected at concentrations exceeding MRLs in soil samples collected from the excavated soil unit, and therefore are not discussed below. The data evaluation results for all other COIs are provided in the following sections.

### 5.1.1 ORO

ORO was not detected at concentrations exceeding applicable screening levels. Therefore, ORO in the excavated soil unit does not pose an unacceptable risk to potential human and ecological receptors, and does not require special handling during restoration construction.

### 5.1.2 Metals

Metals were not detected at concentrations exceeding applicable screening levels, with the exception of arsenic, chromium, copper, and lead, which were detected in some samples at concentrations exceeding the JSCS SLVs and/or the Level II SLVs. The 90 percent UCL of the arithmetic means of the concentrations of arsenic, cadmium, chromium, copper, and lead for the 58 samples collected from the excavated soil unit was calculated using ProUCL (Table 3).

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[2] UCLs of the arithmetic mean were calculated for normal, lognormal, gamma, and non-parametric distributions at 95 percent confidence. The 90 percent UCL used in this report was selected based on the best fit for the distribution of the data set as identified by ProUCL. For normal distributions, the 90 percent UCL was calculated using a standard one-tailed t-test with the appropriate number of degrees of freedom.

[3] The Sample Sizes module calculations were performed using a 95 percent confidence interval.

The Sample Sizes module indicated that the minimum number of samples from the excavated soil unit to provide reasonable precision around the estimated mean concentrations of arsenic, chromium, copper, and lead is 26. The 90 percent UCL of the arithmetic mean of the concentrations of barium, which was not detected at concentrations exceeding applicable screening levels in samples collected from the excavated soil unit, also was calculated using ProUCL (Table 3). Because mercury, selenium, and silver were detected in three or fewer excavated soil unit samples, the 90 percent UCLs of the arithmetic means of the concentrations of these COIs were not calculated using ProUCL.

The 90 percent UCL of the arithmetic means of arsenic and copper concentrations did not exceed screening levels. Therefore, concentrations of these metals in the excavated soil unit do not pose an unacceptable risk to potential human and ecological receptors, and do not require special handling during restoration construction.

The 90 percent UCL of the arithmetic mean of chromium concentrations exceeds the Level II SLVs, but is less than the default background concentration. Therefore, concentrations of chromium in the excavated soil unit do not pose an unacceptable risk to potential human and ecological receptors, and do not require special handling during restoration construction.

The 90 percent UCL of the arithmetic mean of lead concentrations exceeds the Level II SLVs and the JSCS SLVs, and is greater than the default background concentration. The Portland Harbor JSCS (DEQ/EPA 2005) indicates that an exceedance of the JSCS SLV does not necessarily result in an unacceptable risk to receptors, and recommends performing a weight-of-evidence evaluation to assess actual potential risk. A weight-of-evidence evaluation was performed for lead and mercury in the excavated unit using the following Site-specific factors described in the Portland Harbor JSCS:

- Magnitude of exceedance above SLV;
- Regional background soil concentrations; and
- Site surface conditions and riverbank stability.

The results from the weight-of-evidence evaluation for lead are discussed below.

**Magnitude of Exceedance above SLV:** The magnitude of exceedance typically is evaluated by calculating an exceedance quotient (EQ) for a COI. In most cases, the EQ is calculated as the COI concentration at a specific sampling location divided by the screening level. Because the excavated soil unit will be mixed and used as fill above the OHWM throughout the Site, it was appropriate to calculate the EQ for lead using the 90 percent UCL of the arithmetic means, which represent the average soil quality in the excavated soil unit in its entirety, and not using lead and mercury concentrations in soil samples from individual borings. The calculated EQs are presented in the table below:

| COI | DEQ Level II SLV EQ | JSCS SLV EQ |
|---|---|---|
| Lead | 7.5 | 7.1 |

The EQs for lead were less than 10, indicating that these compounds do not pose a material risk to ecological receptors, and are not a material source of recontamination to river sediment.

**Regional Background Soil Concentrations**: The 90 percent UCL of the arithmetic mean of lead concentrations is 126 mg/kg, which is greater than the default background concentration for lead (96 mg/kg). The default background concentration is the 95 percent upper prediction limit (UPL) of the dataset for soil in the Portland Basin evaluated by DEQ. According to DEQ, the 95 percent UPL is expected to be exceeded only rarely by individual samples. The lead concentrations in only 2 of the 50 (4 percent) excavated soil unit cells sampled exceed the default background concentration.

**Site Surface Conditions and Riverbank Stability:** Excavated soil will be placed above the OHWM (Figure 4) in the URA, which is in planting zone 3, as shown on sheets L1 and L2 of the 50% Design Submittal for Site restoration prepared by Waterways Consulting Inc. and Grette Associates L.L.C. (Appendix A of the upland Work Plan). Zone 3 will be planted extensively with grasses and shrubs during restoration construction activities, to prevent erosion and promote the success of the habitat.

Based on the weight-of-evidence evaluation, the concentrations of lead exceeding DEQ Level II SLVs and JSCS SLVs detected in soil samples collected from the excavated soil unit do not pose an unacceptable risk to potential human and ecological receptors after the soil is excavated and placed in the URA because:

- The EQs for the excavated soil unit in its entirety using the 90 percent UCL of the arithmetic mean concentration are less than 10;
- The number of individual grid cells with concentrations of lead and mercury exceeding the background default concentrations are low; and
- The extensive plantings to be implemented as part of the restoration construction will limit erosion and the potential for PAHs in future URA surface soil to be mobilized and to enter the ARA surface soil or river sediments.

Accordingly, lead in the excavated soil unit does not require special handling during restoration construction.

### 5.1.3 PAHs

Individual PAHs were not detected at concentrations exceeding applicable screening levels, with the following exceptions:

- Indeno(1,2,3-cd)pyrene was detected at a concentration exceeding the JSCS SLV in the sample collected from boring B5 at a depth interval of 0 to 26 feet bgs;
- Acenaphthylene, benzo(g,h,i)perylene, fluoranthene, phenanthrene, pyrene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene were detected at concentrations exceeding the JSCS SLVs in the soil sample collected from boring B12 at a depth interval of 0 to 20 feet bgs; and
- Benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene were detected at concentrations exceeding JSCS SLVs in the soil sample collected from boring B50 at a depth interval of 0 to 18 feet bgs.

The 90 percent UCL of the arithmetic mean of concentrations of acenaphthylene, benzo(g,h,i)perylene, fluoranthene, phenanthrene, pyrene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene concentrations for the 58 samples collected from the excavated soil unit was calculated using ProUCL (Table 4). The Sample Sizes module indicated that the minimum number of samples from the excavated soil unit to provide reasonable precision around the estimated mean concentrations of acenaphthylene, benzo(g,h,i)perylene, fluoranthene, phenanthrene, pyrene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene PAHs is 35. Because the 90 percent UCL of the arithmetic mean of the concentrations of acenaphthylene, benzo(g,h,i)perylene, fluoranthene, phenanthrene, pyrene, and benzo(a)pyrene does not exceed applicable screening levels, these PAHs in the excavated soil unit do not pose an unacceptable risk to potential human and ecological receptors, and do not require special handling during restoration construction.

The 90 percent UCL of the arithmetic mean of concentrations of indeno(1,2,3-cd)pyrene exceeds the JSCS SLVs. A weight-of-evidence evaluation was performed for indeno(1,2,3-cd)pyrene in the excavated unit using the following Site-specific factors described in the Portland Harbor JSCS:

- Magnitude of exceedance above SLV; and
- Site surface conditions and riverbank stability.

The results from the weight-of-evidence evaluation for indeno(1,2,3-cd)pyrene are discussed below.

**Magnitude of Exceedance above SLV:** The EQ for indeno(1,2,3-cd)pyrene using the 90 percent UCL of the arithmetic means is 1.5, which is less than 10, indicating that indeno(1,2,3-cd)pyrene does not pose a material risk to ecological receptors, and is not a material source of recontamination to river sediment for this compound.

**Site Surface Conditions and Riverbank Stability:** Excavated soil will be placed above the OHWM (Figure 4) in the UR, which is in planting zone 3, as shown on sheets L1 and L2 of the 50% Design Submittal for Site restoration prepared by Waterways Consulting Inc. and Grette Associates L.L.C. (Appendix A of the upland Work Plan). Zone 3 will be planted extensively with grasses and shrubs during restoration construction activities, to prevent erosion and promote the success of the habitat.

Based on the weight-of-evidence evaluation, the concentrations of indeno(1,2,3-cd)pyrene exceeding the JSCS SLV detected in soil samples collected from the excavated soil unit do not pose an unacceptable risk to potential human and ecological receptors after the soil is excavated and placed in the URA because:

- The EQ for the excavated soil unit is less than or equal to 10; and
- The extensive plantings to be implemented as part of the restoration construction will limit erosion and the potential for PAHs in future URA surface soil to be mobilized and to enter the ARA surface soil or river sediments.

Accordingly, indeno(1,2,3-cd)pyrene in the excavated soil unit does not pose an unacceptable risk to potential human and ecological receptors, and does not require special handling during restoration construction.

### 5.1.4 PCBs

PCBs as Aroclors were not detected at concentrations exceeding Level II SLVs or JSCS SLVs. To evaluate PCB data against DEQ RBCs and Level II SLVs for total PCBs, the sum of PCB concentrations (total PCB concentration) was calculated for each sample using Aroclor data (Table 5). The total PCB concentrations do not exceed screening levels. Because the concentrations of individual PCBs as Aroclors and total PCB concentrations do not exceed screening levels, PCBs in the excavated soil unit do not pose an unacceptable risk to potential human and ecological receptors, and do not require special handling during restoration construction.

## 5.2 ARA SURFACE SOIL UNIT

As defined in the upland Work Plan, the applicable screening levels for the ARA surface soil unit are DEQ RBCs for excavation and construction workers, and Portland Harbor Preliminary Remediation Goals (PRGs). The upland Work Plan referenced Draft Portland Harbor PRGs dated April 11, 2014. Final PRGs were listed in the EPA (2016) Superfund Proposed Plan issued in June 2016. Therefore, ARA surface soil unit data have been compared against the PRGs listed in the Superfund Proposed Plan. Metals concentrations were compared with background concentrations. These screening levels are presented in Tables 2 through 6. DRO was not detected at concentrations exceeding MRLs in soil samples collected from the ARA surface soil unit, and therefore is not discussed below. The data evaluation results for all other COIs are provided in the following sections.

### 5.2.1 GRO

GRO was not detected at concentrations exceeding applicable screening levels in the ARA surface soil unit. Therefore, GRO in the ARA surface soil unit does not pose an unacceptable risk to potential human and ecological receptors, and does not require special handling during restoration construction; VPH analysis is not necessary to evaluate the composition of hydrocarbons detected in Site soil.

### 5.2.2 ORO

ORO was not detected at concentrations exceeding applicable screening levels in the ARA surface soil unit. Therefore, ORO in the ARA surface soil unit does not pose an unacceptable risk to potential human and ecological receptors, and does not require special handling during restoration construction.

### 5.2.3 Metals

Metals were not detected at concentrations exceeding applicable screening levels, with the exception of arsenic, which was detected at a concentration exceeding the PRG in the sample collected from boring B18. The 90 percent UCL of the arithmetic mean of arsenic concentrations for the 27 samples collected from the ARA surface soil unit was calculated using ProUCL

(Table 3). The Sample Sizes module indicated that the minimum number of samples in the excavated soil unit to provide reasonable precision around the estimated mean concentration is 3.

The 90 percent UCL of the arithmetic mean of arsenic concentrations exceeds the PRG, but is less than the default background concentration. Because metals concentrations generally do not exceed screening levels, and the 90 percent UCL of the arithmetic mean of the concentrations of arsenic is less than the default background concentration, metals in the ARA surface soil unit do not pose an unacceptable risk to potential human and ecological receptors, and do not require special handling during restoration construction.

### 5.2.4 PAHs

Individual PAHs were not detected at concentrations exceeding applicable screening levels. To evaluate PAH data against PRGs, the total PAH concentration was calculated for each sample as the sum of the concentrations of individual PAHs, and the toxic equivalent concentration (TEC) for cPAHs was calculated as the sum of individual cPAH concentrations multiplied by the appropriate toxicity equivalency factors. Total PAH concentrations, toxicity equivalency factors, and TECs are presented in Table 4. The total PAH concentrations do not exceed PRGs. The TECs for the soil samples collected from borings B2, B3, B15, B24, and B35 exceed PRGs; therefore, cPAHs in the ARA surface soil unit in the vicinity of these borings may pose an unacceptable risk to potential human and ecological receptors, and require special handling during restoration construction. ARA surface soil samples collected from borings B2 and B3 consisted in part of wood waste; ARA surface soil samples collected from borings B5, B24, and B35 contained no visible wood waste. Therefore, the PRG exceedances apparently do not correlate with the presence of wood waste in the subsurface.

### 5.2.5 PCBs

PCBs as Aroclors were not detected at concentrations exceeding Level II SLVs or JSCS SLVs. To evaluate PCB data against DEQ RBCs and Level II SLVs for total PCBs, the total PCB concentration was calculated for each sample using Aroclor data (Table 5). The total PCB concentrations for samples collected from borings B24 and B31 exceed the PRG. As a result, PCBs in the ARA surface soil unit in the vicinity of these borings may pose an unacceptable risk to potential human and ecological receptors, and require special handling during restoration construction. ARA surface soil samples collected from borings B24 and B31 contained no visible wood waste. Therefore, the PRG exceedances apparently do not correlate with the presence of wood waste in the subsurface.

### 5.2.6 Organochlorine Pesticides

To evaluate organochlorine pesticide data against applicable screening levels, total DDD, DDE, DDT, and DDx concentrations were calculated for each sample as follows:

- Total DDD = the sum of the concentrations of the 2,4' and 4,4' isomers of DDD;
- Total DDE = the sum of the concentrations of the 2,4' and 4,4' isomers of DDE;

- Total DDT = the sum of the concentrations of the 2,4' and 4,4' isomers of DDT; and
- Total DDx = the sum of the concentrations of the 2,4' and 4,4' isomers of DDD, DDE, and DDT.

Total DDD, DDE, and DDT concentrations do not exceed DEQ RBCs or PRGs. Therefore, total DDD, DDE, and DDT in the ARA surface soil unit do not pose an unacceptable risk to potential human and ecological receptors, and do not require special handling during restoration construction. Total DDx concentrations do not exceed PRGs, with the exception of the total DDx concentration for the samples collected from boring B24. The 90 percent UCL of the arithmetic mean of total DDx concentrations for the 27 samples collected from the ARA surface soil unit was calculated using ProUCL (Table 6). The Sample Sizes module indicated that the minimum number of samples in the excavated soil unit to provide reasonable precision around the estimated mean concentration of DDx is 24. The 90 percent UCL of the arithmetic mean of DDx concentrations exceeds the PRG. Therefore, DDx concentrations in the excavated soil with the inclusion of data collected from boring B24 may pose an unacceptable risk to potential human and ecological receptors, and require special handling during restoration construction.

## 5.3 URA SURFACE SOIL UNIT

As defined in the upland Work Plan, the applicable screening levels for the URA surface soil unit are DEQ RBCs for excavation and construction workers, Level II SLVs, and JSCS SLVs. Metals concentrations were compared with default background metals concentrations for the Portland Basin established by DEQ (2013). Screening levels are presented in Tables 2 through 6. Neither GRO nor DRO was detected at concentrations exceeding MRLs in soil samples collected from the URA surface soil unit, and therefore are not discussed below. The data evaluation results for all other COIs are provided in the following sections.

### 5.3.1 ORO

ORO was not detected at concentrations exceeding applicable screening levels. Therefore, ORO in the URA surface soil unit does not pose an unacceptable risk to potential human and ecological receptors, and does not require special handling during restoration construction.

### 5.3.2 Metals

Metals were not detected at concentrations exceeding applicable screening levels, with the exception of arsenic, chromium, copper, lead, and mercury, which were detected in the samples collected from some borings at concentrations exceeding the Level II SLV and/or JSCS SLV PRG. The 90 percent UCL of the arithmetic mean of the arsenic, chromium, copper, lead, and mercury concentrations for the 26 samples collected from the URA surface soil unit was calculated using ProUCL (Table 3). The Sample Sizes module indicated that the minimum number of samples from the excavated soil unit to provide reasonable precision around the estimated mean concentration is 20.

The 90 percent UCL of the arithmetic mean of arsenic concentrations exceeds only the JSCS SLV, and is less than the default background concentration. The 90 percent UCL of the arithmetic mean for chromium concentrations is less than the Level II SLV, the JSCS SLV, and the default background concentration. The 90 percent UCL of the arithmetic mean for lead concentrations exceeds the Level II SLV and the JSCS SLV, but is less than the default background concentration. The 90 percent UCL of the arithmetic mean for mercury concentrations was not calculated because mercury was detected at concentrations exceeding the MRL in only one sample and one duplicate sample collected from the URA surface soil unit. The concentration of mercury detected in both samples exceeds the Level II SLV and the JSCS SLV, but only the concentration in the duplicate sample exceeds the default background concentration. Because the 90 percent UCLs of the arithmetic means of the concentrations of arsenic, chromium, lead, and mercury do not exceed applicable screening levels and/or are less than default background concentrations, arsenic, chromium, lead, and mercury in the URA surface unit do not pose an unacceptable risk to potential human and ecological receptors, and do not require special handling during restoration construction.

The 90 percent UCL of the arithmetic mean of copper concentrations exceeds the Level II SLVs and the default background concentration. A weight-of-evidence evaluation was performed for copper in these URA surface unit samples using the following Site-specific factors described in the Portland Harbor JSCS:

- Magnitude of exceedance above SLV;
- Regional background soil concentrations; and
- Site surface conditions and riverbank stability.

The results from the weight-of-evidence evaluation for copper are discussed below.

**Magnitude of Exceedance above SLV:** An EQ (the concentration divided by the DEQ Level II SLV or the JSCS SLV) was calculated for each sample in which copper was detected at a concentration exceeding the DEQ Level II SLV or the JSCS SLV. The calculated EQs are presented in the table below:

| Boring | DEQ Level II SLV EQ | JSCS SLV EQ |
|---|---|---|
| B6 | 1.6 | 0.54 |
| B17 | 2.5 | 0.85 |
| B32 | 5.2 | 1.7 |
| B43 | 10 | 3.5 |

The EQs for copper generally were less than 10, indicating that copper does not pose a material risk to ecological receptors, and is not a material source of recontamination to river sediment.

**Regional Background Soil Concentrations:** The 90 percent UCL of the arithmetic mean of copper concentrations is 120.3 mg/kg, which is greater than the default background concentration for copper of 34 mg/kg. The copper concentrations exceed the default background concentration in only 4 of the 22 (18 percent) excavated soil unit cells sampled.

**Site Surface Conditions and Riverbank Stability:** The URA surface soil unit is above the OHWM (Figure 4) and in planting zone 3, as shown on sheets L1 and L2 of the 50% Design Submittal for Site restoration prepared by Waterways Consulting Inc. and Grette Associates L.L.C. (Appendix A of the upland Work Plan). Zone 3 will be planted extensively with grasses and shrubs during restoration construction activities, to prevent erosion and promote the success of the habitat.

Based on the weight-of-evidence evaluation, the concentrations of copper exceeding DEQ Level II SLVs and JSCS SLVs detected in soil samples collected from the URA surface soil unit do not pose an unacceptable risk to potential human and ecological receptors in the URA because:

- The EQs for the URA surface soil cells in which copper concentrations exceed DEQ Level II SLVs and JSCS SLVs are less than or equal to 10;
- The number of individual grid cells with concentrations of copper exceed default background concentrations are low; and
- The extensive plantings to be implemented as part of the restoration construction will limit erosion and the potential for PAHs in future URA surface soil to be mobilized and enter the ARA surface soil or river sediments.

Accordingly, copper in the URA surface soil unit does not pose an unacceptable risk to potential human and ecological receptors, and does not require special handling during restoration construction.

### 5.3.3 PAHs

Individual PAHs were not detected at concentrations exceeding applicable screening levels, with the following exceptions:

- Benzo(g,h,i)perylene, pyrene and indeno(1,2,3-cd)pyrene were detected at concentrations exceeding JSCS SLVs in the soil sample collected from boring B7 at a depth interval of 13 to 15 feet bgs; and
- Acenaphthene, benzo(g,h,i)perylene, fluoranthene, naphthalene, phenanthrene, pyrene, and indeno(1,2,3-cd)pyrene were detected at concentrations exceeding the JSCS SLVs in the sample collected from boring B50 at a depth interval of 18 to 20 feet bgs.

Concentrations of PAHs detected in samples collected from borings B7 and B50 exceeded only JSCS SLVs. A weight-of-evidence evaluation was performed for PAH exceedances detected in borings B7 and B50 using the following Site-specific factors described in the Portland Harbor JSCS:

- Magnitude of exceedance above SLV; and
- Site surface conditions and riverbank stability.

The results from the weight-of-evidence evaluation are discussed below.

**Magnitude of Exceedance above SLV:** An EQ (the concentration divided by the JSCS SLV) was calculated for each PAH detected at a concentration exceeding the JSCS SLV. The calculated EQs are presented in the table below:

| PAH | Boring B7 EQ | Boring B50 EQ |
|---|---|---|
| Acenaphthene, | --- | 2 |
| Benzo(g,h,i)perylene | 1.8 | 2.8 |
| Fluoranthene | --- | 1.5 |
| Naphthalene | --- | 1.4 |
| Phenanthrene | --- | 2.6 |
| Pyrene | 1.4 | 2.8 |
| Indeno(1,2,3-cd)pyrene | 5 | 7.7 |

NOTE:
--- = not detected at a concentration exceeding the JSCS SLV

The EQs for these PAHs were less than or equal to 10, indicating that these compounds do not pose a material risk to ecological receptors, and are not a material source of recontamination to river sediment.

**Site Surface Conditions and Riverbank Stability:** Borings B7 and B50 are in grid cells O4 and V2, respectively, at an elevation of approximately 30 feet above mean sea level, which is approximately 10 feet above the OHWM (Figure 4). Grid cells O4 and V2 are in planting zones 2 and 3, as shown on sheets L1 and L2 of the 50% Design Submittal for Site restoration prepared by Waterways Consulting Inc. and Grette Associates L.L.C. (Appendix A of the upland Work Plan). Zones 2 and 3 will be planted extensively with grasses and shrubs during restoration construction activities, to prevent erosion and promote the success of the habitat.

Based on the weight-of-evidence evaluation, the concentrations of PAHs exceeding JSCS SLVs detected in soil samples collected from borings B7 and B50 do not pose an unacceptable risk to potential human and ecological receptors in the URA surface soil unit because the EQs are low, and extensive plantings to be implemented as part of the restoration construction will limit erosion and the potential for PAHs in URA surface soil to be mobilized and to enter the ARA surface soil or river sediments.

### 5.3.4 PCBs

PCBs as Aroclors were not detected at concentrations exceeding Level II SLVs or JSCS SLVs. To evaluate PCB data against DEQ RBCs and Level II SLVs for total PCBs, the total PCB concentration was calculated for each sample using Aroclor data (Table 5). The total PCB concentrations are less than DEQ RBCs and Level II SLVs. As a result, PCBs in the URA surface soil unit do not pose an unacceptable risk to potential human and ecological receptors, and do not require special handling during restoration construction.

# 6.0 SUMMARY AND CONCLUSIONS

This section presents a summary of the upland investigation, and conclusions regarding the portions of the restoration area that may pose a risk to potential human and ecological receptors. This section also includes a description of proposed follow-up activities to mitigate risks and promote long-term viability of the restoration area.

## 6.1 SUMMARY

The upland investigation was performed in accordance with the scope of work described in the upland Work Plan, and included advancing 49 borings; collecting a total of 111 soil samples from the excavated soil, ARA surface soil, and URA surface soil units for analysis for the Site COIs (GRO, DRO, ORO, RCRA 8 metals, copper, PAHs, and PCBs) and/or organochlorine pesticides; and evaluating sampling results against applicable screening levels. The investigation results, including the Site geology and hydrogeology observed during investigation activities, and the screening level evaluation for each soil unit, are summarized below.

### 6.1.1 Site Geology and Hydrogeology

Subsurface conditions observed included a non-stratified mixture of gravels, silty sands, and sandy silts that likely represent emplaced dredge material; and anthropogenic fill materials, including brick, concrete, and wood debris. Groundwater was detected at depths ranging from 11.1 to 38.9 feet bgs.

### 6.1.2 Excavated Soil Unit

COIs in the excavated soil unit do not pose an unacceptable risk to potential human and ecological receptors for the following reasons:

- GRO or DRO was not detected at concentrations exceeding MRLs.
- ORO was not detected at concentrations exceeding applicable screening levels.
- The 90 percent UCL of the arithmetic mean of the concentrations of individual metals detected exceeding screening levels (arsenic, cadmium, chromium, copper, lead, and mercury) does not exceed applicable screening levels, is less than default background concentrations; and/or based on the weight-of evidence evaluation, does not pose an unacceptable risk to potential human and ecological receptors in the URA.
- The 90 percent UCL of the arithmetic mean of the concentrations of individual PAHs detected exceeding screening levels (acenaphthylene, benzo(g,h,i)perylene, fluoranthene, phenanthrene, pyrene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene) does not exceed applicable screening levels; and/or based on the weight-of evidence evaluation, does not pose an unacceptable risk to potential human and ecological receptors in the URA.
- The concentrations of individual PCBs as Aroclors and total PCB concentrations do not exceed applicable screening levels.

As a result, soil from the excavated soil unit does not require special handling during restoration construction.

### 6.1.3 ARA Surface Soil Unit

The following COIs and organochlorine pesticides in the ARA surface soil unit do not pose an unacceptable risk to potential human and ecological receptors, and do not require special handling during restoration construction for the following reasons:

- GRO or ORO was not detected at concentrations exceeding applicable screening levels.
- DRO was not detected at concentrations exceeding MRLs.
- The 90 percent UCL of the arithmetic mean of the concentrations of the individual metal detected exceeding screening levels (arsenic) exceeds the PRG, but is less than default background concentrations.
- Total DDD, DDE, and DDT concentrations, and the 90 percent UCL of the arithmetic mean of DDx concentrations do not exceed applicable screening levels.

The following COIs in the ARA surface soil unit may pose an unacceptable risk to potential human and ecological receptors for the following reasons:

- Although individual PAHs and total PAH concentrations do not exceed applicable screening levels, the cPAH TECs for the soil samples collected from borings B2, B3, B15, B24, and B35 exceed the PRG.
- Although PCBs as Aroclors were not detected at concentrations exceeding applicable screening levels, total PCB concentrations for samples collected from borings B24 and B35 exceed the PRG.
- Total DDx in the sample collected from boring B24 exceeds the PRG.

As a result, soil from the ARA surface soil unit in the vicinity of borings B2, B3, B15, B24, and B35 may require special handling during restoration construction.

### 6.1.4 URA Surface Soil Unit

COIs in the URA surface soil unit do not pose an unacceptable risk to potential human and ecological receptors for the following reasons:

- GRO or DRO was not detected at concentrations exceeding MRLs.
- ORO was not detected at concentrations exceeding applicable screening levels.
- The 90 percent UCL of the arithmetic mean of the concentrations of individual metals detected exceeding screening levels (arsenic, chromium, copper, lead, and mercury) does not exceed applicable screening levels, and/or is similar to background concentrations; and/or based on the weight-of evidence evaluation, does not pose an unacceptable risk to potential human and ecological receptors in the URA.

- The 90 percent UCL of the arithmetic mean of the concentrations of individual PAHs detected exceeding screening levels (acenaphthylene, benzo(g,h,i)perylene, fluoranthene, naphthalene, phenanthrene, pyrene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene) does not exceed screening levels, with the exception of JSCS SLVs for erodible soil. However, a weight-of-evidence evaluation demonstrated that the JSCS exceedances do not indicate an unacceptable risk to potential human and ecological receptors in the URA.
- The concentrations of individual PCBs as Aroclors, and total PCB concentrations do not exceed applicable screening levels.

As a result, soil from the URA surface soil unit does not require special handling during restoration construction.

## 6.2 CONCLUSIONS

The objectives of the upland investigation were to evaluate soil conditions in the restoration area. Specifically, the objectives were to:

- Determine whether concentrations of COIs in soil at the planned finished grade of the restoration area may pose an unacceptable risk to potential human and ecological receptors;
- Identify areas where modification of the planned earthwork activities will be necessary to mitigate unacceptable risk to potential receptors; and
- Provide information for development of an EMMP.

Investigation conclusions with respect to each objective are presented in the following sections.

### 6.2.1 Risk to Potential Human and Ecological Receptors

The investigation results indicate that concentrations of only cPAHs, PCBs, and/or DDx in the ARA surface soil unit in the vicinity of borings B2, B3, B15, B24, and B35 may pose an unacceptable risk to potential human and ecological receptors. The potential risk is based on exceedances of PRGs for sediments in the PHSS. As described in the EPA (2016) Proposed Plan for the PHSS, PRGs are used to develop the long-term contaminant concentrations that need to be achieved to meet the remedial action objectives for the PHSS. Because the Proposed Plan for the PHSS included no remediation of nearshore sediments adjacent to the Site, it is anticipated that no remediation of nearshore sediments at the Site will be necessary to meet EPA requirements for cleanup of the PHSS. Soil in the ARA will become hydraulically connected to PHSS sediments at the conclusion of restoration construction activities, but is not PHSS sediments. Accordingly, modification of planned earthwork activities described below is intended only to promote the viability of the restoration area habitat, and is not for PHSS remediation purposes.

### 6.2.2 Modification of Planned Earthwork Activities

It is anticipated that excavation beyond the vertical limits proposed in the 50% Design Submittal for Site restoration, and/or capping of ARA surface soil in the vicinity of borings B2, B3, B15, B24, and B35 may be necessary to mitigate risk to potential human and ecological receptors in the restoration area habitat that may be posed by PRG exceedances. As part of the planned earthwork activities, soil in the vicinity of borings B2, B3, B15, B24, and B35 will be over-excavated and capped with clean fill to final elevations as set forth in the project design documents.

# 7.0 REFERENCES

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# 8.0 LIMITATIONS

## 8.1 GENERAL LIMITATIONS

The conclusions contained in this report/assessment are based on professional opinions with regard to the subject matter. These opinions have been arrived at in accordance with currently accepted hydrogeologic and engineering standards and practices applicable to this location. The conclusions contained herein are subject to the following inherent limitations:

- **Accuracy of Information.** Farallon obtained, reviewed, and evaluated certain information used in this report/assessment from sources that were believed to be reliable. Farallon's conclusions, opinions, and recommendations are based in part on such information. Farallon's services did not include verification of its accuracy or authenticity. Should the information upon which Farallon relied prove to be inaccurate or unreliable, Farallon reserves the right to amend or revise its conclusions, opinions, and/or recommendations.
- **Reconnaissance and/or Characterization.** Farallon performed a reconnaissance and/or characterization of the Site that is the subject of this report/assessment to document current conditions. Farallon focused on areas deemed more likely to exhibit hazardous materials conditions. Contamination may exist in other areas of the Site that were not investigated or were inaccessible. Site activities beyond Farallon's control could change at any time after the completion of this report/assessment.

Farallon cannot and does not warrant or guarantee that the Site is free of hazardous or potentially hazardous substances or conditions, or that latent or undiscovered conditions will not become evident in the future. Farallon's observations, findings, and opinions can be considered valid only as of the date of the report hereof.

This report/assessment has been prepared in accordance with the contract for services between Farallon and Linnton Water Credits, LLC. No other warranties, representations, or certifications are made.

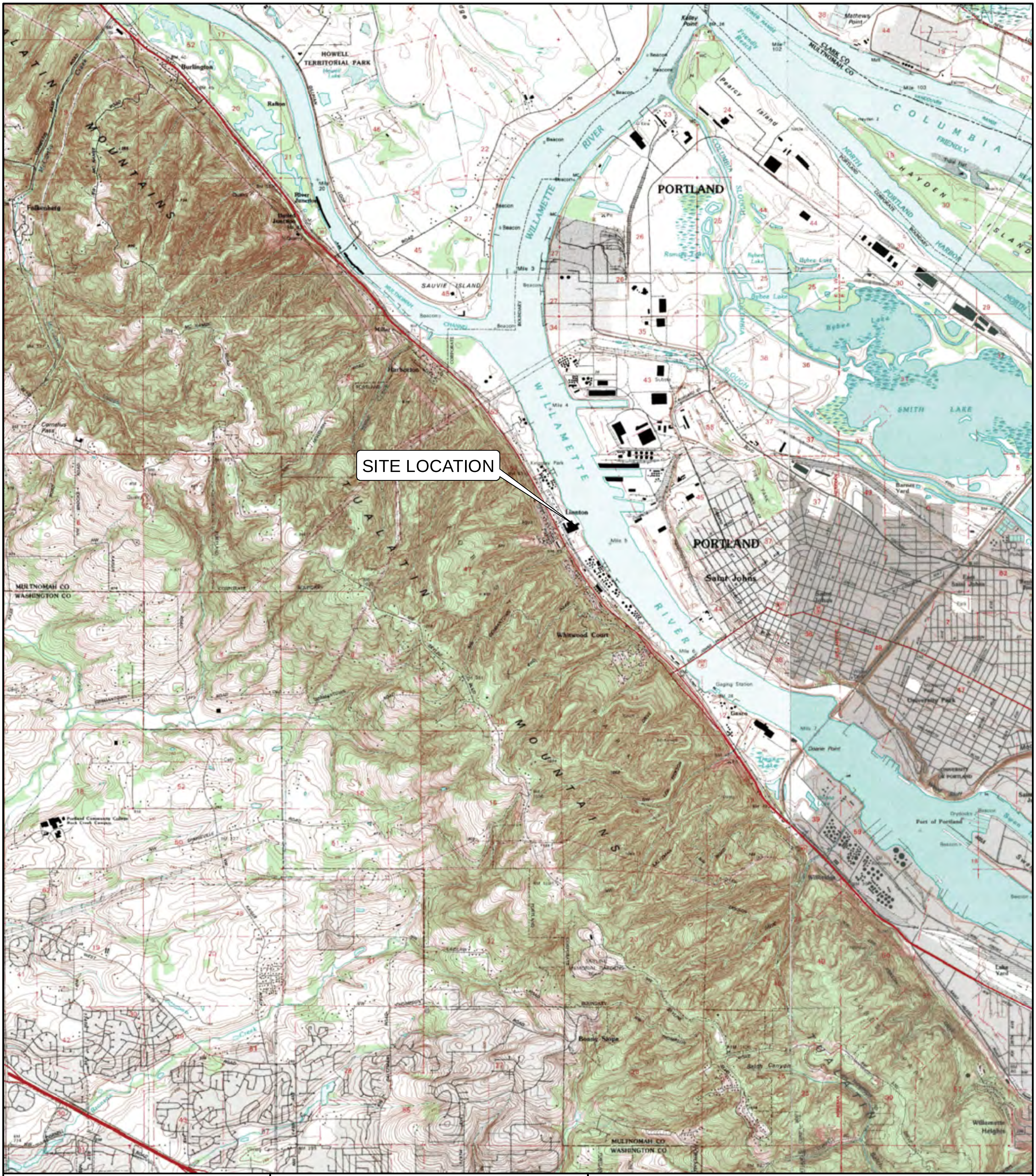
## 8.2 LIMITATION ON RELIANCE BY THIRD PARTIES

**Reliance by third parties is prohibited.** Any use, interpretation, or reliance upon this report/assessment by anyone other than Linnton Water Credits, LLC is at the sole risk of that party, and Farallon will have no liability for such unauthorized use, interpretation, or reliance.

# FIGURES

NEW EXPOSED SURFACE INVESTIGATION REPORT
Linnton Mill Site Restoration
10504 Northwest Saint Helens Road
Portland, Oregon

Farallon PN:  1588-001



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SOURCE: USGS 100K, VANCOUVER
DATE: 1975

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# FIGURE 1

## SITE VICINITY MAP
## LINNTON MILL SITE RESTORATION
## 10504 NORTHWEST SAINT HELENS ROAD
## PORTLAND, OREGON

Farallon PN: 1588-001

Drawn By: pgarvin | Checked By: | Date: 11/11/2016 | Disc Reference: 1588001.MXD

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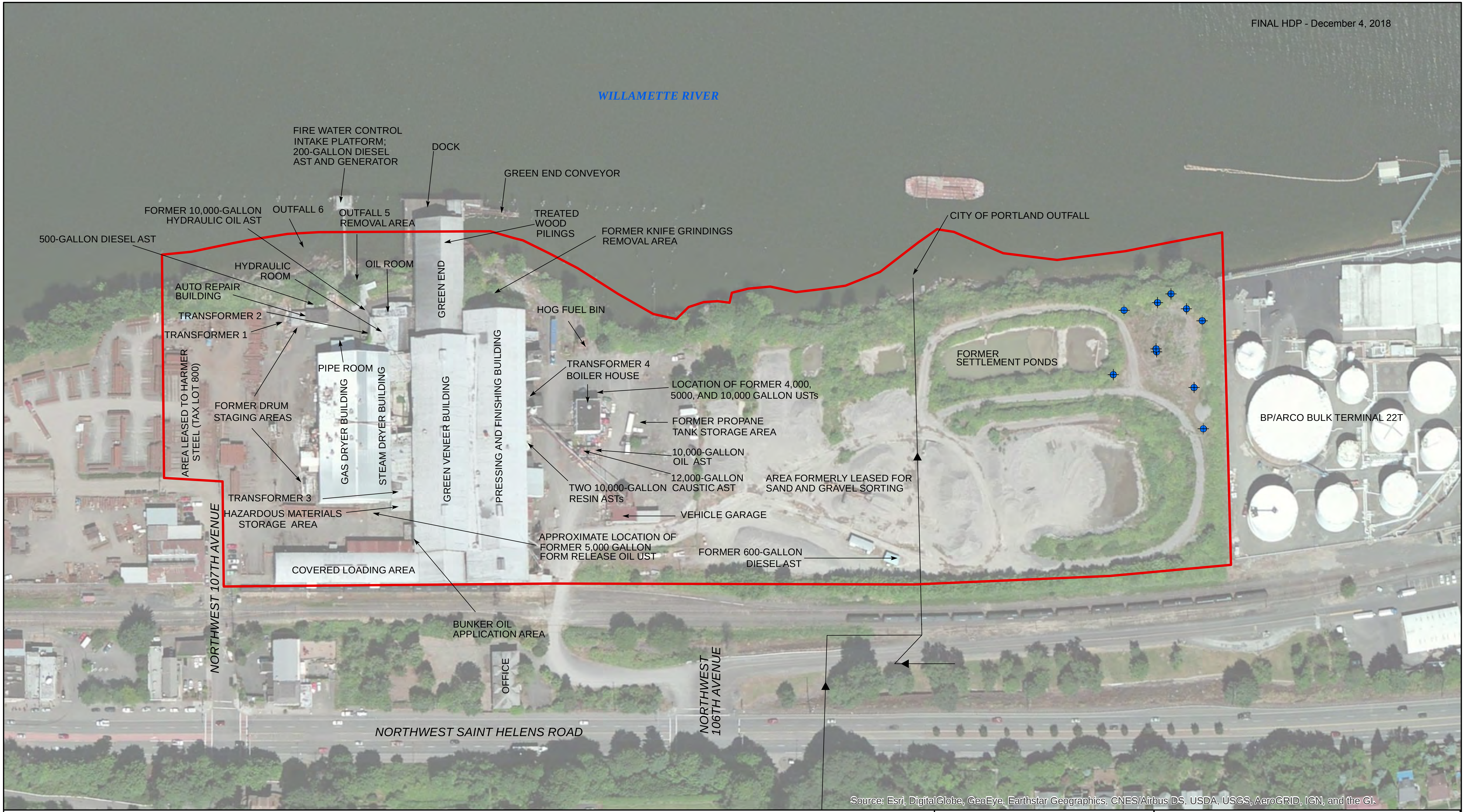

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GI.

LEGEND

- 🟥 APPROXIMATE SITE BOUNDARY
- ⌖ MONITORING WELL
- ← CULVERT

N

0 150

Scale in feet

NOTE: LOCATIONS ARE APPROXIMATE

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## FIGURE 2

SITE PLAN
LINNTON MILL SITE RESTORATION
10504 NORTHWEST SAINT HELENS ROAD
PORTLAND, OREGON

Farallon PN: 1588-001

Drawn By: pgarvin Checked By: MH Date: 11/11/2016 Disk Reference: 1588001.MXD

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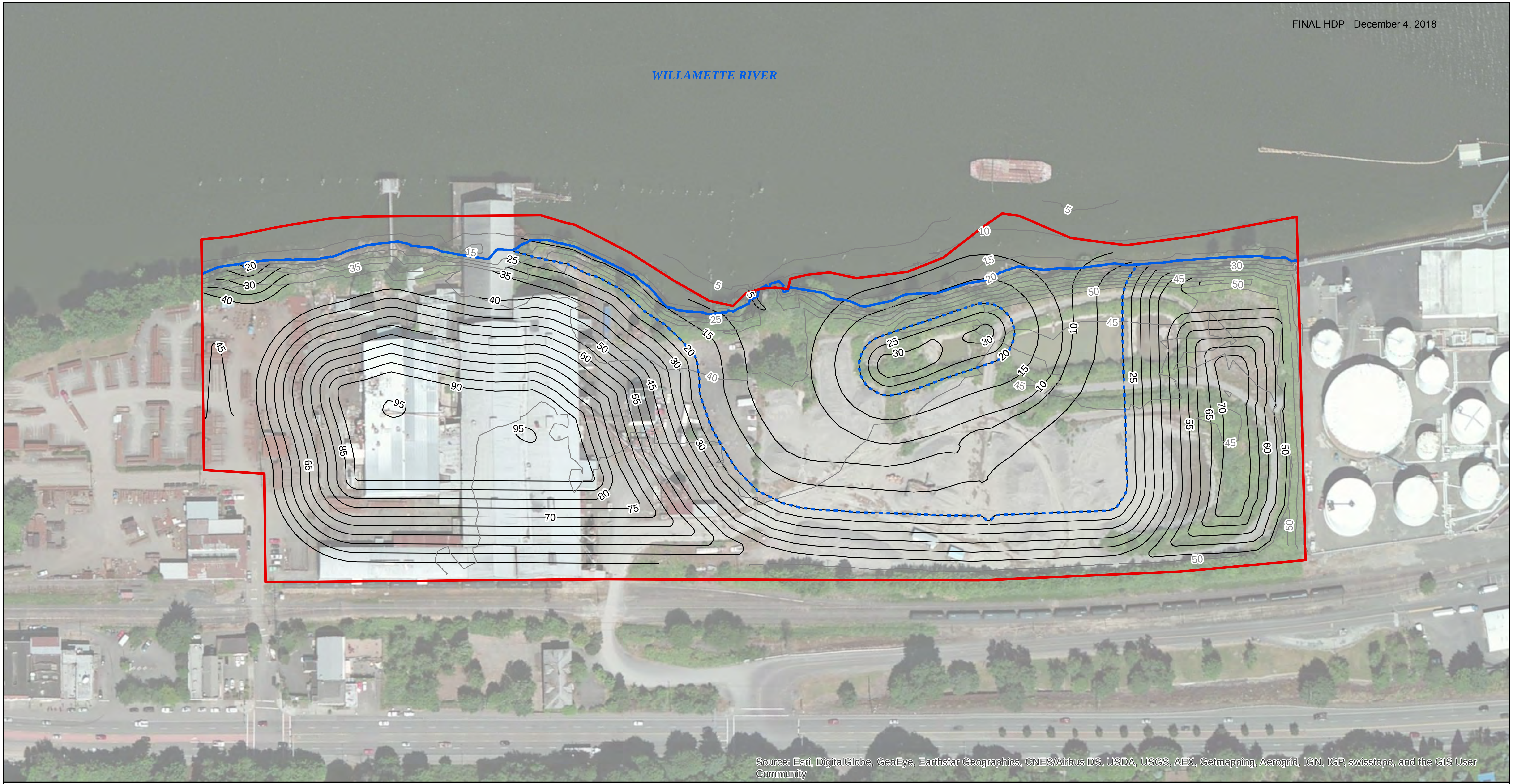

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

**LEGEND**

| | |
|---|---|
| 🟥 | APPROXIMATE SITE BOUNDARY |
| — | APPROXIMATE OHWM |
| - - - | APPROXIMATE PROPOSED 20.1 FOOT RESTORATION LAND SURFACE CONTOUR |
| — | EXISTING LAND SURFACE CONTOURS (5 FOOT) |
| — | PROPOSED 50% DESIGN LAND SURFACE CONTOURS (5 FOOT) |

N

0 150
Scale in feet

NOTES:
1) ELEVATION SOURCE: LINNTON MITIGATION SITE 50% DESIGN SUBMITTAL PREPARED BY WATERWAYS CONSULTING, INC. AND GRETTE ASSOCIATES L.L.C.
2) ELEVATIONS ARE BASED ON NGS HARN BENCHMARK RD4218 "HELEN" WITH A NORTH AMERICAN VERTICAL DATUM ELEVATION OF 79.346 FEET
3) OHWM = ORDINARY HIGH WATER MARK
4) OHWM IS AT A NAVD 88 ELEVATION OF 20.1 FEET

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## FIGURE 3

## EXISTING AND PROPOSED LAND SURFACE CONTOURS
LINNTON MILL SITE RESTORATION
10504 NORTHWEST SAINT HELENS ROAD
PORTLAND, OREGON
Farallon PN: 1588-001

Drawn By: pgarvin
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Date: 3/15/2016
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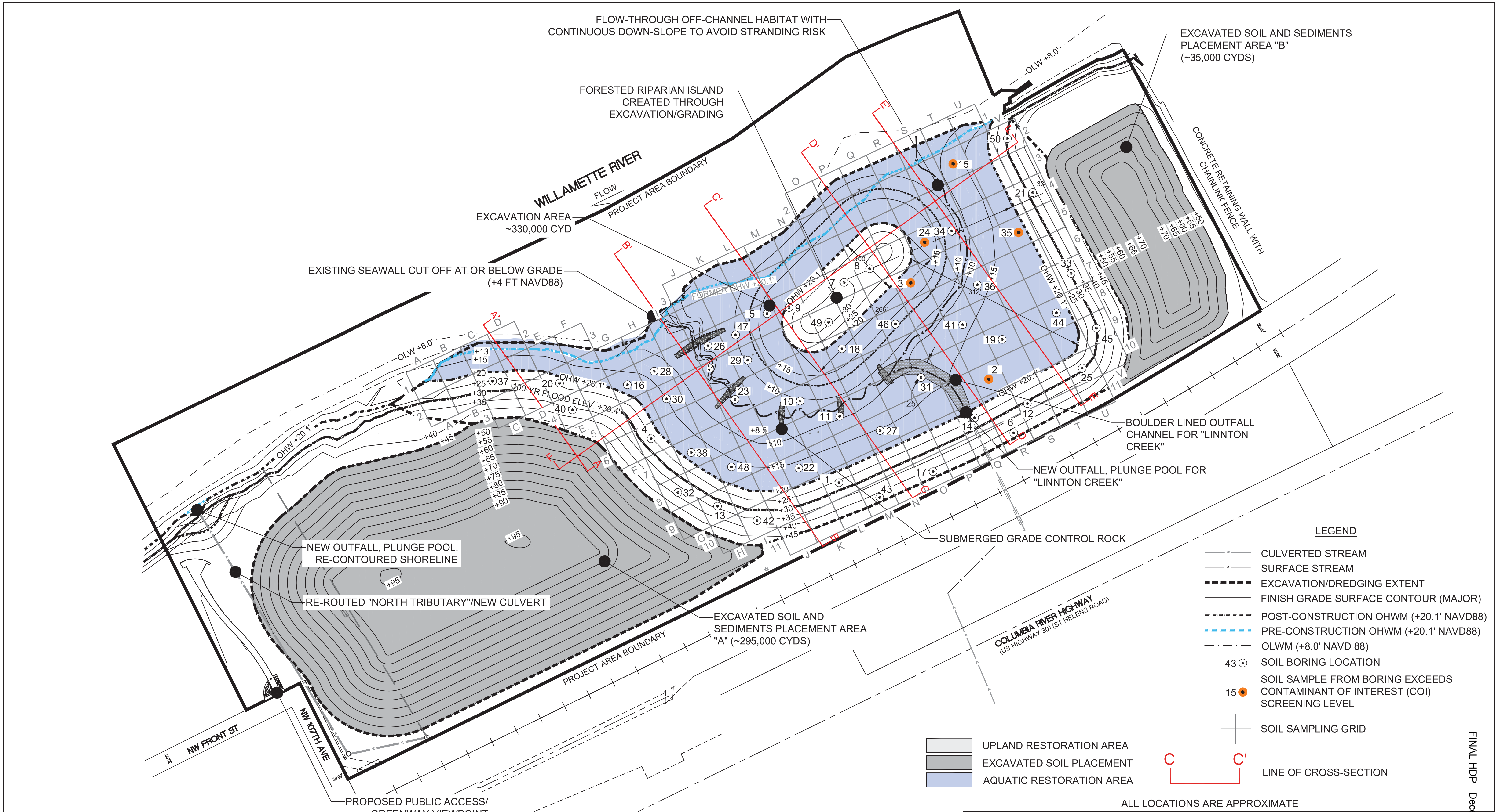

ALL LOCATIONS ARE APPROXIMATE

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## FIGURE 4

SITE PLAN WITH BORING LOCATIONS
LINNTON MILL SITE RESTORATION
10504 SAINT HELENS ROAD
PORTLAND, OREGON

FARALLON PN: 1588-001

Drawn By: DJR
Checked By: MH
Date: 8/25/2016
Disk Reference: 1588-001.dwg

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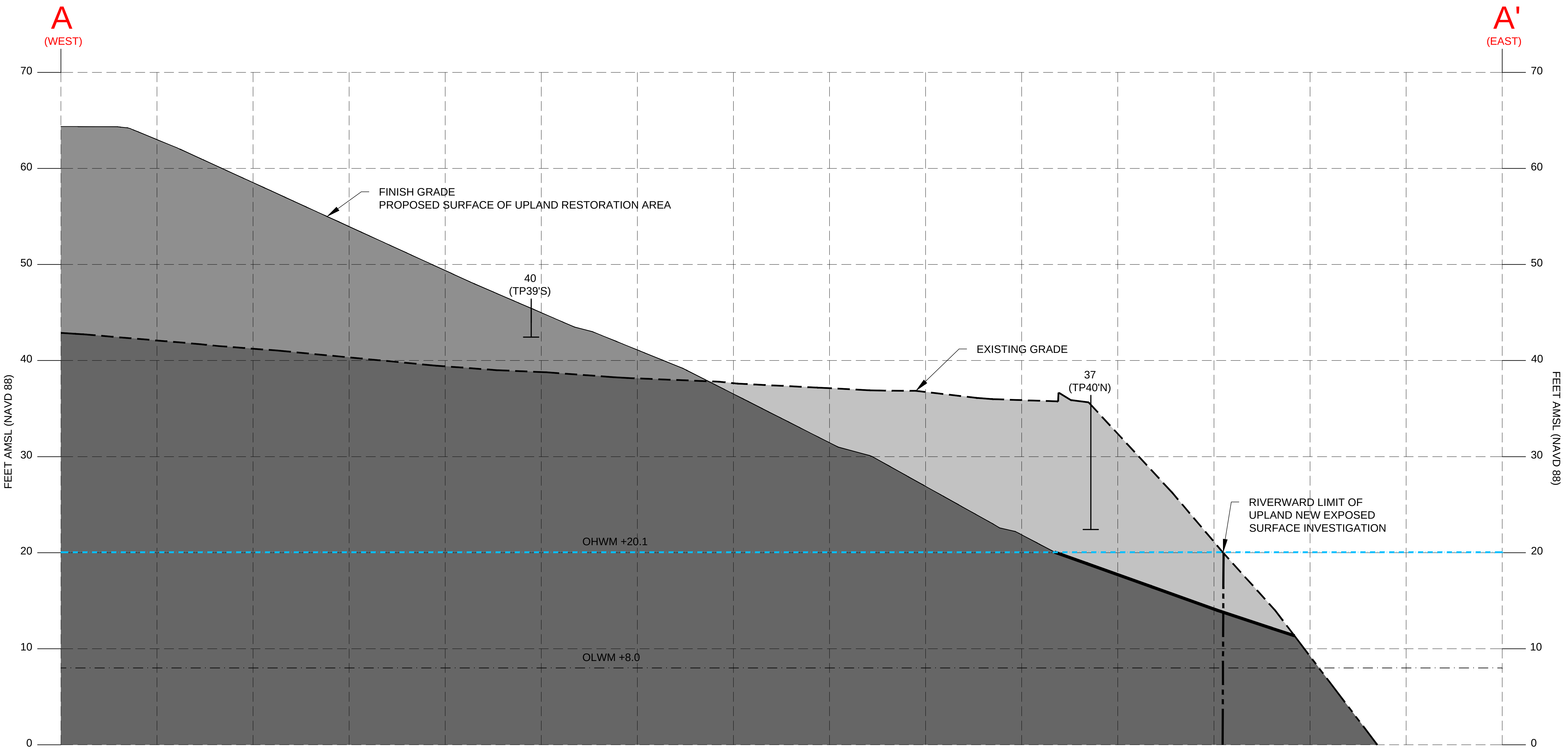

LEGEND

BORING/WELL LOCATION

APPROXIMATE GROUND SURFACE — 40 (TP39'S) — TRANSPOSED BORING LOCATION IN FEET FROM CROSS SECTION

—— FINISH GRADE

━━ FINISHED GRADE PROPOSED SURFACE OF AQUATIC RESTORATION AREA

– – – EXISTING GRADE

—·— INFERRED SURFACE

ALL LOCATIONS ARE APPROXIMATE

░ EXCAVATION

▒ SOIL PLACEMENT (FILL)

▓ EXISTING GROUND

OHWM = ORDINARY HIGH WATER MARK

OLWM = ORDINARY LOW WATER MARK

AMSL = ABOVE MEAN SEA LEVEL

NAVD 88 = NORTH AMERICAN VERTICAL DATUM 1988

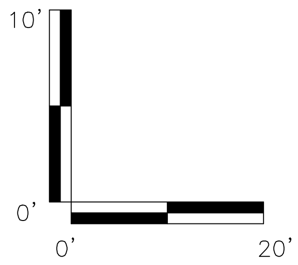

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FIGURE 5

CROSS SECTION A-A'
LINNTON MILL SITE RESTORATION
10504 SAINT HELENS ROAD
PORTLAND, OREGON

FARALLON PN: 1588-001

Drawn By: DJR
Checked By: MH
Date: 8/25/2016
Disk Reference: 1588-001_P&P.dwg

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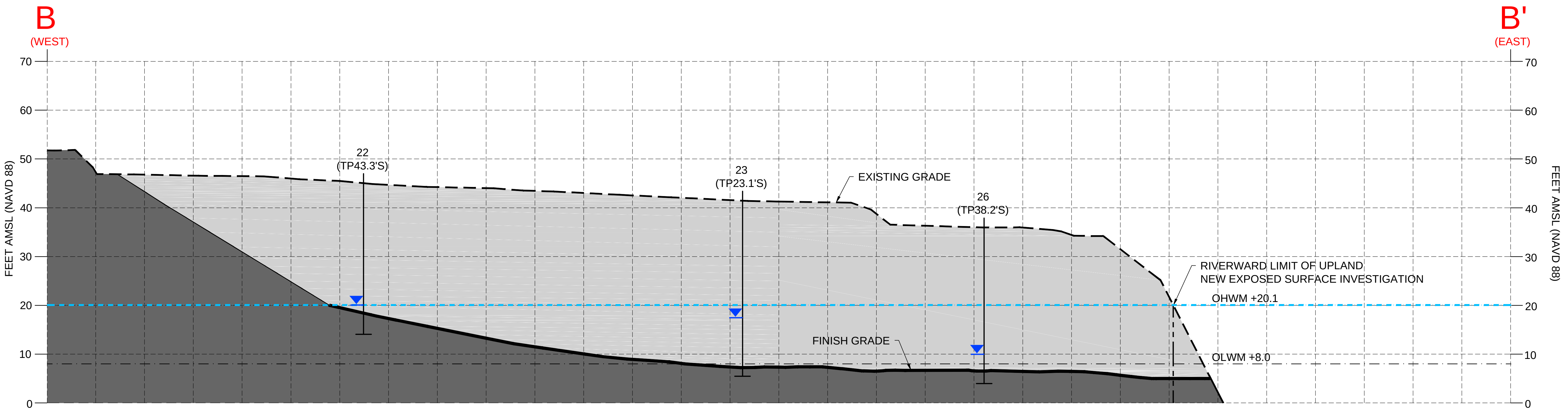


LEGEND

BORING/WELL LOCATION

APPROXIMATE GROUND SURFACE — 22 (TP43.3'S) — TRANSPOSED BORING LOCATION IN FEET FROM CROSS SECTION

FINISH GRADE

FINISHED GRADE PROPOSED SURFACE OF AQUATIC RESTORATION AREA

EXISTING GRADE

INFERRED SURFACE

ALL LOCATIONS ARE APPROXIMATE

| | |
|---|---|
| ▨ | EXCAVATION |
| ■ | EXISTING GROUND |

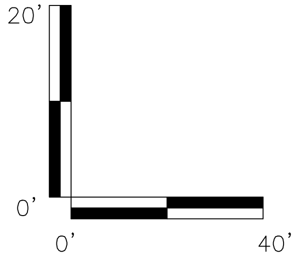
OHWM = ORDINARY HIGH WATER MARK

OLWM = ORDINARY LOW WATER MARK

AMSL = ABOVE MEAN SEA LEVEL

NAVD 88 = NORTH AMERICAN VERTICAL DATUM 1988

▼ = APPROXIMATE GROUNDWATER ELEVATION (FEET AMSL)



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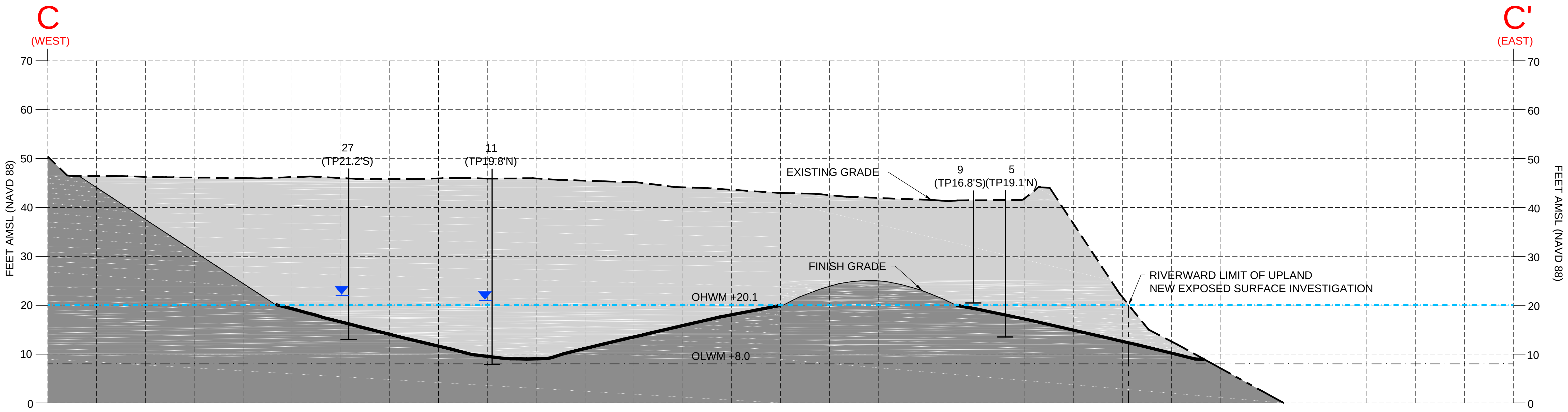
# FIGURE 6

CROSS SECTION B-B'
LINNTON MILL SITE RESTORATION
10504 SAINT HELENS ROAD
PORTLAND, OREGON

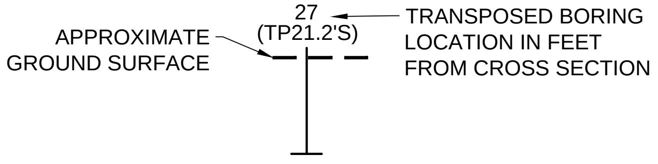
FARALLON PN: 1588-001

Drawn By: DJR Checked By: MH Date: 8/25/2016 Disk Reference: 1588-001_P&P.dwg



LEGEND

BORING/WELL LOCATION



———— FINISH GRADE

━━━━ FINISHED GRADE PROPOSED SURFACE OF AQUATIC RESTORATION AREA

– – – – EXISTING GRADE

—·—·— INFERRED SURFACE

ALL LOCATIONS ARE APPROXIMATE

▒ EXCAVATION

▓ EXISTING GROUND

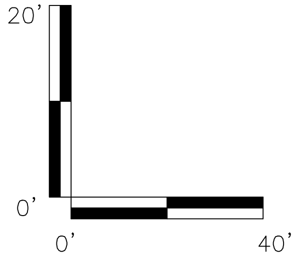
OHWM = ORDINARY HIGH WATER MARK

OLWM = ORDINARY LOW WATER MARK

AMSL = ABOVE MEAN SEA LEVEL

NAVD 88 = NORTH AMERICAN VERTICAL DATUM 1988

▼ = APPROXIMATE GROUNDWATER ELEVATION (FEET AMSL)



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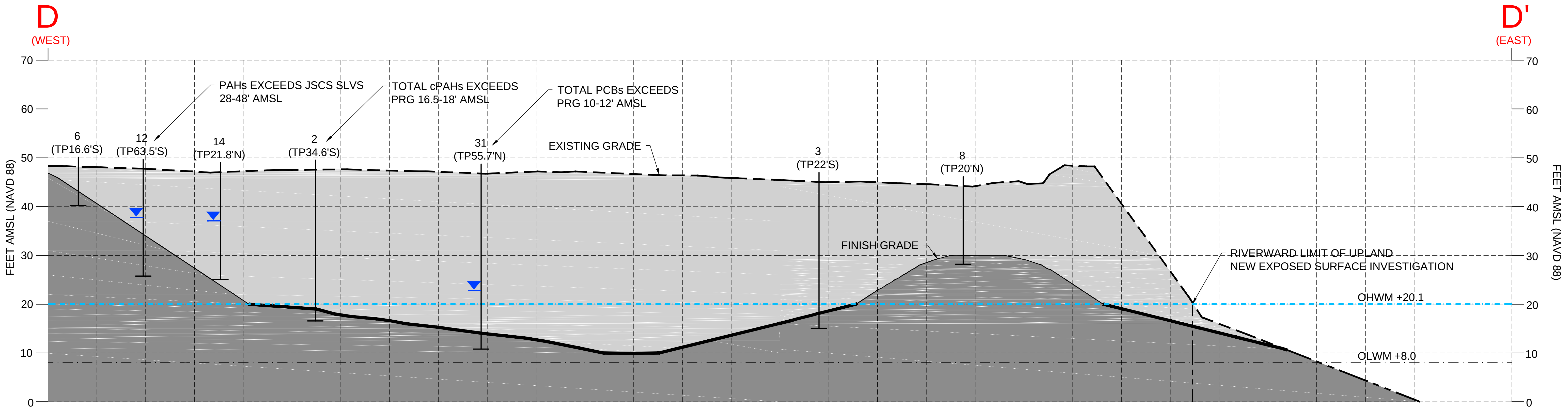
## FIGURE 7

CROSS SECTION C-C'
LINNTON MILL SITE RESTORATION
10504 SAINT HELENS ROAD
PORTLAND, OREGON

FARALLON PN: 1588-001

| | | | |
|---|---|---|---|
| Drawn By: DJR | Checked By: MH | Date: 8/25/2016 | Disk Reference: 1588-001_P&P.dwg |



LEGEND

BORING/WELL LOCATION

6
(TP16.6'S) ← TRANSPOSED BORING LOCATION IN FEET FROM CROSS SECTION

APPROXIMATE GROUND SURFACE

FINISH GRADE

FINISHED GRADE PROPOSED SURFACE OF AQUATIC RESTORATION AREA

EXISTING GRADE

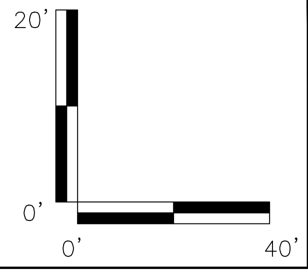
INFERRED SURFACE

ALL LOCATIONS ARE APPROXIMATE

▒ EXCAVATION

▓ EXISTING GROUND

PRG = PRELIMINARY REMEDIATION GOAL
PCBs = POLYCHLORINATED BIPHENYLS
cPAH = CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBON
JSCS SLV = JOINT SOURCE CONTROL STRATEGY SCREENING LEVEL VALUE
OHWM = ORDINARY HIGH WATER MARK
OLWM = ORDINARY LOW WATER MARK
AMSL = ABOVE MEAN SEA LEVEL
NAVD 88 = NORTH AMERICAN VERTICAL DATUM 1988
▼ = APPROXIMATE GROUNDWATER ELEVATION (FEET AMSL)



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## FIGURE 8

CROSS SECTION D-D'
LINNTON MILL SITE RESTORATION
10504 SAINT HELENS ROAD
PORTLAND, OREGON

FARALLON PN: 1588-001

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Disk Reference: 1588-001_P&P.dwg

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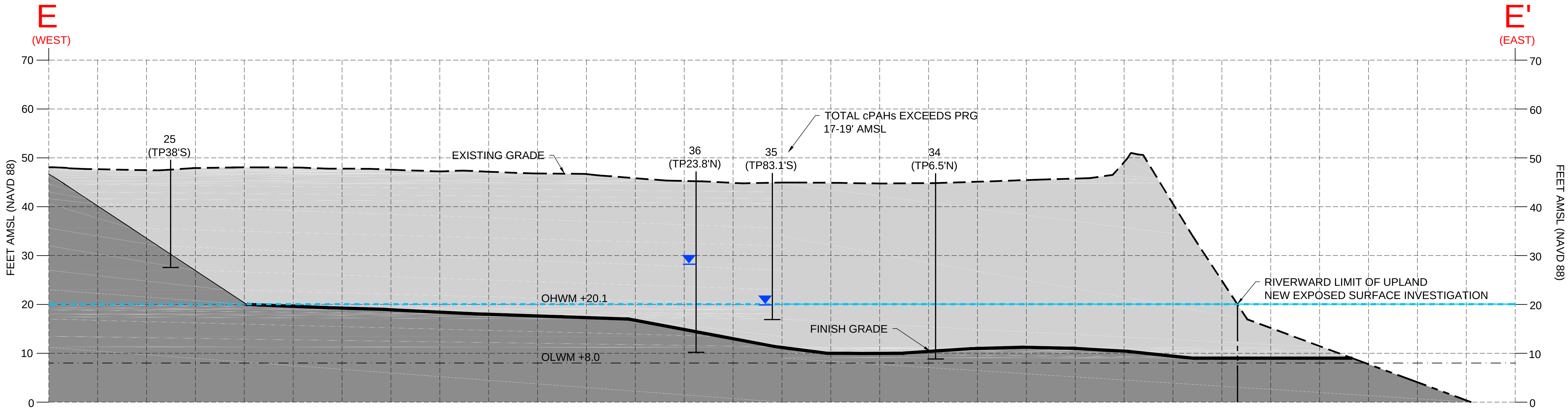

LEGEND

BORING/WELL LOCATION

APPROXIMATE GROUND SURFACE — 25 (TP38'S) — TRANSPOSED BORING LOCATION IN FEET FROM CROSS SECTION

FINISH GRADE

FINISHED GRADE PROPOSED SURFACE OF AQUATIC RESTORATION AREA

EXISTING GRADE

INFERRED SURFACE

ALL LOCATIONS ARE APPROXIMATE

▨ EXCAVATION

■ EXISTING GROUND

PRG = PRELIMINARY REMEDIATION GOAL
cPAH = CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBON
OHWM = ORDINARY HIGH WATER MARK
OLWM = ORDINARY LOW WATER MARK
AMSL = ABOVE MEAN SEA LEVEL
NAVD 88 = NORTH AMERICAN VERTICAL DATUM 1988
▼ = APPROXIMATE GROUNDWATER ELEVATION (FEET AMSL)

20’
0’
0’
40’

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# FIGURE 9

CROSS SECTION E-E'
LINNTON MILL SITE RESTORATION
10504 SAINT HELENS ROAD
PORTLAND, OREGON

FARALLON PN: 1588-001

Drawn By: DJR
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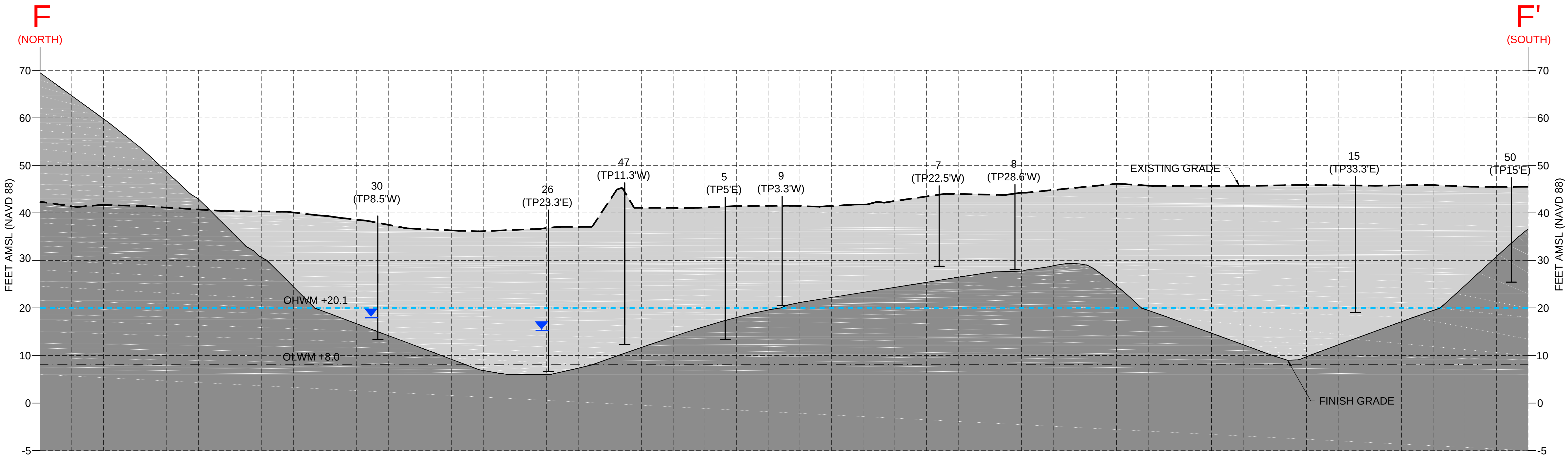


LEGEND

BORING/WELL LOCATION

APPROXIMATE GROUND SURFACE

30 (TP8.5'W)

TRANSPOSED BORING LOCATION IN FEET FROM CROSS SECTION

FINISH GRADE

EXISTING GRADE

ALL LOCATIONS ARE APPROXIMATE

▨ EXCAVATION

▨ SOIL PLACEMENT (FILL)

▨ EXISTING GROUND

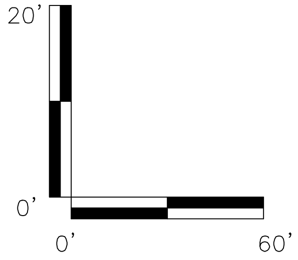
OHWM = ORDINARY HIGH WATER MARK

OLWM = ORDINARY LOW WATER MARK

AMSL = ABOVE MEAN SEA LEVEL

NAVD 88 = NORTH AMERICAN VERTICAL DATUM 1988

▼ = APPROXIMATE GROUNDWATER ELEVATION (FEET AMSL)



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## FIGURE 10

CROSS SECTION F-F'
LINNTON MILL SITE RESTORATION
10504 SAINT HELENS ROAD
PORTLAND, OREGON

FARALLON PN: 1588-001

Drawn By: DJR | Checked By: MH | Date: 11/11/2016 | Disk Reference: 1588-001_P&P.dwg

# TABLES

NEW EXPOSED SURFACE INVESTIGATION REPORT
Linnton Mill Site Restoration
10504 Northwest Saint Helens Road
Portland, Oregon

Farallon PN: 1588-001

# Table 1
# Sampling Summary
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Designation | Boring Grid Cell | Boring Grid Location | Approximate Excavation Depth (feet bgs) | Boring Depth (feet bgs) | Excavated Soil Unit Sample Depth Interval (feet bgs) | New Surface Units Sample Depth Interval (feet bgs) | Ground Surface Elevation (feet amsl) | Approximate Depth to Groundwater (feet bgs) | Approximate Groundwater Elevation (feet amsl) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | L10 | URA | 19 | 21 | 0-19 | 19-21 | 46.6 | --- | --- |
| 2 | R9 | ARA | 29 | 31 | 0-29 | 29-31 | 47.7 | --- | --- |
| 3 | Q5 | ARA | 28 | 30 | 0-28 | 28-30 | 45.2 | --- | --- |
| 4 | G6 | URA | 17 | 19 | 0-17 | 17-19 | 42.2 | --- | --- |
| 5 | L4 | ARA | 26 | 28 | 0-26 | 26-28 | 42.3 | --- | --- |
| 6 | R11 | URA | 6 | 8 | 0-6 | 6-8 | 48.4 | --- | --- |
| 7 | O4 | ARA | 13 | 15 | 0-13 | 13-15 | 43.0 | --- | --- |
| 8 | P4 | URA | 14 | 16 | 0-14 | 14-16 | 43.8 | --- | --- |
| 9 | M4 | URA | 19 | 21 | 0-19 | 19-21 | 41.8 | --- | --- |
| 10 | L7 | ARA | 35 | 37 | 0-35 | 35-37 | 44.0 | 25.5 | 18.5 |
| 11 | M8 | ARA | 36 | 38 | 0-36 | 36-38 | 45.7 | 25.0 | 20.7 |
| 12 | S10 | URA | 20 | 22 | 0-20 | 20-22 | 48.0 | 10.0 | 38.0 |
| 13 | H9 | URA | 12 | 14 | 0-12 | 12-14 | 45.2 | --- | --- |
| 14 | Q10 | URA | 20 | 22 | 0-22 | 20-22 | 47.0 | 10.0 | 37.0 |
| 15 | T2 | ARA | 33 | 35 | 0-33 | 33-35 | 44.3 | 21.0 | 23.3 |
| 16 | F3 | ARA | 19 | 21 | 0-19 | 19-21 | 36.8 | --- | --- |
| 17 | O11 | URA | 4 | 6 | 0-4 | 4-6 | 46.2 | --- | --- |
| 18 | N6 | ARA | 26 | 28 | 0-26 | 26-28 | 44.1 | --- | --- |
| 19 | S8 | ARA | 30 | 32 | 0-30 | 30-32 | 47.5 | 12.0 | 35.5 |
| 20 | E2 | ARA | 13 | 15 | 0-13 | 13-15 | 36.3 | --- | --- |
| 21 | V4 | URA | 11 | 13 | 0-11 | 11-13 | 45.0 | --- | --- |
| 22 | K9 | ARA | 29 | 31 | 0-29 | 29-31 | 45.2 | 25.0 | 20.2 |
| 23 | J6 | ARA | 34 | 36 | 0-34 | 34-36 | 41.3 | 24.0 | 17.3 |
| 24 | R4 | ARA | 29 | 31 | 0-29 | 29-31 | 44.9 | 6.0 | 38.9 |
| 25 | U10 | URA | 18 | 20 | 0-18 | 18-20 | 47.1 | --- | --- |
| 26 | J4 | ARA | 30 | 32 | 0-30 | 30-32 | 36.1 | 25.0 | 11.1 |
| 27 | N9 | ARA | 31 | 33 | 0-31 | 31-33 | 46.1 | 24.0 | 22.1 |
| 28 | H4 | ARA | 23 | 25 | 0-23 | 23-25 | 35.8 | 23.0 | 12.8 |
| 29 | K5 | ARA | 30 | 32 | 0-30 | 30-32 | 41.5 | 24.0 | 17.5 |
| 30 | H5 | ARA | 24 | 26 | 0-24 | 24-36 | 38.6 | 24.0 | 14.6 |
| 31 | P8 | ARA | 34 | 36 | 0-34 | 34-36 | 46.4 | 10.0 | 36.4 |
| 32 | G8 | URA | 6 | 8 | 0-6 | 6-8 | 45.4 | --- | --- |
| 33 | V7 | URA | 15 | 17 | 0-15 | 15-17 | 46.7 | --- | --- |
| 34 | S4 | ARA | 34 | 36 | 0-34 | 34-36 | 44.9 | --- | --- |

# Table 1
# Sampling Summary
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Designation | Boring Grid Cell | Boring Grid Location | Approximate Excavation Depth (feet bgs) | Boring Depth (feet bgs) | Excavated Soil Unit Sample Depth Interval (feet bgs) | New Surface Units Sample Depth Interval (feet bgs) | Ground Surface Elevation (feet amsl) | Approximate Depth to Groundwater (feet bgs) | Approximate Groundwater Elevation (feet amsl) |
|---|---|---|---|---|---|---|---|---|---|
| 35 | U5 | ARA | 26 | 28 | 0-26 | 26-28 | 45.2 | 25.0 | 20.2 |
| 36 | S6 | ARA | 33 | 35 | 0-33 | 33-35 | 45.4 | 17.0 | 28.4 |
| 37 | C2 | URA | 11 | 13 | 0-11 | 11-13 | 35.8 | --- | --- |
| 38 | H7 | ARA | 26 | 28 | 0-26 | 26-28 | 44.0 | --- | --- |
| 40 | E4 | URA | 1 | 3 | 0-1 | 1-3 | 38.0 | --- | --- |
| 41 | R7 | ARA | 33 | 35 | 0-33 | 33-35 | 46.8 | --- | --- |
| 42 | I10 | URA | 18 | 20 | 0-18 | 18-20 | 46.0 | --- | --- |
| 43 | M11 | URA | 4 | 6 | 0-4 | 4-6 | 46.3 | --- | --- |
| 44 | U8 | ARA | 27 | 29 | 0-27 | 27-29 | 48.0 | 15.0 | 33.0 |
| 45 | V9 | URA | 20 | 22 | 0-20 | 20-22 | 47.3 | --- | --- |
| 46 | P6 | ARA | 32 | 34 | 0-32 | 32-34 | 46.0 | 26.0 | 20.0 |
| 47 | K3 | ARA | 32 | 34 | 0-32 | 32-34 | 41.6 | 27.0 | 14.6 |
| 48 | I8 | ARA | 27 | 29 | 0-27 | 27-29 | 44.2 | --- | --- |
| 49 | N5 | URA | 13 | 15 | 0-13 | 13-15 | 43.1 | --- | --- |
| 50 | V2 | URA | 18 | 20 | 0-18 | 18-20 | 49.1 | --- | --- |

NOTES:

--- denotes groundwater was not encountered.

amsl = above mean sea level
ARA = Aquatic Restoration Area
bgs = below ground surface
URA = Upland Restoration Area

# Table 2
# Soil Analytical Results – Total Petroleum Hydrocarbons
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Decision Unit | Sample Location | Sample Identification | Sample Depth (feet)$^{1}$ | Sample Date | Analytical Results (micrograms per kilogram) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | GRO$^{2}$ | DRO$^{3}$ | ORO$^{3}$ | Benzene$^{4}$ | Toluene$^{4}$ | Ethylbenzene$^{4}$ | Xylenes$^{4}$ | Aliphatic Hydrocarbon (C8-C10)$^{5}$ | Aliphatic Hydrocarbon (C10-C12)$^{5}$ | Aromatic Hydrocarbon (C8-C10)$^{5}$ | Aromatic Hydrocarbon (C10-C12)$^{5}$ |
| Excavated | B1 | B1-062116-0-19 | 0 - 19 | 6/21/2016 | < 6,570 | < 29,700 | 86,300 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B2 | B2_062316_0-29.5 | 0 - 29.5 | 6/23/2016 | < 5,540 | < 28,900 | 117,000 F | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B3 | B3_062716_0-28 | 0 - 28 | 6/27/2016 | < 5,330 | < 29,700 | 66,400 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B4 | B4_062816_0-17 | 0 - 17 | 6/28/2016 | < 6,510 | < 30,800 | < 61,500 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B5 | B5_062916_0-26 | 0 - 26 | 6/29/2016 | < 6,640 | < 26,900 | 1,180,000 F1 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B6 | B_6_062316_0-6 | 0 - 6 | 6/23/2016 | < 4,530 | < 26,300 | < 52,700 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B6 | B_6_062316_0-6-1 (Dup) | 0 - 6 | 6/23/2016 | < 5,590 | < 25,000 | < 50,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B7 | B7_062916_0-13 | 0 - 13 | 6/29/2016 | < 5,230 | < 26,500 | 61,300 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B8 | B8_062716_0-14 | 0 - 14 | 6/27/2016 | < 6,050 | < 25,200 | < 50,500 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B9 | B9_062816_0-19 | 0 - 19 | 6/28/2016 | < 5,580 | < 27,400 | < 54,700 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B9 | B9_062816_0-19-1 (Dup) | 0 - 19 | 6/28/2016 | < 5,390 | < 27,900 | < 55,800 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B10 | B10-062116-2.5-7.5 | 2.5 - 7.5 | 6/21/2016 | < 18,400 | < 57,400 | 790,000 J F | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B10 | B10-062116-8-35 | 8 - 35 | 6/21/2016 | < 7,540 | < 28,300 | < 56,600 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B11 | B11-062116-0-36 | 0 - 36 | 6/21/2016 | < 6,680 | < 28,300 | < 56,600 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B12 | B_12_062316_0-20 | 0 - 20 | 6/23/2016 | < 6,050 | < 26,400 | 467,000 F | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B13 | B_13_062216_0-12 | 0 - 12 | 6/22/2016 | < 7,640 | < 29,700 | 521,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B14 | B14_062316_0-20 | 0 - 20 | 6/23/2016 | < 5,290 | < 28,000 | 82,100 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B15 | B15_062916_0-33 | 0 - 33 | 6/29/2016 | < 6,230 | < 27,200 | < 54,300 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B16 | B16_062816_0-19 | 0 - 19 | 6/28/2016 | < 6,390 | < 27,500 | 135,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B17 | B17-062116-0-4 | 0 - 4 | 6/21/2016 | < 6,500 | < 27,800 | < 55,500 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B18 | B18_062716_0-26 | 0 - 26 | 6/27/2016 | < 6,860 | < 27,200 | < 54,300 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B19 | B_19_062316_0-30 | 0 - 30 | 6/23/2016 | < 5,450 | < 27,800 | 76,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B19 | B_19_062316_0-30-1 (Dup) | 0 - 30 | 6/23/2016 | < 5,400 | < 25,200 | 77,400 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B20 | B20_062816_0-13 | 0 - 13 | 6/28/2016 | < 5,810 | < 25,900 | < 51,900 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B22 | B_22_062216_0-29 | 0 - 29 | 6/22/2016 | < 6,550 | < 29,200 | < 58,300 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B23 | B_23_062216_0-30 | 0 - 30 | 6/22/2016 | < 7,620 | < 30,300 | < 60,500 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B24 | B24_062716_0-29 | 0 - 29 | 6/27/2016 | < 5,430 | < 27,600 | < 55,300 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B24 | B24_062716_0-29-1 (Dup) | 0 - 29 | 6/27/2016 | < 5,420 | < 27,600 | < 55,200 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B25 | B25_062716_0-18 | 0 - 18 | 6/27/2016 | < 5,710 | < 25,000 | < 50,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B26 | B26_062816_0-30 | 0 - 30 | 6/28/2016 | < 7,960 | < 33,800 | < 67,600 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B27 | B27-062116-0-30 | 0 - 30 | 6/21/2016 | < 7,070 | < 30,800 | < 61,600 | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEQ RBC: Construction Worker$^{6}$** | | | | | **9,700,000** | **4,600,000** | **11,000,000** | **380,000** | **28,000,000** | **1,700,000** | **20,000,000** | **NE** | **NE** | **NE** | **NE** |
| **DEQ RBC: Excavation Worker$^{6}$** | | | | | **> Max** | **> Max** | **> Max** | **11,000,000** | **770,000,000** | **49,000,000** | **560,000,000** | **NE** | **NE** | **NE** | **NE** |
| **DEQ Level II SLVs$^{7}$** | | | | | **NE** | **NE** | **NE** | **3,300,000** | **200,000** | **NE** | **100,000** | **NE** | **NE** | **NE** | **NE** |
| **JSCS SLV Catch Basin Solids and Erodible Soil$^{8}$** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** |

# Table 2
# Soil Analytical Results – Total Petroleum Hydrocarbons
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| | | | | | Analytical Results (micrograms per kilogram) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Decision Unit** | **Sample Location** | **Sample Identification** | **Sample Depth (feet)[1]** | **Sample Date** | **GRO[2]** | **DRO[3]** | **ORO[3]** | **Benzene[4]** | **Toluene[4]** | **Ethylbenzene[4]** | **Xylenes[4]** | **Aliphatic Hydrocarbon (C8-C10)[5]** | **Aliphatic Hydrocarbon (C10-C12)[5]** | **Aromatic Hydrocarbon (C8-C10)[5]** | **Aromatic Hydrocarbon (C10-C12)[5]** |
| Excavated | B28 | B28_062816_0-23 | 0 - 23 | 6/28/2016 | < 6,990 | < 31,200 | < 62,500 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B29 | B29-062116-0-30 | 0 - 30 | 6/21/2016 | < 7,180 | < 29,100 | 121,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B30 | B_30_062216_0-24 | 0 - 24 | 6/22/2016 | < 6,850 | < 610,000 | 4,190,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B31 | B_31_062316_0-34 | 0 - 34 | 6/23/2016 | < 5,160 | < 28,900 | < 57,800 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B32 | B32_062816_0-6 | 0 - 6 | 6/28/2016 | < 5,350 | < 29,800 | < 59,600 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B32 | B32_062816_0-6-1 | 0 - 6 | 6/28/2016 | < 5,190 | < 28,700 | < 57,300 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B33 | B33_062716_0-15 | 0 - 15 | 6/27/2016 | < 5,080 | < 25,000 | 79,600 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B34 | B34_062416_0-34 | 0 - 34 | 6/24/2016 | < 6,390 | < 30,300 | 63,200 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B35 | B35_062416_0-26 | 0 - 26 | 6/24/2016 | < 4,830 | < 27,500 | 523,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B36 | B36_062416_0-33 | 0 - 33 | 6/24/2016 | < 6,040 | < 30,100 | < 60,200 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B37 | B37_062816_0-11 | 0 - 11 | 6/28/2016 | < 5,710 | < 25,000 | 238,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B38 | B_38_062216_0-26 | 0 - 26 | 6/22/2016 | < 8,380 | < 29,300 | 277,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B40 | B40_062816_0-1 | 0 - 1 | 6/28/2016 | < 5,620 | < 25,000 | < 50,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B41 | B41_062416_0-33 | 0 - 33 | 6/24/2016 | < 5,840 | < 25,800 | 77,300 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B42 | B_42_062216_0-18 | 0 - 18 | 6/22/2016 | < 6,930 | < 29,300 | < 58,600 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B42 | B_42_062216_0-18-1 (Dup) | 0 - 18 | 6/22/2016 | < 6,320 | < 28,400 | < 56,800 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B44 | B44_062716_0-27 | 0 - 27 | 6/27/2016 | < 5,390 | < 26,500 | 53,600 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B45 | B45_062716_0-20 | 0 - 20 | 6/27/2016 | < 5,310 | < 28,700 | < 57,500 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B46 | B46_062916_0-32 | 0 - 32 | 6/29/2016 | < 5,920 | < 29,400 | < 58,700 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B47 | B47_062816_0-32 | 0 - 32 | 6/28/2016 | < 7,200 | < 32,600 | 445,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B47 | B47_062816_30-32 | 30 - 32 | 6/28/2016 | < 6,610 | < 30,900 | < 61,700 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B48 | B_48_062216_0-27 | 0 - 27 | 6/22/2016 | < 3,930 | < 27,400 | < 54,900 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B49 | B49_062816_0-13 | 0 - 13 | 6/28/2016 | < 5,790 | < 29,700 | < 59,300 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B49 | B49_062816_0-13-1 (Dup) | 0 - 13 | 6/28/2016 | < 5,980 | < 28,200 | < 56,500 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B50 | B50_062916_0-18 | 0 - 18 | 6/29/2016 | < 6,420 | < 27,100 | < 54,100 | --- | --- | --- | --- | --- | --- | --- | --- |
| Excavated | B50 | B50_062916_0-18-1 (Dup) | 0 - 18 | 6/29/2016 | < 6,060 | < 28,000 | 71,900 | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEQ RBC: Construction Worker[6]** | | | | | **9,700,000** | **4,600,000** | **11,000,000** | **380,000** | **28,000,000** | **1,700,000** | **20,000,000** | **NE** | **NE** | **NE** | **NE** |
| **DEQ RBC: Excavation Worker[6]** | | | | | **> Max** | **> Max** | **> Max** | **11,000,000** | **770,000,000** | **49,000,000** | **560,000,000** | **NE** | **NE** | **NE** | **NE** |
| **DEQ Level II SLVs[7]** | | | | | **NE** | **NE** | **NE** | **3,300,000** | **200,000** | **NE** | **100,000** | **NE** | **NE** | **NE** | **NE** |
| **JSCS SLV Catch Basin Solids and Erodible Soil[8]** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** |

# Table 2
## Soil Analytical Results – Total Petroleum Hydrocarbons
## Linnton Mill Site Restoration
## Portland, Oregon
## Farallon PN: 1588-001

| | | | | | Analytical Results (micrograms per kilogram) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Decision Unit | Sample Location | Sample Identification | Sample Depth (feet)[1] | Sample Date | GRO[2] | DRO[3] | ORO[3] | Benzene[4] | Toluene[4] | Ethylbenzene[4] | Xylenes[4] | Aliphatic Hydrocarbon (C8-C10)[5] | Aliphatic Hydrocarbon (C10-C12)[5] | Aromatic Hydrocarbon (C8-C10)[5] | Aromatic Hydrocarbon (C10-C12)[5] |
| ARA New Surface | B2 | B2_062316_29.5-31 | 29.5 - 31 | 6/23/2016 | < 6,930 | < 33,200 | 160,000 F | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B3 | B3_062716_28-30 | 28 - 30 | 6/27/2016 | < 21,100 | < 52,200 | 358,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B5 | B5_062916_26-28 | 26 - 28 | 6/29/2016 | < 6,960 | < 29,200 | < 58,400 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B10 | B10-062116-35-37 | 35 - 37 | 6/21/2016 | < 7,490 | < 28,900 | < 57,800 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B11 | B11-062116-36-38 | 36 - 38 | 6/21/2016 | < 6,590 | < 26,700 | < 53,400 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B15 | B15_062916_33-35 | 33 - 35 | 6/29/2016 | 11,900 F | < 34,200 | 95,500 F | < 18.1 | < 90.7 | < 45.4 | < 136 | <1910 | <1910 | 2920 | <1910 |
| ARA New Surface | B16 | B16_062816_19-21 | 19-21 | 6/28/2016 | < 6,800 | < 28,400 | < 56,900 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B18 | B18_062716_26-28 | 26 - 28 | 6/27/2016 | < 8,530 | < 32,500 | < 65,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B19 | B_19_062316_30-32 | 30 - 32 | 6/23/2016 | < 7,740 | < 31,400 | 106,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B22 | B_22_062216_29-31 | 29 - 31 | 6/22/2016 | < 6,430 | < 28,200 | < 56,300 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B23 | B_23_062216_34-36 | 34 - 36 | 6/22/2016 | < 7,350 | < 30,600 | < 61,100 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B24 | B24_062716_29-31 | 29 - 31 | 6/27/2016 | < 5,980 | < 27,400 | 162,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B24 | B24_062716_29-31-1 (Dup) | 29 - 31 | 6/27/2016 | < 5,720 | < 27,500 | < 55,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B26 | B26_062816_30-32 | 30 - 32 | 6/28/2016 | < 7,520 | < 31,100 | < 62,100 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B27 | B27-062116-31-33 | 31 - 33 | 6/21/2016 | < 6,840 | < 30,500 | < 61,100 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B28 | B28_062816_23-25 | 23 - 25 | 6/28/2016 | < 7,680 | < 33,200 | < 66,400 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B29 | B29-062116-30-32 | 30 - 32 | 6/21/2016 | < 7,330 | < 32,200 | < 64,500 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B30 | B_30_062216_24-26 | 24 - 26 | 6/22/2016 | < 7,160 | < 28,600 | 1,760,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B34 | B34_062416_34-36 | 34 - 36 | 6/24/2016 | < 6,360 | < 28,300 | < 56,600 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B35 | B35_062416_26-28 | 26 - 28 | 6/24/2016 | < 6,450 | < 29,400 | 127,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B36 | B36_062416_33-35 | 33 - 35 | 6/24/2016 | < 6,840 | < 30,600 | < 61,300 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B38 | B_38_062216_26-28 | 26 - 28 | 6/22/2016 | < 7,540 | < 30,700 | < 61,400 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B41 | B41_062416_33-35 | 33 - 35 | 6/24/2016 | < 6,210 | < 29,200 | < 58,400 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B44 | B44_062716_27-29 | 27 - 29 | 6/27/2016 | 152,000 F | < 28,600 | < 57,200 | < 10.9 | < 54.6 | < 27.3 | < 81.9 | 2720 | 7750 | 14100 | 5000 |
| ARA New Surface | B46 | B46_062916_32-34 | 32 - 34 | 6/29/2016 | < 6,930 | < 31,000 | < 62,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B47 | B47_062816_32-34 | 32 - 34 | 6/28/2016 | < 6,160 | < 31,300 | < 62,500 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B48 | B_48_062216_27-29 | 27 - 29 | 6/22/2016 | < 7,500 | < 29,500 | < 58,900 | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEQ RBC: Construction Worker[6]** | | | | | **9,700,000** | **4,600,000** | **11,000,000** | **380,000** | **28,000,000** | **1,700,000** | **20,000,000** | **NE** | **NE** | **NE** | **NE** |
| **DEQ RBC: Excavation Worker[6]** | | | | | **> Max** | **> Max** | **> Max** | **11,000,000** | **770,000,000** | **49,000,000** | **560,000,000** | **NE** | **NE** | **NE** | **NE** |
| **Portland Harbor Sediment PRGs[9]** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** |

# Table 2
## Soil Analytical Results – Total Petroleum Hydrocarbons
## Linnton Mill Site Restoration
## Portland, Oregon
## Farallon PN: 1588-001

| Decision Unit | Sample Location | Sample Identification | Sample Depth (feet)[1] | Sample Date | Analytical Results (micrograms per kilogram) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | GRO[2] | DRO[3] | ORO[3] | Benzene[4] | Toluene[4] | Ethylbenzene[4] | Xylenes[4] | Aliphatic Hydrocarbon (C8-C10)[5] | Aliphatic Hydrocarbon (C10-C12)[5] | Aromatic Hydrocarbon (C8-C10)[5] | Aromatic Hydrocarbon (C10-C12)[5] |
| URA New Surface | B1 | B1-062116-19-21 | 19 - 21 | 6/21/2016 | < 7,050 | < 28,200 | < 56,500 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B4 | B4_062816_17-19 | 17 - 19 | 6/28/2016 | < 6,920 | < 30,200 | < 60,400 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B6 | B_6_062316_6-8 | 6 - 8 | 6/23/2016 | < 5,900 | < 25,600 | < 51,300 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B7 | B7_062916_13-15 | 13 - 15 | 6/29/2016 | < 5,860 | < 26,900 | 147,000 F | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B8 | B8_062716_14-16 | 14 - 16 | 6/27/2016 | < 5,770 | < 27,100 | < 54,100 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B9 | B9_062816_19-21 | 19 - 21 | 6/28/2016 | < 6,180 | < 29,200 | 106,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B9 | B9_062816_19-21-1 (Dup) | 19 - 21 | 6/28/2016 | < 5,980 | < 30,100 | 94,900 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B12 | B_12_062316_20-22 | 20 - 22 | 6/23/2016 | < 6,580 | < 32,400 | 385,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B13 | B_13_062216_12-14 | 12 - 14 | 6/22/2016 | < 6,860 | < 28,500 | < 57,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B14 | B14_062316_20-22 | 20 - 22 | 6/23/2016 | < 5,570 | < 26,300 | < 52,500 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B17 | B17-062116-4-6 | 4 - 6 | 6/21/2016 | < 6,120 | < 25,300 | 215,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B20 | B20_062816_13-15 | 13 - 15 | 6/28/2016 | < 5,500 | < 25,700 | < 51,300 | --- | --- | --- | --- | --- | --- | --- | --- |
| ARA New Surface | B21 | B21_062416_11-13 | 11 - 13 | 6/24/2016 | < 4,520 | < 31,600 | < 63,200 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B25 | B25_062716_18-20 | 18 - 20 | 6/27/2016 | < 6,180 | < 28,000 | < 56,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B31 | B_31_062316_34-36 | 34 - 36 | 6/23/2016 | < 7,580 | < 30,300 | 120,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B32 | B32_062816_6-8 | 6 - 8 | 6/28/2016 | < 6,400 | < 30,900 | 107,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B32 | B32_062816_6-8-1 (Dup) | 6 - 8 | 6/28/2016 | < 6,920 | < 31,300 | 65,600 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B33 | B33_062716_15-17 | 15 - 17 | 6/27/2016 | < 4,900 | < 25,000 | 52,300 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B37 | B37_062816_11-13 | 11 - 13 | 6/28/2016 | < 5,870 | < 26,900 | < 53,700 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B40 | B40_062816_1-3 | 1 - 3 | 6/28/2016 | < 5,740 | < 27,300 | < 54,500 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B42 | B_42_062216_18-20 | 18 - 20 | 6/22/2016 | < 6,610 | < 25,600 | < 51,100 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B43 | B43_062716_4-6 | 4 - 6 | 6/27/2016 | < 5,300 | < 26,900 | 100,000 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B45 | B45_062716_20-22 | 20 - 22 | 6/27/2016 | < 5,170 | < 25,700 | 53,500 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B49 | B49_062816_13-15 | 13 - 15 | 6/28/2016 | < 6,770 | < 29,600 | < 59,200 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B49 | B49_062816_13-15-1 (Dup) | 13 - 15 | 6/28/2016 | < 6,710 | < 29,200 | < 58,400 | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B50 | B50_062916_18-20 | 18 - 20 | 6/29/2016 | < 7,810 | < 34,400 | 151,000 F | --- | --- | --- | --- | --- | --- | --- | --- |
| URA New Surface | B50 | B50_062916_18-20-1 (Dup) | 18 - 20 | 6/29/2016 | < 7,520 | < 30,300 | 125,000 F | --- | --- | --- | --- | --- | --- | --- | --- |
| **DEQ RBC: Construction Worker[6]** | | | | | **9,700,000** | **4,600,000** | **11,000,000** | **380,000** | **28,000,000** | **1,700,000** | **20,000,000** | **NE** | **NE** | **NE** | **NE** |
| **DEQ RBC: Excavation Worker[6]** | | | | | **> Max** | **> Max** | **> Max** | **11,000,000** | **770,000,000** | **49,000,000** | **560,000,000** | **NE** | **NE** | **NE** | **NE** |
| **DEQ Level II SLVs[7]** | | | | | **NE** | **NE** | **NE** | **3,300,000** | **200,000** | **NE** | **100,000** | **NE** | **NE** | **NE** | **NE** |
| **JSCS SLV Catch Basin Solids and Erodible Soil[8]** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** |

NOTES:

< denotes analyte not detected at or exceeding the laboratory reporting limit listed.

--- denotes analyte was not included in analysis.

[1] Depth in feet below ground surface.

[2] Analyzed by Northwest Method NWTPH-Gx.

[3] Analyzed by Northwest Method NWTPH-Dx.

[4] Analyzed by U.S. Environmental Protection Agency Method 8260C.

[5] Analyzed by Northwest Method NWVPH

[6] State of Oregon Department of Environmental Quality Risk-Based Concentrations Table, revised November 1, 2015.

[7] DEQ Screening Level for Plants, Invertebrates, and Wildlife Exposed to Soil; from Guidance for Ecological Risk Assessment Levels I, II, III, IV, April 1998. Currently under revision.

[8] Joint Source Control Strategy Screening Level Values, Table 3-1 of Portland Harbor Joint Source Control Strategy (JSCS), as revised July 16, 2007.

[9] Portland Harbor Preliminary Remediation Goals (PRGs), Superfund Proposed Plan, Portland Harbor Superfund Site.

>Csat denote soil risk-based concentrations (RBCs) that exceed the limit of three-phase equilibrium partitioning; soil concentrations in excess of the Csat indicate that free product might be present.

>Max denotes the constituent for this pathway is calculated as exceeding 1,000,000 milligrams per kilogram; therefore, this substance is deemed not to pose a risk in this scenario.

* This soil RBC exceeds the limit of three-phase equilibrium partitioning; soil concentrations in excess of the Csat indicate that free product might be present.

DEQ = Oregon Department of Environmental Quality
DRO = total petroleum hydrocarbons as diesel-range organics
F = Result is due to the presence of single analyte peaks in the quantitation range that are not representative of the fuel pattern reported.
F1 = The chromatographic pattern does not resemble the fuel standard used for quantitation.
GRO = total petroleum hydrocarbons as gasoline-range organics
J = estimated result
NE = value not established
ORO = total petroleum hydrocarbons as oil-range organics
SLV = screening level value

# Table 3
## Soil Analytical Results – Metals
## Linnton Mill Site Restoration
## Portland, Oregon
## Farallon PN: 1588-001

| | | | Sample Depth | | Analytical Results (milligrams per kilogram)[2] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil Decision Unit** | **Sample Location** | **Sample Identification** | **(feet) [1]** | **Sample Date** | **Arsenic** | **Barium** | **Cadmium** | **Chromium** | **Copper** | **Lead** | **Mercury** | **Selenium** | **Silver** |
| Excavated | B1 | B1-062116-0-19 | 0 - 19 | 6/21/2016 | 8.71 | 160 | < 0.256 | 18.4 | 24.8 | 24.4 | < 0.102 | < 2.56 | < 0.256 |
| Excavated | B2 | B2_062316_0-29.5 | 0 - 29.5 | 6/23/2016 | 3.84 | 117 | 0.404 | 26.6 | 30.7 | 27.4 | 0.148 | < 1.30 | < 0.261 |
| Excavated | B3 | B3_062716_0-28 | 0 - 28 | 6/27/2016 | 2.52 | 89.3 | < 0.244 | 15.7 | 17.9 | 14.9 | < 0.0977 H | < 2.44 | < 0.244 |
| Excavated | B4 | B4_062816_0-17 | 0 - 17 | 6/28/2016 | 8.20 | 182 | 0.357 | 18.6 | 37.4 | 79.7 | < 0.102 | < 2.55 | < 0.255 |
| Excavated | B5 | B5_062916_0-26 | 0 - 26 | 6/29/2016 | 6.61 | 208 | 0.448 | 12.1 | **71.2** | 91.8 | < 0.105 | < 1.32 | 0.263 |
| Excavated | B6 | B_6_062316_0-6 | 0 - 6 | 6/23/2016 | 2.01 | 64.9 | < 0.243 | 5.93 | 9.73 | 5.20 | < 0.0973 | < 2.43 | < 0.243 |
| Excavated | B6 | B_6_062316_0-6-1 (Dup) | 0 - 6 | 6/23/2016 | 1.92 | 60.4 | < 0.239 | 5.32 | 10.7 | 6.30 | < 0.0954 | < 2.39 | < 0.239 |
| Excavated | B7 | B7_062916_0-13 | 0 - 13 | 6/29/2016 | 3.07 | 120 | < 0.229 | 22.2 | 21.4 | 13.8 | < 0.0916 | < 1.14 | < 0.229 |
| Excavated | B8 | B8_062716_0-14 | 0 - 14 | 6/27/2016 | 1.54 | 59.9 | < 0.224 | 6.59 | 9.40 | 6.71 | < 0.0898 H | < 2.24 | < 0.224 |
| Excavated | B9 | B9_062816_0-19 | 0 - 19 | 6/28/2016 | 2.11 | 83.4 | 0.222 | 6.98 | 11.7 | 12.7 | < 0.0887 | < 1.11 | < 0.222 |
| Excavated | B9 | B9_062816_0-19-1 (Dup) | 0 - 19 | 6/28/2016 | 2.15 | 92.5 | < 0.220 | 10.4 | 12.2 | 13.8 | < 0.0878 | < 1.10 | < 0.220 |
| Excavated | B10 | B10-062116-2.5-7.5 | 2.5 - 7.5 | 6/21/2016 | 3.53 | 80.7 | < 0.494 | 2.94 | 26.4 | **204** | < 0.197 | < 4.94 | < 0.494 |
| Excavated | B10 | B10-062116-8-35 | 8 - 35 | 6/21/2016 | 7.51 | 146 | 0.375 | 12.9 | 20.8 | 14.0 | < 0.115 | < 2.89 | < 0.289 |
| Excavated | B11 | B11-062116-0-36 | 0 - 36 | 6/21/2016 | **12.0** | 213 | 0.327 | 22.9 | **300** | 12.7 | < 0.101 | < 2.52 | < 0.252 |
| Excavated | B12 | B_12_062316_0-20 | 0 - 20 | 6/23/2016 | 2.48 | 101 | 0.267 | 12.3 | 18.4 | 20.9 B | < 0.102 | < 1.27 | < 0.254 |
| Excavated | B13 | B_13_062216_0-12 | 0 - 12 | 6/22/2016 | 5.50 | 147 | 0.633 | 18.2 | 18.2 | 29.2 B | < 0.103 | < 1.29 | < 0.258 |
| Excavated | B14 | B14_062316_0-20 | 0 - 20 | 6/23/2016 | 2.96 | 121 | 0.307 | 31.6 | 30.0 | 21.4 | 0.103 | < 1.18 | < 0.237 |
| Excavated | B15 | B15_062916_0-33 | 0 - 33 | 6/29/2016 | 3.26 | 117 | < 0.247 | 18.9 | 23.9 | 15.2 | 0.113 | < 1.24 | < 0.247 |
| Excavated | B16 | B16_062816_0-19 | 0 - 19 | 6/28/2016 | **13.1** | 164 | < 0.283 | 20.8 | 27.1 | 17.5 | < 0.113 | < 2.83 | < 0.283 |
| Excavated | B17 | B17-062116-0-4 | 0 - 4 | 6/21/2016 | 3.04 | 174 | 0.306 | 19.8 | **64.2** | 7.63 | < 0.0942 | < 2.35 | 0.424 |
| Excavated | B18 | B18_062716_0-26 | 0 - 26 | 6/27/2016 | 2.85 | 108 | < 0.248 | 20.4 | 23.5 | 15.3 | < 0.0990 H | < 2.48 | < 0.248 |
| Excavated | B19 | B_19_062316_0-30 | 0 - 30 | 6/23/2016 | 2.06 | 64.3 | < 0.260 | 7.24 | 10.9 | 6.27 B | < 0.104 | < 1.30 | < 0.260 |
| Excavated | B19 | B_19_062316_0-30-1 (Dup) | 0 - 30 | 6/23/2016 | 1.89 | 62.1 | < 0.236 | 6.60 | 10.6 | 7.37 B | < 0.0944 | < 1.18 | < 0.236 |
| Excavated | B20 | B20_062816_0-13 | 0 - 13 | 6/28/2016 | 2.64 | 76.1 | < 0.223 | 10.7 | 12.9 | 4.42 | < 0.0891 | < 2.23 | < 0.223 |
| Excavated | B21 | B21_062416_11-13 | 11 - 13 | 6/24/2016 | 1.42 | 69.2 | 0.309 | 7.17 | 7.36 | 4.20 | < 0.107 | < 1.34 | < 0.269 |
| Excavated | B22 | B_22_062216_0-29 | 0 - 29 | 6/22/2016 | **11.4** | 148 | < 0.281 | 20.0 B | 25.1 | 11.5 B | < 0.112 | < 1.40 | < 0.281 |
| Excavated | B23 | B_23_062216_0-30 | 0 - 30 | 6/22/2016 | **14.3** | 159 | 0.281 | 14.7 | 37.1 | 33.4 B | < 0.107 | < 1.34 | < 0.267 |
| Excavated | B24 | B24_062716_0-29 | 0 - 29 | 6/27/2016 | 1.83 | 67.5 | < 0.250 | 9.53 | 10.5 | 7.76 | < 0.100 H | < 2.50 | < 0.250 |
| Excavated | B24 | B24_062716_0-29-1 (Dup) | 0 - 29 | 6/27/2016 | 1.97 | 85.2 | < 0.253 | 9.11 | 10.8 | 9.03 | < 0.101 H | < 2.53 | < 0.253 |
| Excavated | B25 | B25_062716_0-18 | 0 - 18 | 6/27/2016 | 2.14 | 84.0 | 0.229 | 12.9 | 15.1 | 33.7 | < 0.0916 H | < 1.14 | < 0.229 |
| Excavated | B26 | B26_062816_0-30 | 0 - 30 | 6/28/2016 | 7.90 | 203 | < 0.270 | 15.3 | 30.7 | 26.7 | < 0.108 | < 2.70 | < 0.270 |
| Excavated | B27 | B27-062116-0-30 | 0 - 30 | 6/21/2016 | 7.36 | 141 | < 0.276 | 15.6 | 22.9 | 21.8 | < 0.110 | < 2.76 | < 0.276 |
| Excavated | B28 | B28_062816_0-23 | 0 - 23 | 6/28/2016 | **12.4** | 170 | 0.289 | 18.6 | 27.6 | 21.4 | < 0.110 | < 2.75 | < 0.275 |
| Excavated | B29 | B29-062116-0-30 | 0 - 30 | 6/21/2016 | 7.37 | 184 | 0.366 | 23.3 | 33.2 | 28.7 | < 0.108 | < 2.71 | < 0.271 |
| Excavated | B30 | B_30_062216_0-24 | 0 - 24 | 6/22/2016 | **11.4** | 172 | 0.298 | 15.1 | 28.8 | 17.6 B | < 0.104 | < 1.30 | < 0.259 |
| Excavated | B31 | B_31_062316_0-34 | 0 - 34 | 6/23/2016 | 2.58 | 105 | < 0.255 | 13.4 | 21.8 | 9.25 | < 0.102 | < 2.55 | < 0.255 |
| **DEQ RBC: Construction Worker[3]** | | | | | **15** | **69,000** | **350** | **530,000** | **14,000** | **800** | **110** | **NE** | **1,800** |
| **DEQ RBC: Excavation Worker[3]** | | | | | **420** | **> Max** | **9,700** | **> Max** | **390,000** | **800** | **2,900** | **NE** | **49,000** |
| **DEQ Level II Screening Level Values[4]** | | | | | **10** | **NE** | **4** | **0.4** | **50** | **16** | **0.1** | **1** | **2** |
| **JSCS SLV Catch Basin Solids and Erodible Soil[5]** | | | | | **7** | **NE** | **1** | **111** | **149** | **17** | **0.07** | **2** | **5** |
| **Default Background Concentrations [7]** | | | | | **8.8** | **790** | **0.630** | **76** | **34** | **96** | **0.230** | **0.710** | **0.820** |

# Table 3
# Soil Analytical Results – Metals
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| | | | | | Analytical Results (milligrams per kilogram)[2] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil Decision Unit** | **Sample Location** | **Sample Identification** | **Sample Depth (feet) [1]** | **Sample Date** | **Arsenic** | **Barium** | **Cadmium** | **Chromium** | **Copper** | **Lead** | **Mercury** | **Selenium** | **Silver** |
| Excavated | B32 | B32_062816_0-6 | 0 - 6 | 6/28/2016 | 8.19 | 150 | 0.238 | 19.2 | 20.8 | 54.1 | < 0.0953 | < 1.19 | < 0.238 |
| Excavated | B32 | B32_062816_0-6-1 (Dup) | 0 - 6 | 6/28/2016 | **9.90** | 160 | 0.280 | 20.3 | 35.6 | 23.3 | < 0.0935 | < 1.17 | < 0.234 |
| Excavated | B33 | B33_062716_0-15 | 0 - 15 | 6/27/2016 | 1.86 | 72.4 | 0.246 | 9.38 | 11.6 | 8.88 | < 0.0896 H | < 1.12 | < 0.224 |
| Excavated | B34 | B34_062416_0-34 | 0 - 34 | 6/24/2016 | 2.81 | 114 | 0.364 | 17.5 | 18.3 | 9.61 | < 0.104 | < 2.60 | < 0.260 |
| Excavated | B35 | B35_062416_0-26 | 0 - 26 | 6/24/2016 | 3.28 | 126 | 0.279 | 14.0 | 26.3 | 26.1 | < 0.0972 | < 2.43 | < 0.243 |
| Excavated | B36 | B36_062416_0-33 | 0 - 33 | 6/24/2016 | 2.08 | 88.3 | 0.285 | 10.3 | 12.8 | 6.42 | < 0.114 | < 1.43 | < 0.285 |
| Excavated | B37 | B37_062816_0-11 | 0 - 11 | 6/28/2016 | 4.41 | 183 | 0.355 | 19.6 | 32.9 | 26.8 | < 0.0887 | < 2.22 | < 0.222 |
| Excavated | B38 | B_38_062216_0-26 | 0 - 26 | 6/22/2016 | 7.77 | 148 | 0.281 | 18.8 | 23.0 | 11.9 B | < 0.107 | < 1.34 | < 0.268 |
| Excavated | B40 | B40_062816_0-1 | 0 - 1 | 6/28/2016 | **10.7** | 96.1 | 0.294 | 13.2 | 23.8 | 18.4 | < 0.0904 | < 2.26 | < 0.226 |
| Excavated | B41 | B41_062416_0-33 | 0 - 33 | 6/24/2016 | 2.23 | 88.7 | < 0.260 | 10.9 | 14.9 | 9.48 | < 0.104 | < 1.30 | < 0.260 |
| Excavated | B42 | B_42_062216_0-18 | 0 - 18 | 6/22/2016 | 6.95 | 132 | < 0.275 | 16.4 | 19.8 | 10.6 B | < 0.110 | < 1.38 | < 0.275 |
| Excavated | B42 | B_42_062216_0-18-1 (Dup) | 0 - 18 | 6/22/2016 | 6.91 | 138 | 0.314 | 14.4 | 22.1 | 11.5 B | < 0.105 | < 1.31 | < 0.262 |
| Excavated | B44 | B44_062716_0-27 | 0 - 27 | 6/27/2016 | 2.14 | 71.5 | < 0.258 | 12.0 | 14.7 | 11.9 | < 0.103 H | < 1.29 | < 0.258 |
| Excavated | B45 | B45_062716_0-20 | 0 - 20 | 6/27/2016 | 1.99 | 77.5 | < 0.241 | 11.7 | 13.4 | 9.99 | < 0.0965 H | < 1.21 | < 0.241 |
| Excavated | B46 | B46_062916_0-32 | 0 - 32 | 6/29/2016 | 3.18 | 114 | < 0.259 | 16.7 | 21.3 | 12.1 | < 0.104 | < 1.30 | < 0.259 |
| Excavated | B47 | B47_062816_0-32 | 0 - 32 | 6/28/2016 | 4.81 | 259 | **1.28** | 17.4 | **94.8** | **1,430** | < 0.112 | < 2.79 | 0.404 |
| Excavated | B47 | B47_062816_30-32 | 30 - 32 | 6/28/2016 | 6.14 | 129 | 0.283 | 11.8 | 33.1 | 22.6 | < 0.103 | < 1.29 | < 0.257 |
| Excavated | B48 | B_48_062216_0-27 | 0 - 27 | 6/22/2016 | 6.46 | 131 | < 0.265 | 16.1 | 28.9 | 27.3 B | < 0.106 | < 1.32 | < 0.265 |
| Excavated | B49 | B49_062816_0-13 | 0 - 13 | 6/28/2016 | 2.51 | 104 | 0.296 | 19.4 | 19.1 | 22.6 | < 0.0946 | < 2.37 | < 0.237 |
| Excavated | B49 | B49_062816_0-13-1 (Dup) | 0 - 13 | 6/28/2016 | 2.85 | 111 | 0.283 | 20.1 | 28.1 | 24.7 | < 0.0986 | < 2.46 | < 0.246 |
| Excavated | B50 | B50_062916_0-18 | 0 - 18 | 6/29/2016 | 3.25 | 117 | 0.263 | 27.4 | 26.0 | 18.9 | < 0.105 | < 2.63 | < 0.263 |
| Excavated | B50 | B50_062916_0-18-1 (Dup) | 0 - 18 | 6/29/2016 | 3.36 | 117 | 0.270 | 20.1 | 23.7 | 19.6 | < 0.103 | < 2.57 | < 0.257 |
| 90% Upper Confidence Limit of the arithmetic mean as calculated using ProUCL Software | | | | | 6.40 | 131 | 0.33 | 16.27 | 44.4 | 121 | NC | NC | NC |
| **DEQ RBC: Construction Worker[3]** | | | | | **15** | **69,000** | **350** | **530,000** | **14,000** | **800** | **110** | **NE** | **1,800** |
| **DEQ RBC: Excavation Worker[3]** | | | | | **420** | **> Max** | **9,700** | **> Max** | **390,000** | **800** | **2,900** | **NE** | **49,000** |
| **DEQ Level II Screening Level Values[4]** | | | | | **10** | **NE** | **4** | **0.4** | **50** | **16** | **0.1** | **1** | **2** |
| **JSCS SLV Catch Basin Solids and Erodible Soil[5]** | | | | | **7** | **NE** | **1** | **111** | **149** | **17** | **0.07** | **2** | **5** |
| **Default Background Concentrations [7]** | | | | | **8.8** | **790** | **0.630** | **76** | **34** | **96** | **0.230** | **0.710** | **0.820** |

# Table 3
# Soil Analytical Results – Metals
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| | | | Sample Depth | | Analytical Results (milligrams per kilogram)[2] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil Decision Unit** | **Sample Location** | **Sample Identification** | **(feet) [1]** | **Sample Date** | **Arsenic** | **Barium** | **Cadmium** | **Chromium** | **Copper** | **Lead** | **Mercury** | **Selenium** | **Silver** |
| ARA Surface | B2 | B2_062316_29.5-31 | 29.5 - 31 | 6/23/2016 | 3.53 | 160 | 0.309 | 42.9 | 31.6 | 17.9 | < 0.108 | < 2.69 | < 0.269 |
| ARA Surface | B3 | B3_062716_28-30 | 28 - 30 | 6/27/2016 | 3.67 | 106 | < 0.437 | 14.3 | 17.1 | 9.78 | < 0.175 H | < 4.37 | < 0.437 |
| ARA Surface | B5 | B5_062916_26-28 | 26 - 28 | 6/29/2016 | 8.89 | 138 | 0.286 | 15.6 | 22.5 | 12.8 | < 0.104 | < 1.30 | < 0.260 |
| ARA Surface | B10 | B10-062116-35-37 | 35 - 37 | 6/21/2016 | 3.63 | 131 | 0.304 | 9.32 | 16.0 | 5.74 | < 0.101 | < 2.54 | < 0.254 |
| ARA Surface | B11 | B11-062116-36-38 | 36 - 38 | 6/21/2016 | 2.96 | 97.2 | < 0.267 | 9.06 | 14.2 | 4.78 | < 0.107 | < 2.67 | < 0.267 |
| ARA Surface | B15 | B15_062916_33-35 | 33 - 35 | 6/29/2016 | 2.12 | 118 | < 0.307 | 10.7 | 16.3 | 9.08 | < 0.123 | < 1.53 | < 0.307 |
| ARA Surface | B16 | B16_062816_19-21 | 19 - 21 | 6/28/2016 | 6.87 | 140 | 0.331 | 14.0 | 21.7 | 12.9 | < 0.106 | < 2.65 | < 0.265 |
| ARA Surface | B18 | B18_062716_26-28 | 26 - 28 | 6/27/2016 | **13.9** | 160 | < 0.281 | 19.8 | 22.4 | 12.9 | < 0.113 H | < 2.81 | < 0.281 |
| ARA Surface | B19 | B_19_062316_30-32 | 30 - 32 | 6/23/2016 | 1.77 | 78.9 | < 0.266 | 10.8 | 11.2 | 4.83 B | < 0.106 | < 1.33 | < 0.266 |
| ARA Surface | B22 | B_22_062216_29-31 | 29 - 31 | 6/22/2016 | 6.47 | 138 | < 0.252 | 19.4 B | 19.7 | 8.93 B | < 0.101 | < 1.26 | < 0.252 |
| ARA Surface | B23 | B_23_062216_34-36 | 34 - 36 | 6/22/2016 | 3.43 | 111 | < 0.260 | 6.52 | 14.5 | 5.03 B | < 0.104 | < 1.30 | < 0.260 |
| ARA Surface | B24 | B24_062716_29-31 | 29 - 31 | 6/27/2016 | 2.06 | 60.1 | < 0.252 J | 8.06 | 9.20 | 7.20 | < 0.101 H | < 2.52 | < 0.252 |
| ARA Surface | B24 | B24_062716_29-31-1 (Dup) | 29 - 31 | 6/27/2016 | 1.62 | 57.6 | < 0.253 | 7.93 | 8.49 | 6.92 | < 0.101 H | < 2.53 | < 0.253 |
| ARA Surface | B26 | B26_062816_30-32 | 30 - 32 | 6/28/2016 | 7.49 | 141 | 0.262 | 12.5 | 21.1 | 11.9 | < 0.105 | < 1.31 | < 0.262 |
| ARA Surface | B27 | B27-062116-31-33 | 31 - 33 | 6/21/2016 | 4.00 | 105 | 0.304 | 8.81 | 16.0 | 7.49 | < 0.106 | < 2.64 | < 0.264 |
| ARA Surface | B28 | B28_062816_23-25 | 23 - 25 | 6/28/2016 | 7.17 | 131 | 0.382 | 12.8 | 22.0 | 10.5 | < 0.113 | < 1.41 | < 0.283 |
| ARA Surface | B29 | B29-062116-30-32 | 30 - 32 | 6/21/2016 | 3.96 | 99.6 | < 0.274 | 8.03 | 14.6 | 7.13 | < 0.109 | < 2.74 | < 0.274 |
| ARA Surface | B30 | B_30_062216_24-26 | 24 - 26 | 6/22/2016 | 5.74 | 135 | < 0.295 | 15.4 | 23.3 | 14.6 B | < 0.118 | < 1.47 | < 0.295 |
| ARA Surface | B34 | B34_062416_34-36 | 34 - 36 | 6/24/2016 | 2.51 | 155 | < 0.290 | 23.7 | 18.4 | 6.92 | < 0.116 | < 1.45 | < 0.290 |
| ARA Surface | B35 | B35_062416_26-28 | 26 - 28 | 6/24/2016 | 3.98 | 151 | < 0.270 | 14.0 | 25.9 | 31.9 | < 0.108 | < 2.70 | < 0.270 |
| ARA Surface | B36 | B36_062416_33-35 | 33 - 35 | 6/24/2016 | 2.99 | 132 | < 0.288 | 26.5 | 16.1 | 7.71 | < 0.115 | < 1.44 | < 0.288 |
| ARA Surface | B38 | B_38_062216_26-28 | 26 - 28 | 6/22/2016 | 3.89 | 129 | 0.260 | 11.1 | 17.7 | 4.82 B | < 0.104 | < 1.30 | < 0.260 |
| ARA Surface | B41 | B41_062416_33-35 | 33 - 35 | 6/24/2016 | 1.71 | 106 | < 0.265 | 19.8 | 11.1 | 6.19 | < 0.106 | < 1.32 | < 0.265 |
| ARA Surface | B44 | B44_062716_27-29 | 27 - 29 | 6/27/2016 | 1.71 | 58.6 | < 0.244 | 6.35 | 6.55 | 3.63 | < 0.0975 H | < 1.22 | < 0.244 |
| ARA Surface | B46 | B46_062916_32-34 | 32 - 34 | 6/29/2016 | 1.92 | 129 | < 0.270 | 19.0 | 11.6 | 6.46 | < 0.108 | < 1.35 | < 0.270 |
| ARA Surface | B47 | B47_062816_32-34 | 32 - 34 | 6/28/2016 | 4.93 | 110 | < 0.266 | 9.96 | 17.1 | 9.05 | < 0.107 | < 2.66 | < 0.266 |
| ARA Surface | B48 | B_48_062216_27-29 | 27 - 29 | 6/22/2016 | 3.18 | 120 | 0.276 | 7.96 | 17.1 | 9.05 B | < 0.100 | < 1.25 | < 0.251 |
| 90% Upper Confidence Limit of the arithmetic mean as calculated using ProUCL Software | | | | | 5.30 | 126 | 0.28 | 16.9 | 18.6 | 11.4 | NC | NC | NC |
| **DEQ RBC: Construction Worker[3]** | | | | | **15** | **69,000** | **350** | **530,000** | **14,000** | **800** | **110** | **NE** | **1,800** |
| **DEQ RBC: Excavation Worker[3]** | | | | | **420** | **> Max** | **9,700** | **> Max** | **390,000** | **800** | **2,900** | **NE** | **49,000** |
| **Portland Harbor Sediment PRGs[6]** | | | | | **3** | **NE** | **0.51** | **NE** | **359** | **196** | **0.085** | **NE** | **NE** |
| **Default Background Concentrations [7]** | | | | | **8.8** | **790** | **0.630** | **76** | **34** | **96** | **0.230** | **0.710** | **0.820** |

# Table 3
# Soil Analytical Results – Metals
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Soil Decision Unit | Sample Location | Sample Identification | Sample Depth (feet) [1] | Sample Date | Analytical Results (milligrams per kilogram)[2] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **Arsenic** | **Barium** | **Cadmium** | **Chromium** | **Copper** | **Lead** | **Mercury** | **Selenium** | **Silver** |
| URA Surface | B1 | B1-062116-19-21 | 19 - 21 | 6/21/2016 | 4.59 | 117 | 0.308 | 9.61 | 16.3 | 8.11 | < 0.0984 | < 2.46 | < 0.246 |
| URA Surface | B4 | B4_062816_17-19 | 17 - 19 | 6/28/2016 | 7.99 | 148 | < 0.268 | 14.6 | 21.6 | 12.0 | < 0.107 | < 2.68 | < 0.268 |
| URA Surface | B6 | B_6_062316_6-8 | 6 - 8 | 6/23/2016 | **10.8** | 181 | 0.261 | 21.1 | **80.3** | 22.4 | < 0.104 | < 2.61 | < 0.261 |
| URA Surface | B7 | B7_062916_13-15 | 13 - 15 | 6/29/2016 | 3.07 | 136 | < 0.249 | 20.1 | 18.3 | 14.7 | < 0.0997 | < 1.25 | < 0.249 |
| URA Surface | B8 | B8_062716_14-16 | 14 - 16 | 6/27/2016 | 2.50 | 130 | 0.268 | 15.8 | 22.4 | 18.7 | < 0.0975 H | < 2.44 | < 0.244 |
| URA Surface | B9 | B9_062816_19-21 | 19 - 21 | 6/28/2016 | 7.14 | 159 | < 0.241 | 12.9 | 44.1 | 33.5 | < 0.0965 | < 1.21 | < 0.241 |
| URA Surface | B9 | B9_062816_19-21-1 (Dup) | 19 - 21 | 6/28/2016 | 3.51 | 121 | 0.274 | 10.9 | 18.4 | 20.4 | < 0.104 | < 1.30 | < 0.261 |
| URA Surface | B12 | B_12_062316_20-22 | 20 - 22 | 6/23/2016 | 2.49 | 113 | < 0.259 | 23.8 | 25.0 | 24.5 B | < 0.104 | < 1.30 | < 0.259 |
| URA Surface | B13 | B_13_062216_12-14 | 12 - 14 | 6/22/2016 | 5.12 | 129 | 0.293 | 12.7 | 19.2 | 8.42 B | < 0.0975 | < 1.22 | < 0.244 |
| URA Surface | B14 | B14_062316_20-22 | 20 - 22 | 6/23/2016 | 2.43 | 91.1 | < 0.248 | 13.5 | 19.0 | 13.7 | < 0.0990 | < 1.24 | < 0.248 |
| URA Surface | B17 | B17-062116-4-6 | 4 - 6 | 6/21/2016 | 7.58 | 191 | 0.294 | 19.5 | **127** | 26.9 | < 0.0939 | < 2.35 | < 0.235 |
| URA Surface | B20 | B20_062816_13-15 | 13 - 15 | 6/28/2016 | 2.47 | 80.5 | < 0.223 | 10.8 | 12.4 | 3.10 | < 0.0891 | < 2.23 | < 0.223 |
| URA Surface | B25 | B25_062716_18-20 | 18 - 20 | 6/27/2016 | **10.2** | 145 | < 0.288 | 21.4 | 23.4 | 14.9 | < 0.115 H | < 1.44 | < 0.288 |
| URA Surface | B31 | B_31_062316_34-36 | 34 - 36 | 6/23/2016 | 1.94 | 95.2 | < 0.282 | 12.4 | 23.5 | 15.3 | < 0.113 | < 2.82 | < 0.282 |
| URA Surface | B32 | B32_062816_6-8 | 6 - 8 | 6/28/2016 | **22.1** | 194 | < 0.286 | 23.4 | **260** | **146** | < 0.115 | < 2.86 | < 0.286 |
| URA Surface | B32 | B32_062816_6-8-1 (Dup) | 6 - 8 | 6/28/2016 | **12.8** | 201 | < 0.268 | 21.6 | 35.9 | 33.2 | < 0.107 | < 2.68 | < 0.268 |
| URA Surface | B33 | B33_062716_15-17 | 15 - 17 | 6/27/2016 | 1.92 | 77.9 | < 0.240 | 8.86 | 11.6 | 9.79 | < 0.0962 H | < 2.40 | < 0.240 |
| URA Surface | B37 | B37_062816_11-13 | 11 - 13 | 6/28/2016 | 4.27 | 91.4 | < 0.239 | 10.9 | 21.3 | 10.9 | < 0.0954 | < 2.39 | < 0.239 |
| URA Surface | B40 | B40_062816_1-3 | 1 - 3 | 6/28/2016 | 3.75 | 84.5 | < 0.225 | 11.2 | 16.5 | 8.45 | < 0.0900 | < 2.25 | < 0.225 |
| URA Surface | B42 | B_42_062216_18-20 | 18 - 20 | 6/22/2016 | 3.23 | 123 | < 0.254 | 10.9 | 14.3 | 4.83 B | < 0.102 | < 1.27 | < 0.254 |
| URA Surface | B43 | B43_062716_4-6 | 4 - 6 | 6/27/2016 | **14.9** | 262 | 0.340 | 35.7 | **524** | 25.0 | < 0.105 H | < 1.31 | 0.353 |
| URA Surface | B45 | B45_062716_20-22 | 20 - 22 | 6/27/2016 | 1.86 | 64.1 | < 0.237 | 9.99 | 10.1 | 5.90 | < 0.0948 H | < 1.19 | < 0.237 |
| URA Surface | B49 | B49_062816_13-15 | 13 - 15 | 6/28/2016 | 4.39 | 163 | < 0.251 | 20.7 | 19.4 | 10.0 | < 0.100 | < 2.51 | < 0.251 |
| URA Surface | B49 | B49_062816_13-15-1 (Dup) | 13 - 15 | 6/28/2016 | 4.19 | 182 | < 0.252 | 22.5 | 19.2 | 8.49 | < 0.101 | < 2.52 | < 0.252 |
| URA Surface | B50 | B50_062916_18-20 | 18 - 20 | 6/29/2016 | 3.68 | 142 | 0.332 | 23.7 | 32.9 | 19.6 | 0.145 | < 1.44 | < 0.289 |
| URA Surface | B50 | B50_062916_18-20-1 (Dup) | 18 - 20 | 6/29/2016 | 3.55 | 139 | 0.288 | 23.1 | 33.5 | 19.6 | **0.271** | < 1.44 | < 0.288 |
| 90% Upper Confidence Limit of the arithmetic mean as calculated using ProUCL Software | | | | | 7.69 | 165.00 | 0.263 | 18.67 | 120.3 | 27.6 | NC | NC | NC |
| **DEQ RBC: Construction Worker[3]** | | | | | **15** | **69,000** | **350** | **530,000** | **14,000** | **800** | **110** | **NE** | **1,800** |
| **DEQ RBC: Excavation Worker[3]** | | | | | **420** | **> Max** | **9,700** | **> Max** | **390,000** | **800** | **2,900** | **NE** | **49,000** |
| **DEQ Level II SLVs[4]** | | | | | **10** | **NE** | **4** | **0.4** | **50** | **16** | **0.1** | **1** | **2** |
| **JSCS SLV Catch Basin Solids and Soil[5]** | | | | | **7** | **NE** | **1** | **111** | **149** | **17** | **0.07** | **2** | **5** |
| **Default Background Concentrations [7]** | | | | | **8.8** | **790** | **0.630** | **76** | **34** | **96** | **0.230** | **0.710** | **0.820** |

NOTES:

Results in **bold** denote concentrations exceeding one or more screening criteria and the default background concentration.

< denotes analyte not detected at or exceeding the laboratory reporting limit listed.

>Max denotes the constituent for this pathway is calculated as exceeding 1,000,000 milligrams per kilogram; therefore, this substance is deemed not to pose a risk in this scenario.

[1] Depth in feet below ground surface.

[2] Analyzed by U.S. Environmental Protection Agency Method 6020A.

[3] State of Oregon Department of Environmental Quality Risk-Based Concentrations Table, revised November 1, 2015.

[4] DEQ Screening Level for Plants, Invertebrates, and Wildlife Exposed to Soil; from Guidance for Ecological Risk Assessment Levels I, II, III, IV, April 1998. Currently under revision.

[5] Joint Source Control Strategy Screening Level Values, Table 3-1 of Portland Harbor Joint Source Control Strategy (JSCS), as revised July 16, 2007.

[6] Portland Harbor Preliminary Remediation Goals (PRGs), Superfund Proposed Plan, Portland Harbor Superfund Site.

[7] DEQ Development of Oregon Background Metals Concentrations in Soil, March 2013.

B = analyte detected in associate blank at a level exceeding the method reporting limit.
DEQ = Oregon Department of Environmental Quality
H = Analysis conducted outside of holding time.
J = estimated result between the method detection limit and method reporting limit.
NA = insufficient number of detections to calculate standard deviation
NC = not calculated
NE = not established
RBC = risk-based concentration
SLV = screening level value

# Table 4
# Soil Analytical Results – Polycyclic Aromatic Hydrocarbons
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Decision Unit | Sample Location | Sample Identification | Sample Depth (feet)[1] | Sample Date | Analytical Results (micrograms per kilogram)[2] | | | | | | | | | | | | | | | | Calculated Results (micrograms per kilogram) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Non-Carcinogenic PAHs | | | | | | | | | Carcinogenic PAHs | | | | | | | | |
| | | | | | Acenaphthene | Acenaphthylene | Anthracene | Benzo(g,h,i)Perylene | Fluoranthene | Fluorene | Naphthalene | Phenanthrene | Pyrene | Benzo(a)pyrene | Benzo(a)anthracene | Benzo(b)fluoranthene | Benzo(k)Fluoranthene | Chrysene | Dibenzo(a,h)Anthracene | Indeno(1,2,3-cd)Pyrene | Total PAHs[4] | Total Carcinogenic PAHs TEC[3,4] |
| | | | | | | | | | | | | | | TEF | | | | | | | | |
| | | | | | | | | | | | | | | 1 | 0.1 | 0.1 | 0.01 | 0.001 | 1 | 0.1 | | |
| Excavated | B1 | B1-062116-0-19 | 0 - 19 | 6/21/2016 | < 11.9 J | < 11.9 J | < 11.9 J | < 11.9 J | < 11.9 J | < 11.9 J | < 11.9 J | < 11.9 J | < 11.9 J | < 11.9 J | < 11.9 J | < 11.9 J | < 11.9 J | < 11.9 J | < 11.9 J | < 11.9 J | --- | --- |
| Excavated | B2 | B2_062316_0-29.5 | 0 - 29.5 | 6/23/2016 | 80.2 | < 11.9 | 52.7 | 67.8 | 210 | 57.1 | 185 | 226 | 255 | 84.6 | 69.0 J | 89.1 J | 35.4 J | 97.7 J | < 11.9 | 58.7 | --- | --- |
| Excavated | B3 | B3_062716_0-28 | 0 - 28 | 6/27/2016 | 11.3 | 15.6 | 29.0 | 106 | 140 | 10.5 | 85.6 | 109 | 169 | 110 | 68.8 J | 119 J | 49.8 J | 95.8 J | 11.8 | 92.8 | --- | --- |
| Excavated | B5 | B5_062916_0-26 | 0 - 26 | 6/29/2016 | < 11.6 | 38.1 | 51.8 | 126 | 154 | < 11.6 | 37.6 | 101 | 151 | 95.5 | 72.6 J | 173 J | 60.5 J | 134 J | 32.4 | **164** | --- | --- |
| Excavated | B7 | B7_062916_0-13 | 0 - 13 | 6/29/2016 | 10.5 | 17.9 | 30.3 | 107 | 210 | < 10.0 | 28.5 | 96.8 | 262 | 130 | 85.1 J | 134 J | 50.6 J | 108 J | 12.4 | 96.7 | --- | --- |
| Excavated | B10 | B10-062116-2.5-7.5 | 2.5 - 7.5 | 6/21/2016 | < 23.0 J | < 23.0 J | < 23.0 J | < 23.0 J | < 23.0 J | < 23.0 J | < 23.0 J | < 23.0 J | < 23.0 J | < 23.0 J | < 23.0 J | < 23.0 J | < 23.0 J | < 23.0 J | < 23.0 J | < 23.0 J | --- | --- |
| Excavated | B12 | B_12_062316_0-20 | 0 - 20 | 6/23/2016 | 186 | **203** | 699 | **453** | **2,290** | 338 | 202 | **2,710** | **2,590** | 1,050 | **1,060** | 1,070 J | 396 J | 1,280 | 109 | **493** | --- | --- |
| Excavated | B13 | B_13_062216_0-12 | 0 - 12 | 6/22/2016 | < 63.3 | < 63.3 | < 63.3 | 113 J | < 63.3 | < 63.3 | 115 J | 186 | 134 | < 63.3 | < 82.4 | < 63.3 | < 63.3 | < 184 | < 63.3 | < 63.3 | --- | --- |
| Excavated | B14 | B14_062316_0-20 | 0 - 20 | 6/23/2016 | 17.4 | < 11.4 | 19.5 | 24.9 | 66.9 | 15.0 | 68.1 | 59.3 | 82.2 | 28.8 | 27.1 J | 31.7 J | 13.9 J | 36.0 J | < 11.4 | 22.1 | --- | --- |
| Excavated | B16 | B16_062816_0-19 | 0 - 19 | 6/28/2016 | < 11.3 | < 11.3 | < 11.3 | < 11.3 | 11.3 | < 11.3 | < 11.3 | < 11.3 | 14.6 | < 11.3 | < 11.3 | < 11.3 | < 11.3 | < 11.3 | < 11.3 | < 11.3 | --- | --- |
| Excavated | B19 | B_19_062316_0-30 | 0 - 30 | 6/23/2016 | 19.3 | < 10.2 | 24.4 | 28.6 | 92.2 | 15.0 | 61.5 | 85.9 | 107 | 38.3 | 34.9 J | 39.1 J | 18.0 J | 43.5 J | < 10.2 | 26.4 | --- | --- |
| Excavated | B19 | B_19_062316_0-30-1 | 0 - 30 | 6/23/2016 | 23.8 | < 9.96 | 30.7 | 41.8 | 113 | 22.0 | 105 | 109 | 136 | 56.3 | 48.1 J | 58.2 J | 24.9 J | 59.9 J | < 9.96 | 38.4 | --- | --- |
| Excavated | B29 | B29-062116-0-30 | 0 - 30 | 6/21/2016 | < 11.6 J | < 11.6 J | 46.4 J | 20.9 J | 316 J | < 11.6 J | < 11.6 J | 199 J | 34.1 J | 69.5 J | 154 J | 157 J | 68.3 J | 178 J | 14.9 J | 25.0 J | --- | --- |
| Excavated | B30 | B_30_062216_0-24 | 0 - 24 | 6/22/2016 | < 12.5 | < 12.5 | < 12.5 | < 12.5 | < 52.5 | 34.7 | < 12.5 | < 12.5 | 97.2 | 23.0 | < 57.5 | 30.2 J | < 12.5 | < 175 | < 12.5 | < 12.5 | --- | --- |
| Excavated | B33 | B33_062716_0-15 | 0 - 15 | 6/27/2016 | < 9.74 | < 9.74 | 15.3 | 62.2 | 96.8 | < 9.74 | 51.4 | 71.8 | 123 | 59.6 | 34.7 J | 66.9 J | 27.6 J | 58.3 J | < 9.74 | 51.0 | --- | --- |
| Excavated | B34 | B34_062416_0-34 | 0 - 34 | 6/24/2016 | 13.4 | < 12.5 | 26.7 | 66.9 | 116 | < 12.5 | 41.2 | 83.8 | 148 | 77.6 | 50.4 J | 79.1 J | 29.2 J | 69.3 J | < 12.5 | 59.6 | --- | --- |
| Excavated | B35 | B35_062416_0-26 | 0 - 26 | 6/24/2016 | < 58.1 | < 58.1 | < 58.1 | 84.5 | 127 | < 58.1 | < 58.1 | 99.2 | 155 | 89.4 | 69.1 J | 102 J | < 58.1 | 116 J | < 58.1 | 72.7 | --- | --- |
| Excavated | B37 | B37_062816_0-11 | 0 - 11 | 6/28/2016 | < 9.57 | 25.7 | 76.2 | 115 | 363 | 17.0 | < 9.57 | 328 | 423 | 131 | 108 J | 150 J | 55.9 J | 164 J | 11.4 | 99.9 | --- | --- |
| Excavated | B38 | B_38_062216_0-26 | 0 - 26 | 6/22/2016 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | --- | --- |
| Excavated | B41 | B41_062416_0-33 | 0 - 33 | 6/24/2016 | 14.7 | 14.5 | 21.8 | 59.1 | 107 | 12.3 | 79.5 | 107 | 134 | 57.4 | 38.3 J | 66.2 J | 24.6 J | 61.9 J | < 11.5 | 49.4 | --- | --- |
| Excavated | B44 | B44_062716_0-27 | 0 - 27 | 6/27/2016 | 24.8 | < 10.3 | 27.0 | 61.5 | 104 | 17.2 | 154 | 85.0 | 130 | 71.0 | 56.3 J | 76.6 J | 31.2 J | 71.5 J | < 10.3 | 54.9 | --- | --- |
| Excavated | B47 | B47_062816_0-32 | 0 - 32 | 6/28/2016 | < 60.4 | < 60.4 | < 60.4 | 75.0 | 149 | < 60.4 | < 60.4 | 83.5 | 152 | 81.5 | 87.2 J | 92.3 J | 62.1 J | 112 J | < 60.4 | 64.8 | --- | --- |
| Excavated | B50 | B50_062916_0-18-1 | 0 - 18 | 6/29/2016 | 95.4 | 81.9 | 185 | **544** | 1,070 | 91.4 | 390 | 675 | 1,360 | 587 | 375 J | 632 J | 180 J | 520 J | 59.0 | **490** | --- | --- |
| **90% Upper Confidence Limit of the arithmetic mean as calculated using ProUCL Software** | | | | | 34.4 | NC | NC | 128.4 | 563.8 | NC | NC | 558.8 | 649 | 338.1 | NC | NC | NC | NC | NC | 151.9 | --- | --- |
| **DEQ RBC: Construction Worker[5]** | | | | | **21,000,000** | **NE** | **110,000,000** | **NE** | **10,000,000** | **14,000** | **550,000** | **NE** | **7,500,000** | **2,400** | **24,000** | **24,000** | **240,000** | **2,400,000** | **2,400** | **24,000** | **NE** | **NE** |
| **DEQ RBC: Excavation Worker[5]** | | | | | **590,000,000** | **NE** | **> Max** | **NE** | **280,000,000** | **390,000,000** | **16,000,000** | **NE** | **210,000,000** | **67,000** | **660,000** | **670,000** | **6,700,000** | **67,000,000** | **67,000** | **670,000** | **NE** | **NE** |
| **DEQ Level II SLVs[6]** | | | | | **20,000** | **NE** | **NE** | **NE** | **NE** | **30,000** | **10,000** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** |
| **JSCS SLV Catch Basin Solids and Erodible Soil[7]** | | | | | **300** | **200** | **1,050** | **300** | **2,230** | **536** | **561** | **1,170** | **1,520** | **1,450** | **1,050** | **NE** | **13,000** | **1,290** | **1,300** | **100** | **NE** | **NE** |
| ARA New Surface | B2 | B2_062316_29.5-31 | 29.5 - 31 | 6/23/2016 | 59.4 | < 13.3 | 40.0 | 64.3 | 184 | 34.2 | 111 | 188 | 225 | 86.8 | 69.7 J | 86.7 J | 36.1 J | 99.4 J | < 13.3 | 56.7 | 1341.3 | **108.6** |
| ARA New Surface | B3 | B3_062716_28-30 | 28 - 30 | 6/27/2016 | < 18.3 | 29.9 | 28.8 | 63.6 | 154 | < 18.3 | 65.1 | 139 | 178 | 85.2 | 42.5 J | 60.0 J | 29.2 J | 46.2 J | < 18.3 | 52.9 | 974 | **101** |
| ARA New Surface | B15 | B15_062916_33-35 | 33 - 35 | 6/29/2016 | 15.1 | 33.7 | 45.9 | 133 | 296 | 14.5 | 182 | 219 | 364 | 150 | 89.6 J | 137 J | 57.6 J | 113 J | < 14.2 | 117 | 1,967 | **185** |
| ARA New Surface | B19 | B_19_062316_30-32 | 30 - 32 | 6/23/2016 | < 13.2 | < 13.2 | < 13.2 | < 13.2 | < 13.2 | < 13.2 | 15.6 | < 13.2 | 14.4 | < 13.2 | < 13.2 | < 13.2 | < 13.2 | < 13.2 | < 13.2 | < 13.2 | 30 | 0 |
| ARA New Surface | B24 | B24_062716_29-31 | 29 - 31 | 6/27/2016 | < 10.9 | < 10.9 | < 10.9 | 35.4 | 65.7 | < 10.9 | 16.3 | 32.7 | 99.2 | 40.6 | 29.8 J | 44.1 J | 19.7 J | 52.3 J | < 10.9 | 32.7 | 468.5 | **51.5** |
| ARA New Surface | B30 | B_30_062216_24-26 | 24 - 26 | 6/22/2016 | < 12.1 | < 12.1 | < 12.1 | < 12.1 | < 15.7 | < 12.1 | < 12.1 | < 12.1 | 35.8 | < 12.1 | < 23.0 | < 12.1 | < 12.1 | < 77.5 | < 12.1 | < 12.1 | 35.8 | 0 |
| ARA New Surface | B31 | B_31_062316_34-36 | 34 - 36 | 6/23/2016 | < 12.2 | < 12.2 | < 12.2 | < 12.2 | 16.3 | < 12.2 | 16.1 | 16.1 | 20.8 | < 12.2 | < 12.2 | < 12.2 | < 12.2 | < 12.2 | < 12.2 | < 12.2 | 69.3 | 0 |
| ARA New Surface | B35 | B35_062416_26-28 | 26 - 28 | 6/24/2016 | < 12.1 | < 12.1 | 20.6 | 40.8 | 89.3 | < 12.1 | 64.9 | 72.0 | 102 | 53.7 | 43.3 J | 64.2 J | 26.5 J | 62.6 J | < 12.1 | 38.4 | 648.3 | **65.6** |
| **DEQ RBC: Construction Worker[5]** | | | | | **21,000,000** | **NE** | **110,000,000** | **NE** | **10,000,000** | **14,000** | **550,000** | **NE** | **7,500,000** | **2,400** | **24,000** | **24,000** | **240,000** | **2,400,000** | **2,400** | **24,000** | **NE** | **NE** |
| **DEQ RBC: Excavation Worker[5]** | | | | | **590,000,000** | **NE** | **> Max** | **NE** | **280,000,000** | **390,000,000** | **16,000,000** | **NE** | **210,000,000** | **67,000** | **660,000** | **670,000** | **6,700,000** | **67,000,000** | **67,000** | **670,000** | **NE** | **NE** |
| **Portland Harbor Sediment PRGs[8]** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **23,000** | **12** |

# Table 4
# Soil Analytical Results – Polycyclic Aromatic Hydrocarbons
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| | | | | | Analytical Results (micrograms per kilogram)[2] | | | | | | | | | | | | | | | | Calculated Results (micrograms per kilogram) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Non-Carcinogenic PAHs | | | | | | | | | Carcinogenic PAHs | | | | | | | | |
| | | | | | | | | | | | | | | Benzo(a)pyrene | Benzo(a)anthracene | Benzo(b)fluoranthene | Benzo(k)Fluoranthene | Chrysene | Dibenzo(a,h)Anthracene | Indeno(1,2,3-cd)Pyrene | | |
| | | | | | | | | | | | | | | TEF | | | | | | | | |
| Decision Unit | Sample Location | Sample Identification | Sample Depth (feet)[1] | Sample Date | Acenaphthene | Acenaphthylene | Anthracene | Benzo(g,h,i)Perylene | Fluoranthene | Fluorene | Naphthalene | Phenanthrene | Pyrene | **1** | **0.1** | **0.1** | **0.01** | **0.001** | **1** | **0.1** | Total PAHs[4] | Total Carcinogenic PAHs TEC[3,4] |
| URA New Surface | B7 | B7_062916_13-15 | 13 - 15 | 6/29/2016 | 23.7 | 151 | 198 | **554** | 1,620 | 64.4 | 36.0 | 1,130 | **2,160** | 745 | 472 J | 709 J | 228 J | 679 J | 53.6 | **503** | --- | --- |
| URA New Surface | B9 | B9_062816_19-21 | 19 - 21 | 6/28/2016 | < 10.5 | < 10.5 | < 10.5 | 57.5 | 40.9 | < 10.5 | 12.2 | 26.8 | 54.1 | 51.2 | 28.7 J | 52.1 J | 23.8 J | 45.5 J | < 10.5 | 44.0 | --- | --- |
| URA New Surface | B9 | B9_062816_19-21-1 (Dup) | 19 - 21 | 6/28/2016 | < 11.0 | < 11.0 | < 11.0 | 46.4 | 44.3 | < 11.0 | 14.1 | 30.7 | 56.6 | 38.9 | 21.5 J | 42.6 J | 19.6 J | 41.6 J | < 11.0 | 35.6 | --- | --- |
| URA New Surface | B12 | B_12_062316_20-22 | 20 - 22 | 6/23/2016 | 86.6 | < 12.5 | 48.3 | 40.4 | 159 | 50.7 | 92.0 | 162 | 174 | 56.2 | 55.9 J | 65.2 J | 24.1 J | 79.5 J | < 12.5 | 36.0 | --- | --- |
| URA New Surface | B17 | B17-062116-4-6 | 4 - 6 | 6/21/2016 | < 10.1 J | < 10.1 J | 18.2 J | 13.1 J | 87.3 J | 11.1 J | 19.0 J | 77.6 J | 72.4 J | 10.7 J | 31.8 J | 41.5 J | 24.4 J | 62.1 J | < 10.1 J | 17.0 J | --- | --- |
| URA New Surface | B32 | B32_062816_6-8 | 6 - 8 | 6/28/2016 | < 11.2 | 22.5 | 14.2 | < 11.2 | 56.0 | < 11.2 | 143 | 79.2 | 47.2 | < 11.2 | 14.5 J | 16.1 J | < 11.2 | 21.4 J | < 11.2 | < 11.2 | --- | --- |
| URA New Surface | B32 | B32_062816_6-8-1 (Dup) | 6 - 8 | 6/28/2016 | < 11.3 | 20.8 | 13.8 | 11.8 | 57.3 | < 11.3 | 125 | 76.5 | 49.2 | < 11.3 | 14.5 J | 16.7 J | < 11.3 | 22.1 J | < 11.3 | < 11.3 | --- | --- |
| URA New Surface | B33 | B33_062716_15-17 | 15 - 17 | 6/27/2016 | < 9.78 | < 9.78 | 13.2 | 23.9 | 53.6 | < 9.78 | 25.9 | 41.7 | 63.8 | 29.0 | 27.2 J | 34.0 J | 15.7 J | 33.5 J | < 9.78 | 21.3 | --- | --- |
| URA New Surface | B43 | B43_062716_4-6 | 4 - 6 | 6/27/2016 | < 9.41 | < 9.41 | 13.1 | 14.6 | 54.1 | < 9.41 | 10.4 | 51.0 | 47.5 | 18.0 | 20.9 J | 21.9 J | 12.1 J | 22.4 J | < 9.41 | 13.8 | --- | --- |
| URA New Surface | B45 | B45_062716_20-22 | 20 - 22 | 6/27/2016 | 13.1 | < 10.0 | 19.9 | 45.8 | 93.8 | 10.9 | 49.4 | 66.2 | 119 | 51.6 | 44.4 J | 53.5 J | 22.3 J | 57.6 J | < 10.0 | 38.9 | --- | --- |
| URA New Surface | B50 | B50_062916_18-20 | 18 - 20 | 6/29/2016 | **596** | 101 | 662 | **826** | **3,380** | 458 | **799** | **3,050** | **4,320** | 1,280 | 894 | 1,110 J | 412 J | 1,250 | 98.2 | **770** | --- | --- |
| URA New Surface | B50 | B50_062916_18-20-1 (Dup) | 18 - 20 | 6/29/2016 | **469** | 93.0 | 555 | **601** | **2,620** | 344 | **569** | **2,540** | **3,360** | 931 | 698 | 828 J | 314 J | 945 | 72.4 | **562** | --- | --- |
| **DEQ RBC: Construction Worker[5]** | | | | | **21,000,000** | **NE** | **110,000,000** | **NE** | **10,000,000** | **14,000** | **550,000** | **NE** | **7,500,000** | **2,400** | **24,000** | **24,000** | **240,000** | **2,400,000** | **2,400** | **24,000** | **NE** | **NE** |
| **DEQ RBC: Excavation Worker[5]** | | | | | **590,000,000** | **NE** | **> Max** | **NE** | **280,000,000** | **390,000,000** | **16,000,000** | **NE** | **210,000,000** | **67,000** | **660,000** | **670,000** | **6,700,000** | **67,000,000** | **67,000** | **670,000** | **NE** | **NE** |
| **DEQ Level II SLVs[6]** | | | | | **20,000** | **NE** | **NE** | **NE** | **NE** | **30,000** | **10,000** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** |
| **JSCS SLV Catch Basin Solids and Erodible Soil[7]** | | | | | **300** | **200** | **1,050** | **300** | **2,230** | **536** | **561** | **1,170** | **1,520** | **1,450** | **1,050** | **NE** | **13,000** | **1,290** | **1,300** | **100** | **NE** | **NE** |

NOTES:

Results in **bold** denote concentrations exceeding one or more screening criteria.

< denotes analyte not detected at or exceeding the laboratory method reporting limit listed.

>Max denotes the constituent for this pathway is calculated as exceeding 1,000,000 milligrams per kilogram; therefore, this substance is deemed not to pose a risk in this scenario.

[1] Depth in feet below ground surface.

[2] Analyzed by U.S. Environmental Protection Agency Method 8270D/SIM.

[3] Total carcinogenic polycyclic aromatic hydrocarbons derived using the total toxicity equivalency method .

[4] Total PAHs and PAH TECs were calculated using zeros for analytes not detected at concentrations exceeding the labratory method reporting limits.

[5] State of Oregon Department of Environmental Quality Risk-Based Concentrations Table, revised November 1, 2015.

[6] DEQ Screening Level for Plants, Invertebrates, and Wildlife Exposed to Soil; from Guidance for Ecological Risk Assessment Levels I, II, III, IV, April 1998. Currently under revision.

[7] Joint Source Control Strategy Screening Level Values, Table 3-1 of Portland Harbor Joint Source Control Strategy (JSCS), as revised July 16, 2007.

[8] Portland Harbor Preliminary Remediation Goals (PRGs), Superfund Proposed Plan, Portland Harbor Superfund Site.

Two numerical values per cell indicates multiple instances of analysis per sample

DEQ = Oregon Department of Environmental Quality
J = result is an estimate
NC = not calculated
NE = not established
PAHs = polycyclic aromatic hydrocarbons
RBC = risk-based concentration
SLV = screening level value
TEC = toxic equivalent concentration
TEF = toxicity equivalency factor

# Table 5
# Soil Analytical Results – Polychlorinated Biphenyls
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| | | | | | Analytical Results (micrograms per kilogram)[2] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Decision Unit** | **Sample Location** | **Sample Identification** | **Sample Depth (feet)[1]** | **Sample Date** | **Aroclor 1016** | **Aroclor 1221** | **Aroclor 1232** | **Aroclor 1242** | **Aroclor 1248** | **Aroclor 1254** | **Aroclor 1260** | **Total PCBs [3]** |
| Excavated | B1 | B1-062116-0-19 | 0 - 19 | 6/21/2016 | < 12.5 | < 12.5 | < 12.5 | < 12.5 | < 12.5 | 16.7 | < 12.5 | 16.70 |
| Excavated | B2 | B2_062316_0-29.5 | 0 - 29.5 | 6/23/2016 | < 11.1 | < 11.1 | < 11.1 | < 11.1 | < 11.1 | < 11.1 | < 11.1 | 0 |
| Excavated | B3 | B3_062716_0-28 | 0 - 28 | 6/27/2016 | < 11.5 | < 11.5 | < 11.5 | < 11.5 | < 11.5 | < 11.5 | < 11.5 | 0 |
| Excavated | B5 | B5_062916_0-26 | 0 - 26 | 6/29/2016 | < 12.2 | < 12.2 | < 12.2 | < 12.2 | < 12.2 | < 12.2 | < 12.2 | 0 |
| Excavated | B7 | B7_062916_0-13 | 0 - 13 | 6/29/2016 | < 11.0 | < 11.0 | < 11.0 | < 11.0 | < 11.0 | 110 | < 11.0 | 110 |
| Excavated | B10 | B10-062116-2.5-7.5 | 2.5 - 7.5 | 6/21/2016 | < 21.8 | < 21.8 | < 21.8 | < 21.8 | < 21.8 | < 21.8 | 30.5 | 30.5 |
| Excavated | B12 | B_12_062316_0-20 | 0 - 20 | 6/23/2016 | < 11.5 | < 11.5 | < 26.4 | < 14.9 | < 11.5 | < 11.5 | < 11.5 | 0 |
| Excavated | B13 | B_13_062216_0-12 | 0 - 12 | 6/22/2016 | < 12.3 | < 12.3 | < 12.3 | < 12.3 | < 12.3 | 65.7 J | < 12.3 | 65.7 |
| Excavated | B14 | B14_062316_0-20 | 0 - 20 | 6/23/2016 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | < 11.4 | 0 |
| Excavated | B16 | B16_062816_0-19 | 0 - 19 | 6/28/2016 | < 12.8 | < 12.8 | < 12.8 | < 12.8 | < 12.8 | < 12.8 | < 12.8 | 0 |
| Excavated | B17 | B17-062116-4-6 | 4 - 6 | 6/21/2016 | < 11.6 | < 11.6 | < 15.1 | < 11.6 | < 11.6 | < 11.6 | 36.4 J | 36.4 |
| Excavated | B19 | B_19_062316_0-30 | 0 - 30 | 6/23/2016 | < 11.0 | < 11.0 | < 11.0 | < 11.0 | < 11.0 | < 11.0 | < 11.0 | 0 |
| Excavated | B19 | B_19_062316_0-30-1 (Dup) | 0 - 30 | 6/23/2016 | < 11.2 | < 11.2 | < 11.2 | < 11.2 | < 11.2 | < 11.2 | < 11.2 | 0 |
| Excavated | B29 | B29-062116-0-30 | 0 - 30 | 6/21/2016 | < 13.1 | < 13.1 | < 13.1 | < 13.1 | < 13.1 | 44.9 | < 13.1 | 44.9 |
| Excavated | B30 | B_30_062216_0-24 | 0 - 24 | 6/22/2016 | < 12.8 | < 12.8 | < 12.8 | < 12.8 | < 12.8 | < 12.8 | < 12.8 | 0 |
| Excavated | B33 | B33_062716_0-15 | 0 - 15 | 6/27/2016 | < 10.8 | < 10.8 | < 10.8 | < 10.8 | < 10.8 | < 10.8 | < 10.8 | 0 |
| Excavated | B34 | B34_062416_0-34 | 0 - 34 | 6/24/2016 | < 12.1 | < 12.1 | < 12.1 | < 12.1 | < 12.1 | < 12.1 | < 12.1 | 0 |
| Excavated | B35 | B35_062416_0-26 | 0 - 26 | 6/24/2016 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | 94.3 | 13.6 J | 107.9 |
| Excavated | B37 | B37_062816_0-11 | 0 - 11 | 6/28/2016 | < 10.8 | < 10.8 | < 10.8 | < 10.8 | < 10.8 | 42.8 | < 10.8 | 42.8 |
| Excavated | B38 | B_38_062216_0-26 | 0 - 26 | 6/22/2016 | < 12.6 | < 12.6 | < 12.6 | < 12.6 | < 12.6 | < 12.6 | < 12.6 | 0 |
| Excavated | B41 | B41_062416_0-33 | 0 - 33 | 6/24/2016 | < 11.5 | < 11.5 | < 11.5 | < 11.5 | < 11.5 | < 11.5 | < 11.5 | 0 |
| Excavated | B44 | B44_062716_0-27 | 0 - 27 | 6/27/2016 | < 11.3 | < 11.3 | < 11.3 | < 11.3 | < 11.3 | < 11.3 | 16.8 | 16.8 |
| Excavated | B47 | B47_062816_0-32 | 0 - 32 | 6/28/2016 | < 13.1 | < 13.1 | < 13.1 | < 13.1 | < 13.1 | 19.4 | < 13.1 | 19.4 |
| Excavated | B50 | B50_062916_0-18-1 | 0 - 18 | 6/29/2016 | < 12.0 | < 12.0 | < 12.0 | < 12.0 | < 12.0 | < 12.0 | < 12.0 | 0 |
| **DEQ RBC: Construction Worker[4]** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **4,900** |
| **DEQ RBC: Excavation Worker[4]** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **140,000** |
| **DEQ Level II Screening Level Values[5]** | | | | | **NE** | **NE** | **NE** | **1,500** | **NE** | **700** | **NE** | **40,000** |
| **JSCS SLV Catch Basin Solids and Soil[6]** | | | | | **530** | **NE** | **NE** | **NE** | **1,500** | **300** | **200** | **NE** |

# Table 5
# Soil Analytical Results – Polychlorinated Biphenyls
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Decision Unit | Sample Location | Sample Identification | Sample Depth (feet)[1] | Sample Date | Analytical Results (micrograms per kilogram)[2] | | | | | | | Total PCBs [3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Aroclor 1016 | Aroclor 1221 | Aroclor 1232 | Aroclor 1242 | Aroclor 1248 | Aroclor 1254 | Aroclor 1260 | |
| ARA New Surface | B2 | B2_062316_29.5-31 | 29.5 - 31 | 6/23/2016 | < 8.36 | < 8.36 | < 8.36 | < 8.36 | < 8.36 | < 8.36 | < 8.36 | 0 |
| ARA New Surface | B3 | B3_062716_28-30 | 28 - 30 | 6/27/2016 | < 20.9 | < 20.9 | < 20.9 | < 20.9 | < 20.9 | < 20.9 | < 20.9 | 0 |
| ARA New Surface | B15 | B15_062916_33-35 | 33 - 35 | 6/29/2016 | < 14.8 | < 14.8 | < 14.8 | < 14.8 | < 14.8 | < 14.8 | < 14.8 | 0 |
| ARA New Surface | B19 | B_19_062316_30-32 | 30 - 32 | 6/23/2016 | < 8.29 | < 8.29 | < 8.29 | < 8.29 | < 8.29 | < 8.29 | < 8.29 | 0 |
| ARA New Surface | B24 | B24_062716_29-31 | 29 - 31 | 6/27/2016 | < 12.0 | < 12.0 | < 12.0 | < 12.0 | < 12.0 | 95.0 | < 12.0 | 95.0 |
| ARA New Surface | B30 | B_30_062216_24-26 | 24 - 26 | 6/22/2016 | < 8.39 | < 8.39 | < 8.39 | < 8.39 | < 8.39 | < 8.39 | < 8.39 | 0 |
| ARA New Surface | B31 | B_31_062316_34-36 | 34 - 36 | 6/23/2016 | < 25.3 | < 12.6 | < 78.3 | < 36.6 | < 26.5 | 19.2 J | < 12.6 | 19.2 |
| ARA New Surface | B35 | B35_062416_26-28 | 26 - 28 | 6/24/2016 | < 8.46 | < 8.46 | < 8.46 | < 8.46 | < 8.46 | < 8.46 | < 8.46 | 0 |
| **DEQ RBC: Construction Worker[4]** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **4,900** |
| **DEQ RBC: Excavation Worker[4]** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **140,000** |
| **Portland Harbor Sediment PRGs[7]** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **9** |

# Table 5
# Soil Analytical Results – Polychlorinated Biphenyls
## Linnton Mill Site Restoration
## Portland, Oregon
## Farallon PN: 1588-001

| Decision Unit | Sample Location | Sample Identification | Sample Depth (feet)[1] | Sample Date | Analytical Results (micrograms per kilogram)[2] | | | | | | | Total PCBs [3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Aroclor 1016 | Aroclor 1221 | Aroclor 1232 | Aroclor 1242 | Aroclor 1248 | Aroclor 1254 | Aroclor 1260 | |
| URA New Surface | B7 | B7_062916_13-15 | 13 - 15 | 6/29/2016 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | 0 |
| URA New Surface | B9 | B9_062816_19-21 | 19 - 21 | 6/28/2016 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | 0 |
| URA New Surface | B9 | B9_062816_19-21-1 (Dup) | 19 - 21 | 6/28/2016 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | 25.1 | < 11.6 | 25 |
| URA New Surface | B12 | B_12_062316_20-22 | 20 - 22 | 6/23/2016 | < 13.4 | < 13.4 | < 13.4 | < 13.4 | < 13.4 | < 13.4 | < 13.4 | 0 |
| URA New Surface | B32 | B32_062816_6-8 | 6 - 8 | 6/28/2016 | < 12.2 | < 12.2 | < 12.2 | < 12.2 | < 12.2 | < 12.2 | < 12.2 | 0 |
| URA New Surface | B32 | B32_062816_6-8-1 (Dup) | 6 - 8 | 6/28/2016 | < 12.6 | < 12.6 | < 12.6 | < 12.6 | < 12.6 | < 12.6 | < 12.6 | 0 |
| URA New Surface | B33 | B33_062716_15-17 | 15 - 17 | 6/27/2016 | < 10.8 | < 10.8 | < 10.8 | < 10.8 | < 10.8 | < 10.8 | < 10.8 | 0 |
| URA New Surface | B43 | B43_062716_4-6 | 4 - 6 | 6/27/2016 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | < 11.6 | 0 |
| URA New Surface | B45 | B45_062716_20-22 | 20 - 22 | 6/27/2016 | < 11.2 | < 11.2 | < 11.2 | < 11.2 | < 11.2 | < 11.2 | < 11.2 | 0 |
| URA New Surface | B50 | B50_062916_18-20 | 18 - 20 | 6/29/2016 | < 13.0 | < 13.0 | < 13.0 | < 13.0 | < 13.0 | 21.9 J | 20.1 J | 42 |
| URA New Surface | B50 | B50_062916_18-20-1 (Dup) | 18 - 20 | 6/29/2016 | < 13.1 | < 13.1 | < 13.1 | < 13.1 | < 13.1 | 18.2 J | 18.8 J | 37 |
| **DEQ RBC: Construction Worker[4]** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **4,900** |
| **DEQ RBC: Excavation Worker[4]** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **140,000** |
| **DEQ Level II Screening Level Values[5]** | | | | | **NE** | **NE** | **NE** | **1,500** | **NE** | **700** | **NE** | **40,000** |
| **JSCS SLV Catch Basin Solids and Erodible Soil[6]** | | | | | **530** | **NE** | **NE** | **NE** | **1,500** | **300** | **200** | **NE** |

NOTES:

Results in **bold** denote concentrations exceeding applicable screening levels.

< denotes analyte not detected at or exceeding the laboratory reporting limit listed.

[1] Depth in feet below ground surface.

[2] Analyzed by U.S. Environmental Protection Agency (EPA) Method 8082A.

[3] Total PCBs calculated using zeros for analytes not detected at concentrations exceeding the laboratory method reporting limits.

[4] State of Oregon Department of Environmental Quality (DEQ) Risk-Based Concentrations Table, revised November 1, 2015.

[5] DEQ Screening Level for Plants, Invertebrates, and Wildlife Exposed to Soil; from Guidance for Ecological Risk Assessment Levels I, II, III, IV, April 1998. Currently under revision.

[6] Joint Source Control Strategy Screening Level Values, Table 3-1 of Portland Harbor Joint Source Control Strategy (JSCS), as revised July 16, 2007.

[7] Portland Harbor Preliminary Remediation Goals (PRGs), Superfund Proposed Plan, Portland Harbor Superfund Site.

J = result is an estimate
NE = not established
PCB = polychlorinated biphenyl
RBC = risk-based concentration

# Table 6
# Soil Analytical Results – Organochlorine Pesticides
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| | | | | | Analytical Results (micrograms per kilogram)[2] | | | | | | Calculated Results (micrograms per kilogram) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil Decision Unit** | **Sample Location** | **Sample Identification** | **Sample Depth (feet)[1]** | **Sample Date** | **2,4'-DDD** | **4,4'-DDD** | **2,4'-DDE** | **4,4'-DDE** | **2,4'-DDT** | **4,4'-DDT** | **Total DDD[3]** | **Total DDE[4]** | **Total DDT[5]** | **Total DDx[6]** |
| ARA New Surface | B2 | B2_062316_29.5-31 | 29.5 - 31 | 6/23/2016 | < 2.48 | 2.49 | < 2.48 | < 2.48 | < 2.48 | 3.60 | 2.49 | 0 | 3.60 | 6.09 |
| ARA New Surface | B3 | B3_062716_28-30 | 28 - 30 | 6/27/2016 | < 4.19 | < 4.19 | < 4.19 | < 4.19 | < 4.19 | < 4.19 | 0 | 0 | 0 | 0 |
| ARA New Surface | B5 | B5_062916_26-28 | 26 - 28 | 6/29/2016 | < 2.51 | < 2.51 | < 2.51 | < 2.51 | < 2.51 | < 2.51 | 0 | 0 | 0 | 0 |
| ARA New Surface | B10 | B10-062116-35-37 | 35 - 37 | 6/21/2016 | < 1.16 | < 1.16 | < 1.16 | < 1.16 | < 1.16 | < 1.16 | 0 | 0 | 0 | 0 |
| ARA New Surface | B11 | B11-062116-36-38 | 36 - 38 | 6/21/2016 | < 1.07 | < 1.07 | < 1.07 | < 1.07 | < 1.07 | < 1.07 | 0 | 0 | 0 | 0 |
| ARA New Surface | B15 | B15_062916_33-35 | 33 - 35 | 6/29/2016 | < 2.92 | < 2.92 | < 2.92 | < 2.92 | < 2.92 | < 2.92 | 0 | 0 | 0 | 0 |
| ARA New Surface | B16 | B16_062816_19-21 | 19 - 21 | 6/28/2016 | < 2.51 | < 2.51 | < 2.51 | < 2.51 | < 2.51 | < 2.51 | 0 | 0 | 0 | 0 |
| ARA New Surface | B18 | B18_062716_26-28 | 26 - 28 | 6/27/2016 | < 2.36 | < 2.36 | < 2.36 | < 2.36 | < 2.36 | < 2.36 | 0 | 0 | 0 | 0 |
| ARA New Surface | B19 | B_19_062316_30-32 | 30 - 32 | 6/23/2016 | < 2.69 | < 2.69 | < 2.69 | < 2.69 | < 2.69 | < 2.69 | 0 | 0 | 0 | 0 |
| ARA New Surface | B22 | B_22_062216_29-31 | 29 - 31 | 6/22/2016 | < 2.43 | < 2.43 | < 2.43 | < 2.43 | < 2.43 | < 3.17 | 0 | 0 | 0 | 0 |
| ARA New Surface | B23 | B_23_062216_34-36 | 34 - 36 | 6/22/2016 | < 2.53 | < 2.53 | < 2.53 | < 2.53 | < 2.53 | < 2.53 | 0 | 0 | 0 | 0 |
| ARA New Surface | B24 | B24_062716_29-31 | 29 - 31 | 6/27/2016 | < 4.87 | 14.5 | < 2.43 | 7.47 | < 3.10 | 8.55 J | 14.50 | 7 | 8.55 | 30.52 |
| ARA New Surface | B24 | B24_062716_29-31-1 (Dup) | 29 - 31 | 6/27/2016 | < 3.64 | 9.90 | < 2.96 | 7.08 | < 2.28 | 8.36 J | 9.90 | 7 | 8.36 | 25.34 |
| ARA New Surface | B26 | B26_062816_30-32 | 30 - 32 | 6/28/2016 | < 2.97 | < 2.97 | < 2.97 | < 2.97 | < 2.97 | < 2.97 | 0 | 0 | 0 | 0 |
| ARA New Surface | B27 | B27-062116-31-33 | 31 - 33 | 6/21/2016 | < 1.18 | < 1.18 | < 1.18 | < 1.18 | < 1.18 | < 1.18 | 0 | 0 | 0 | 0 |
| ARA New Surface | B28 | B28_062816_23-25 | 23 - 25 | 6/28/2016 | < 4.88 | < 2.44 | < 2.44 | < 2.44 | < 2.44 | < 2.44 | 0 | 0 | 0 | 0 |
| ARA New Surface | B29 | B29-062116-30-32 | 30 - 32 | 6/21/2016 | < 1.18 | < 1.18 | < 1.18 | < 1.18 | < 1.18 | < 1.18 | 0 | 0 | 0 | 0 |
| ARA New Surface | B30 | B_30_062216_24-26 | 24 - 26 | 6/22/2016 | < 2.45 | < 2.45 | < 2.45 | < 2.45 | < 2.45 | < 2.45 | 0 | 0 | 0 | 0 |
| ARA New Surface | B31 | B_31_062316_34-36 | 34 - 36 | 6/23/2016 | < 2.41 | < 2.41 | < 2.41 | < 2.41 | < 2.41 | < 2.41 | 0 | 0 | 0 | 0 |
| ARA New Surface | B34 | B34_062416_34-36 | 34 - 36 | 6/24/2016 | < 2.61 | < 2.61 | < 2.61 | < 2.61 | < 2.61 | < 2.61 | 0 | 0 | 0 | 0 |
| ARA New Surface | B35 | B35_062416_26-28 | 26 - 28 | 6/24/2016 | < 2.36 | < 2.36 | < 2.36 | < 2.36 | < 2.36 | < 2.36 | 0 | 0 | 0 | 0 |
| ARA New Surface | B36 | B36_062416_33-35 | 33 - 35 | 6/24/2016 | < 2.45 | < 2.45 | < 2.45 | < 2.45 | < 2.45 | < 2.45 | 0 | 0 | 0 | 0 |
| ARA New Surface | B38 | B_38_062216_26-28 | 26 - 28 | 6/22/2016 | < 2.29 | < 2.29 | < 2.29 | < 2.29 | < 2.29 | < 2.29 | 0 | 0 | 0 | 0 |
| ARA New Surface | B41 | B41_062416_33-35 | 33 - 35 | 6/24/2016 | < 2.46 | < 2.46 | < 2.46 | < 2.46 | < 2.46 | < 2.46 | 0 | 0 | 0 | 0 |
| ARA New Surface | B44 | B44_062716_27-29 | 27 - 29 | 6/27/2016 | < 2.34 | < 2.34 | < 2.34 | < 2.34 | < 2.34 | < 2.34 | 0 | 0 | 0 | 0 |
| ARA New Surface | B46 | B46_062916_32-34 | 32 - 34 | 6/29/2016 | < 2.77 | < 2.77 | < 2.77 | < 2.77 | < 2.77 | < 2.77 | 0 | 0 | 0 | 0 |
| ARA New Surface | B47 | B47_062816_30-32 | 30 - 32 | 6/28/2016 | < 2.33 | < 2.33 | < 2.33 | < 2.33 | < 2.33 | < 2.33 | 0 | 0 | 0 | 0 |
| ARA New Surface | B47 | B47_062816_32-34 | 32 - 34 | 6/28/2016 | < 2.21 | < 2.21 | < 2.21 | < 2.21 | < 2.21 | < 2.21 | 0 | 0 | 0 | 0 |
| ARA New Surface | B48 | B_48_062216_27-29 | 27 - 29 | 6/22/2016 | < 2.41 | < 2.41 | < 2.41 | < 2.41 | < 2.41 | < 2.41 | 0 | 0 | 0 | 0 |
| 90% Upper Confidence Limit of the arithmetic mean as calculated using ProUCL Software | | | | | NC | NC | NC | NC | NC | NC | NC | NC | NC | 7.96 |
| **DEQ RBC: Construction Worker[7]** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **94,000** | **66,000** | **66,000** | **NE** |
| **DEQ RBC: Excavation Worker[7]** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **2,600,000** | **1,800,000** | **1,800,000** | **NE** |
| **Portland Harbor Sediment PRGs[8]** | | | | | **NE** | **NE** | **NE** | **NE** | **NE** | **NE** | **114** | **226** | **246** | **6.1** |

NOTES:

Results in **bold** denote concentrations exceeding one or more screening criteria.

< denotes analyte not detected at or exceeding the laboratory reporting limit listed.

[1] Depth in feet below ground surface.

[2] Analyzed by U.S. Environmental Protection Agency Method 8081A.

[3] Sum of 2,4- and 4,4-dichlorodiphenyldichloroethane (DDD). Zero used in summation when analyte was not detected.

[4] Sum of 2,4- and 4,4-dichlorodiphenyldichloroethene (DDE). Zero used in summation when analyte was not detected.

[5] Sum of 2,4- and 4,4-dichlorodiphenyltrichloroethane (DDT). Zero used in summation when analyte was not detected.

[6] Total DDx is the sum of 2,4- and 4,4-DDD, 2,4- and 4,4-DDE, and 2,4- and 4,4-DDT. Zeros were used in the summations for analytes not detected at concentrations exceeding method detection limits.

[7] State of Oregon Department of Environmental Quality Risk-Based Concentrations Table, revised November 1, 2015.

[8] Portland Harbor Preliminary Remediation Goals (PRGs), Superfund Proposed Plan, Portland Harbor Superfund Site.

J = estimated result
NC = not calculated
NE = not established
RBCs = risk-based concentrations

# APPENDIX A
# BORING LOGS

NEW EXPOSED SURFACE INVESTIGATION REPORT
Linnton Mill Site Restoration
10504 Northwest Saint Helens Road
Portland, Oregon

Farallon PN: 1588-001

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FINAL HDP - December 4, 2018

# Log of Boring: B1

Page 1 of 1

**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/21/16 0820 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/21/16 0850 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 21.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 1.0': Well-graded GRAVEL with sand (80% gravel, 10% sand, 10% silt), medium sand, brown, moist, no odor, no sheen. | GW | | | | | | | |
| | | 1.0 to 4.0': Silty SAND with gravel (60% sand, 20% silty, 20% gravel), fine to medium sand, brown, moist, no odor, no sheen. | SM | | 100 | | 0.0 | | | |
| 5<br>10 | | 4.0 to 14.2': Sandy SILTY with clay (50% silt, 25% sand, 25% clay), fine sand, brown with grayish mottling from 5.0 to 6.5', moist, no odor, no sheen. | ML | | 100<br>100 | | 0.0<br>0.0<br>0.0<br>0.0 | B1_062116_0-10<br>B1_062116_0-19 | <br>X | |
| 15 | | 14.2 to 15.0': Silty SAND (50% sand, 50% silt), fine sand, brown, moist, no odor, no sheen. | SM | | | | | B1_062116_10-19 | | |
| | | 15.0 to 17.8': Sandy SILT with clay (50% silt, 25% sand, 25% clay), fine sand, brown, moist, no odor, no sheen. | ML | | 100 | | 0.0<br>0.0 | | | |
| 20 | | 17.8 to 21.0': Silty SAND (50% sand, 50% silt), fine sand, brown, moist, no odor, no sheen. | SM | | | | 0.0 | B1_062116_19-21 | X | |

## Well Construction Information

| | | | |
|---|---|---|---|
| **Monument Type:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | | **Y:** NA |
| **Filter Pack:** | NA | | |
| **Surface Seal:** | NA | | |
| **Annular Seal:** | NA | | |
| **Boring Abandonment:** | Bentonite | | |

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# Log of Boring: B2

Page 1 of 1

**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/23/16 1550 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/23/16 1700 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 31.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 1.0': Poorly-graded SAND with silt (80% sand, 15% silt, 5% clay), fine sand, gray, moist, no odor, no sheen. | SP-SM | | | | 0.0 | | | |
| | | 1.0 to 5.0': Silty SAND (70% sand, 30% silt), medium sand, brown, moist, no odor, no sheen. | SM | | 100 | | 0.0 | | | |
| 5 | | 5.0 to 10.0': No Recovery | | | 0 | | 0.0 | B2_062316_0-10 | | |
| 10 | | 10.0 to 18.0': Sandy SILT (50% silt, 40% sand, 10% clay), fine to medium sand, gray, moist, no odor, no sheen. | ML | | 100<br>100 | | 0.0<br>0.0<br>0.0<br>0.0 | B2_062316_0-29.5<br><br>B2_062316_10-20 | X | Bentonite |
| 20 | | 18.0 to 21.0': Wood debris | WD | | | | 0.0 | | | |
| | | 21.0 to 21.5': Silty SAND (80% sand, 15% silt, 5% clay), fine sand, gray, moist, no odor, no sheen. | SM | | | | 0.0 | | | |
| 25 | | 21.5 to 27.0': SILT with sand (50% silt, 30% clay, 20% sand), fine sand, gray, moist, no odor, no sheen. | ML | | 100 | | 0.0 | B2_062316_20-29 | | |
| | | 27.0 to 29.5': Wood debris | WD | | 100 | | | | | |
| 30 | | 29.5 to 31.0': SILT with sand (50% silt, 30% clay, 20% sand), fine sand, gray, moist, no odor, no sheen. | ML | | 100 | | 0.0 | B2_062316_29.5-31 | X | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | | | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Filter Pack:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Surface Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Annular Seal:** | NA | | **Y:** NA |
| | | **Boring Abandonment:** | Bentonite | | |

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FINAL HDP - December 4, 2018

# Log of Boring: B3

Page 1 of 1

**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/27/16 1150 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/27/16 1215 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 30.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 4.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM | | 80 | | 0.0<br>0.0<br>0.0 | | | |
| | | 4.0 to 5.0': No recovery | | | | | 0.0 | | | |
| 5 | | 5.0 to 6.0': No recovery | | | | | 0.0 | B3_062716_0-10 | | |
| 10<br>15 | | 6.0 to 16.0': Sandy SILT (50% silt, 40% sand, 10% clay), medium sand, gray, moist, no odor, no sheen. | ML | | 80<br>100 | | 0.0<br>0.0<br>0.0 | B3_062716_0-28<br>B3_062716_10-20 | X | Bentonite |
| 20 | | 16.0 to 21.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM | | 100 | | 0.0<br>0.0 | | | |
| 25 | | 21.0 to 27.0': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, gray, moist, no odor, no sheen. | ML | | 100 | | 0.0<br>0.0 | B3_062716_20-28 | | |
| 30 | | 27.0 to 30.0': Wood debris | WD | | 100 | | 0.0<br>0.0 | B3_062716_28-30 | X | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

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# Log of Boring: B4

Page 1 of 1

**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/28/16 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/28/16 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 19.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 1.5 to 3.0 Silty SAND (60% sand, 30% silt, 10% clay), fine sand, gray, moist, no odor, no sheen, contains 10% wood debris. | SM | | | | 0.0 | | | |
| | | 1.5 to 3.0 Silty SAND (60% sand, 30% silt, 10% clay), fine sand, gray, moist, no odor, no sheen, contains 10% wood debris | SM | | 60 | | 0.0 | | | |
| | | 3.0 to 5.0': No recovery | | | | | | | | |
| 5 | | 5.0 to 7.5': Silty SAND (60% sand, 30% silt, 10% clay), fine sand, gray, moist, no odor, no sheen, contains 10% wood debris. | SM | | | | 0.0<br>0.0 | B4_062816_0-10 | | |
| | | 7.5 to 10.0': No recovery | | | 50 | | | B4_062816_0-17 | X | |
| 10 | | 10.0 to 12.5': Sandy SILT (50% silt, 30% sand, 20% clay), fine sand, gray, moist, no odor, no sheen. | ML | | | | | | | Bentonite |
| | | 12.5 to 13.0': No recovery | | | 80 | | | | | |
| | | 13.0 to 13.2': Wood debris | WD | | | | | B4_062816_10-17 | | |
| | | 13.2 to 14.0': Wood debris | WD | | | | | | | |
| | | 14.0 to 15.0': No recovery | | | | | | | | |
| 15 | | 15.0 to 19.0': Sand SILT (50% silt, 40% sand, 10% clay), fine sand, brown, moist, no odor, no sheen. | ML | | 100 | | 0.0 | B4_062816_17-19 | X | |
| 20 | | | | | | | | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA **Y:** NA

FARALLON CONSULTING

FINAL HDP - December 4, 2018

# Log of Boring: B5

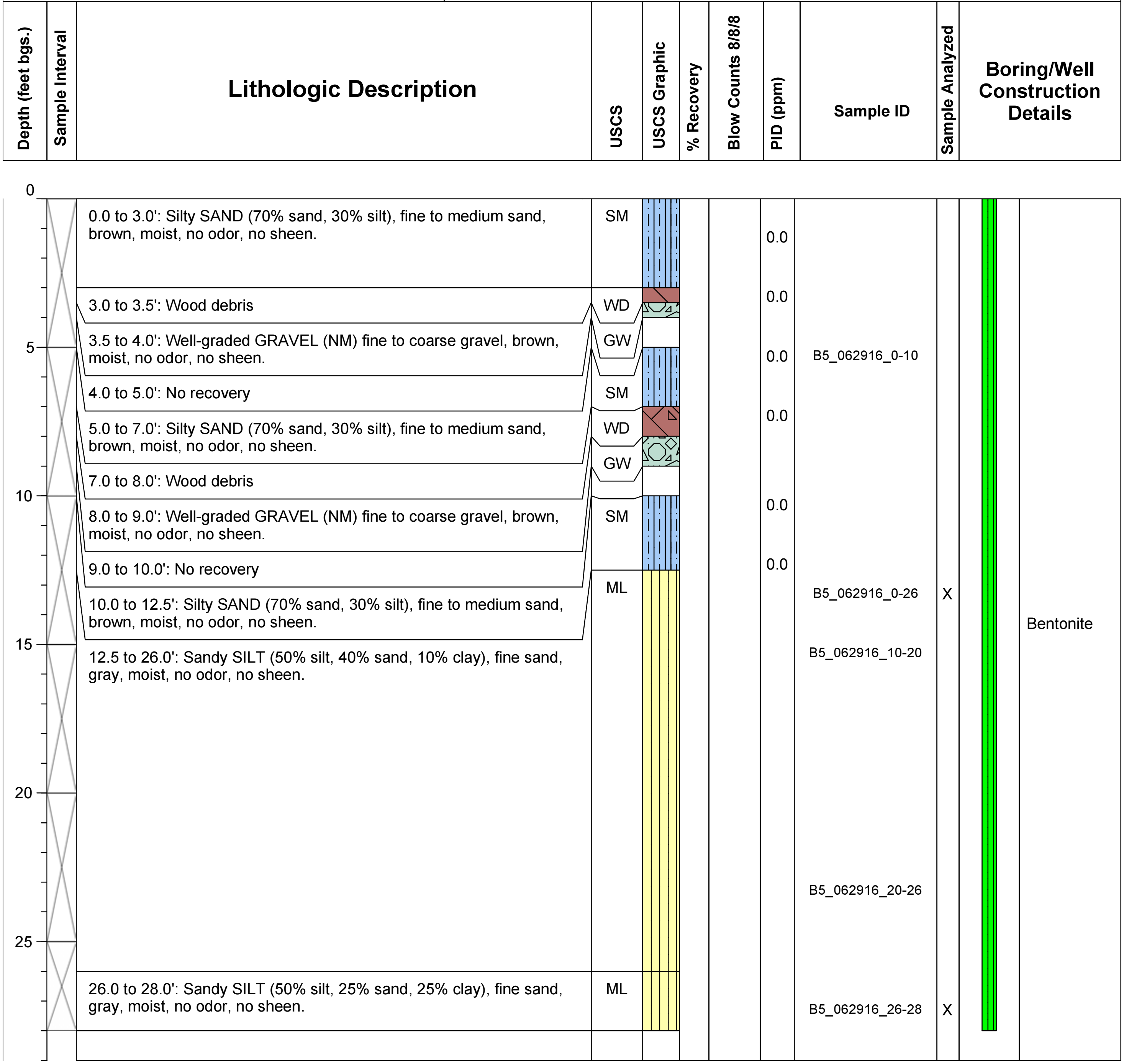
Page 1 of 1

**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/29/16 1052 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/29/16 1130 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 28.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |



| Lithologic Description | USCS |
|---|---|
| 0.0 to 3.0': Silty SAND (70% sand, 30% silt), fine to medium sand, brown, moist, no odor, no sheen. | SM |
| 3.0 to 3.5': Wood debris | WD |
| 3.5 to 4.0': Well-graded GRAVEL (NM) fine to coarse gravel, brown, moist, no odor, no sheen. | GW |
| 4.0 to 5.0': No recovery | |
| 5.0 to 7.0': Silty SAND (70% sand, 30% silt), fine to medium sand, brown, moist, no odor, no sheen. | SM |
| 7.0 to 8.0': Wood debris | WD |
| 8.0 to 9.0': Well-graded GRAVEL (NM) fine to coarse gravel, brown, moist, no odor, no sheen. | GW |
| 9.0 to 10.0': No recovery | |
| 10.0 to 12.5': Silty SAND (70% sand, 30% silt), fine to medium sand, brown, moist, no odor, no sheen. | SM |
| 12.5 to 26.0': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, gray, moist, no odor, no sheen. | ML |
| 26.0 to 28.0': Sandy SILT (50% silt, 25% sand, 25% clay), fine sand, gray, moist, no odor, no sheen. | ML |

| PID (ppm) |
|---|
| 0.0 |
| 0.0 |
| 0.0 |
| 0.0 |
| 0.0 |
| 0.0 |

| Sample ID | Sample Analyzed |
|---|---|
| B5_062916_0-10 | |
| B5_062916_0-26 | X |
| B5_062916_10-20 | |
| B5_062916_20-26 | |
| B5_062916_26-28 | X |

**Boring/Well Construction Details:** Bentonite

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

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# Log of Boring: B6

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/23/16 1110
**Date/Time Completed:** 6/23/16 1122
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** NE
**Total Boring Depth (ft bgs):** 8.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | ☒ | 0.0 to 1.0': Well-graded GRAVEL (70% gravel, 20% sand, 10% silt), fine sand, brown, moist, no odor, no sheen. | GW | | | | | | | |
| | ☒ | 1.0 to 5.0': Silty SAND (50% sand, 40% silt, 10% clay), fine sand, gray, moist, no odor, no sheen. | SM | | 100 | | 0.0<br>0.0 | B6_062316_0-6 | X | Bentonite |
| 5 | ☒ | 5.0 to 8.0': Sandy SILT (50% silt, 30% sand, 20% clay), fine sand, gray, moist, no odor, no sheen, contains random construction debris. | ML | | 100 | | 0.0<br>0.0<br>0.0 | B6_062316_6-8 | X | |
| 10 | | | | | | | | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

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# Log of Boring: B7

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/29/16 0940 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/29/16 1000 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 15.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 2.5': Silty SAND (70% sand, 30% silt), medium sand, brown, moist, no odor, no sheen. | SM | | | 0.0 | | | |
| | | 2.5 to 2.8': Wood debris | WD | 80 | | | | | |
| | | 2.8 to 4.0': Sand SILT (50% silt, 50% sand), fine sand, gray, moist, no odor, no sheen. | ML | | | 0.0 | | | |
| | | 4.0 to 5.0': No recovery | | | | | | | |
| 5 | | 5.0 to 6.0': Sand SILT (50% silt, 50% sand), fine sand, gray, moist, no odor, no sheen. | ML | | | 0.0 | B7_062916_0-10 | | |
| | | 6.0 to 7.5': Silty SAND (70% sand, 30% silt), medium sand, brown, moist, no odor, no sheen. | SM | | | 0.0 | B7_062916_0-13 | X | |
| | | 7.5 to 8.0': Sand SILT (50% silt, 50% sand), fine sand, gray, moist, no odor, no sheen. | ML | 100 | | | | | Bentonite |
| 10 | | 8.0 to 15': Sand SILT (50% silt, 50% sand), fine sand, gray, moist, no odor, no sheen. | ML | 100 | | 0.0<br>0.0<br>0.0 | B7_062916_10-13<br>B7_062916_13-15 | <br>X | |
| 15 | | | | | | 0.0 | | | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

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# Log of Boring: B8

**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/27/16 1500
**Date/Time Completed:** 6/27/16 1520
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** NE
**Total Boring Depth (ft bgs):** 16.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 |  | 0.0' to 3.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen, brick fragments present. | SM |  | 60 |  | 0.0 |  |  | Bentonite |
|  |  | 3.0 to 5.0': No recovery |  |  |  |  | 0.0<br>0.0 |  |  |  |
| 5 |  | 5.0 to 12.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM |  | 100 |  | 0.0 | B8_062716_0-10<br>B8_062716_0-14<br>B8_062716_10-14 | <br>X<br> |  |
| 10 |  |  |  |  |  |  |  |  |  |  |
|  |  | 12.0 to 16': Sand SILT (50% silt, 40% sand, 10% clay), medium sand, brown, moist, no odor, no sheen, contains brick fragments present. | ML |  | 100<br>100 |  | 0.0 | B8_062716_14-16 | X |  |
| 15 |  |  |  |  |  |  |  |  |  |  |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

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# Log of Boring: B9

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/28/16 0837
**Date/Time Completed:** 6/28/16 0900
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** NE
**Total Boring Depth (ft bgs):** 21.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 7.5': Poorly-graded silty SAND (90% sand, 10% silt), medium sand, brown, moist, no odor, no sheen. | SP | | | | | | | |
| | | | | | | | 0.0 | | | |
| | | | | | 100 | | | | | |
| | | | | | | | 0.0 | | | |
| 5 | | | | | | | 0.0 | B9_062816_0-10 | | |
| | | 7.5 to 21.0': Sandy SILT (60% silt, 30% sand, 10% clay), fine sand, gray, moist, no odor, no sheen, contains minor wood debris. | ML | | 100 | | 0.0 | | | |
| | | | | | | | | B9_062816_0-19 | X | |
| 10 | | | | | | | 0.0 | | | |
| | | | | | 100 | | | | | |
| 15 | | | | | | | | B9_062816_10-19 | | |
| | | | | | | | 0.0 | | | Bentonite |
| | | | | | | | 0.0 | | | |
| | | | | | 100 | | | | | |
| 20 | | | | | | | 0.0 | B9_062816_19-21 | X | |
| | | | | | 100 | | | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

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# Log of Boring: B10

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/21/16 1300
**Date/Time Completed:** 6/21/16 1403
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** 25.5
**Total Boring Depth (ft bgs):** 37.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 2.5': Silty SAND (70% sand, 20% silt, 10% gravel), medium sand, brown, moist, no odor, no sheen. | SM | | | | | | | |
| | | | | | 100 | | 0.0 | | | |
| | | 2.5 to 7.5': Wood debris | WD | | | | | | | |
| 5 | | | | | | | 0.0 | B10_062116_2.5-7.5 | X | |
| | | 7.5 to 28.0': Sandy SILT (50% silt, 30% clay, 20% sand), fine sand, gray, moist to wet at 25.5', no odor, no sheen. | ML | | 100 | | 0.0 | | | |
| 10 | | | | | | | 0.0 | | | |
| | | | | | 100 | | 0.0 | B10_062116_8-18 | | |
| 15 | | | | | | | 0.0 | | | |
| | | | | | 100 | | 0.0 | B10_062116_18-28 | | Bentonite |
| 20 | | | | | | | 0.0 | | | |
| | | | | | | | | B10_062116_8-35 | X | |
| | | | | | 100 | | 0.0 | | | |
| 25 | | | | | | | 0.0 | | | ▼ |
| | | 28.0 to 37.0': Sandy SILT (40% silt, 40% clay, 20% sand), fine sand, brown, wet, no odor, no sheen. | ML | | 100 | | | | | |
| 30 | | | | | | | | | | |
| | | | | | 100 | | | B10_062116_28-35 | | |
| 35 | | | | | | | | | | |
| | | | | | 100 | | | B10_062116_35-37 | X | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

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# Log of Boring: B11

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/21/16 1110 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/21/16 1201 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | 25.0 |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 38.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Lithologic Description | USCS | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 to 4.0': Silty SAND with gravel (60% sand, 20% silt, 20% gravel), coarse sand, brown, moist, no odor, no sheen. | SM | 100 | | 0.0<br>0.0<br>0.0 | | | |
| 5 | 4.0 to 5.5': Well-graded GRAVEL with silt and sand (50% gravel, 25% silt, 25% sand), medium to coarse sand, gray, moist, no odor, no sheen. | GW-GM | | | 0.0 | B11_062116_0-10 | | |
| | 5.5 to 11.5': Silty SAND (80% sand, 20% silt), medium sand, black to dark brown, moist, no odor, no sheen. | SM | 100 | | 0.0<br>0.0 | | | |
| 10 | | | | | | | | |
| | 11.5 to 26.0': Sandy SILT (50% silt, 30% sand, 20% clay), fine sand, gray, moist to wet at 25.0', no odor, no sheen. | ML | 100<br>100<br>100 | | 0.0<br>0.0<br>0.0<br>0.0<br>0.0 | B11_062116_10-20<br>B11_062116_0-36<br>B11_062116_20-30 | <br>X<br> | Bentonite<br>Water Level |
| 15 | | | | | | | | |
| 20 | | | | | | | | |
| 25 | | | | | | | | |
| | 26.0 to 31.0': Sandy SILT (50% silt, 30% sand, 20% clay), fine sand, brown, wet, no odor, no sheen. | ML | 100 | | 0.0<br>0.0 | | | |
| 30 | | | | | | | | |
| | 31.0 to 34.0': Sandy SILT (50% silt, 35% sand, 15% clay), fine sand, brown, wet no odor, no sheen. | ML | 100 | | 0.0 | B11_062116_30-36 | X | |
| 35 | 34.0 to 38.0': Silty SAND (60% sand, 30% silt, 10% clay), fine sand, brown, wet, no odor, no sheen. | SM | 100 | | | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** X: NA
Y: NA

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# Log of Boring: B12

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/21/16 1250 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/21/16 1340 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | 10.0 |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 22.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 0.5': Silty GRAVEL with sand (50% gravel, 30% silt, 20% sand), fine to medium sand, gray, moist, no odor, no sheen. | GM | | | | | | | |
| | | 0.5 to 4.0': Silty SAND (80% sand, 20% silt), medium sand, gray, moist, no odor, no sheen. | SM | | | | 0.0 | | | |
| | | | | | 80 | | 0.0 | | | |
| | | 4.0 to 5.0': No recovery | | | | | | | | |
| 5 | | 5.0 to 10.0': Silty GRAVEL with sand (50% sand, 20% silt, 20% sand, 10% clay), medium sand, gray, moist, no odor, no sheen. | GM | | | | 0.0 | B12_062316_0-10 | | |
| | | | | | 100 | | 0.0 | | | |
| 10 | | 10.0 to 22.0': Sandy SILT with gravel (50% silt, 20% sand, 20% gravel, 10% clay), fine sand, gray, wet, no odor, no sheen. | ML | | | | 0.0 | B12_062316_0-20 | X | Bentonite |
| | | | | | 100 | | 0.0 | | | |
| 15 | | | | | | | 0.0 | B12_062316_10-20 | | |
| | | | | | 100 | | 0.0 | | | |
| 20 | | | | | | | 0.0 | | | |
| | | | | | 100 | | | B12_062316_20-22 | X | |

## Well Construction Information

| | | | |
|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite |

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA **Y:** NA

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# Log of Boring: B13

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/22/16 1250 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/22/16 1315 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 14.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Lithologic Description | USCS |
|---|---|---|
| 0 | 0.0 to 1.0': Silty GRAVEL with sand (60% gravel, 20% silt, 20% sand), fine sand, gray, moist, no odor, no sheen. | GM |
| | 1.0 to 2.0': Sandy SILT (50% silt, 30% clay, 20% sand), fine sand, gray, moist, no odor, no sheen. | ML |
| | 2.0 to 3.0': Sandy SILT (50% silt, 30% clay, 20% sand), fine sand, black, moist, petroleum-like odor, no sheen, wood debris present. | ML |
| | 3.0 to 5.0': No recovery | |
| 5 | 5.0 to 14.0': Sandy SILT (50% silt, 25% sand, 25% clay), fine sand, brown, moist, no odor, no sheen. | ML |
| 10 | | |
| 15 | | |

| % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|
| 60 | | 0.0 | | | |
| | | 3.1 | | | |
| | | 0.0 | B13_0-10 | | |
| | | | B13_0-12 | X | |
| | | | | | Bentonite |
| 100 | | 0.0 | | | |
| | | 0.0 | | | |
| | | | B13_10-12 | | |
| 100 | | 0.0 | | | |
| | | | B13_12-14 | X | |
| | | 0.0 | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

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# Log of Boring: B14

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/23/16 1030
**Date/Time Completed:** 6/23/16 1100
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** 10
**Total Boring Depth (ft bgs):** 22
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Lithologic Description | USCS | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 to 12.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist to wet at 10', no odor, no sheen. | SM | | | | | | |
| | | | | | 0.0 | | | |
| | | | 100 | | 0.0 | | | |
| 5 | | | | | 0.0 | B14_062316_0-10 | | |
| | | | 100 | | 0.0 | | | |
| 10 | | | | | 0.0 | B14_062316_0-20 | X | ▼ Water Level |
| | | | | | | | | Bentonite |
| | 12.0 to 20.0': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, gray, wet, no odor, no sheen, brick fragments and charcoal observed at 18 to 20'. | ML | 100 | | 0.0 | | | |
| 15 | | | | | 0.0 | B14_062316_10-20 | | |
| | | | 100 | | 0.0 | | | |
| 20 | 20.0 to 22.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist to wet at 10', no odor, no sheen. | SM | | | 0.0 | | | |
| | | | 100 | | | B14_062316_20-22 | X | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

FARALLON CONSULTING

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# Log of Boring: B15

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/29/16 0850 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/29/16 0930 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | 21 |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 35.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Lithologic Description | USCS | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 to 7.5': Silty SAND (60% sand, 35% silt, 5% clay), fine to coarse sand, brown, moist, no odor, no sheen. | SM | 100 | | 0.0<br>0.0<br>0.0 | B15_062916_0-10 | | |
| 5 | 7.5 to 10.0': Sandy SILT (50% silt, 40% sand, 10% clay, fine sand, gray, moist, no odor, no sheen, burnt wood debris present. | ML | 100 | | 0.0 | | | |
| 10 | 10.0 to 12.0': Silty SAND (60% sand, 35% silt, 5% clay), fine to coarse sand, brown, moist, no odor, no sheen. | SM | | | 0.0 | | | |
| | 12.0 to 13.0': Well-graded GRAVEL with silt (80% gravel, 10% silt, 10% sand), fine to medium sand, brown, moist, no odor, no sheen. | GW-GM | 100 | | 0.0 | | | |
| 15 | 13.0 to 21.0': Sandy SILT (50% silt, 40% sand, 10% clay, fine sand, gray, moist, no odor, no sheen, burnt wood debris present. | ML | 100 | | 0.0<br>0.0<br>0.0 | B15_062316_10-20<br>B15_062316_0-33 | <br>X | Bentonite |
| 20 | 21.0 to 24.0': Silty SAND (70% sand, 30% silt), medium sand, gray, wet, no odor, no sheen, contains wood debris. | SM | 100 | | 0.0 | B15_062316_30-33 | | ▼ Water Level |
| | 24.0 to 25.0': Wood Debris | WD | | | | | | |
| 25 | 25.0 to 28.0': Sandy SILT (50% silt, 40% sand, 10% clay, fine sand, gray, moist, no odor, no sheen, burnt wood debris present. | ML | 100 | | 0.0<br>0.0 | B15_062316_20-30 | | |
| | 28.0 to 29.0': Silty SAND (70% sand, 30% silt), medium sand, gray, wet, no odor, no sheen, contains wood debris. | SM | | | | | | |
| 30 | 29.0 to 31.0': Wood Debris | WD | | | 0.0 | | | |
| 35 | 31.0 to 35.0': Silty SAND (70% sand, 30% silt), medium sand, gray, wet, no odor, biologic sheen from 31 to 32', contains wood debris. | SM | 100 | | 0.0 | B15_062316_33-35 | X | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

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# Log of Boring: B16

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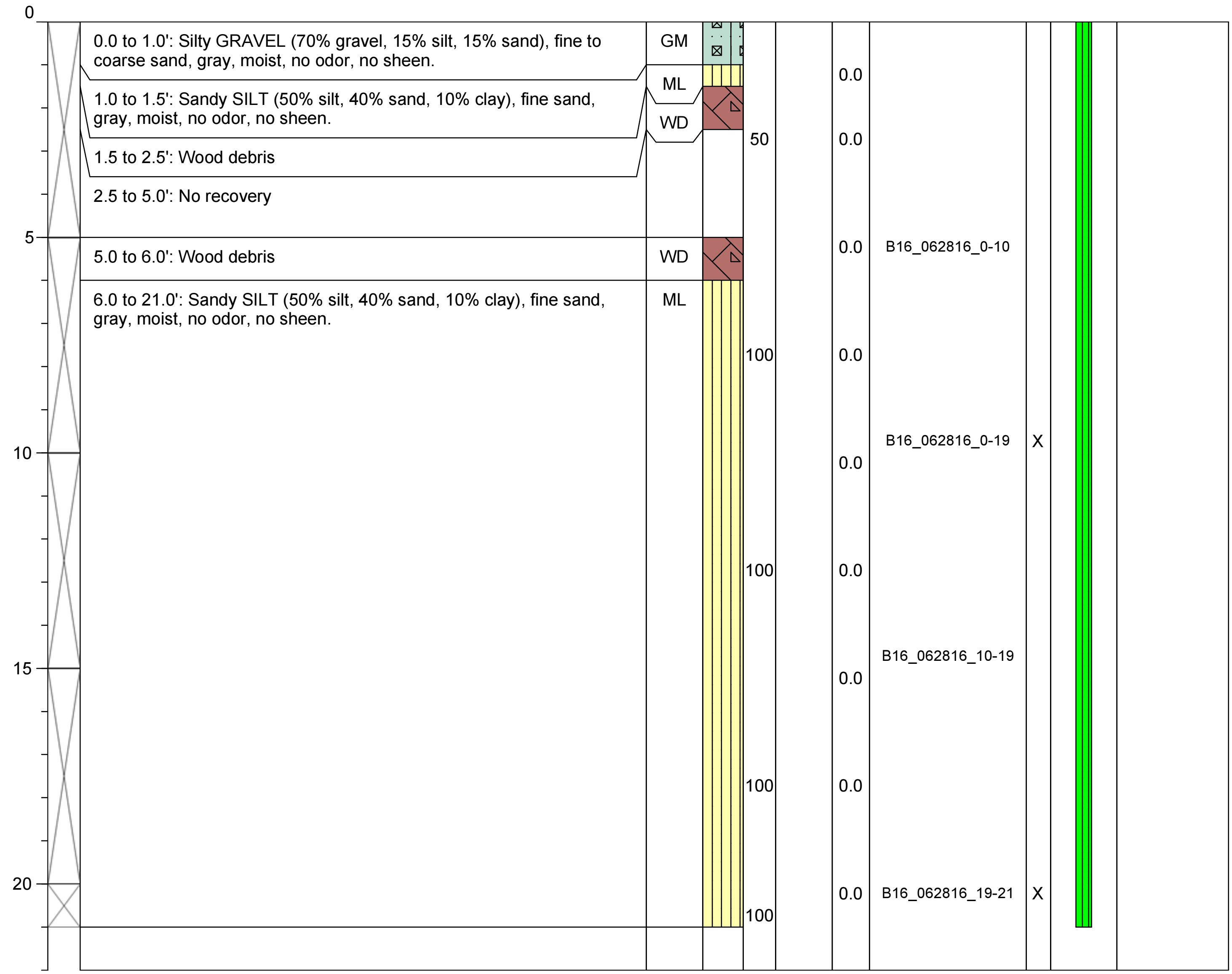
**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/28/16 1445
**Date/Time Completed:** 6/28/16 1500
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** NE
**Total Boring Depth (ft bgs):** 21.0
**Total Well Depth (ft bgs):** NA



| Lithologic Description | USCS |
|---|---|
| 0.0 to 1.0': Silty GRAVEL (70% gravel, 15% silt, 15% sand), fine to coarse sand, gray, moist, no odor, no sheen. | GM |
| 1.0 to 1.5': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, gray, moist, no odor, no sheen. | ML |
| 1.5 to 2.5': Wood debris | WD |
| 2.5 to 5.0': No recovery | |
| 5.0 to 6.0': Wood debris | WD |
| 6.0 to 21.0': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, gray, moist, no odor, no sheen. | ML |

| % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed |
|---|---|---|---|---|
| | | 0.0 | | |
| 50 | | 0.0 | | |
| | | 0.0 | B16_062816_0-10 | |
| 100 | | 0.0 | | |
| | | | B16_062816_0-19 | X |
| | | 0.0 | | |
| 100 | | 0.0 | | |
| | | | B16_062816_10-19 | |
| | | 0.0 | | |
| 100 | | 0.0 | | |
| | | 0.0 | B16_062816_19-21 | X |
| 100 | | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

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# Log of Boring: B17

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

|  |  |  |  |
|---|---|---|---|
| **Date/Time Started:** | 6/21/16 0915 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/21/16 0929 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 6 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push |  |  |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 |  | 0.0 to 1.5': Silty GRAVEL with Sand (50% gravel, 25% silt, 25% sand), fine to medium sand, brown, moist, no odor, no sheen. | GM |  |  |  |  |  |  |  |
|  |  | 1.5 to 4.0': Well-graded GRAVEL with silt and sand (50% gravel, 40% sand, 10% silt), medium to coarse sand, brown, moist, no odor, no sheen. | GW-GM |  | 100 |  | 0.0 | B17_062116_0-4 | X | Bentonite |
|  |  | 4.0 to 5.0': Well-graded GRAVEL with silt and sand (50% gravel, 40% sand, 10% silt), medium to coarse sand, brown, moist, slight petroleum-like odor, no sheen, asphalt appearance from 4.5 to 5'. | GW-GM |  |  |  |  |  |  |  |
| 5 |  | 5.0 to 6.0': Silty SAND with gravel (50% sand, 20% gravel, 15% clay, 15% silt), medium sand, gray, moist, no odor, no sheen. | SM |  | 100 |  | 0.0 | B17_062116_4-6 | X |  |

## Well Construction Information

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite |  | **Y:** NA |

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# Log of Boring: B18

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/27/16 1535 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/27/16 1620 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 28.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Lithologic Description | USCS |
|---|---|
| 0.0 to 3.0': Poorly-graded SAND with silt and gravel (NM), fine to coarse sand, brown. moist, no odor, no sheen. | SW-SM |
| 3.0 to 7.5': Sandy SILT (50% silt, 35% sand, 15% clay), fine to medium sand, gray, moist, no odor, no sheen. | ML |
| 7.5 to 8.0': Silty GRAVEL with sand (70% gravel, 15% sand, 15% silt), medium sand, gray, moist, no odor, no sheen. | GM |
| 8.0 to 10.0': Sandy SILT (50% silt, 35% sand, 15% clay), fine to medium sand, gray, moist, no odor, no sheen. | ML |
| 10.0 to 17.5': Silty SAND (60% sand, 40% silt), fine sand, gray, moist, no odor, no sheen. | SM |
| 17.5 to 28.0': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, gray, moist, no odor, no sheen. | ML |

| Depth (feet bgs.) | % Recovery | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|
| 0 | | 0.0 | | | Bentonite |
| | 100 | 0.0 | | | |
| 5 | | 0.0 | B18_062716_0-10 | | |
| | 100 | 0.0 | | | |
| 10 | | 0.0 | | | |
| | 100 | 0.0 | B18_062716_0-26 | X | |
| 15 | | 0.0 | B18_062716_10-20 | | |
| | 100 | 0.0 | | | |
| 20 | | 0.0 | | | |
| | 100 | 0.0 | B18_062716_20-26 | | |
| 25 | | 0.0 | | | |
| | 100 | 0.0 | B18_062716_26-28 | X | |

Blow Counts 8/8/8

## Well Construction Information

| | | | |
|---|---|---|---|
| **Monument Type:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | | **Y:** NA |
| **Filter Pack:** | NA | | |
| **Surface Seal:** | NA | | |
| **Annular Seal:** | NA | | |
| **Boring Abandonment:** | Bentonite | | |

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# Log of Boring: B19

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/23/16 1400
**Date/Time Completed:** 6/23/16 1445
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** 12.0
**Total Boring Depth (ft bgs):** 32.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 0.5': Silty GRAVEL with sand (70% gravel, 15% silt, 15% sand), fine to medium sand, brown, moist, no odor, no sheen. | GM | | | | 0.0 | | | |
| | | 0.5 to 3.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM | | 60 | | 0.0 | | | |
| | | 3.0' to 5.0': No recovery | | | | | | | | |
| 5 | | 5.0 to 9.0': Sandy SILT with gravel (50% silt, 20% sand, 20% gravel), medium sand, gray, moist, no odor, no sheen. | ML | | 80 | | 0.0<br>0.0 | B19_062316_0-10 | | |
| | | 9.0 to 10.0': No recovery | | | | | | | | |
| 10 | | 10.0 to 14.0': Sandy SILT (50% silt, 40% sand, 10% clay), medium sand, brown, moist to wet at 12.0', no odor, no sheen. | ML | | 100 | | 0.0<br>0.0 | B19_062316_10-20 | | ▼ Water Level |
| 15<br>20 | | 14.0 to 23.0': Silty SAND (80% sand, 20% silt), coarse sand, brown, wet, no odor, no sheen. | SM | | 100<br>100 | | 0.0<br>0.0<br>0.0<br>0.0 | B19_062316_0-30 | X | Bentonite |
| 25<br>30 | | 23.0 to 32.0': Silty SAND (70% sand, 20% silt, 5% gravel), brown, wet, no odor, no sheen, wood debris present from 29.0 to 30.0'. | SM | | 100<br>100 | | 0.0<br>0.0<br>0.0 | B19_062316_20-30<br>B19_062316_30-32 | <br>X | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** X: NA
Y: NA

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# Log of Boring: B20

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/28/16 1520 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/28/16 1540 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 15.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 0.5': Well-graded GRAVEL with silt (80% gravel, 10% silt, 10% sand), coarse sand, gray, moist, no odor, no sheen. | GW-GM | | | | 0.0 | | | |
| | | 0.5 to 3.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM | | 60 | | 0.0 | | | |
| | | 3.0 to 5.0': No recovery | | | | | | | | |
| 5 | | 5.0 to 15.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM | | | | 0.0 | B20_062816_0-10 | | |
| | | | | | | | | B20_062816_0-13 | X | |
| | | | | | 100 | | 0.0 | | | Bentonite |
| 10 | | | | | | | 0.0 | | | |
| | | | | | | | | B20_062816_10-13 | | |
| | | | | | 100 | | 0.0 | | | |
| | | | | | | | | B20_062816_13-15 | X | |
| 15 | | | | | | | 0.0 | | | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

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# Log of Boring: B21

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/24/16 1300
**Date/Time Completed:** 6/24/16 1400
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** NE
**Total Boring Depth (ft bgs):** 15.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 4.0': Silty SAND (70% sand, 30% silt), medium sand, brown, moist, no odor, no sheen. | SM | | 80 | | 0.0<br>0.0 | | | |
| | | 4.0 to 5.0': No recovery | | | | | | | | |
| 5 | | 5.0 to 8.0': Silty SAND (70% sand, 30% silt), medium sand, brown, moist, no odor, no sheen. | SM | | 80 | | 0.0<br>0.0 | B21_062416_0-10 | | Bentonite |
| | | 8.0 to 9.0': Sand SILT (50% silt, 25% sand, 25% clay), medium sand, gray, moist, no odor, no sheen. | ML | | | | | | | |
| | | 9.0 to 10.0': No recovery | | | | | | | | |
| 10 | | 10.0 to 14.0': Sand SILT (50% silt, 25% sand, 25% clay), medium sand, gray, moist, no odor, no sheen. | ML | | 80 | | 0.0<br>0.0 | B21_062416_10-11<br>B21_062416_11-13 | X<br>X | |
| | | 14.0 to 15.0': No recovery | | | | | | | | |
| 15 | | | | | | | | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA **Y:** NA

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# Log of Boring: B22

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/22/16 1020
**Date/Time Completed:** 6/22/16 1105
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** 25
**Total Boring Depth (ft bgs):** 31.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Lithologic Description | USCS | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 to 1.0': Well-graded GRAVEL with silt and sand (70% gravel, 20% sand, 10% silt), medium sand, gray, moist, no odor, no sheen. | GW-GM | | | 0.0 | | | |
| | 1.0 to 2.5': Silty SAND (70% sand, 30% silt), medium sand, gray, moist, no odor, no sheen. | SM | | | | | | |
| | 2.5 to 3.5': Sandy SILT (50% silt, 25% sand, 25% clay), fine sand, brown, moist, no odor, no sheen. | ML | 70 | | 0.0 | | | |
| 5 | 3.5 to 5.0': No recovery | | | | 0.0 | B22_062216_0-10 | | |
| | 5.0 to 23.0': Sandy SILT (50% silt, 25% sand, 25% clay), brown, moist, no odor, no sheen. | ML | 100 | | 0.0 | | | |
| 10 | | | | | 0.0 | | | |
| | | | 100 | | 0.0 | | | |
| 15 | | | | | 0.0 | B22_062216_0-29<br>B22_062216_10-20 | X | Bentonite |
| | | | 100 | | 0.0 | | | |
| 20 | | | | | 0.0 | | | |
| | | | 100 | | 0.0 | | | |
| | 23.0 to 31.0': Sandy SILT (50% silt, 30% sand, 20% clay), medium sand, brown, moist to wet at 25.0', no odor, no sheen. | ML | | | | | | |
| 25 | | | | | 0.0 | B22_062216_20-29 | | ▼ Water Level |
| | | | 100 | | 0.0 | | | |
| 30 | | | | | 0.0 | B22_062216_29-31 | X | |
| | | | 100 | | 0.0 | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA **Y:** NA

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# Log of Boring: B23

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/22/16 0810 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/22/16 1008 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | 24.0 |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 36.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Lithologic Description | USCS |
|---|---|---|
| 0 | 0.0 to 2.5': Silty GRAVEL with sand (50% gravel, 25% silt, 25% sand), medium to coarse sand, gray, moist, no odor, no sheen. | GM |
| 2.5 | 2.5 to 3.0': Fill containing bricks | FILL |
| 3.0 | 3.0 to 5.0': No recovery | |
| 5 | 5.0 to 17.5': Sandy SILT (50% silt, 30% sand, 20% clay), fine to medium sand, gray, moist, no odor, no sheen. | ML |
| 17.5 | 17.5 to 20.0': No Recovery | |
| 20 | 20.0 to 36.0': Sandy SILT (50% silt, 30% sand, 20% clay), fine to medium sand, gray, moist to wet at 24.0', no odor, no sheen. | ML |

| Depth (feet bgs.) | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed |
|---|---|---|---|---|---|
| 0 | | | 0.0 | | |
| 2.5 | 60 | | 0.0 | | |
| 5 | | | 0.0 | B23_062216_0-10 | |
| 7.5 | 100 | | 0.0 | | |
| 10 | | | 0.0 | | |
| 12.5 | 100 | | 0.0 | | |
| 15 | | | 0.0 | B23_062216_10-20 | |
| 17 | | | | B23_062216_0-34 | X |
| 17.5 | 50 | | 0.0 | | |
| 20 | | | 0.0 | | |
| 22.5 | 100 | | 0.0 | | |
| 25 | | | 0.0 | B23_062216_20-30 | |
| 27.5 | 100 | | 0.0 | | |
| 30 | | | 0.0 | | |
| 32.5 | 100 | | 0.0 | B23_062216_30-34 | |
| 35 | | | 0.0 | B23_062216_34-36 | X |
| 36 | 100 | | 0.0 | | |

**Boring/Well Construction Details**

Bentonite

▼ Water Level

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

FARALLON CONSULTING

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# Log of Boring: B24

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/27/16 1405
**Date/Time Completed:** 6/27/16 1450
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** 6
**Total Boring Depth (ft bgs):** 31.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0<br>5 | | 0.0 to 6.0': Silty SAND (80% sand, 20% silt), fine to medium sand, brown, moist, no odor, no sheen. | SM | | 100 | | 0.0<br>0.0<br>0.0 | B24_062716_0-10 | | ▼ Water Level |
| 10 | | 6.0 to 12.0': Silty SAND (80% sand, 20% silt), fine to medium sand, brown, wet, no odor, no sheen. | SM | | 100 | | 0.0<br>0.0 | | | |
| | | 12.0 to 15.0': Sandy SILT (60% silt, 40% sand, 10% clay), fine sand, gray, wet, no odor, no sheen. | ML | | 100 | | 0.0 | | | |
| 15 | | 15.0 to 17.5': Silty SAND (50% sand, 45% silt, 5% clay), fine sand, gray, wet, no odor, no sheen. | SM | | | | 0.0 | B24_062716_0-29<br>B24_062716_10-20 | X | Bentonite |
| | | 17.5 to 20.0': No recovery | | | 50 | | 0.0 | | | |
| 20 | | 20.0 to 24.5': Silty SAND (50% sand, 45% silt, 5% clay), fine sand, gray, wet, no odor, no sheen. | SM | | 100 | | 0.0<br>0.0 | | | |
| 25<br>30 | | 24.5 to 31.0': Silty SAND (60% sand, 30% silt, 10% clay), coarse sand, brown, wet, no odor, no sheen, wood debris present from 24.5 to 25.0'. | SM | | 100<br>100 | | 0.0<br>0.0<br>0.0 | B24_062716_20-29<br>B24_062716_29-31 | <br>X | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA **Y:** NA

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# Log of Boring: B25

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

|  |  |  |  |
|---|---|---|---|
| **Date/Time Started:** | 6/27/16 0900 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/27/16 0915 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 20.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push |  |  |

| Depth (feet bgs.) | Lithologic Description | USCS | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 to 4.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM |  |  | 0.0 |  |  |  |
|  |  |  | 100 |  | 0.0 |  |  |  |
|  | 4.0 to 11.0': SILT with sand (50% silt, 30% clay, 10% sand, 10% gravel), fine to coarse sand, gray, moist, no odor, no sheen. | ML |  |  |  |  |  |  |
| 5 |  |  |  |  | 0.0 | B25_062716_0-10 |  |  |
|  |  |  | 100 |  | 0.0 |  |  |  |
|  |  |  |  |  |  | B25_062716_0-18 | X |  |
| 10 |  |  |  |  | 0.0 |  |  | Bentonite |
|  | 11.0 to 18.0': Silty SAND (60% sand, 30% silt, 10% gravel), fine sand, dark gray, moist, no odor, no sheen. | SM |  |  |  |  |  |  |
|  |  |  | 100 |  | 0.0 |  |  |  |
|  |  |  |  |  |  | B25_062716_10-18 |  |  |
| 15 |  |  |  |  | 0.0 |  |  |  |
|  |  |  | 100 |  | 0.0 |  |  |  |
|  | 18.0 to 20.0': Sandy SILT (50% silt, 25% sand, 25% clay), fine sand, gray, moist, no odor, no sheen. | ML |  |  |  |  |  |  |
|  |  |  |  |  |  | B25_062716_18-20 | X |  |
| 20 |  |  |  |  | 0.0 |  |  |  |

## Well Construction Information

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite |  | **Y:** NA |

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# Log of Boring: B26

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/28/16 1015
**Date/Time Completed:** 6/28/16 1105
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** 25.0
**Total Boring Depth (ft bgs):** 32.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Lithologic Description | USCS | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 to 1.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM | | | 0.0 | | | |
| | 1.0 to 2.0': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, brown, moist, no odor, no sheen. | ML | 40 | | 0.0 | | | |
| 5 | 2.0 to 5.0': No Recovery | | | | 0.0 | B26_062816_0-10 | | |
| | 5.0 to 6.0': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, brown, moist, no odor, no sheen. | ML | | | | | | |
| | 6.0 to 10.0': No Recovery | | 20 | | 0.0 | | | |
| 10 | 10.0 to 13.0': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, brown, moist, no odor, no sheen. | ML | 60 | | 0.0<br>0.0 | | | |
| | 13.0 to 15.0': No Recovery | | | | | B26_062816_0-30 | X | |
| 15 | 15.0 to 17.5': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, brown, moist, no odor, no sheen, contains wood debris. | ML | | | 0.0 | B26_062816_10-20 | | Bentonite |
| 20<br>25<br>30 | 17.5 to 32.0': Sandy SILT (50% silt, 30% sand, 10% clay), fine sand, brown, moist to wet at 25.0', no odor, no sheen. | ML | 100<br>100<br>100<br>100 | | | B26_062816_20-30<br>B26_062816_30-32 | <br>X | Water Level |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** X: NA
Y: NA

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# Log of Boring: B27

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

|  |  |  |  |
|---|---|---|---|
| **Date/Time Started:** | 6/21/16 0938 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/21/16 1020 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | 24.0 |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 33.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push |  |  |

**Depth (feet bgs.)** | **Sample Interval** | **Lithologic Description** | **USCS** | **USCS Graphic** | **% Recovery** | **Blow Counts 8/8/8** | **PID (ppm)** | **Sample ID** | **Sample Analyzed** | **Boring/Well Construction Details**

Depth (feet bgs.): 0, 5, 10, 15, 20, 25, 30, 35

| Lithologic Description | USCS |
|---|---|
| 0.0 to 0.8': Silty SAND (70% sand, 30% silt), coarse sand, brown, moist, no odor, no sheen. | SM |
| 0.8 to 2.5': Silty GRAVEL with sand (60% gravel, 20% sand, 20% silt), coarse sand, brown, moist, no odor, no sheen. | GM |
| 2.5 to 5.0': No recovery |  |
| 5.0 to 8.0': Silty GRAVEL with sand (60% gravel, 20% sand, 20% silt), coarse sand, brown, moist, no odor, no sheen. | GM |
| 8.0 to 10.5': Silty SAND (NM), medium sand, brown to black at 9.0', moist, no odor, no sheen. | SM |
| 10.5 to 20.0': Sandy SILT (50% silt, 30% clay, 20% sand), fine sand, gray, moist, no odor, no sheen. | ML |
| 20.0 to 26.5': Sandy SILT (60% silt, 20% sand, 20% clay), fine sand, gray, moist to wet at 24.0', no odor, no sheen. | ML |
| 26.5 to 33.0': Sandy SILT (50% silt, 30% sand, 20% clay), fine sand, brown, wet, no odor, no sheen. | ML |

| % Recovery | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|
|  | 0.0 |  |  |  |
| 50 | 0.0 |  |  |  |
|  | 3.9 | B27_062116_0-10 |  |  |
| 100 | 0.0 |  |  |  |
|  | 0.0 |  |  |  |
| 100 | 0.0 |  |  |  |
|  | 0.0 | B27_062116_10-20 |  | Bentonite |
| 100 | 0.0 | B27_062116_0-30 | X |  |
|  | 0.0 |  |  |  |
| 100 | 0.0 |  |  |  |
|  | 0.0 | B27_062116_20-30 |  | Water Level |
| 100 | 0.0 |  |  |  |
|  | 0.0 |  |  |  |
| 100 |  | B27_062116_31-33 | X |  |
|  | 0.0 |  |  |  |

## Well Construction Information

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite |  | **Y:** NA |

FARALLON CONSULTING

FINAL HDP - December 4, 2018

# Log of Boring: B28

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/28/16 1400 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/28/16 1430 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | 23.0 |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 25.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 1.5': Silty GRAVEL (70% gravel, 15% silt, 15% sand), coarse sand, gray, moist, no odor, no sheen. | GM | | | | 0.0 | | | |
| | | 1.5 to 2.0': Wood debris | WD | | | | | | | |
| | | 2.0 to 25.0': Sandy SILT (60% silt, 30% sand, 10% clay), fine to medium sand, brown, moist to wet at 23.0', no odor, no sheen. | ML | | 100 | | 0.0 | | | |
| 5 | | | | | | | 3.9 | B28_062816_0-10 | | |
| | | | | | 100 | | 0.0 | | | |
| 10 | | | | | | | 0.0 | | | |
| | | | | | | | | B28_062816_0-23 | X | |
| | | | | | 100 | | 0.0 | | | Bentonite |
| 15 | | | | | | | 0.0 | B28_062816_10-20 | | |
| | | | | | 100 | | 0.0 | | | |
| 20 | | | | | | | 0.0 | | | |
| | | | | | | | | B28_062816_20-23 | | |
| | | | | | 100 | | 0.0 | | | ▼ Water Level |
| | | | | | | | | B28_062816_23-25 | X | |
| 25 | | | | | | | 0.0 | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

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# Log of Boring: B29

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/21/16 1420 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/21/16 1510 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | 24.0 |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 32.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 3.5': Silty SAND (70% sand, 20% silt, 10% gravel), medium to coarse sand, brown, miost, no odor, no sheen. | SM | | 100 | | 0.0<br>0.0 | | | |
| | | 3.5 to 5.0': Wood debris | WD | | | | | | | |
| 5 | | 5.0 to 7.5': Silty SAND (70% sand, 20% silt, 10% gravel), medium to coarse sand, brown, moist, no odor, no sheen. | SM | | | | 0.0 | B29_062116_0-10 | | |
| | | 7.5 to 8.0': Wood debris | WD | | 100 | | 0.0 | | | |
| | | 8.0 to 10.0': Sandy SILT (50% silt, 20% sand, 30% clay), fine sand, gray, moist, no odor, no sheen. | ML | | | | | | | |
| 10 | | 10.0 to 11.0': Sandy SILT (50% silt, 30% clay, 20% sand), fine sand, gray, moist, no odor, no sheen. | ML | | | | 0.0 | | | |
| | | 11.0 to 15.0': No recovery | | | 20 | | 0.0 | | | |
| 15 | | 15.0 to 24.0': Sandy SILT (50% silt, 30% clay, 20% sand), fine sand, gray, moist, no odor, no sheen. | ML | | 100<br>100 | | 0.0<br>0.0<br>0.0<br>0.0 | B29_062116_10-20<br>B29_062116_0-30 | <br>X | Bentonite |
| 20 | | | | | | | | | | |
| 25 | | 24.0 to 32.0': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, brown, wet, no odor, no sheen. | ML | | 100<br>100 | | 0.0<br>0.0<br>0.0<br>0.0 | B29_062116_20-30<br>B29_062116_30-32 | <br>X | Water Level |
| 30 | | | | | | | | | | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

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# Log of Boring: B30

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/22/16 1500 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/22/16 1545 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | 24.0 |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 26.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Lithologic Description | USCS | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 to 1.0': Well-graded GRAVEL with sand (60% gravel, 20% sand, 20% debris), fine to medium sand, gray, moist, no odor, no sheen. | GW-SP | | | 0.0 | | | |
| 1 | 1.0 to 2.0': Wood debris | WD | | | | | | |
| 2 | 2.0 to 2.5': Sandy SILT (50% silt, 30% sand, 20% clay), gray, moist, no odor, no sheen. | ML | 50 | | 0.0 | | | |
| 2.5 | 2.5 to 5.0': No Recovery | | | | | | | |
| 5 | 5.0 to 21.0': Sandy SILT (50% silt, 30% sand, 20% clay), gray, moist, no odor, no sheen. | ML | | | 0.0 | B30_062216_0-10 | | |
| | | | 100 | | 0.0 | | | |
| 10 | | | | | 0.0 | | | |
| | | | | | | B30_062216_0-24 | X | |
| | | | 100 | | 0.0 | | | Bentonite |
| 15 | | | | | 0.0 | B30_062216_10-20 | | |
| | | | 100 | | 0.0 | | | |
| 20 | | | | | 0.0 | | | |
| 21 | 21.0 to 26.0': Sandy SILT (50% silt, 25% sand, 25% clay), fine sand, brown, moist, no odor, no sheen. | ML | | | | | | |
| | | | | | | B30_062216_20-24 | | |
| | | | 100 | | 0.0 | | | |
| 24 | | | | | | | | ▼ Water Level |
| 25 | | | | | 0.0 | B30_062216_24-26 | X | |
| | | | 100 | | 0.0 | | | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

FARALLON CONSULTING

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# Log of Boring: B31

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/23/16 0910 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/23/16 1020 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | 10 |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 36.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Lithologic Description | USCS | % Recovery | Blow Counts 8/8/8 |
|---|---|---|---|---|
| 0.0–5.0 | 0.0 to 5.0': Silty SAND (70% sand, 25% silt, 5% gravel), medium sand, brown, moist, no odor, no sheen. | SM | 100 | |
| 5.0–5.5 | 5.0 to 5.5': Well-graded GRAVEL (NM) gray, moist, no odor, no sheen. | GW | 10 | |
| 5.5–10.0 | 5.5 to 10.0': Not characterized | | | |
| 10.0–17.5 | 10.0 to 17.5': Sandy SILT (50% silt, 20% sand, 20% clay, 10% gravel), medium sand, gray, wet, no odor. | ML | 100<br>100 | |
| 17.5–18.0 | 17.5 to 18.0': Poorly-graded SAND with silt (90% sand, 10% silt), medium sand, gray, wet, no odor, no sheen. | SP-SM | | |
| 18.0–30.0 | 18.0 to 30.0': Sandy SILT (60% silt, 30% sand, 10% clay), fine sand, gray, wet, no odor, no sheen. | ML | 100<br>100 | |
| 30.0–34.0 | 30.0 to 34.0': Well-graded GRAVEL with silt (50% gravel, 30% sand, 10% silt, 10% clay), fine to coarse sand, gray, wet, no odor, no sheen. | GW-GM | 80 | |
| 34.0–35.0 | 34.0 to 35.0': No recovery | | | |
| 35.0–36.0 | 35.0 to 36.0': Well-graded GRAVEL with silt (50% gravel, 30% sand, 10% silt, 10% clay), fine to coarse sand, gray, wet, no odor. | GW-GM | 100 | |

| Depth (feet bgs.) | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|
| 0.5 | 0.0 | | | |
| 3 | 0.0 | B31_062316_0-5.5 | | |
| 5.5 | 0.0 | | | |
| 8 | 0.0 | | | |
| 10.5 | 0.0 | | | |
| 13 | 0.0 | | | |
| 15.5 | 0.0 | B31_062316_10-20 | | |
| 17.5 | | B31_062316_0-34 | X | |
| 18 | 0.0 | | | Bentonite |
| 20.5 | 0.0 | | | |
| 23 | 0.0 | | | |
| 24.5 | | | | Water Level |
| 25.5 | 0.0 | B31_062316_20-30 | | |
| 28 | 0.0 | | | |
| 30.5 | 0.0 | | | |
| 33 | 0.0 | B31_062316_30-34 | | |
| 36 | 0.0<br>0.0 | B31_062316_34-36 | X | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

FARALLON CONSULTING

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# Log of Boring: B32

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/28/16 1115 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/28/16 1130 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 8.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 1.5': Silty GRAVEL with sand (60% gravel, 20% silt, 20% sand), fine to coarse sand, gray, moist, no odor, no sheen. | GM | | | | | | | |
| | | 1.5 to 8.0': Sandy SILT (50% silt, 40$ sand, 10% clay), fine sand, gray, moist, no odor, no sheen. | ML | | 100 | | | B32_062816_0-6 | X | Bentonite |
| 5 | | | | | 100 | | | B32_062816_6-8 | X | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

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# Log of Boring: B33

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/27/16 1035 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/27/16 1110 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 17.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 9.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM | | | | | | | |
| | | | | | 100 | | | | | |
| 5 | | | | | | | | B33_062716_0-10 | | |
| | | | | | 100 | | | B33_062716_0-15 | X | |
| | | 9.0 to 12.0': Sandy SILT (80% silt, 20% sand), fine sand, gray, moist, no odor, no sheen, | ML | | | | | | | |
| 10 | | | | | | | | | | |
| | | 11.0 to 12.0': Wood debris | WD | | | | | | | |
| | | 12.0 to 17.0': Sandy SILT (80% silt, 20% sand), fine sand, gray, moist, no odor, no sheen, | ML | | 100 | | | B33_062716_10-15 | | |
| 15 | | | | | | | | | | |
| | | | | | 100 | | | B33_062716_15-17 | X | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

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# Log of Boring: B34

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/24/16 1250 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/24/16 1330 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NM |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 36.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 2.5': Silty SAND (70% sand, 30% silt), fine sand, brown, moist, no odor, no sheen. | SM | | | | 0.0 | | | Bentonite |
| | | 2.5 to 5.0': No Recovery | | | 50 | | 0.0 | | | |
| 5 | | 5.0 to 8.0': Silty SAND (70% sand, 30% silt), fine sand, brown, moist, no odor, no sheen. | SM | | 60 | | 0.0<br>0.0 | B34_0-10 | | |
| | | 8.0 to 10.0': No Recovery | | | | | | | | |
| 10 | | 10.0 to 12.0': Silty SAND (70% sand, 30% silt), fine sand, brown, moist, no odor, no sheen. | SM | | | | 0.0 | | | |
| 15 | | 12.0 to 18.0': Sandy SILT (50% silt, 30% sand, 20% clay), fine sand, gray, moist, no odor, no sheen. | ML | | 100<br>100 | | 0.0<br>0.0<br>0.0 | B34_10-20<br>B34_0-34 | X | |
| 20 | | 18.0 to 23.0': Silty SAND (50% sand, 40% silt, 10% clay), fine to medium sand, gray, moist, no odor, no sheen. | SM | | 100 | | 0.0<br>0.0 | | | |
| 25 | | 23.0 to 28.0': Sandy SILT (50% silt, 15% sand, 15% clay, 20% wood debris) | ML | | 100 | | 0.0<br>0.0 | B34_20-30 | | |
| 30 | | 28.0 to 32.0': Sandy SILT (50% silt, 30% sand, 20% clay), fine sand, gray, moist, no odor, no sheen. | ML | | | | 0.0 | | | |
| | | 32.0 to 35.0': Silty SAND (50% sand, 40% silt, 10% clay), fine to medium sand, gray, moist, no odor, no sheen. | SM | | 100 | | 0.0 | B34_30-34 | | |
| 35 | | 35.0 to 36.0': Wood debris | WD | | 100 | | 0.0<br>0.0 | B34_34-36 | X | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

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# Log of Boring: B35

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| | | | | | |
|---|---|---|---|---|---|
| **Client:** | Linnton Water Credits, LLC | **Date/Time Started:** | 6/24/16 1420 | **Sampler Type:** | 5' Macro core |
| **Project:** | Linnton Mill Site | **Date/Time Completed:** | 6/24/16 1500 | **Drive Hammer (lbs.):** | Auto |
| **Location:** | Portland, OR | **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | 25 |
| **Farallon PN:** | 1588-001 | **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 28.0 |
| **Logged By:** | Paul Garvin | **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| | | **Drilling Method:** | Direct Push | | |

| Lithologic Description | USCS |
|---|---|
| 0.0 to 2.0': Silty SAND (70% sand, 30% silt), medium sand, brown, moist, no odor, no sheen. | SM |
| 2.0 to 3.0': Sandy SILT (50% silt, 25% sand, 25% clay), gray, moist, no odor, no sheen. | ML |
| 3.0 to 5.0': No Recovery | |
| 5.0 to 5.5': Sandy SILT (50% silt, 25% sand, 25% clay), gray, moist, no odor, no sheen. | ML |
| 5.5 to 6.5': Silty SAND (70% sand, 30% silt), medium sand, brown, moist, no odor, no sheen. | SM |
| 6.5 to 8.0': Sandy SILT (50% silt, 25% sand, 25% clay), gray, moist, no odor, no sheen. | ML |
| 8.0 to 10.0': No Recovery | |
| 10.0 to 11.0': Silty GRAVEL with sand (50% gravel, 25% silt, 20% sand, 5% clay), | GM |
| 11.0 to 12.5': Sandy SILT (50% silt, 25% sand, 25% clay), gray, moist, no odor, no sheen. | ML |
| 12.5 to 17.0': Silty GRAVEL with sand (50% gravel, 25% silt, 20% sand, 5% clay), | GM |
| 17.0 to 21.0': Sandy SILT (50% silt, 25% sand, 25% clay), gray, moist, no odor, no sheen. | ML |
| 21.0 to 23.0': Sandy SILT (50% silt, 25% sand, 25% clay), gray, moist, no odor, no sheen. | ML |
| 23.0 to 24.0': Wood debris | WD |
| 24.0 to 25.0': No Recovery | |
| 25.0 to 28.0': Sandy SILT (50% silt, 30% sand, 20% clay), fine sand, gray, wet, no odor, no sheen. | ML |

| % Recovery | PID (ppm) | Sample ID | Sample Analyzed |
|---|---|---|---|
| | 0.0 | | |
| 60 | 0.0 | | |
| | 0.0 | B35_062416_0-10 | |
| 60 | 0.0 | | |
| | 0.0 | | |
| 100 | 0.0 | | |
| | 0.0 | B35_062416_10-20 | |
| 100 | 0.0 | | |
| | 0.0 | | |
| 80 | 0.0 | B35_062416_20-26 | |
| | 0.0 | | |
| 100 | 0.0 | B35_062416_26-28 | X |

Boring/Well Construction Details: Bentonite

▼ Water Level

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

FARALLON CONSULTING

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# Log of Boring: B36

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/24/16 1010 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/24/16 1050 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | 17.0 |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 35.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 2.5': Silty SAND (70% sand, 30% silt), fine to medium sand, brown, moist, no odor, no sheen. | SM | ▥ | | | 0.0 | | | 🟩 |
| | | 2.5 to 5.0': No Recovery | | | 50 | | 0.0 | | | 🟩 |
| 5 | | 5.0 to 6.5': Silty SAND (70% sand, 30% silt), fine to medium sand, brown, moist, no odor, no sheen. | SM | ▥ | | | 0.0 | B36_062416_0-10 | | 🟩 |
| | | 6.5 to 7.5': Sandy SILT (50% silt, 25% sand, 25% clay), fine sand, brown, moist, no odor, no sheen. | ML | ▤ | | | | | | 🟩 |
| | | 7.5 to 10.0': No Recovery | | | 50 | | 0.0 | | | 🟩 |
| 10 | | 10.0 to 13.0': Silty SAND (70% sand, 20% silt, 10% clay), fine sand, brown, moist, no odor, no sheen. | SM | ▥ | 60 | | 0.0<br>0.0 | | | 🟩 |
| | | 13.0 to 15.0': No Recovery | | | | | | | | 🟩 |
| 15 | | 15.0 to 17.5': Silty SAND (70% sand, 20% silt, 10% clay), fine sand, brown, moist, no odor, no sheen. | SM | ▥ | | | 0.0 | B36_062416_10-20<br>B36_062416_0-33 | <br>X | 🟩 Water Level<br>Bentonite |
| | | 17.5 to 20.0': No Recovery | | | 50 | | 0.0 | | | 🟩 |
| 20 | | 20.0 to 24.0': Silty SAND (70% sand, 30% silt), medium sand, gray, wet, no odor, no sheen. | SM | ▥ | 100 | | 0.0<br>0.0 | | | 🟩 |
| | | 24.0 to 25.0': Wood debris | WD | ▨ | | | | | | 🟩 |
| 25 | | 25.0 to 30.0': Not characterized | | | 100 | | 0.0<br>0.0 | B36_062416_20-30 | | 🟩 |
| 30 | | 30.0 to 35.0':Silty SAND (70% sand, 30% silt), medium sand, gray, wet, no odor, no sheen. | SM | ▥ | 100 | | 0.0<br>0.0 | B36_062416_30-33<br>B36_062416_33-35 | <br>X | 🟩 |
| 35 | | | | | | | 0.0 | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

FARALLON CONSULTING

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# Log of Boring: B37

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/28/16 1555 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/28/16 1620 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 13.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 3.0': Silty GRAVEL with sand (60% gravel, 20% silt, 20% sand), fine to coarse sand, gray, moist, no odor, no sheen. | GM | | 60 | | | | | |
| | | 3.0 to 5.0': No Recovery | | | | | | | | |
| 5 | | 5.0 to 13.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM | | | | | B37_062816_0-10 | | |
| | | | | | | | | B37_062816_0-11 | X | |
| | | | | | 100 | | | | | |
| 10 | | | | | | | | B37_062816_10-11 | | |
| | | | | | 100 | | | | | |
| | | | | | | | | B37_062816_11-13 | X | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

# Log of Boring: B38

**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/22/16 1414 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/22/16 1448 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 28.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Lithologic Description | USCS |
|---|---|
| 0.0 to 0.5': Silty GRAVEL with sand (60% gravel, 20% silt, 20% sand), fine to coarse sand, brown, moist, no odor, no sheen. | GM |
| 0.5 to 1.5': Sandy SILT (60% silt, 20% sand, 20% clay), fine to medium sand, brown, moist, no odor, no sheen. | ML |
| 1.5 to 2.5': Wood debris | WD |
| 2.5 to 5.0': No Recovery | |
| 5.0 to 6.5': Sandy SILT (60% silt, 20% sand, 20% clay), fine to medium sand, brown, moist, no odor, no sheen. | ML |
| 6.5 to 22.0': Sandy SILT (50% silt, 35% sand, 15% clay), gray, moist, no odor, no sheen. | ML |
| 22.0 to 28.0': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, gray, moist to wet at 24', no odor, no sheen. | ML |

| Depth (feet bgs.) | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed |
|---|---|---|---|---|---|
| 0 | | | 0.0 | | |
| | 50 | | 0.0 | | |
| 5 | | | 0.0 | B38_062216_0-10 | |
| | 100 | | 0.0 | | |
| 10 | | | 0.0 | | |
| | 100 | | 0.0 | B38_062216_0-26 | X |
| 15 | | | 0.0 | B38_062216_10-20 | |
| | 100 | | 0.0 | | |
| 20 | | | 0.0 | | |
| | 100 | | 0.0 | B38_062216_20-26 | |
| 25 | 100 | | 0.0 | | |
| | | | 0.0 | B38_062216_26-28 | X |

**Boring/Well Construction Details**

Bentonite

Water Level

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

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# Log of Boring: B40

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/28/16 1505 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/28/16 1510 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 3' |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 1.5': Well-graded GRAVEL (90% gravel, 10% sand), fine to coarse sand, gray, moist, no odor, no sheen. | GW | | | | 0.0 | B40_062816_0-1 | X | |
| | | | | | | | 0.0 | | | |
| | | 1.5 to 3.0': Poorly-graded SAND with silt (90% sand, 10% silt), medium sand, brown, moist, no odor, no sheen. | SP | | 100 | | | | | Bentonite |
| | | | | | | | 0.0 | B40_062816_1-3 | X | |
| | | | | | | | 0.0 | | | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** | NA | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

FARALLON CONSULTING

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# Log of Boring: B41

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/24/16 0835
**Date/Time Completed:** 6/24/16 1000
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** NE
**Total Boring Depth (ft bgs):** 35.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 4.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM | | | | 0.0 | | | |
| | | | | | 80 | | 0.0 | | | |
| | | 4.0 to 6.0': Possible fill Material consisting of CDF | CO | | | | | | | |
| 5 | | | | | | | 0.0 | B41_062416_0-10 | | |
| | | 6.0 to 7.0': Sandy SILT (50% silt, 30% sand, 20% clay), medium sand, gray, moist, no odor, no sheen. | ML | | | | | | | |
| | | 7.0 to 10.0': No Recovery | | | | | | | | |
| | | | | | 40 | | 0.0 | | | |
| 10 | | 10.0 to 13.0': Sandy SILT (50% silt, 30% sand, 20% clay), medium sand, gray, moist, no odor, no sheen. | ML | | | | 0.0 | | | |
| | | | | | 100 | | 0.0 | | | |
| | | 13.0 to 27.0': Silty SAND (70% sand, 15% silt, 15% debris), fine sand, gray, moist, no odor, no sheen, contains brick debris and wood fragments. | SM | | | | | | | |
| 15 | | | | | | | 0.0 | B41_062416_10-20 | | |
| | | | | | | | | B41_062416_0-33 | X | Bentonite |
| | | | | | 100 | | 0.0 | | | |
| 20 | | | | | | | 0.0 | | | |
| | | | | | 100 | | 0.0 | | | |
| 25 | | | | | | | 0.0 | B41_062416_20-30 | | |
| | | 27.0 to 30.0': Wood debris | WD | | | | | | | |
| | | | | | 100 | | 0.0 | | | |
| 30 | | 30.0 to 35.0': Sandy SILT (50% silt, 35% sand, 15% clay), fine sand, gray, moist, no odor, no sheen. | ML | | | | 0.0 | | | |
| | | | | | | | | B41_062416_30-33 | | |
| | | | | | 100 | | 0.0 | | | |
| | | | | | | | | B41_062416_33-35 | X | |
| 35 | | | | | | | 0.0 | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

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# Log of Boring: B42

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/22/16 1116
**Date/Time Completed:** 6/22/16 1140
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** NE
**Total Boring Depth (ft bgs):** 20.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Lithologic Description | USCS | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 to 1.5': Silty GRAVEL with sand (60% gravel, 20% silt, 20% sand), medium sand, gray, moist, no odor, no sheen. | GM | | | 0.0 | | | |
| | 1.5 to 2.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM | | | | | | |
| | 2.0 to 3.0': Sandy SILT (50% silt, 25% sand, 25% clay), fine sand, brown, moist, no odor, no sheen. | ML | 60 | | 0.0 | | | |
| | 3.0 to 5.0': No Recovery | | | | | | | |
| 5 | 5.0 to 20.0': Sandy SILT (50% silt, 35% sand, 15% clay), fine sands, brown, moist, no odor, no sheen. | ML | | | 0.0 | B42_062216_0-10 | | |
| | | | 100 | | 0.0 | | | |
| | | | | | | B42_062216_0-18 | X | |
| 10 | | | | | 0.0 | | | Bentonite |
| | | | 100 | | 0.0 | | | |
| | | | | | | B42_062216_10-18 | | |
| 15 | | | | | 0.0 | | | |
| | | | 100 | | | | | |
| | | | | | | B42_062216_18-20 | X | |
| 20 | | | | | | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

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# Log of Boring: B43

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/27/16 0815 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/27/16 0830 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | NE |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 6.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 1.5': Silty GRAVEL with sand (50% gravel, 25% sand, 25% silt), fine to coarse sand, brown, moist, no odor, no sheen. | GM | | | | 0.0 | | | |
| | | 1.5 to 4.0': Silty SAND (60% sand, 30% silt, 10% gravel), fine to coarse sand, gray, moist, no odor, no sheen. | SM | | 100 | | 0.0 | B43_062716_0-4 | X | Bentonite |
| 5 | | 4.0 to 6.0': Sandy SILT (50% silt, 35% sand, 15% clay), fine sand, gray, moist, no odor, no sheen. | ML | | 100 | | 0.0<br>0.0 | B43_062716_4-6 | X | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** NA | | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

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# Log of Boring: B44

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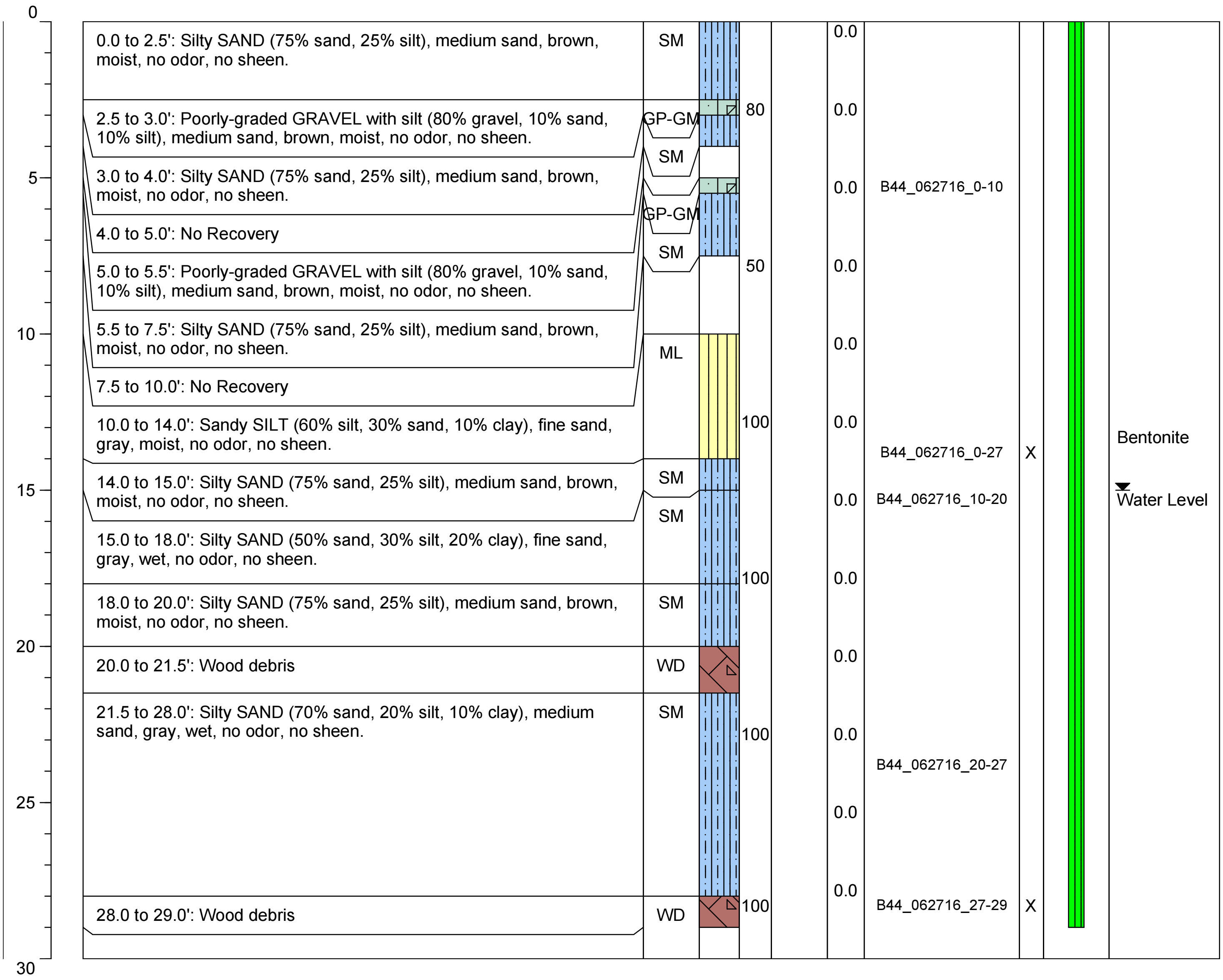
**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/27/16 0948
**Date/Time Completed:** 6/27/16 1030
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** 15
**Total Boring Depth (ft bgs):** 29.0
**Total Well Depth (ft bgs):** NA



| Lithologic Description | USCS |
|---|---|
| 0.0 to 2.5': Silty SAND (75% sand, 25% silt), medium sand, brown, moist, no odor, no sheen. | SM |
| 2.5 to 3.0': Poorly-graded GRAVEL with silt (80% gravel, 10% sand, 10% silt), medium sand, brown, moist, no odor, no sheen. | GP-GM |
| 3.0 to 4.0': Silty SAND (75% sand, 25% silt), medium sand, brown, moist, no odor, no sheen. | SM |
| 4.0 to 5.0': No Recovery | |
| 5.0 to 5.5': Poorly-graded GRAVEL with silt (80% gravel, 10% sand, 10% silt), medium sand, brown, moist, no odor, no sheen. | GP-GM |
| 5.5 to 7.5': Silty SAND (75% sand, 25% silt), medium sand, brown, moist, no odor, no sheen. | SM |
| 7.5 to 10.0': No Recovery | |
| 10.0 to 14.0': Sandy SILT (60% silt, 30% sand, 10% clay), fine sand, gray, moist, no odor, no sheen. | ML |
| 14.0 to 15.0': Silty SAND (75% sand, 25% silt), medium sand, brown, moist, no odor, no sheen. | SM |
| 15.0 to 18.0': Silty SAND (50% sand, 30% silt, 20% clay), fine sand, gray, wet, no odor, no sheen. | SM |
| 18.0 to 20.0': Silty SAND (75% sand, 25% silt), medium sand, brown, moist, no odor, no sheen. | SM |
| 20.0 to 21.5': Wood debris | WD |
| 21.5 to 28.0': Silty SAND (70% sand, 20% silt, 10% clay), medium sand, gray, wet, no odor, no sheen. | SM |
| 28.0 to 29.0': Wood debris | WD |

| % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed |
|---|---|---|---|---|
| | | 0.0 | | |
| 80 | | 0.0 | | |
| | | 0.0 | B44_062716_0-10 | |
| 50 | | 0.0 | | |
| | | 0.0 | | |
| 100 | | 0.0 | | |
| | | | B44_062716_0-27 | X |
| | | 0.0 | B44_062716_10-20 | |
| 100 | | 0.0 | | |
| | | 0.0 | | |
| 100 | | 0.0 | | |
| | | | B44_062716_20-27 | |
| | | 0.0 | | |
| | | 0.0 | | |
| 100 | | | B44_062716_27-29 | X |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

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# Log of Boring: B45

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/27/16 0918
**Date/Time Completed:** 6/27/16 0935
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** 20.0
**Total Boring Depth (ft bgs):** 22.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 6.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM | | | | 0.0 | | | |
| | | | | | 100 | | 0.0 | | | |
| 5 | | | | | | | 0.0 | B45_062716_0-10 | | |
| | | 6.0 to 11.0': Sandy SILT (50% silt, 40% sand, 10% clay), medium sand, brown, moist, no odor, no sheen. | ML | | | | | | | |
| | | | | | 100 | | 0.0 | | | |
| 10 | | | | | | | 0.0 | B45_062716_0-20 | X | Bentonite |
| | | 11.0 to 22.0': Silty SAND (60% sand, 30% silt, 10% clay), medium sand, brown, moist to wet at 15.0', no odor, no sheen. | SM | | | | | | | |
| | | | | | 100 | | 0.0 | | | |
| 15 | | | | | | | 0.0 | B45_062716_10-20 | | |
| | | | | | 100 | | 0.0 | | | |
| 20 | | | | | | | 0.0 | | | ▼ Water Level |
| | | | | | 100 | | | B45_062716_20-22 | X | |
| | | | | | | | 0.0 | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA **Y:** NA

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# Log of Boring: B46

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/29/16 1015
**Date/Time Completed:** 6/29/16 1040
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** 26.0
**Total Boring Depth (ft bgs):** 34.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Lithologic Description | USCS | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 to 4.0': Silty SAND (70% sand, 30% silt), medium sand, brown, moist, no odor, no sheen. | SM | | | 0.0 | | | |
| | | | 100 | | 0.0 | | | |
| 5 | 4.0 to 5.0': Poorly-graded SAND with silt (90% sand, 10% silt), coarse sand, gray, moist, no odor, no sheen. | SP-SM | | | 0.0 | B46_062916_0-10 | | |
| | 5.0 to 7.0': Silty SAND (70% sand, 30% silt), medium sand, brown, moist, no odor, no sheen. | SM | | | | | | |
| | 7.0 to 30.0': Sandy SILT (50% silt, 40% sand, 10% clay), brown, moist to wet at 26.0', no odor, no sheen. | ML | 80 | | 0.0 | | | |
| 10 | | | | | 0.0 | | | |
| | | | 100 | | 0.0 | | | |
| 15 | | | | | 0.0 | B46_062916_10-20 | | |
| | | | | | | B46_062916_0-32 | X | Bentonite |
| | | | 100 | | 0.0 | | | |
| 20 | | | | | 0.0 | | | |
| | | | 100 | | 0.0 | | | |
| 25 | | | | | 0.0 | B46_062916_20-30 | | |
| | | | | | | | | Water Level |
| | | | 100 | | 0.0 | | | |
| 30 | 30.0 to 34.0': Sandy SILT (50% silt, 25% sand, 25% silt), fine sand, gray, wet, no odor, no sheen. | ML | | | 0.0 | | | |
| | | | | | | B46_062916_30-32 | | |
| | | | 100 | | 0.0 | B46_062916_32-34 | X | |
| 35 | | | | | | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** X: NA
Y: NA

FARALLON CONSULTING

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# Log of Boring: B47

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

| | | | |
|---|---|---|---|
| **Date/Time Started:** | 6/28/16 0916 | **Sampler Type:** | 5' Macro core |
| **Date/Time Completed:** | 6/28/16 1000 | **Drive Hammer (lbs.):** | Auto |
| **Equipment:** | Geoprobe 7730DT | **Depth of Water ATD (ft bgs):** | 27.0 |
| **Drilling Company:** | Cascade Drilling | **Total Boring Depth (ft bgs):** | 34.0 |
| **Drilling Foreman:** | Tyler Day | **Total Well Depth (ft bgs):** | NA |
| **Drilling Method:** | Direct Push | | |

| Depth (feet bgs.) | Lithologic Description | USCS | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 to 1.5': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM | | | 0.0 | | | |
| | 1.5 to 2.0': Sandy SILT (60% silt, 30% sand, 10% clay), fine sand, gray, moist, no odor, no sheen. | ML | 60 | | 0.0 | | | |
| | 2.0 to 3.0': Wood debris | WD | | | | | | |
| 5 | 3.0 to 5.0': No Recovery | | | | 0.0 | B47_062816_0-10 | | |
| | 5.0 to 7.5': Wood debris | WD | 100 | | 0.0 | | | |
| | 7.5 to 10.0': Sandy SILT (60% silt, 30% sand, 10% clay), fine sand, gray, moist, no odor, no sheen, contains wood debris. | ML | | | | | | |
| 10 | 10.0 to 23.0': Sandy SILT (60% silt, 30% sand, 10% clay), fine sand, gray, moist, no odor, no sheen, contains wood debris. | ML | | | 0.0 | | | |
| | | | 100 | | 0.0 | | | |
| 15 | | | | | 0.0 | B47_062816_10-20 | | |
| | | | | | | B47_062816_0-32 | X | Bentonite |
| | | | 100 | | 0.0 | | | |
| 20 | | | | | 0.0 | | | |
| | | | 100 | | 0.0 | | | |
| | 23.0 to 34.0': Sandy SILT (50% sand, 40% silt, 10% clay), fine sand, gray, moist to wet at 27.0', no odor, no sheen | ML | | | | | | |
| 25 | | | | | 0.0 | B47_062816_20-30 | | |
| | | | 100 | | 0.0 | | | ▼ Water Level |
| 30 | | | | | 0.0 | | | |
| | | | | | | B47_062816_30-32 | X | |
| | | | 100 | | 0.0 | | | |
| | | | | | | B47_062816_32-34 | X | |
| 35 | | | | | 0.0 | | | |

## Well Construction Information

| | | | | | |
|---|---|---|---|---|---|
| **Monument Type:** NA | | **Filter Pack:** | NA | **Ground Surface Elevation (ft):** | NA |
| **Casing Diameter (inches):** | NA | **Surface Seal:** | NA | **Top of Casing Elevation (ft):** | NA |
| **Screen Slot Size (inches):** | NA | **Annular Seal:** | NA | **Surveyed Location:** | **X:** NA |
| **Screened Interval (ft bgs):** | NA | **Boring Abandonment:** | Bentonite | | **Y:** NA |

FARALLON CONSULTING

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# Log of Boring: B48

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**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/22/16 1322
**Date/Time Completed:** 6/22/16 1350
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** NE
**Total Boring Depth (ft bgs):** 29.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Lithologic Description | USCS | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 to 0.5': Well-graded GRAVEL with silt and sand (70% gravel, 20% sand, 10% silt), fine sand, gray, moist, no odor, no sheen. | GW-GM | | | 0.0 | | | |
| | 0.5 to 1.5': Sandy SILT (50% silt, 30% clay, 20% sand), fine sand, gray, moist, no odor, no sheen. | ML | 80 | | 0.0 | | | |
| | 1.5 to 2.0': Wood debris | WD | | | | | | |
| 5 | 2.0 to 4.0': Sandy SILT (50% silt, 30% clay, 20% sand), fine sand, gray, moist, no odor, no sheen. | ML | | | 0.0 | B48_062216_0-10 | | |
| | 4.0 to 5.0': No Recovery | | 100 | | 0.0 | | | |
| | 5.0 to 16.0': Sandy SILT (60% silt, 30% sand, 10% clay), fine sand, gray, moist, no odor, no sheen. | ML | | | | | | |
| 10 | | | | | 0.0 | | | |
| | | | 100 | | 0.0 | | | |
| | | | | | | B48_062216_0-27 | X | |
| 15 | | | | | 0.0 | B48_062216_10-20 | | Bentonite |
| | 16.0 to 29.0': Silty SAND (70% sand, 30% silt), fine to medium sand, brown, moist, no odor, no sheen. | SM | | | | | | |
| | | | 100 | | 0.0 | | | |
| 20 | | | | | 0.0 | | | |
| | | | 100 | | 0.0 | | | |
| | | | | | | B48_062216_20-27 | | |
| 25 | | | | | 0.0 | | | |
| | | | 100 | | 0.0 | | | |
| | | | | | | B48_062216_27-29 | X | |
| 30 | | | | | | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

FINAL HDP - December 4, 2018

# Log of Boring: B49

**Page 1 of 1**

**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/28/16 0805
**Date/Time Completed:** 6/28/16 0830
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** NE
**Total Boring Depth (ft bgs):** 15.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Sample Interval | Lithologic Description | USCS | USCS Graphic | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 0.0 to 2.0': Silty SAND (80% sand, 20% silt), medium sand, brown, moist, no odor, no sheen. | SM | | | | 0.0 | | | |
| | | 2.0 to 4.0': Sandy SILT (50% silt, 30% sand, 20% clay), fine sand, gray, moist, no odor, no sheen. | ML | | 80 | | 0.0 | | | |
| | | 4.0 to 5.0': No Recovery | | | | | | | | |
| 5 | | 5.0 to 6.5': Sandy SILT (50% silt, 30% sand, 20% clay), fine sand, gray, moist, no odor, no sheen. | ML | | | | 0.0 | B49_062816_0-10 | | |
| | | 6.5 to 8.0': Well-graded GRAVEL with sand and silt (NM), medium sand, gray, moist, no odor, no sheen. | GW-GM | | 100 | | 0.0 | B49_062816_0-13 | X | Bentonite |
| | | 8.0 to 15.0': Sandy SILT (70% silt, 30% sand), fine sand, moist, no odor, no sheen. | ML | | | | | | | |
| 10 | | | | | | | 0.0 | | | |
| | | | | | | | | B49_062816_10-13 | | |
| | | | | | 100 | | 0.0 | | | |
| | | | | | | | | B49_062816_13-15 | X | |
| 15 | | | | | | | 0.0 | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

FINAL HDP - December 4, 2018

# Log of Boring: B50

Page 1 of 1

**Client:** Linnton Water Credits, LLC
**Project:** Linnton Mill Site
**Location:** Portland, OR

**Farallon PN:** 1588-001

**Logged By:** Paul Garvin

**Date/Time Started:** 6/29/16 0815
**Date/Time Completed:** 6/29/16 0840
**Equipment:** Geoprobe 7730DT
**Drilling Company:** Cascade Drilling
**Drilling Foreman:** Tyler Day
**Drilling Method:** Direct Push

**Sampler Type:** 5' Macro core
**Drive Hammer (lbs.):** Auto
**Depth of Water ATD (ft bgs):** NE
**Total Boring Depth (ft bgs):** 20.0
**Total Well Depth (ft bgs):** NA

| Depth (feet bgs.) | Lithologic Description | USCS | % Recovery | Blow Counts 8/8/8 | PID (ppm) | Sample ID | Sample Analyzed | Boring/Well Construction Details |
|---|---|---|---|---|---|---|---|---|
| 0 | 0.0 to 1.5': Silty SAND (70% sand, 30% silt), fine to medium sand, brown, moist, no odor, no sheen. | SM | | | 0.0 | | | |
| | 1.5 to 7.5': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, gray, moist, no odor, no sheen. | ML | 100 | | 0.0 | | | |
| 5 | | | | | 0.0 | B50_062916_0-10 | | |
| | 7.5 to 8.5': Silty SAND (70% sand, 30% silt), medium sand, gray, moist, no odor, no sheen. | SM | 100 | | 0.0 | | | |
| | 8.5 to 10.0': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, gray, moist, no odor, no sheen. | ML | | | | B50_062916_0-18 | X | |
| 10 | 10.0 to 12.5': Silty SAND (70% sand, 30% silt), medium sand, gray, moist, no odor, no sheen. | SM | | | 0.0 | | | Bentonite |
| | 12.5 to 20.0': Sandy SILT (50% silt, 40% sand, 10% clay), fine sand, gray, moist, slight petroleum-like odor, no sheen. | ML | 100 | | 0.0 | B50_062916_10-18 | | |
| 15 | | | | | 0.0 | | | |
| | | | 100 | | 0.0 | B50_062916_18-20 | X | |
| 20 | | | | | | | | |

## Well Construction Information

**Monument Type:** NA
**Casing Diameter (inches):** NA
**Screen Slot Size (inches):** NA
**Screened Interval (ft bgs):** NA

**Filter Pack:** NA
**Surface Seal:** NA
**Annular Seal:** NA
**Boring Abandonment:** Bentonite

**Ground Surface Elevation (ft):** NA
**Top of Casing Elevation (ft):** NA
**Surveyed Location:** **X:** NA
**Y:** NA

# APPENDIX B
# LABORATORY ANALYTICAL REPORTS

NEW EXPOSED SURFACE INVESTIGATION REPORT
Linnton Mill Site Restoration
10504 Northwest Saint Helens Road
Portland, Oregon

Farallon PN: 1588-001

Fremont Analytical

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

**Apex Laboratories**
Philip Nerenberg
12232 S.W. Garden Place
Tigard, OR 97223

**RE: A6G0036**
**Lab ID: 1607062**

July 15, 2016

**Attention Philip Nerenberg:**

Fremont Analytical, Inc. received 1 sample(s) on 7/8/2016 for the analyses presented in the following report.

***Volatile Petroleum Hydrocarbons by NWVPH***

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

**Date:** *07/15/2016*

**CLIENT:** Apex Laboratories
**Project:** A6G0036
**Lab Order:** 1607062

## Work Order Sample Summary

| Lab Sample ID | Client Sample ID | Date/Time Collected | Date/Time Received |
|---|---|---|---|
| 1607062-001 | B44_062716_27-29 | 06/27/2016 10:20 AM | 07/08/2016 9:30 AM |

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

# Case Narrative

WO#: **1607062**
Date: **7/15/2016**

**CLIENT:** Apex Laboratories
**Project:** A6G0036

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

# Qualifiers & Acronyms

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

# Analytical Report

WO#: **1607062**
Date Reported: **7/15/2016**

**Client:** Apex Laboratories
**Project:** A6G0036
**Lab ID:** 1607062-001
**Client Sample ID:** **B44_062716_27-29**

**Collection Date:** 6/27/2016 10:20:00 AM
**Matrix:** Soil

| Analyses | Result | RL | Qual | Units | DF | Date Analyzed |
|---|---|---|---|---|---|---|
| **Volatile Petroleum Hydrocarbons by NWVPH** | | | | Batch ID: 14208 | | Analyst: EM |
| Aliphatic Hydrocarbon (C5-C6) | ND | 1.35 | | mg/Kg | 1 | 7/8/2016 4:14:41 PM |
| Aliphatic Hydrocarbon (C6-C8) | ND | 1.35 | | mg/Kg | 1 | 7/8/2016 4:14:41 PM |
| Aliphatic Hydrocarbon (C8-C10) | 2.72 | 1.35 | | mg/Kg | 1 | 7/8/2016 4:14:41 PM |
| Aliphatic Hydrocarbon (C10-C12) | 7.75 | 1.35 | | mg/Kg | 1 | 7/8/2016 4:14:41 PM |
| Aromatic Hydrocarbon (C8-C10) | 14.1 | 1.35 | | mg/Kg | 1 | 7/8/2016 4:14:41 PM |
| Aromatic Hydrocarbon (C10-C12) | 5.00 | 1.35 | | mg/Kg | 1 | 7/8/2016 4:14:41 PM |
| Aromatic Hydrocarbon (C12-C13) | ND | 1.35 | | mg/Kg | 1 | 7/8/2016 4:14:41 PM |
| Surr: 1,4-Difluorobenzene | 135 | 65-140 | | %Rec | 1 | 7/8/2016 4:14:41 PM |
| Surr: Bromofluorobenzene | 128 | 65-140 | | %Rec | 1 | 7/8/2016 4:14:41 PM |

**Work Order:** 1607062
**CLIENT:** Apex Laboratories
**Project:** A6G0036

## QC SUMMARY REPORT

### Volatile Petroleum Hydrocarbons by NWVPH

Sample ID **MB-14208** SampType: **MBLK** Units: **mg/Kg** Prep Date: **7/8/2016** RunNo: **30594**
Client ID: **MBLKS** Batch ID: **14208** Analysis Date: **7/8/2016** SeqNo: **577272**

| Analyte | Result | RL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C5-C6) | ND | 2.00 | | 0 | 0 | | | | | | |
| Aliphatic Hydrocarbon (C6-C8) | ND | 2.00 | | 0 | 0 | | | | | | |
| Aliphatic Hydrocarbon (C8-C10) | ND | 2.00 | | 0 | 0 | | | | | | |
| Aliphatic Hydrocarbon (C10-C12) | ND | 2.00 | | 0 | 0 | | | | | | |
| Aromatic Hydrocarbon (C8-C10) | ND | 2.00 | | 0 | 0 | | | | | | |
| Aromatic Hydrocarbon (C10-C12) | ND | 2.00 | | 0 | 0 | | | | | | |
| Aromatic Hydrocarbon (C12-C13) | ND | 2.00 | | 0 | 0 | | | | | | |
| Surr: 1,4-Difluorobenzene | 2.50 | | 2.500 | | 99.9 | 65 | 140 | | | | |
| Surr: Bromofluorobenzene | 2.95 | | 2.500 | | 118 | 65 | 140 | | | | |

Sample ID **LCS-14208** SampType: **LCS** Units: **mg/Kg** Prep Date: **7/8/2016** RunNo: **30594**
Client ID: **LCSS** Batch ID: **14208** Analysis Date: **7/8/2016** SeqNo: **577273**

| Analyte | Result | RL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C5-C6) | 30.1 | 2.00 | 30.00 | 0 | 100 | 70 | 130 | | | | |
| Aliphatic Hydrocarbon (C6-C8) | 8.64 | 2.00 | 10.00 | 0 | 86.4 | 70 | 130 | | | | |
| Aliphatic Hydrocarbon (C8-C10) | 12.1 | 2.00 | 10.00 | 0 | 121 | 70 | 130 | | | | |
| Aliphatic Hydrocarbon (C10-C12) | 11.5 | 2.00 | 10.00 | 0 | 115 | 70 | 130 | | | | |
| Aromatic Hydrocarbon (C8-C10) | 42.0 | 2.00 | 40.00 | 0 | 105 | 70 | 130 | | | | |
| Aromatic Hydrocarbon (C10-C12) | 8.71 | 2.00 | 10.00 | 0 | 87.1 | 70 | 130 | | | | |
| Aromatic Hydrocarbon (C12-C13) | 10.6 | 2.00 | 10.00 | 0 | 106 | 70 | 130 | | | | |
| Surr: 1,4-Difluorobenzene | 2.55 | | 2.500 | | 102 | 65 | 140 | | | | |
| Surr: Bromofluorobenzene | 3.01 | | 2.500 | | 121 | 65 | 140 | | | | |

Sample ID **1607059-003BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **7/8/2016** RunNo: **30594**
Client ID: **BATCH** Batch ID: **14208** Analysis Date: **7/8/2016** SeqNo: **577265**

| Analyte | Result | RL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C5-C6) | ND | 2.26 | | 0 | 0 | | | 0 | | 25 | |
| Aliphatic Hydrocarbon (C6-C8) | ND | 2.26 | | 0 | 0 | | | 0 | | 25 | |

**Work Order:** 1607062
**CLIENT:** Apex Laboratories
**Project:** A6G0036

# QC SUMMARY REPORT

## Volatile Petroleum Hydrocarbons by NWVPH

Sample ID **1607059-003BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **7/8/2016** RunNo: **30594**
Client ID: **BATCH** Batch ID: **14208** Analysis Date: **7/8/2016** SeqNo: **577265**

| Analyte | Result | RL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C8-C10) | ND | 2.26 | | 0 | 0 | | | 0 | | 25 | |
| Aliphatic Hydrocarbon (C10-C12) | ND | 2.26 | | 0 | 0 | | | 0 | | 25 | |
| Aromatic Hydrocarbon (C8-C10) | ND | 2.26 | | 0 | 0 | | | 0 | | 25 | |
| Aromatic Hydrocarbon (C10-C12) | ND | 2.26 | | 0 | 0 | | | 0 | | 25 | |
| Aromatic Hydrocarbon (C12-C13) | ND | 2.26 | | 0 | 0 | | | 0 | | 25 | |
| Surr: 1,4-Difluorobenzene | 3.85 | | 2.823 | | 136 | 65 | 140 | | 0 | | |
| Surr: Bromofluorobenzene | 3.94 | | 2.823 | | 140 | 65 | 140 | | 0 | | |

Sample ID **1607062-001AMS** SampType: **MS** Units: **mg/Kg** Prep Date: **7/8/2016** RunNo: **30594**
Client ID: **B44_062716_27-29** Batch ID: **14208** Analysis Date: **7/8/2016** SeqNo: **577267**

| Analyte | Result | RL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C5-C6) | 19.8 | 1.35 | 20.27 | 0 | 97.4 | 70 | 130 | | | | |
| Aliphatic Hydrocarbon (C6-C8) | 6.46 | 1.35 | 6.757 | 0.9828 | 81.0 | 70 | 130 | | | | |
| Aliphatic Hydrocarbon (C8-C10) | 10.9 | 1.35 | 6.757 | 2.722 | 122 | 70 | 130 | | | | |
| Aliphatic Hydrocarbon (C10-C12) | 19.2 | 1.35 | 6.757 | 7.750 | 169 | 70 | 130 | | | | S |
| Aromatic Hydrocarbon (C8-C10) | 44.5 | 1.35 | 27.03 | 14.14 | 112 | 70 | 130 | | | | |
| Aromatic Hydrocarbon (C10-C12) | 8.57 | 1.35 | 6.757 | 5.005 | 52.8 | 70 | 130 | | | | S |
| Aromatic Hydrocarbon (C12-C13) | 7.45 | 1.35 | 6.757 | 0.4319 | 104 | 70 | 130 | | | | |
| Surr: 1,4-Difluorobenzene | 2.19 | | 1.689 | | 130 | 65 | 140 | | | | |
| Surr: Bromofluorobenzene | 2.28 | | 1.689 | | 135 | 65 | 140 | | | | |

**NOTES:**
S - Spike recovery indicates a possible matrix effect. The method is in control as indicated by the Laboratory Control Sample (LCS).

Sample ID **1607062-001AMSD** SampType: **MSD** Units: **mg/Kg** Prep Date: **7/8/2016** RunNo: **30594**
Client ID: **B44_062716_27-29** Batch ID: **14208** Analysis Date: **7/8/2016** SeqNo: **577268**

| Analyte | Result | RL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C5-C6) | 20.1 | 1.35 | 20.27 | 0 | 99.3 | 70 | 130 | 19.75 | 1.92 | 30 | |
| Aliphatic Hydrocarbon (C6-C8) | 5.14 | 1.35 | 6.757 | 0.9828 | 61.5 | 70 | 130 | 6.456 | 22.7 | 30 | S |
| Aliphatic Hydrocarbon (C8-C10) | 9.39 | 1.35 | 6.757 | 2.722 | 98.7 | 70 | 130 | 10.94 | 15.2 | 30 | |

**Work Order:** 1607062
**CLIENT:** Apex Laboratories
**Project:** A6G0036

# QC SUMMARY REPORT

## Volatile Petroleum Hydrocarbons by NWVPH

Sample ID **1607062-001AMSD** SampType: **MSD** Units: **mg/Kg** Prep Date: **7/8/2016** RunNo: **30594**
Client ID: **B44_062716_27-29** Batch ID: **14208** Analysis Date: **7/8/2016** SeqNo: **577268**

| Analyte | Result | RL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C10-C12) | 15.2 | 1.35 | 6.757 | 7.750 | 110 | 70 | 130 | 19.18 | 23.1 | 30 | |
| Aromatic Hydrocarbon (C8-C10) | 41.3 | 1.35 | 27.03 | 14.14 | 101 | 70 | 130 | 44.54 | 7.51 | 30 | |
| Aromatic Hydrocarbon (C10-C12) | 9.48 | 1.35 | 6.757 | 5.005 | 66.3 | 70 | 130 | 8.571 | 10.1 | 30 | S |
| Aromatic Hydrocarbon (C12-C13) | 11.0 | 1.35 | 6.757 | 0.4319 | 156 | 70 | 130 | 7.447 | 38.5 | 30 | RS |
| Surr: 1,4-Difluorobenzene | 2.25 | | 1.689 | | 133 | 65 | 140 | | 0 | | |
| Surr: Bromofluorobenzene | 2.33 | | 1.689 | | 138 | 65 | 140 | | 0 | | |

**NOTES:**

S - Spike recovery indicates a possible matrix effect. The method is in control as indicated by the Laboratory Control Sample (LCS).

R - High RPD observed. The method is in control as indicated by the LCS.

# Sample Log-In Check List

| | | | |
|---|---|---|---|
| Client Name: | **APEX** | Work Order Number: | **1607062** |
| Logged by: | **Clare Griggs** | Date Received: | **7/8/2016 9:30:00 AM** |

## ***Chain of Custody***

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? UPS

## ***Log In***

3. Coolers are present? Yes ☑ No ☐ NA ☐
4. Shipping container/cooler in good condition? Yes ☑ No ☐
5. Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact) Yes ☐ No ☐ Not Required ☑
6. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
7. Were all items received at a temperature of >0°C to 10.0°C* Yes ☑ No ☐ NA ☐
8. Sample(s) in proper container(s)? Yes ☑ No ☐
9. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
10. Are samples properly preserved? Yes ☑ No ☐
11. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☑
13. Did all samples containers arrive in good condition(unbroken)? Yes ☑ No ☐
14. Does paperwork match bottle labels? Yes ☑ No ☐
15. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
16. Is it clear what analyses were requested? Yes ☑ No ☐
17. Were all holding times able to be met? Yes ☑ No ☐

## ***Special Handling (if applicable)***

18. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date
By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:
Client Instructions:

19. Additional remarks:

**Item Information**

| Item # | Temp ºC |
|---|---|
| Cooler | 2.0 |
| Sample | 8.8 |
| Temp Blank | 0.8 |

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

# SUBCONTRACT ORDER

**Apex Laboratories**

**A6G0036**

DA.

11007062

**SENDING LABORATORY:**

Apex Laboratories
12232 S.W. Garden Place
Tigard, OR 97223
Phone: (503) 718-2323
Fax: (503) 718-0333
Project Manager: Philip Nerenberg ✓

**RECEIVING LABORATORY:**

Fremont Analytical
3600 Fremont Avenue N.
Seattle, WA 98103
Phone :(206) 352-3790
Fax: (206) 352-7178 ✓

**D on jar says 6/23** ✓

**Sample Name: B44_062716_27-29** **Soil** **Sampled:** ~~06/27/16 10:20~~ (A6G0036-16)

| Analysis | Due | Expires | Comments |
|---|---|---|---|
| **NWTPH-VPH (Sub)** ✓ | 07/21/16 17:00 | 07/11/16 10:20 | hold time exp Monday 7/11----Fremont Analytical |

*Containers Supplied:*
(C)40 mL VOA - 5035 (MeOH) ✓

Watch HOLD TIME!

STANDARD TAT.

| | | | |
|---|---|---|---|
| Released By | Date 7/7/16 | Received By UPS | Date |
| Released By UPS | Date | Received By | Date 7/8/16 9:30 |

Fremont Analytical

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

**Apex Laboratories**
Philip Nerenberg
12232 S.W. Garden Place
Tigard, OR 97223

**RE: A6G0072**
**Lab ID: 1607098**

July 19, 2016

**Attention Philip Nerenberg:**

Fremont Analytical, Inc. received 1 sample(s) on 7/12/2016 for the analyses presented in the following report.

***Volatile Petroleum Hydrocarbons by NWVPH***

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Mike Ridgeway
Laboratory Director

*DoD/ELAP Certification #L2371, ISO/ICC 17025:2005*
*ORELAP Certification: WA 100009-007 (NELAP Recognized)*

**Date:** *07/19/2016*

**CLIENT:** Apex Laboratories
**Project:** A6G0072
**Lab Order:** 1607098

## Work Order Sample Summary

| Lab Sample ID | Client Sample ID | Date/Time Collected | Date/Time Received |
|---|---|---|---|
| 1607098-001 | B15_062916_33-35 | 06/29/2016 9:30 AM | 07/12/2016 9:36 AM |

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

# Case Narrative

WO#: **1607098**
Date: **7/19/2016**

**CLIENT:** Apex Laboratories
**Project:** A6G0072

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

# Qualifiers & Acronyms

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Fremont Analytical

# Analytical Report

WO#: **1607098**
Date Reported: **7/19/2016**

**Client:** Apex Laboratories
**Collection Date:** 6/29/2016 9:30:00 AM
**Project:** A6G0072
**Lab ID:** 1607098-001
**Matrix:** Soil
**Client Sample ID:** **B15_062916_33-35**

## Volatile Petroleum Hydrocarbons by NWVPH

Batch ID: 14227 Analyst: EM

| Analyses | Result | RL | Qual | Units | DF | Date Analyzed |
|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C5-C6) | ND | 1.91 | | mg/Kg | 1 | 7/12/2016 2:36:28 PM |
| Aliphatic Hydrocarbon (C6-C8) | ND | 1.91 | | mg/Kg | 1 | 7/12/2016 2:36:28 PM |
| Aliphatic Hydrocarbon (C8-C10) | ND | 1.91 | | mg/Kg | 1 | 7/12/2016 2:36:28 PM |
| Aliphatic Hydrocarbon (C10-C12) | ND | 1.91 | | mg/Kg | 1 | 7/12/2016 2:36:28 PM |
| Aromatic Hydrocarbon (C8-C10) | 2.62 | 1.91 | | mg/Kg | 1 | 7/12/2016 2:36:28 PM |
| Aromatic Hydrocarbon (C10-C12) | ND | 1.91 | | mg/Kg | 1 | 7/12/2016 2:36:28 PM |
| Aromatic Hydrocarbon (C12-C13) | ND | 1.91 | | mg/Kg | 1 | 7/12/2016 2:36:28 PM |
| Surr: 1,4-Difluorobenzene | 138 | 65-140 | | %Rec | 1 | 7/12/2016 2:36:28 PM |
| Surr: Bromofluorobenzene | 124 | 65-140 | | %Rec | 1 | 7/12/2016 2:36:28 PM |

**Work Order:** 1607098
**CLIENT:** Apex Laboratories
**Project:** A6G0072

# QC SUMMARY REPORT

## Volatile Petroleum Hydrocarbons by NWVPH

Sample ID **MB-14227** SampType: **MBLK** Units: **mg/Kg** Prep Date: **7/12/2016** RunNo: **30645**
Client ID: **MBLKS** Batch ID: **14227** Analysis Date: **7/12/2016** SeqNo: **578007**

| Analyte | Result | RL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C5-C6) | ND | 2.00 | | 0 | 0 | | | | | | |
| Aliphatic Hydrocarbon (C6-C8) | ND | 2.00 | | 0 | 0 | | | | | | |
| Aliphatic Hydrocarbon (C8-C10) | ND | 2.00 | | 0 | 0 | | | | | | |
| Aliphatic Hydrocarbon (C10-C12) | ND | 2.00 | | 0 | 0 | | | | | | |
| Aromatic Hydrocarbon (C8-C10) | ND | 2.00 | | 0 | 0 | | | | | | |
| Aromatic Hydrocarbon (C10-C12) | ND | 2.00 | | 0 | 0 | | | | | | |
| Aromatic Hydrocarbon (C12-C13) | ND | 2.00 | | 0 | 0 | | | | | | |
| Surr: 1,4-Difluorobenzene | 2.72 | | 2.500 | | 109 | 65 | 140 | | | | |
| Surr: Bromofluorobenzene | 3.10 | | 2.500 | | 124 | 65 | 140 | | | | |

Sample ID **LCS-14227** SampType: **LCS** Units: **mg/Kg** Prep Date: **7/12/2016** RunNo: **30645**
Client ID: **LCSS** Batch ID: **14227** Analysis Date: **7/12/2016** SeqNo: **578006**

| Analyte | Result | RL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C5-C6) | 29.7 | 2.00 | 30.00 | 0 | 99.0 | 70 | 130 | | | | |
| Aliphatic Hydrocarbon (C6-C8) | 9.58 | 2.00 | 10.00 | 0 | 95.8 | 70 | 130 | | | | |
| Aliphatic Hydrocarbon (C8-C10) | 8.46 | 2.00 | 10.00 | 0 | 84.6 | 70 | 130 | | | | |
| Aliphatic Hydrocarbon (C10-C12) | 11.6 | 2.00 | 10.00 | 0 | 116 | 70 | 130 | | | | |
| Aromatic Hydrocarbon (C8-C10) | 44.9 | 2.00 | 40.00 | 0 | 112 | 70 | 130 | | | | |
| Aromatic Hydrocarbon (C10-C12) | 9.05 | 2.00 | 10.00 | 0 | 90.5 | 70 | 130 | | | | |
| Aromatic Hydrocarbon (C12-C13) | 11.6 | 2.00 | 10.00 | 0 | 116 | 70 | 130 | | | | |
| Surr: 1,4-Difluorobenzene | 3.11 | | 2.500 | | 125 | 65 | 140 | | | | |
| Surr: Bromofluorobenzene | 3.34 | | 2.500 | | 134 | 65 | 140 | | | | |

Sample ID **1607098-001ADUP** SampType: **DUP** Units: **mg/Kg** Prep Date: **7/12/2016** RunNo: **30645**
Client ID: **B15_062916_33-35** Batch ID: **14227** Analysis Date: **7/12/2016** SeqNo: **578003**

| Analyte | Result | RL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C5-C6) | ND | 1.91 | | 0 | 0 | | | 0 | | 25 | |
| Aliphatic Hydrocarbon (C6-C8) | ND | 1.91 | | 0 | 0 | | | 0 | | 25 | |

**Work Order:** 1607098
**CLIENT:** Apex Laboratories
**Project:** A6G0072

# QC SUMMARY REPORT

## Volatile Petroleum Hydrocarbons by NWVPH

Sample ID **1607098-001ADUP** SampType: **DUP** Units: **mg/Kg** Prep Date: **7/12/2016** RunNo: **30645**
Client ID: **B15_062916_33-35** Batch ID: **14227** Analysis Date: **7/12/2016** SeqNo: **578003**

| Analyte | Result | RL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C8-C10) | ND | 1.91 | | 0 | 0 | | | 0 | | 25 | |
| Aliphatic Hydrocarbon (C10-C12) | ND | 1.91 | | 0 | 0 | | | 0 | | 25 | |
| Aromatic Hydrocarbon (C8-C10) | 2.92 | 1.91 | | 0 | 0 | | | 2.621 | 10.7 | 25 | |
| Aromatic Hydrocarbon (C10-C12) | ND | 1.91 | | 0 | 0 | | | 0 | | 25 | |
| Aromatic Hydrocarbon (C12-C13) | ND | 1.91 | | 0 | 0 | | | 0 | | 25 | |
| Surr: 1,4-Difluorobenzene | 3.21 | | 2.390 | | 134 | 65 | 140 | | 0 | | |
| Surr: Bromofluorobenzene | 3.07 | | 2.390 | | 128 | 65 | 140 | | 0 | | |

Sample ID **1607085-001BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **7/12/2016** RunNo: **30645**
Client ID: **BATCH** Batch ID: **14227** Analysis Date: **7/12/2016** SeqNo: **577999**

| Analyte | Result | RL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C5-C6) | 24.5 | 1.61 | 24.16 | 0 | 102 | 70 | 130 | | | | |
| Aliphatic Hydrocarbon (C6-C8) | 8.94 | 1.61 | 8.053 | 1.412 | 93.5 | 70 | 130 | | | | |
| Aliphatic Hydrocarbon (C8-C10) | 19.3 | 1.61 | 8.053 | 6.728 | 156 | 70 | 130 | | | | S |
| Aliphatic Hydrocarbon (C10-C12) | 58.2 | 1.61 | 8.053 | 50.43 | 97.0 | 70 | 130 | | | | |
| Aromatic Hydrocarbon (C8-C10) | 59.8 | 1.61 | 32.21 | 21.63 | 118 | 70 | 130 | | | | |
| Aromatic Hydrocarbon (C10-C12) | 93.4 | 1.61 | 8.053 | 85.65 | 95.8 | 70 | 130 | | | | |
| Aromatic Hydrocarbon (C12-C13) | 134 | 1.61 | 8.053 | 128.6 | 71.5 | 70 | 130 | | | | |
| Surr: 1,4-Difluorobenzene | 2.73 | | 2.013 | | 135 | 65 | 140 | | | | |
| Surr: Bromofluorobenzene | 2.71 | | 2.013 | | 135 | 65 | 140 | | | | |

**NOTES:**
S - Outlying QC recoveries were observed. The method is in control as indicated by the LCS.

Sample ID **1607085-001BMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **7/12/2016** RunNo: **30645**
Client ID: **BATCH** Batch ID: **14227** Analysis Date: **7/12/2016** SeqNo: **578000**

| Analyte | Result | RL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C5-C6) | 24.7 | 1.61 | 24.16 | 0 | 102 | 70 | 130 | 24.53 | 0.644 | 30 | |
| Aliphatic Hydrocarbon (C6-C8) | 10.9 | 1.61 | 8.053 | 1.412 | 118 | 70 | 130 | 8.941 | 19.9 | 30 | |
| Aliphatic Hydrocarbon (C8-C10) | 15.9 | 1.61 | 8.053 | 6.728 | 114 | 70 | 130 | 19.30 | 19.4 | 30 | |

**Work Order:** 1607098
**CLIENT:** Apex Laboratories
**Project:** A6G0072

# QC SUMMARY REPORT

## Volatile Petroleum Hydrocarbons by NWVPH

| | | | | | |
|---|---|---|---|---|---|
| Sample ID **1607085-001BMSD** | SampType: **MSD** | Units: **mg/Kg-dry** | Prep Date: **7/12/2016** | RunNo: **30645** | |
| Client ID: **BATCH** | Batch ID: **14227** | | Analysis Date: **7/12/2016** | SeqNo: **578000** | |

| Analyte | Result | RL | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aliphatic Hydrocarbon (C10-C12) | 61.4 | 1.61 | 8.053 | 50.43 | 136 | 70 | 130 | 58.24 | 5.30 | 30 | S |
| Aromatic Hydrocarbon (C8-C10) | 66.3 | 1.61 | 32.21 | 21.63 | 139 | 70 | 130 | 59.78 | 10.3 | 30 | S |
| Aromatic Hydrocarbon (C10-C12) | 95.5 | 1.61 | 8.053 | 85.65 | 123 | 70 | 130 | 93.37 | 2.31 | 30 | |
| Aromatic Hydrocarbon (C12-C13) | 131 | 1.61 | 8.053 | 128.6 | 30.3 | 70 | 130 | 134.3 | 2.50 | 30 | S |
| Surr: 1,4-Difluorobenzene | 2.81 | | 2.013 | | 140 | 65 | 140 | | 0 | | |
| Surr: Bromofluorobenzene | 2.81 | | 2.013 | | 140 | 65 | 140 | | 0 | | |

**NOTES:**
S - Outlying QC recoveries were observed. The method is in control as indicated by the LCS.

Fremont Analytical

# Sample Log-In Check List

| | | | |
|---|---|---|---|
| Client Name: | **APEX** | Work Order Number: | **1607098** |
| Logged by: | **Erica Silva** | Date Received: | **7/12/2016 9:36:00 AM** |

## *Chain of Custody*

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐

2. How was the sample delivered? UPS

## *Log In*

3. Coolers are present? Yes ☑ No ☐ NA ☐

4. Shipping container/cooler in good condition? Yes ☑ No ☐

5. Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact) Yes ☐ No ☑ Not Required ☐

6. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐

7. Were all items received at a temperature of >0°C to 10.0°C* Yes ☐ No ☑ NA ☐

**Please refer to Item Information**

8. Sample(s) in proper container(s)? Yes ☑ No ☐

9. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐

10. Are samples properly preserved? Yes ☑ No ☐

11. Was preservative added to bottles? Yes ☐ No ☑ NA ☐

12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☑

13. Did all samples containers arrive in good condition(unbroken)? Yes ☑ No ☐

14. Does paperwork match bottle labels? Yes ☑ No ☐

15. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐

16. Is it clear what analyses were requested? Yes ☑ No ☐

17. Were all holding times able to be met? Yes ☑ No ☐

## *Special Handling (if applicable)*

18. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: Date

By Whom: Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding:

Client Instructions:

19. Additional remarks:

**Item Information**

| Item # | Temp °C |
|---|---|
| Cooler | 3.0 |
| Sample | 19.7 |
| Temp Blank | 0.8 |

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

# SUBCONTRACT ORDER

**Apex Laboratories**

**A6G0072**

1607098

**SENDING LABORATORY:**

Apex Laboratories
12232 S.W. Garden Place
Tigard, OR 97223
Phone: (503) 718-2323
Fax: (503) 718-0333
Project Manager: Philip Nerenberg

**RECEIVING LABORATORY:**

Fremont Analytical
3600 Fremont Avenue N.
Seattle, WA 98103
Phone :(206) 352-3790
Fax: (206) 352-7178

**Sample Name: B15_062916_33-35** **Soil** **Sampled: 06/29/16 09:30** (A6G0072-28)

| Analysis | Due | Expires | Comments |
|---|---|---|---|
| **NWTPH-VPH (Sub)** | 07/22/16 17:00 | 07/13/16 09:30 | +7/8; Fremont; Watch HOLD time--->expires on 7/13 |

*Containers Supplied:*
(B)40 mL VOA - 5035 (MeOH)

STANDARD TAT
Watch HOLD TIME.

Ship Monday 7/11

| | | | |
|---|---|---|---|
| Released By | Date 7/11/16 | Received By M. Elyge | Date 7/12/16 9:36am |
| UPS (Shipper) | | UPS (Shipper) | |
| Released By | Date | Received By | Date |

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

AMENDED REPORT

Monday, August 15, 2016

Mark Havighorst
Farallon Consulting
4380 SW Macadam Ave #500
Portland, OR 97239

RE: Linnton Mill / 1588-001

Enclosed are the results of analyses for work order A6G0072, which was received by the laboratory on 6/29/2016 at 4:30:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: pnerenberg@apex-labs.com, or by phone at 503-718-2323.

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

Apex Labs

AMENDED REPORT

**12232 S.W. Garden Place**
**Tigard, OR 97223**
**503-718-2323 Phone**
**503-718-0333 Fax**

| | | |
|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL REPORT FOR SAMPLES

### SAMPLE INFORMATION

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| **B16_062816_0-19** | A6G0072-03 | Soil | 06/28/16 15:00 | 06/29/16 16:30 |
| **B16_062816_19-21** | A6G0072-04 | Soil | 06/28/16 15:00 | 06/29/16 16:30 |
| **B40_062816_0-1** | A6G0072-05 | Soil | 06/28/16 15:10 | 06/29/16 16:30 |
| **B40_062816_1-3** | A6G0072-06 | Soil | 06/28/16 15:10 | 06/29/16 16:30 |
| **B20_062816_0-13** | A6G0072-09 | Soil | 06/28/16 15:40 | 06/29/16 16:30 |
| **B20_062816_13-15** | A6G0072-10 | Soil | 06/28/16 15:40 | 06/29/16 16:30 |
| **B37_062816_0-11** | A6G0072-13 | Soil | 06/28/16 16:20 | 06/29/16 16:30 |
| **B37_062816_11-13** | A6G0072-14 | Soil | 06/28/16 16:20 | 06/29/16 16:30 |
| **B50_062916_0-18** | A6G0072-19 | Soil | 06/29/16 08:40 | 06/29/16 16:30 |
| **B50_062916_0-18-1** | A6G0072-20 | Soil | 06/29/16 08:40 | 06/29/16 16:30 |
| **B50_062916_18-20** | A6G0072-21 | Soil | 06/29/16 08:40 | 06/29/16 16:30 |
| **B50_062916_18-20-1** | A6G0072-22 | Soil | 06/29/16 08:40 | 06/29/16 16:30 |
| **B15_062916_0-33** | A6G0072-27 | Soil | 06/29/16 09:30 | 06/29/16 16:30 |
| **B15_062916_33-35** | A6G0072-28 | Soil | 06/29/16 09:30 | 06/29/16 16:30 |
| **B7_062916_0-13** | A6G0072-31 | Soil | 06/29/16 10:00 | 06/29/16 16:30 |
| **B7_062916_13-15** | A6G0072-32 | Soil | 06/29/16 10:00 | 06/29/16 16:30 |
| **B46_062916_0-32** | A6G0072-37 | Soil | 06/29/16 10:40 | 06/29/16 16:30 |
| **B46_062916_32-34** | A6G0072-38 | Soil | 06/29/16 10:40 | 06/29/16 16:30 |
| **B5_062916_0-26** | A6G0072-42 | Soil | 06/29/16 11:30 | 06/29/16 16:30 |
| **B5_062916_26-28** | A6G0072-43 | Soil | 06/29/16 11:30 | 06/29/16 16:30 |

Philip Nerenberg

| | | |
|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL CASE NARRATIVE

**Work Order: A6G0072**

Amended Report Revision 2:

EPA Method 8081 Pesticides Additional Analytes Reported and ID change.

This report supersedes all previous reports.

All 8081 Pesticides: Originally reported data without 2,4-DDT, 2,4-DDE and 2,4-DDD. Sample extracts were re-analyzed and analytes are now included in report. Blank Spike and Matrix Spike results do not include 2,4-DDT, 2,4-DDE and 2,4-DDD. Analytes were not included in spikes used during extraction.

Sample A6G0072-31 was incorrectly reported as B7_062916_10-13 on previous report versions. It has been changed to the correct ID of B7_062916_0-13 on this report.

Rev 1
Mark Zehr
Organics Manager
8/5/2016

Rev 2
Philip Nerenberg
Lab Director
8/15/16

AMENDED REPORT

| | | |
|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Silica Gel Cleanup

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B16_062816_0-19 (A6G0072-03)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 27.5 | mg/kg dry | 1 | 07/05/16 23:55 | NWTPH-Dx/SG | |
| **Oil** | **135** | --- | 54.9 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 89 %* | *Limits: 50-150 %* | " | " | " | |
| **B16_062816_19-21 (A6G0072-04)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 28.4 | mg/kg dry | 1 | 07/06/16 00:34 | NWTPH-Dx/SG | |
| Oil | ND | --- | 56.9 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 95 %* | *Limits: 50-150 %* | " | " | " | |
| **B40_062816_0-1 (A6G0072-05)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 25.0 | mg/kg dry | 1 | 07/06/16 01:14 | NWTPH-Dx/SG | |
| Oil | ND | --- | 50.0 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 94 %* | *Limits: 50-150 %* | " | " | " | |
| **B40_062816_1-3 (A6G0072-06)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 27.3 | mg/kg dry | 1 | 07/06/16 01:34 | NWTPH-Dx/SG | |
| Oil | ND | --- | 54.5 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 93 %* | *Limits: 50-150 %* | " | " | " | |
| **B20_062816_0-13 (A6G0072-09)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 25.9 | mg/kg dry | 1 | 07/06/16 01:54 | NWTPH-Dx/SG | |
| Oil | ND | --- | 51.9 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 97 %* | *Limits: 50-150 %* | " | " | " | |
| **B20_062816_13-15 (A6G0072-10)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 25.7 | mg/kg dry | 1 | 07/06/16 02:14 | NWTPH-Dx/SG | |
| Oil | ND | --- | 51.3 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 103 %* | *Limits: 50-150 %* | " | " | " | |
| **B37_062816_0-11 (A6G0072-13)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 25.0 | mg/kg dry | 1 | 07/06/16 02:34 | NWTPH-Dx/SG | |
| **Oil** | **238** | --- | 50.0 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 94 %* | *Limits: 50-150 %* | " | " | " | |
| **B37_062816_11-13 (A6G0072-14)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 26.9 | mg/kg dry | 1 | 07/06/16 02:54 | NWTPH-Dx/SG | |
| Oil | ND | --- | 53.7 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 96 %* | *Limits: 50-150 %* | " | " | " | |

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

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|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Silica Gel Cleanup

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B50_062916_0-18 (A6G0072-19)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 27.1 | mg/kg dry | 1 | 07/06/16 03:13 | NWTPH-Dx/SG | |
| Oil | ND | --- | 54.1 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 86 %* | *Limits: 50-150 %* | " | " | " | |
| **B50_062916_0-18-1 (A6G0072-20)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 28.0 | mg/kg dry | 1 | 07/06/16 03:33 | NWTPH-Dx/SG | |
| **Oil** | **71.9** | --- | 55.9 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 94 %* | *Limits: 50-150 %* | " | " | " | |
| **B50_062916_18-20 (A6G0072-21)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 34.4 | mg/kg dry | 1 | 07/06/16 03:53 | NWTPH-Dx/SG | |
| **Oil** | **151** | --- | 68.8 | " | " | " | " | F-03 |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 91 %* | *Limits: 50-150 %* | " | " | " | |
| **B50_062916_18-20-1 (A6G0072-22)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 30.3 | mg/kg dry | 1 | 07/06/16 04:13 | NWTPH-Dx/SG | |
| **Oil** | **125** | --- | 60.6 | " | " | " | " | F-03 |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 95 %* | *Limits: 50-150 %* | " | " | " | |
| **B15_062916_0-33 (A6G0072-27)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 27.2 | mg/kg dry | 1 | 07/06/16 05:53 | NWTPH-Dx/SG | |
| Oil | ND | --- | 54.3 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 92 %* | *Limits: 50-150 %* | " | " | " | |
| **B15_062916_33-35 (A6G0072-28)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 34.2 | mg/kg dry | 1 | 07/06/16 06:13 | NWTPH-Dx/SG | |
| **Oil** | **95.5** | --- | 68.5 | " | " | " | " | F-03 |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 102 %* | *Limits: 50-150 %* | " | " | " | |
| **B7_062916_0-13 (A6G0072-31)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 26.5 | mg/kg dry | 1 | 07/06/16 06:32 | NWTPH-Dx/SG | |
| **Oil** | **61.3** | --- | 53.1 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 99 %* | *Limits: 50-150 %* | " | " | " | |
| **B7_062916_13-15 (A6G0072-32)** | | | **Matrix: Soil** | | **Batch: 6070089** | | | |
| Diesel | ND | --- | 26.9 | mg/kg dry | 1 | 07/06/16 06:52 | NWTPH-Dx/SG | |
| **Oil** | **147** | --- | 53.9 | " | " | " | " | F-03 |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 86 %* | *Limits: 50-150 %* | " | " | " | |

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| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Silica Gel Cleanup

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B46_062916_0-32 (A6G0072-37)** | | | **Matrix: Soil** | | **Batch: 6070141** | | | |
| Diesel | ND | --- | 29.4 | mg/kg dry | 1 | 07/06/16 23:57 | NWTPH-Dx/SG | |
| Oil | ND | --- | 58.7 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 84 %* | *Limits: 50-150 %* | " | " | " | |
| **B46_062916_32-34 (A6G0072-38)** | | | **Matrix: Soil** | | **Batch: 6070141** | | | |
| Diesel | ND | --- | 31.0 | mg/kg dry | 1 | 07/07/16 00:17 | NWTPH-Dx/SG | |
| Oil | ND | --- | 62.0 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 84 %* | *Limits: 50-150 %* | " | " | " | |
| **B5_062916_0-26 (A6G0072-42)** | | | **Matrix: Soil** | | **Batch: 6070141** | | | |
| Diesel | ND | --- | 26.9 | mg/kg dry | 1 | 07/07/16 00:37 | NWTPH-Dx/SG | |
| **Oil** | **1180** | --- | 53.8 | " | " | " | " | F-13 |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 93 %* | *Limits: 50-150 %* | " | " | " | |
| **B5_062916_26-28 (A6G0072-43)** | | | **Matrix: Soil** | | **Batch: 6070141** | | | |
| Diesel | ND | --- | 29.2 | mg/kg dry | 1 | 07/07/16 00:57 | NWTPH-Dx/SG | |
| Oil | ND | --- | 58.4 | " | " | " | " | |
| *Surrogate: o-Terphenyl (Surr)* | | | *Recovery: 90 %* | *Limits: 50-150 %* | " | " | " | |

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| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B16_062816_0-19 (A6G0072-03)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Gasoline Range Organics | ND | --- | 6.39 | mg/kg dry | 50 | 07/06/16 23:06 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 101 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *112 %* | *Limits: 50-150 %* | " | " | " | |
| **B16_062816_19-21 (A6G0072-04)** | | | **Matrix: Soil** | | **Batch: 6070105** | | | |
| Gasoline Range Organics | ND | --- | 6.80 | mg/kg dry | 50 | 07/06/16 14:53 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 112 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *100 %* | *Limits: 50-150 %* | " | " | " | |
| **B40_062816_0-1 (A6G0072-05)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | **V-15** |
| Gasoline Range Organics | ND | --- | 5.62 | mg/kg dry | 50 | 07/06/16 15:17 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 106 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *109 %* | *Limits: 50-150 %* | " | " | " | |
| **B40_062816_1-3 (A6G0072-06)** | | | **Matrix: Soil** | | **Batch: 6070105** | | | |
| Gasoline Range Organics | ND | --- | 5.74 | mg/kg dry | 50 | 07/06/16 16:06 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 111 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *100 %* | *Limits: 50-150 %* | " | " | " | |
| **B20_062816_0-13 (A6G0072-09)** | | | **Matrix: Soil** | | **Batch: 6070105** | | | |
| Gasoline Range Organics | ND | --- | 5.81 | mg/kg dry | 50 | 07/06/16 16:49 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 112 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *102 %* | *Limits: 50-150 %* | " | " | " | |
| **B20_062816_13-15 (A6G0072-10)** | | | **Matrix: Soil** | | **Batch: 6070105** | | | |
| Gasoline Range Organics | ND | --- | 5.50 | mg/kg dry | 50 | 07/06/16 17:29 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 112 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *101 %* | *Limits: 50-150 %* | " | " | " | |
| **B37_062816_0-11 (A6G0072-13)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Gasoline Range Organics | ND | --- | 5.71 | mg/kg dry | 50 | 07/06/16 22:42 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 100 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *111 %* | *Limits: 50-150 %* | " | " | " | |
| **B37_062816_11-13 (A6G0072-14)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Gasoline Range Organics | ND | --- | 5.87 | mg/kg dry | 50 | 07/06/16 15:42 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 97 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *110 %* | *Limits: 50-150 %* | " | " | " | |

## ANALYTICAL SAMPLE RESULTS

### Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B50_062916_0-18 (A6G0072-19)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Gasoline Range Organics | ND | --- | 6.42 | mg/kg dry | 50 | 07/06/16 16:32 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 106 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *113 %* | *Limits: 50-150 %* | " | " | " | |
| **B50_062916_0-18-1 (A6G0072-20)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Gasoline Range Organics | ND | --- | 6.06 | mg/kg dry | 50 | 07/06/16 16:57 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 105 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *112 %* | *Limits: 50-150 %* | " | " | " | |
| **B50_062916_18-20 (A6G0072-21)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Gasoline Range Organics | ND | --- | 7.81 | mg/kg dry | 50 | 07/06/16 17:21 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 112 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *112 %* | *Limits: 50-150 %* | " | " | " | |
| **B50_062916_18-20-1 (A6G0072-22)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Gasoline Range Organics | ND | --- | 7.52 | mg/kg dry | 50 | 07/06/16 17:46 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 108 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *110 %* | *Limits: 50-150 %* | " | " | " | |
| **B15_062916_0-33 (A6G0072-27)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Gasoline Range Organics | ND | --- | 6.23 | mg/kg dry | 50 | 07/06/16 18:11 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 106 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *109 %* | *Limits: 50-150 %* | " | " | " | |
| **B15_062916_33-35 (A6G0072-28)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| **Gasoline Range Organics** | **11.9** | --- | 9.07 | mg/kg dry | 50 | 07/06/16 18:36 | NWTPH-Gx (MS) | F-12 |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 120 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *112 %* | *Limits: 50-150 %* | " | " | " | |
| **B7_062916_0-13 (A6G0072-31)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Gasoline Range Organics | ND | --- | 5.23 | mg/kg dry | 50 | 07/06/16 19:01 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 98 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *109 %* | *Limits: 50-150 %* | " | " | " | |
| **B7_062916_13-15 (A6G0072-32)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Gasoline Range Organics | ND | --- | 5.86 | mg/kg dry | 50 | 07/06/16 19:26 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 102 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *111 %* | *Limits: 50-150 %* | " | " | " | |

**Farallon Consulting**
4380 SW Macadam Ave #500
Portland, OR 97239

Project: **Linnton Mill**
Project Number: 1588-001
Project Manager: Mark Havighorst

**Reported:**
08/15/16 17:27

## ANALYTICAL SAMPLE RESULTS

### Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B46_062916_0-32 (A6G0072-37)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Gasoline Range Organics | ND | --- | 5.92 | mg/kg dry | 50 | 07/06/16 19:51 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 97 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *110 %* | *Limits: 50-150 %* | " | " | " | |
| **B46_062916_32-34 (A6G0072-38)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Gasoline Range Organics | ND | --- | 6.93 | mg/kg dry | 50 | 07/06/16 20:40 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 101 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *112 %* | *Limits: 50-150 %* | " | " | " | |
| **B5_062916_0-26 (A6G0072-42)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Gasoline Range Organics | ND | --- | 6.64 | mg/kg dry | 50 | 07/06/16 21:04 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 101 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *110 %* | *Limits: 50-150 %* | " | " | " | |
| **B5_062916_26-28 (A6G0072-43)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Gasoline Range Organics | ND | --- | 6.96 | mg/kg dry | 50 | 07/06/16 21:29 | NWTPH-Gx (MS) | |
| *Surrogate: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 101 %* | *Limits: 50-150 %* | 1 | " | " | |
| *1,4-Difluorobenzene (Sur)* | | | *113 %* | *Limits: 50-150 %* | " | " | " | |

Philip Nerenberg

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| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### BTEX Compounds by EPA 8260B

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B15_062916_33-35 (A6G0072-28)** | | | **Matrix: Soil** | | **Batch: 6070113** | | | |
| Benzene | ND | --- | 18.1 | ug/kg dry | 50 | 07/06/16 18:36 | 5035/8260B | |
| Toluene | ND | --- | 90.7 | " | " | " | " | |
| Ethylbenzene | ND | --- | 45.4 | " | " | " | " | |
| Xylenes, total | ND | --- | 136 | " | " | " | " | |
| *Surrogate: 1,4-Difluorobenzene (Surr)* | | | *Recovery: 109 %* | *Limits: 70-130 %* | 1 | " | " | |
| *Toluene-d8 (Surr)* | | | *101 %* | *Limits: 70-130 %* | " | " | " | |
| *4-Bromofluorobenzene (Surr)* | | | *95 %* | *Limits: 70-130 %* | " | " | " | |

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Philip Nerenberg

Philip Nerenberg, Lab Director

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|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** |  |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Polychlorinated Biphenyls by EPA 8082A

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B16_062816_0-19 (A6G0072-03)** |  |  | **Matrix: Soil** |  | **Batch: 6070313** |  |  | **C-07** |
| Aroclor 1016 | ND | --- | 12.8 | ug/kg dry | 1 | 07/13/16 19:41 | EPA 8082A |  |
| Aroclor 1221 | ND | --- | 12.8 | " | " | " | " |  |
| Aroclor 1232 | ND | --- | 12.8 | " | " | " | " |  |
| Aroclor 1242 | ND | --- | 12.8 | " | " | " | " |  |
| Aroclor 1248 | ND | --- | 12.8 | " | " | " | " |  |
| Aroclor 1254 | ND | --- | 12.8 | " | " | " | " |  |
| Aroclor 1260 | ND | --- | 12.8 | " | " | " | " |  |
| *Surrogate: Decachlorobiphenyl (Surr)* |  |  | *Recovery: 81 %* | *Limits: 72-126 %* | " | " | " |  |
| **B37_062816_0-11 (A6G0072-13)** |  |  | **Matrix: Soil** |  | **Batch: 6070313** |  |  | **C-07** |
| Aroclor 1016 | ND | --- | 10.8 | ug/kg dry | 1 | 07/13/16 20:17 | EPA 8082A |  |
| Aroclor 1221 | ND | --- | 10.8 | " | " | " | " |  |
| Aroclor 1232 | ND | --- | 10.8 | " | " | " | " |  |
| Aroclor 1242 | ND | --- | 10.8 | " | " | " | " |  |
| Aroclor 1248 | ND | --- | 10.8 | " | " | " | " |  |
| **Aroclor 1254** | **42.8** | --- | 10.8 | " | " | " | " |  |
| Aroclor 1260 | ND | --- | 10.8 | " | " | " | " |  |
| *Surrogate: Decachlorobiphenyl (Surr)* |  |  | *Recovery: 92 %* | *Limits: 72-126 %* | " | " | " |  |
| **B50_062916_0-18-1 (A6G0072-20)** |  |  | **Matrix: Soil** |  | **Batch: 6070313** |  |  | **C-07** |
| Aroclor 1016 | ND | --- | 12.0 | ug/kg dry | 1 | 07/13/16 20:52 | EPA 8082A |  |
| Aroclor 1221 | ND | --- | 12.0 | " | " | " | " |  |
| Aroclor 1232 | ND | --- | 12.0 | " | " | " | " |  |
| Aroclor 1242 | ND | --- | 12.0 | " | " | " | " |  |
| Aroclor 1248 | ND | --- | 12.0 | " | " | " | " |  |
| Aroclor 1254 | ND | --- | 12.0 | " | " | " | " |  |
| Aroclor 1260 | ND | --- | 12.0 | " | " | " | " |  |
| *Surrogate: Decachlorobiphenyl (Surr)* |  |  | *Recovery: 90 %* | *Limits: 72-126 %* | " | " | " |  |
| **B50_062916_18-20 (A6G0072-21)** |  |  | **Matrix: Soil** |  | **Batch: 6070313** |  |  | **C-07** |
| Aroclor 1016 | ND | --- | 13.0 | ug/kg dry | 1 | 07/13/16 21:28 | EPA 8082A |  |
| Aroclor 1221 | ND | --- | 13.0 | " | " | " | " |  |
| Aroclor 1232 | ND | --- | 13.0 | " | " | " | " |  |
| Aroclor 1242 | ND | --- | 13.0 | " | " | " | " |  |
| Aroclor 1248 | ND | --- | 13.0 | " | " | " | " |  |
| **Aroclor 1254** | **21.9** | --- | 13.0 | " | " | " | " | P-10 |
| **Aroclor 1260** | **20.1** | --- | 13.0 | " | " | " | " | P-10 |

## ANALYTICAL SAMPLE RESULTS

### Polychlorinated Biphenyls by EPA 8082A

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B50_062916_18-20 (A6G0072-21)** | | | **Matrix: Soil** | | **Batch: 6070313** | | | **C-07** |
| *Surrogate: Decachlorobiphenyl (Surr)* | | | *Recovery: 98 %* | *Limits: 72-126 %* | 1 | " | EPA 8082A | |
| **B50_062916_18-20-1 (A6G0072-22)** | | | **Matrix: Soil** | | **Batch: 6070313** | | | **C-07** |
| Aroclor 1016 | ND | --- | 13.1 | ug/kg dry | 1 | 07/13/16 22:03 | EPA 8082A | |
| Aroclor 1221 | ND | --- | 13.1 | " | " | " | " | |
| Aroclor 1232 | ND | --- | 13.1 | " | " | " | " | |
| Aroclor 1242 | ND | --- | 13.1 | " | " | " | " | |
| Aroclor 1248 | ND | --- | 13.1 | " | " | " | " | |
| **Aroclor 1254** | **18.2** | --- | 13.1 | " | " | " | " | P-10 |
| **Aroclor 1260** | **18.8** | --- | 13.1 | " | " | " | " | P-10 |
| *Surrogate: Decachlorobiphenyl (Surr)* | | | *Recovery: 96 %* | *Limits: 72-126 %* | " | " | " | |
| **B15_062916_33-35 (A6G0072-28)** | | | **Matrix: Soil** | | **Batch: 6070313** | | | **C-07** |
| Aroclor 1016 | ND | --- | 14.8 | ug/kg dry | 1 | 07/13/16 23:14 | EPA 8082A | |
| Aroclor 1221 | ND | --- | 14.8 | " | " | " | " | |
| Aroclor 1232 | ND | --- | 14.8 | " | " | " | " | |
| Aroclor 1242 | ND | --- | 14.8 | " | " | " | " | |
| Aroclor 1248 | ND | --- | 14.8 | " | " | " | " | |
| Aroclor 1254 | ND | --- | 14.8 | " | " | " | " | |
| Aroclor 1260 | ND | --- | 14.8 | " | " | " | " | |
| *Surrogate: Decachlorobiphenyl (Surr)* | | | *Recovery: 96 %* | *Limits: 72-126 %* | " | " | " | |
| **B7_062916_0-13 (A6G0072-31)** | | | **Matrix: Soil** | | **Batch: 6070313** | | | **C-07** |
| Aroclor 1016 | ND | --- | 11.0 | ug/kg dry | 1 | 07/13/16 23:50 | EPA 8082A | |
| Aroclor 1221 | ND | --- | 11.0 | " | " | " | " | |
| Aroclor 1232 | ND | --- | 11.0 | " | " | " | " | |
| Aroclor 1242 | ND | --- | 11.0 | " | " | " | " | |
| Aroclor 1248 | ND | --- | 11.0 | " | " | " | " | |
| **Aroclor 1254** | **110** | --- | 11.0 | " | " | " | " | |
| Aroclor 1260 | ND | --- | 11.0 | " | " | " | " | |
| *Surrogate: Decachlorobiphenyl (Surr)* | | | *Recovery: 94 %* | *Limits: 72-126 %* | " | " | " | |
| **B7_062916_13-15 (A6G0072-32)** | | | **Matrix: Soil** | | **Batch: 6070313** | | | **C-07** |
| Aroclor 1016 | ND | --- | 11.6 | ug/kg dry | 1 | 07/14/16 00:25 | EPA 8082A | |
| Aroclor 1221 | ND | --- | 11.6 | " | " | " | " | |
| Aroclor 1232 | ND | --- | 11.6 | " | " | " | " | |
| Aroclor 1242 | ND | --- | 11.6 | " | " | " | " | |

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| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Polychlorinated Biphenyls by EPA 8082A

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B7_062916_13-15 (A6G0072-32)** | | | **Matrix: Soil** | | **Batch: 6070313** | | | **C-07** |
| Aroclor 1248 | ND | --- | 11.6 | ug/kg dry | 1 | " | EPA 8082A | |
| Aroclor 1254 | ND | --- | 11.6 | " | " | " | " | |
| Aroclor 1260 | ND | --- | 11.6 | " | " | " | " | |
| *Surrogate: Decachlorobiphenyl (Surr)* | | | *Recovery: 91 %* | *Limits: 72-126 %* | " | " | " | |
| **B5_062916_0-26 (A6G0072-42)** | | | **Matrix: Soil** | | **Batch: 6070313** | | | **C-07** |
| Aroclor 1016 | ND | --- | 12.2 | ug/kg dry | 1 | 07/14/16 01:00 | EPA 8082A | |
| Aroclor 1221 | ND | --- | 12.2 | " | " | " | " | |
| Aroclor 1232 | ND | --- | 12.2 | " | " | " | " | |
| Aroclor 1242 | ND | --- | 12.2 | " | " | " | " | |
| Aroclor 1248 | ND | --- | 12.2 | " | " | " | " | |
| Aroclor 1254 | ND | --- | 12.2 | " | " | " | " | |
| Aroclor 1260 | ND | --- | 12.2 | " | " | " | " | |
| *Surrogate: Decachlorobiphenyl (Surr)* | | | *Recovery: 90 %* | *Limits: 72-126 %* | " | " | " | |

Philip Nerenberg

Philip Nerenberg, Lab Director

## ANALYTICAL SAMPLE RESULTS

### Organochlorine Pesticides by EPA 8081B

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B16_062816_19-21 (A6G0072-04RE1)** | | | **Matrix: Soil** | | **Batch: 6070282** | | | **C-05** |
| 4,4'-DDD | ND | --- | 2.51 | ug/kg dry | 1 | 07/13/16 10:33 | EPA 8081B | |
| 4,4'-DDE | ND | --- | 2.51 | " | " | " | " | |
| 4,4'-DDT | ND | --- | 2.51 | " | " | " | " | |
| 2,4'-DDD | ND | --- | 2.51 | " | " | 08/03/16 19:13 | " | |
| 2,4'-DDE | ND | --- | 2.51 | " | " | " | " | |
| 2,4'-DDT | ND | --- | 2.51 | " | " | " | " | |
| *Surrogate: 2,4,5,6-TCMX (Surr)* | | | *Recovery: 82 %* | *Limits: 42-129 %* | " | 07/13/16 10:33 | " | |
| *Decachlorobiphenyl (Surr)* | | | *87 %* | *Limits: 65-151 %* | " | " | " | |
| **B15_062916_33-35 (A6G0072-28RE1)** | | | **Matrix: Soil** | | **Batch: 6070282** | | | |
| 4,4'-DDD | ND | --- | 2.92 | ug/kg dry | 1 | 07/13/16 17:22 | EPA 8081B | |
| 4,4'-DDE | ND | --- | 2.92 | " | " | " | " | |
| 4,4'-DDT | ND | --- | 2.92 | " | " | " | " | |
| 2,4'-DDD | ND | --- | 2.92 | " | " | 08/03/16 19:30 | " | |
| 2,4'-DDE | ND | --- | 2.92 | " | " | " | " | |
| 2,4'-DDT | ND | --- | 2.92 | " | " | " | " | |
| *Surrogate: 2,4,5,6-TCMX (Surr)* | | | *Recovery: 84 %* | *Limits: 42-129 %* | " | 07/13/16 17:22 | " | |
| *Decachlorobiphenyl (Surr)* | | | *91 %* | *Limits: 65-151 %* | " | " | " | |
| **B46_062916_32-34 (A6G0072-38RE1)** | | | **Matrix: Soil** | | **Batch: 6070361** | | | **C-05** |
| 4,4'-DDD | ND | --- | 2.77 | ug/kg dry | 1 | 07/14/16 12:54 | EPA 8081B | |
| 4,4'-DDE | ND | --- | 2.77 | " | " | " | " | |
| 4,4'-DDT | ND | --- | 2.77 | " | " | " | " | |
| 2,4'-DDD | ND | --- | 2.77 | " | " | 08/03/16 20:22 | " | |
| 2,4'-DDE | ND | --- | 2.77 | " | " | " | " | |
| 2,4'-DDT | ND | --- | 2.77 | " | " | " | " | |
| *Surrogate: 2,4,5,6-TCMX (Surr)* | | | *Recovery: 62 %* | *Limits: 42-129 %* | " | 07/14/16 12:54 | " | |
| *Decachlorobiphenyl (Surr)* | | | *89 %* | *Limits: 65-151 %* | " | " | " | |
| **B5_062916_26-28 (A6G0072-43RE1)** | | | **Matrix: Soil** | | **Batch: 6070361** | | | **C-05** |
| 4,4'-DDD | ND | --- | 2.51 | ug/kg dry | 1 | 07/14/16 13:12 | EPA 8081B | |
| 4,4'-DDE | ND | --- | 2.51 | " | " | " | " | |
| 4,4'-DDT | ND | --- | 2.51 | " | " | " | " | |
| *Surrogate: 2,4,5,6-TCMX (Surr)* | | | *Recovery: 69 %* | *Limits: 42-129 %* | " | " | " | |
| *Decachlorobiphenyl (Surr)* | | | *82 %* | *Limits: 65-151 %* | " | " | " | |
| **B5_062916_26-28 (A6G0072-43RE2)** | | | **Matrix: Soil** | | **Batch: 6070361** | | | **C-05** |

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AMENDED REPORT

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## ANALYTICAL SAMPLE RESULTS

### Organochlorine Pesticides by EPA 8081B

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B5_062916_26-28 (A6G0072-43RE2)** | | | **Matrix: Soil** | | **Batch: 6070361** | | | **C-05** |
| 2,4'-DDD | ND | --- | 2.51 | ug/kg dry | 1 | 08/03/16 20:39 | EPA 8081B | |
| 2,4'-DDE | ND | --- | 2.51 | " | " | " | " | |
| 2,4'-DDT | ND | --- | 2.51 | " | " | " | " | |

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## ANALYTICAL SAMPLE RESULTS

### Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B16_062816_0-19 (A6G0072-03)** | | | **Matrix: Soil** | | **Batch: 6070315** | | | |
| Acenaphthene | ND | --- | 11.3 | ug/kg dry | 1 | 07/13/16 14:36 | EPA 8270D (SIM) | |
| Acenaphthylene | ND | --- | 11.3 | " | " | " | " | |
| Anthracene | ND | --- | 11.3 | " | " | " | " | |
| Benz(a)anthracene | ND | --- | 11.3 | " | " | " | " | |
| Benzo(a)pyrene | ND | --- | 11.3 | " | " | " | " | |
| Benzo(b)fluoranthene | ND | --- | 11.3 | " | " | " | " | |
| Benzo(k)fluoranthene | ND | --- | 11.3 | " | " | " | " | |
| Benzo(g,h,i)perylene | ND | --- | 11.3 | " | " | " | " | |
| Chrysene | ND | --- | 11.3 | " | " | " | " | |
| Dibenz(a,h)anthracene | ND | --- | 11.3 | " | " | " | " | |
| **Fluoranthene** | **11.3** | --- | 11.3 | " | " | " | " | |
| Fluorene | ND | --- | 11.3 | " | " | " | " | |
| Indeno(1,2,3-cd)pyrene | ND | --- | 11.3 | " | " | " | " | |
| Naphthalene | ND | --- | 11.3 | " | " | " | " | |
| Phenanthrene | ND | --- | 11.3 | " | " | " | " | |
| **Pyrene** | **14.6** | --- | 11.3 | " | " | " | " | |
| *Surrogate: 2-Fluorobiphenyl (Surr)* | | | *Recovery: 90 %* | *Limits: 44-120 %* | " | " | " | |
| *p-Terphenyl-d14 (Surr)* | | | *95 %* | *Limits: 54-127 %* | " | " | " | |

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## ANALYTICAL SAMPLE RESULTS

### Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B37_062816_0-11 (A6G0072-13)** | | | **Matrix: Soil** | | **Batch: 6070315** | | | |
| Acenaphthene | ND | --- | 9.57 | ug/kg dry | 1 | 07/13/16 15:05 | EPA 8270D (SIM) | |
| **Acenaphthylene** | **25.7** | --- | 9.57 | " | " | " | " | |
| **Anthracene** | **76.2** | --- | 9.57 | " | " | " | " | |
| **Benz(a)anthracene** | **108** | --- | 9.57 | " | " | " | " | M-02 |
| **Benzo(a)pyrene** | **131** | --- | 9.57 | " | " | " | " | |
| **Benzo(b)fluoranthene** | **150** | --- | 9.57 | " | " | " | " | M-02 |
| **Benzo(k)fluoranthene** | **55.9** | --- | 9.57 | " | " | " | " | M-02 |
| **Benzo(g,h,i)perylene** | **115** | --- | 9.57 | " | " | " | " | |
| **Chrysene** | **164** | --- | 9.57 | " | " | " | " | M-02 |
| **Dibenz(a,h)anthracene** | **11.4** | --- | 9.57 | " | " | " | " | |
| **Fluoranthene** | **363** | --- | 9.57 | " | " | " | " | |
| **Fluorene** | **17.0** | --- | 9.57 | " | " | " | " | |
| **Indeno(1,2,3-cd)pyrene** | **99.9** | --- | 9.57 | " | " | " | " | |
| Naphthalene | ND | --- | 9.57 | " | " | " | " | |
| **Phenanthrene** | **328** | --- | 9.57 | " | " | " | " | |
| **Pyrene** | **423** | --- | 9.57 | " | " | " | " | |
| *Surrogate: 2-Fluorobiphenyl (Surr)* | | | *Recovery: 71 %* | *Limits: 44-120 %* | " | " | " | |
| *p-Terphenyl-d14 (Surr)* | | | *96 %* | *Limits: 54-127 %* | " | " | " | |

Philip Nerenberg

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## ANALYTICAL SAMPLE RESULTS

### Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B50_062916_0-18-1 (A6G0072-20)** | | | **Matrix: Soil** | | **Batch: 6070327** | | | |
| **Acenaphthene** | **95.4** | --- | 11.4 | ug/kg dry | 1 | 07/16/16 20:32 | EPA 8270D (SIM) | |
| **Acenaphthylene** | **81.9** | --- | 11.4 | " | " | " | " | |
| **Anthracene** | **185** | --- | 11.4 | " | " | " | " | |
| **Benz(a)anthracene** | **375** | --- | 11.4 | " | " | " | " | M-02 |
| **Benzo(a)pyrene** | **587** | --- | 11.4 | " | " | " | " | |
| **Benzo(b)fluoranthene** | **632** | --- | 11.4 | " | " | " | " | M-02 |
| **Benzo(k)fluoranthene** | **180** | --- | 11.4 | " | " | " | " | M-02 |
| **Benzo(g,h,i)perylene** | **544** | --- | 11.4 | " | " | " | " | |
| **Chrysene** | **520** | --- | 11.4 | " | " | " | " | M-02 |
| **Dibenz(a,h)anthracene** | **59.0** | --- | 11.4 | " | " | " | " | |
| **Fluoranthene** | **1070** | --- | 11.4 | " | " | " | " | |
| **Fluorene** | **91.4** | --- | 11.4 | " | " | " | " | |
| **Indeno(1,2,3-cd)pyrene** | **490** | --- | 11.4 | " | " | " | " | |
| **Naphthalene** | **390** | --- | 11.4 | " | " | " | " | |
| **Phenanthrene** | **675** | --- | 11.4 | " | " | " | " | |
| **Pyrene** | **1360** | --- | 11.4 | " | " | " | " | |
| *Surrogate: 2-Fluorobiphenyl (Surr)* | | | *Recovery: 89 %* | *Limits: 44-120 %* | " | " | " | |
| *p-Terphenyl-d14 (Surr)* | | | *94 %* | *Limits: 54-127 %* | " | " | " | |

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## ANALYTICAL SAMPLE RESULTS

### Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B50_062916_18-20 (A6G0072-21)** | | | **Matrix: Soil** | | **Batch: 6070327** | | | |
| **Acenaphthene** | **596** | --- | 12.4 | ug/kg dry | 1 | 07/16/16 21:00 | EPA 8270D (SIM) | |
| **Acenaphthylene** | **101** | --- | 12.4 | " | " | " | " | |
| **Anthracene** | **662** | --- | 12.4 | " | " | " | " | |
| **Benz(a)anthracene** | **894** | --- | 12.4 | " | " | " | " | |
| **Benzo(a)pyrene** | **1280** | --- | 12.4 | " | " | " | " | |
| **Benzo(b)fluoranthene** | **1110** | --- | 12.4 | " | " | " | " | M-02 |
| **Benzo(k)fluoranthene** | **412** | --- | 12.4 | " | " | " | " | M-02 |
| **Benzo(g,h,i)perylene** | **826** | --- | 12.4 | " | " | " | " | |
| **Chrysene** | **1250** | --- | 12.4 | " | " | " | " | |
| **Dibenz(a,h)anthracene** | **98.2** | --- | 12.4 | " | " | " | " | |
| **Fluoranthene** | **3380** | --- | 12.4 | " | " | " | " | |
| **Fluorene** | **458** | --- | 12.4 | " | " | " | " | |
| **Indeno(1,2,3-cd)pyrene** | **770** | --- | 12.4 | " | " | " | " | |
| **Naphthalene** | **799** | --- | 12.4 | " | " | " | " | |
| **Phenanthrene** | **3050** | --- | 12.4 | " | " | " | " | |
| **Pyrene** | **4320** | --- | 12.4 | " | " | " | " | |
| *Surrogate: 2-Fluorobiphenyl (Surr)* | | | *Recovery: 85 %* | *Limits: 44-120 %* | " | " | " | |
| *p-Terphenyl-d14 (Surr)* | | | *87 %* | *Limits: 54-127 %* | " | " | " | |

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Philip Nerenberg

Philip Nerenberg, Lab Director

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| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B50_062916_18-20-1 (A6G0072-22)** |  |  | **Matrix: Soil** |  | **Batch: 6070327** |  |  |  |
| **Acenaphthene** | **469** | --- | 12.5 | ug/kg dry | 1 | 07/16/16 21:28 | EPA 8270D (SIM) |  |
| **Acenaphthylene** | **93.0** | --- | 12.5 | " | " | " | " |  |
| **Anthracene** | **555** | --- | 12.5 | " | " | " | " |  |
| **Benz(a)anthracene** | **698** | --- | 12.5 | " | " | " | " |  |
| **Benzo(a)pyrene** | **931** | --- | 12.5 | " | " | " | " |  |
| **Benzo(b)fluoranthene** | **828** | --- | 12.5 | " | " | " | " | M-02 |
| **Benzo(k)fluoranthene** | **314** | --- | 12.5 | " | " | " | " | M-02 |
| **Benzo(g,h,i)perylene** | **601** | --- | 12.5 | " | " | " | " |  |
| **Chrysene** | **945** | --- | 12.5 | " | " | " | " |  |
| **Dibenz(a,h)anthracene** | **72.4** | --- | 12.5 | " | " | " | " |  |
| **Fluoranthene** | **2620** | --- | 12.5 | " | " | " | " |  |
| **Fluorene** | **344** | --- | 12.5 | " | " | " | " |  |
| **Indeno(1,2,3-cd)pyrene** | **562** | --- | 12.5 | " | " | " | " |  |
| **Naphthalene** | **569** | --- | 12.5 | " | " | " | " |  |
| **Phenanthrene** | **2540** | --- | 12.5 | " | " | " | " |  |
| **Pyrene** | **3360** | --- | 12.5 | " | " | " | " |  |
| *Surrogate: 2-Fluorobiphenyl (Surr)* |  |  | *Recovery: 86 %* | *Limits: 44-120 %* | " | " | " |  |
| *p-Terphenyl-d14 (Surr)* |  |  | *87 %* | *Limits: 54-127 %* | " | " | " |  |

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## ANALYTICAL SAMPLE RESULTS

### Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B15_062916_33-35 (A6G0072-28)** | | | **Matrix: Soil** | | **Batch: 6070327** | | | |
| **Acenaphthene** | **15.1** | --- | 14.2 | ug/kg dry | 1 | 07/16/16 21:56 | EPA 8270D (SIM) | |
| **Acenaphthylene** | **33.7** | --- | 14.2 | " | " | " | " | |
| **Anthracene** | **45.9** | --- | 14.2 | " | " | " | " | |
| **Benz(a)anthracene** | **89.6** | --- | 14.2 | " | " | " | " | M-02 |
| **Benzo(a)pyrene** | **150** | --- | 14.2 | " | " | " | " | |
| **Benzo(b)fluoranthene** | **137** | --- | 14.2 | " | " | " | " | M-02 |
| **Benzo(k)fluoranthene** | **57.6** | --- | 14.2 | " | " | " | " | M-02 |
| **Benzo(g,h,i)perylene** | **133** | --- | 14.2 | " | " | " | " | |
| **Chrysene** | **113** | --- | 14.2 | " | " | " | " | M-02 |
| Dibenz(a,h)anthracene | ND | --- | 14.2 | " | " | " | " | |
| **Fluoranthene** | **296** | --- | 14.2 | " | " | " | " | |
| **Fluorene** | **14.5** | --- | 14.2 | " | " | " | " | |
| **Indeno(1,2,3-cd)pyrene** | **117** | --- | 14.2 | " | " | " | " | |
| **Naphthalene** | **182** | --- | 14.2 | " | " | " | " | |
| **Phenanthrene** | **219** | --- | 14.2 | " | " | " | " | |
| **Pyrene** | **364** | --- | 14.2 | " | " | " | " | |
| *Surrogate: 2-Fluorobiphenyl (Surr)* | | | *Recovery: 89 %* | *Limits: 44-120 %* | " | " | " | |
| *p-Terphenyl-d14 (Surr)* | | | *91 %* | *Limits: 54-127 %* | " | " | " | |

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| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B7_062916_0-13 (A6G0072-31)** | | | **Matrix: Soil** | | **Batch: 6070327** | | | |
| **Acenaphthene** | **10.5** | --- | 10.0 | ug/kg dry | 1 | 07/16/16 22:23 | EPA 8270D (SIM) | |
| **Acenaphthylene** | **17.9** | --- | 10.0 | " | " | " | " | |
| **Anthracene** | **30.3** | --- | 10.0 | " | " | " | " | |
| **Benz(a)anthracene** | **85.1** | --- | 10.0 | " | " | " | " | M-02 |
| **Benzo(a)pyrene** | **130** | --- | 10.0 | " | " | " | " | |
| **Benzo(b)fluoranthene** | **134** | --- | 10.0 | " | " | " | " | M-02 |
| **Benzo(k)fluoranthene** | **50.6** | --- | 10.0 | " | " | " | " | M-02 |
| **Benzo(g,h,i)perylene** | **107** | --- | 10.0 | " | " | " | " | |
| **Chrysene** | **108** | --- | 10.0 | " | " | " | " | M-02 |
| **Dibenz(a,h)anthracene** | **12.4** | --- | 10.0 | " | " | " | " | |
| **Fluoranthene** | **210** | --- | 10.0 | " | " | " | " | |
| Fluorene | ND | --- | 10.0 | " | " | " | " | |
| **Indeno(1,2,3-cd)pyrene** | **96.7** | --- | 10.0 | " | " | " | " | |
| **Naphthalene** | **28.5** | --- | 10.0 | " | " | " | " | |
| **Phenanthrene** | **96.8** | --- | 10.0 | " | " | " | " | |
| **Pyrene** | **262** | --- | 10.0 | " | " | " | " | |
| *Surrogate: 2-Fluorobiphenyl (Surr)* | | | *Recovery: 88 %* | *Limits: 44-120 %* | " | " | " | |
| *p-Terphenyl-d14 (Surr)* | | | *94 %* | *Limits: 54-127 %* | " | " | " | |

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*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Philip Nerenberg

Philip Nerenberg, Lab Director

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| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B7_062916_13-15 (A6G0072-32)** | | | **Matrix: Soil** | | **Batch: 6070327** | | | |
| **Acenaphthene** | **23.7** | --- | 10.9 | ug/kg dry | 1 | 07/16/16 22:51 | EPA 8270D (SIM) | |
| **Acenaphthylene** | **151** | --- | 10.9 | " | " | " | " | |
| **Anthracene** | **198** | --- | 10.9 | " | " | " | " | |
| **Benz(a)anthracene** | **472** | --- | 10.9 | " | " | " | " | M-02 |
| **Benzo(a)pyrene** | **745** | --- | 10.9 | " | " | " | " | |
| **Benzo(b)fluoranthene** | **709** | --- | 10.9 | " | " | " | " | M-02 |
| **Benzo(k)fluoranthene** | **228** | --- | 10.9 | " | " | " | " | M-02 |
| **Benzo(g,h,i)perylene** | **554** | --- | 10.9 | " | " | " | " | |
| **Chrysene** | **679** | --- | 10.9 | " | " | " | " | M-02 |
| **Dibenz(a,h)anthracene** | **53.6** | --- | 10.9 | " | " | " | " | |
| **Fluoranthene** | **1620** | --- | 10.9 | " | " | " | " | |
| **Fluorene** | **64.4** | --- | 10.9 | " | " | " | " | |
| **Indeno(1,2,3-cd)pyrene** | **503** | --- | 10.9 | " | " | " | " | |
| **Naphthalene** | **36.0** | --- | 10.9 | " | " | " | " | |
| **Phenanthrene** | **1130** | --- | 10.9 | " | " | " | " | |
| **Pyrene** | **2160** | --- | 10.9 | " | " | " | " | |
| *Surrogate: 2-Fluorobiphenyl (Surr)* | | | *Recovery: 80 %* | *Limits: 44-120 %* | " | " | " | |
| *p-Terphenyl-d14 (Surr)* | | | *86 %* | *Limits: 54-127 %* | " | " | " | |

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Philip Nerenberg

Philip Nerenberg, Lab Director

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| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B5_062916_0-26 (A6G0072-42)** | | | **Matrix: Soil** | | **Batch: 6070327** | | | |
| Acenaphthene | ND | --- | 11.6 | ug/kg dry | 1 | 07/17/16 00:14 | EPA 8270D (SIM) | |
| **Acenaphthylene** | **38.1** | --- | 11.6 | " | " | " | " | |
| **Anthracene** | **51.8** | --- | 11.6 | " | " | " | " | |
| **Benz(a)anthracene** | **72.6** | --- | 11.6 | " | " | " | " | M-02 |
| **Benzo(a)pyrene** | **95.5** | --- | 11.6 | " | " | " | " | |
| **Benzo(b)fluoranthene** | **173** | --- | 11.6 | " | " | " | " | M-02 |
| **Benzo(k)fluoranthene** | **60.5** | --- | 11.6 | " | " | " | " | M-02 |
| **Benzo(g,h,i)perylene** | **126** | --- | 11.6 | " | " | " | " | |
| **Chrysene** | **134** | --- | 11.6 | " | " | " | " | M-02 |
| **Dibenz(a,h)anthracene** | **32.4** | --- | 11.6 | " | " | " | " | |
| **Fluoranthene** | **154** | --- | 11.6 | " | " | " | " | |
| Fluorene | ND | --- | 11.6 | " | " | " | " | |
| **Indeno(1,2,3-cd)pyrene** | **164** | --- | 11.6 | " | " | " | " | |
| **Naphthalene** | **37.6** | --- | 11.6 | " | " | " | " | |
| **Phenanthrene** | **101** | --- | 11.6 | " | " | " | " | |
| **Pyrene** | **151** | --- | 11.6 | " | " | " | " | |
| *Surrogate: 2-Fluorobiphenyl (Surr)* | | | *Recovery: 84 %* | *Limits: 44-120 %* | " | " | " | |
| *p-Terphenyl-d14 (Surr)* | | | *90 %* | *Limits: 54-127 %* | " | " | " | |

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Philip Nerenberg

Philip Nerenberg, Lab Director

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|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B16_062816_0-19 (A6G0072-03)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070325 | | | | | | | | |
| **Arsenic** | **13.1** | --- | 1.41 | mg/kg dry | 10 | 07/14/16 22:28 | EPA 6020A | |
| **Barium** | **164** | --- | 1.41 | " | " | " | " | |
| Cadmium | ND | --- | 0.283 | " | " | " | " | |
| **Chromium** | **20.8** | --- | 1.41 | " | " | " | " | |
| **Copper** | **27.1** | --- | 1.41 | " | " | " | " | |
| **Lead** | **17.5** | --- | 1.41 | " | " | " | " | |
| Mercury | ND | --- | 0.113 | " | " | " | " | |
| Selenium | ND | --- | 2.83 | " | " | " | " | |
| Silver | ND | --- | 0.283 | " | " | " | " | |
| **B16_062816_19-21 (A6G0072-04)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070325 | | | | | | | | |
| **Arsenic** | **6.87** | --- | 1.33 | mg/kg dry | 10 | 07/14/16 22:31 | EPA 6020A | |
| **Barium** | **140** | --- | 1.33 | " | " | " | " | |
| **Cadmium** | **0.331** | --- | 0.265 | " | " | " | " | |
| **Chromium** | **14.0** | --- | 1.33 | " | " | " | " | |
| **Copper** | **21.7** | --- | 1.33 | " | " | " | " | |
| **Lead** | **12.9** | --- | 1.33 | " | " | " | " | |
| Mercury | ND | --- | 0.106 | " | " | " | " | |
| Selenium | ND | --- | 2.65 | " | " | " | " | |
| Silver | ND | --- | 0.265 | " | " | " | " | |
| **B40_062816_0-1 (A6G0072-05)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070325 | | | | | | | | |
| **Arsenic** | **10.7** | --- | 1.13 | mg/kg dry | 10 | 07/14/16 22:34 | EPA 6020A | |
| **Barium** | **96.1** | --- | 1.13 | " | " | " | " | |
| **Cadmium** | **0.294** | --- | 0.226 | " | " | " | " | |
| **Chromium** | **13.2** | --- | 1.13 | " | " | " | " | |
| **Copper** | **23.8** | --- | 1.13 | " | " | " | " | |
| **Lead** | **18.4** | --- | 1.13 | " | " | " | " | |
| Mercury | ND | --- | 0.0904 | " | " | " | " | |
| Selenium | ND | --- | 2.26 | " | " | " | " | |
| Silver | ND | --- | 0.226 | " | " | " | " | |
| **B40_062816_1-3 (A6G0072-06)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070325 | | | | | | | | |
| **Arsenic** | **3.75** | --- | 1.12 | mg/kg dry | 10 | 07/14/16 22:37 | EPA 6020A | |

Philip Nerenberg

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|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B40_062816_1-3 (A6G0072-06)** | | | **Matrix: Soil** | | | | | |
| **Barium** | **84.5** | --- | 1.12 | mg/kg dry | 10 | " | EPA 6020A | |
| Cadmium | ND | --- | 0.225 | " | " | " | " | |
| **Chromium** | **11.2** | --- | 1.12 | " | " | " | " | |
| **Copper** | **16.5** | --- | 1.12 | " | " | " | " | |
| **Lead** | **8.45** | --- | 1.12 | " | " | " | " | |
| Mercury | ND | --- | 0.0900 | " | " | " | " | |
| Selenium | ND | --- | 2.25 | " | " | " | " | |
| Silver | ND | --- | 0.225 | " | " | " | " | |
| **B20_062816_0-13 (A6G0072-09)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070325 | | | | | | | | |
| **Arsenic** | **2.64** | --- | 1.11 | mg/kg dry | 10 | 07/14/16 22:40 | EPA 6020A | |
| **Barium** | **76.1** | --- | 1.11 | " | " | " | " | |
| Cadmium | ND | --- | 0.223 | " | " | " | " | |
| **Chromium** | **10.7** | --- | 1.11 | " | " | " | " | |
| **Copper** | **12.9** | --- | 1.11 | " | " | " | " | |
| **Lead** | **4.42** | --- | 1.11 | " | " | " | " | |
| Mercury | ND | --- | 0.0891 | " | " | " | " | |
| Selenium | ND | --- | 2.23 | " | " | " | " | |
| Silver | ND | --- | 0.223 | " | " | " | " | |
| **B20_062816_13-15 (A6G0072-10)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070325 | | | | | | | | |
| **Arsenic** | **2.47** | --- | 1.11 | mg/kg dry | 10 | 07/14/16 22:43 | EPA 6020A | |
| **Barium** | **80.5** | --- | 1.11 | " | " | " | " | |
| Cadmium | ND | --- | 0.223 | " | " | " | " | |
| **Chromium** | **10.8** | --- | 1.11 | " | " | " | " | |
| **Copper** | **12.4** | --- | 1.11 | " | " | " | " | |
| **Lead** | **3.10** | --- | 1.11 | " | " | " | " | |
| Mercury | ND | --- | 0.0891 | " | " | " | " | |
| Selenium | ND | --- | 2.23 | " | " | " | " | |
| Silver | ND | --- | 0.223 | " | " | " | " | |
| **B37_062816_0-11 (A6G0072-13)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070325 | | | | | | | | |
| **Arsenic** | **4.41** | --- | 1.11 | mg/kg dry | 10 | 07/14/16 22:46 | EPA 6020A | |
| **Barium** | **183** | --- | 1.11 | " | " | " | " | |
| **Cadmium** | **0.355** | --- | 0.222 | " | " | " | " | |

## ANALYTICAL SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B37_062816_0-11 (A6G0072-13)** | | | **Matrix: Soil** | | | | | |
| **Chromium** | **19.6** | --- | 1.11 | mg/kg dry | 10 | " | EPA 6020A | |
| **Copper** | **32.9** | --- | 1.11 | " | " | " | " | |
| **Lead** | **26.8** | --- | 1.11 | " | " | " | " | |
| Mercury | ND | --- | 0.0887 | " | " | " | " | |
| Selenium | ND | --- | 2.22 | " | " | " | " | |
| Silver | ND | --- | 0.222 | " | " | " | " | |
| **B37_062816_11-13 (A6G0072-14)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070325 | | | | | | | | |
| **Arsenic** | **4.27** | --- | 1.19 | mg/kg dry | 10 | 07/14/16 22:49 | EPA 6020A | |
| **Barium** | **91.4** | --- | 1.19 | " | " | " | " | |
| Cadmium | ND | --- | 0.239 | " | " | " | " | |
| **Chromium** | **10.9** | --- | 1.19 | " | " | " | " | |
| **Copper** | **21.3** | --- | 1.19 | " | " | " | " | |
| **Lead** | **10.9** | --- | 1.19 | " | " | " | " | |
| Mercury | ND | --- | 0.0954 | " | " | " | " | |
| Selenium | ND | --- | 2.39 | " | " | " | " | |
| Silver | ND | --- | 0.239 | " | " | " | " | |
| **B50_062916_0-18 (A6G0072-19)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070325 | | | | | | | | |
| **Arsenic** | **3.25** | --- | 1.32 | mg/kg dry | 10 | 07/14/16 22:52 | EPA 6020A | |
| **Barium** | **117** | --- | 1.32 | " | " | " | " | |
| **Cadmium** | **0.263** | --- | 0.263 | " | " | " | " | |
| **Chromium** | **27.4** | --- | 1.32 | " | " | " | " | |
| **Copper** | **26.0** | --- | 1.32 | " | " | " | " | |
| **Lead** | **18.9** | --- | 1.32 | " | " | " | " | |
| Mercury | ND | --- | 0.105 | " | " | " | " | |
| Selenium | ND | --- | 2.63 | " | " | " | " | |
| Silver | ND | --- | 0.263 | " | " | " | " | |
| **B50_062916_0-18-1 (A6G0072-20)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070325 | | | | | | | | |
| **Arsenic** | **3.36** | --- | 1.29 | mg/kg dry | 10 | 07/14/16 23:03 | EPA 6020A | |
| **Barium** | **117** | --- | 1.29 | " | " | " | " | |
| **Cadmium** | **0.270** | --- | 0.257 | " | " | " | " | |
| **Chromium** | **20.1** | --- | 1.29 | " | " | " | " | |
| **Copper** | **23.7** | --- | 1.29 | " | " | " | " | |

## ANALYTICAL SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B50_062916_0-18-1 (A6G0072-20)** | | | **Matrix: Soil** | | | | | |
| **Lead** | **19.6** | --- | 1.29 | mg/kg dry | 10 | " | EPA 6020A | |
| Mercury | ND | --- | 0.103 | " | " | " | " | |
| Selenium | ND | --- | 2.57 | " | " | " | " | |
| Silver | ND | --- | 0.257 | " | " | " | " | |
| **B50_062916_18-20 (A6G0072-21)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070334 | | | | | | | | |
| **Arsenic** | **3.68** | --- | 1.44 | mg/kg dry | 10 | 07/15/16 21:43 | EPA 6020A | |
| **Barium** | **142** | --- | 1.44 | " | " | " | " | |
| **Cadmium** | **0.332** | --- | 0.289 | " | " | " | " | |
| **Chromium** | **23.7** | --- | 1.44 | " | " | " | " | |
| **Copper** | **32.9** | --- | 1.44 | " | " | " | " | |
| **Lead** | **19.6** | --- | 0.289 | " | " | " | " | |
| **Mercury** | **0.145** | --- | 0.115 | " | " | " | " | |
| Selenium | ND | --- | 1.44 | " | " | " | " | |
| Silver | ND | --- | 0.289 | " | " | " | " | |
| **B50_062916_18-20-1 (A6G0072-22)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070334 | | | | | | | | |
| **Arsenic** | **3.55** | --- | 1.44 | mg/kg dry | 10 | 07/15/16 21:46 | EPA 6020A | |
| **Barium** | **139** | --- | 1.44 | " | " | " | " | |
| **Cadmium** | **0.288** | --- | 0.288 | " | " | " | " | |
| **Chromium** | **23.1** | --- | 1.44 | " | " | " | " | |
| **Copper** | **33.5** | --- | 1.44 | " | " | " | " | |
| **Lead** | **19.6** | --- | 0.288 | " | " | " | " | |
| **Mercury** | **0.271** | --- | 0.115 | " | " | " | " | |
| Selenium | ND | --- | 1.44 | " | " | " | " | |
| Silver | ND | --- | 0.288 | " | " | " | " | |
| **B15_062916_0-33 (A6G0072-27)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070334 | | | | | | | | |
| **Arsenic** | **3.26** | --- | 1.24 | mg/kg dry | 10 | 07/15/16 21:49 | EPA 6020A | |
| **Barium** | **117** | --- | 1.24 | " | " | " | " | |
| Cadmium | ND | --- | 0.247 | " | " | " | " | |
| **Chromium** | **18.9** | --- | 1.24 | " | " | " | " | |
| **Copper** | **23.9** | --- | 1.24 | " | " | " | " | |
| **Lead** | **15.2** | --- | 0.247 | " | " | " | " | |
| **Mercury** | **0.113** | --- | 0.0988 | " | " | " | " | |

## ANALYTICAL SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B15_062916_0-33 (A6G0072-27)** | | | **Matrix: Soil** | | | | | |
| Selenium | ND | --- | 1.24 | mg/kg dry | 10 | " | EPA 6020A | |
| Silver | ND | --- | 0.247 | " | " | " | " | |
| **B15_062916_33-35 (A6G0072-28)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070334 | | | | | | | | |
| **Arsenic** | **2.12** | --- | 1.53 | mg/kg dry | 10 | 07/15/16 21:52 | EPA 6020A | |
| **Barium** | **118** | --- | 1.53 | " | " | " | " | |
| Cadmium | ND | --- | 0.307 | " | " | " | " | |
| **Chromium** | **10.7** | --- | 1.53 | " | " | " | " | |
| **Copper** | **16.3** | --- | 1.53 | " | " | " | " | |
| **Lead** | **9.08** | --- | 0.307 | " | " | " | " | |
| Mercury | ND | --- | 0.123 | " | " | " | " | |
| Selenium | ND | --- | 1.53 | " | " | " | " | |
| Silver | ND | --- | 0.307 | " | " | " | " | |
| **B7_062916_0-13 (A6G0072-31)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070334 | | | | | | | | |
| **Arsenic** | **3.07** | --- | 1.14 | mg/kg dry | 10 | 07/15/16 22:04 | EPA 6020A | |
| **Barium** | **120** | --- | 1.14 | " | " | " | " | |
| **Cadmium** | **0.229** | --- | 0.229 | " | " | " | " | |
| **Chromium** | **22.2** | --- | 1.14 | " | " | " | " | |
| **Copper** | **21.4** | --- | 1.14 | " | " | " | " | |
| **Lead** | **13.8** | --- | 0.229 | " | " | " | " | |
| Mercury | ND | --- | 0.0916 | " | " | " | " | |
| Selenium | ND | --- | 1.14 | " | " | " | " | |
| Silver | ND | --- | 0.229 | " | " | " | " | |
| **B7_062916_13-15 (A6G0072-32)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070334 | | | | | | | | |
| **Arsenic** | **3.07** | --- | 1.25 | mg/kg dry | 10 | 07/15/16 22:07 | EPA 6020A | |
| **Barium** | **136** | --- | 1.25 | " | " | " | " | |
| Cadmium | ND | --- | 0.249 | " | " | " | " | |
| **Chromium** | **20.1** | --- | 1.25 | " | " | " | " | |
| **Copper** | **18.3** | --- | 1.25 | " | " | " | " | |
| **Lead** | **14.7** | --- | 0.249 | " | " | " | " | |
| Mercury | ND | --- | 0.0997 | " | " | " | " | |
| Selenium | ND | --- | 1.25 | " | " | " | " | |
| Silver | ND | --- | 0.249 | " | " | " | " | |

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| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B46_062916_0-32 (A6G0072-37)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070334 | | | | | | | | |
| **Arsenic** | **3.18** | --- | 1.30 | mg/kg dry | 10 | 07/15/16 22:10 | EPA 6020A | |
| **Barium** | **114** | --- | 1.30 | " | " | " | " | |
| Cadmium | ND | --- | 0.259 | " | " | " | " | |
| **Chromium** | **16.7** | --- | 1.30 | " | " | " | " | |
| **Copper** | **21.3** | --- | 1.30 | " | " | " | " | |
| **Lead** | **12.1** | --- | 0.259 | " | " | " | " | |
| Mercury | ND | --- | 0.104 | " | " | " | " | |
| Selenium | ND | --- | 1.30 | " | " | " | " | |
| Silver | ND | --- | 0.259 | " | " | " | " | |
| **B46_062916_32-34 (A6G0072-38)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070334 | | | | | | | | |
| **Arsenic** | **1.92** | --- | 1.35 | mg/kg dry | 10 | 07/15/16 22:13 | EPA 6020A | |
| **Barium** | **129** | --- | 1.35 | " | " | " | " | |
| Cadmium | ND | --- | 0.270 | " | " | " | " | |
| **Chromium** | **19.0** | --- | 1.35 | " | " | " | " | |
| **Copper** | **11.6** | --- | 1.35 | " | " | " | " | |
| **Lead** | **6.46** | --- | 0.270 | " | " | " | " | |
| Mercury | ND | --- | 0.108 | " | " | " | " | |
| Selenium | ND | --- | 1.35 | " | " | " | " | |
| Silver | ND | --- | 0.270 | " | " | " | " | |
| **B5_062916_0-26 (A6G0072-42)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070334 | | | | | | | | |
| **Arsenic** | **6.61** | --- | 1.32 | mg/kg dry | 10 | 07/15/16 22:16 | EPA 6020A | |
| **Barium** | **208** | --- | 1.32 | " | " | " | " | |
| **Cadmium** | **0.448** | --- | 0.263 | " | " | " | " | |
| **Chromium** | **12.1** | --- | 1.32 | " | " | " | " | |
| **Copper** | **71.2** | --- | 1.32 | " | " | " | " | |
| **Lead** | **91.8** | --- | 0.263 | " | " | " | " | |
| Mercury | ND | --- | 0.105 | " | " | " | " | |
| Selenium | ND | --- | 1.32 | " | " | " | " | |
| **Silver** | **0.263** | --- | 0.263 | " | " | " | " | |
| **B5_062916_26-28 (A6G0072-43)** | | | **Matrix: Soil** | | | | | |
| Batch: 6070334 | | | | | | | | |
| **Arsenic** | **8.89** | --- | 1.30 | mg/kg dry | 10 | 07/15/16 22:18 | EPA 6020A | |

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| **Farallon Consulting** | Project: **Linnton Mill** |  |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B5_062916_26-28 (A6G0072-43)** |  |  | **Matrix: Soil** |  |  |  |  |  |
| **Barium** | **138** | --- | 1.30 | mg/kg dry | 10 | " | EPA 6020A |  |
| **Cadmium** | **0.286** | --- | 0.260 | " | " | " | " |  |
| **Chromium** | **15.6** | --- | 1.30 | " | " | " | " |  |
| **Copper** | **22.5** | --- | 1.30 | " | " | " | " |  |
| **Lead** | **12.8** | --- | 0.260 | " | " | " | " |  |
| Mercury | ND | --- | 0.104 | " | " | " | " |  |
| Selenium | ND | --- | 1.30 | " | " | " | " |  |
| Silver | ND | --- | 0.260 | " | " | " | " |  |

Philip Nerenberg

Philip Nerenberg, Lab Director

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|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** |  |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B16_062816_0-19 (A6G0072-03)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **76.9** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B16_062816_19-21 (A6G0072-04)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **75.3** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B40_062816_0-1 (A6G0072-05)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **93.2** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B40_062816_1-3 (A6G0072-06)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **87.7** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B20_062816_0-13 (A6G0072-09)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **89.5** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B20_062816_13-15 (A6G0072-10)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **90.5** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B37_062816_0-11 (A6G0072-13)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **87.5** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B37_062816_11-13 (A6G0072-14)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **89.8** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B50_062916_0-18 (A6G0072-19)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **78.8** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B50_062916_0-18-1 (A6G0072-20)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **79.3** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B50_062916_18-20 (A6G0072-21)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **71.7** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B50_062916_18-20-1 (A6G0072-22)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **71.7** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B15_062916_0-33 (A6G0072-27)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **80.0** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B15_062916_33-35 (A6G0072-28)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **65.0** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B7_062916_0-13 (A6G0072-31)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **86.5** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |
| **B7_062916_13-15 (A6G0072-32)** |  |  | **Matrix: Soil** |  | **Batch: 6070122** |  |  |  |
| **% Solids** | **79.8** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C |  |

Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Philip Nerenberg

Philip Nerenberg, Lab Director

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|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## ANALYTICAL SAMPLE RESULTS

### Percent Dry Weight

| Analyte | Result | MDL | Reporting Limit | Units | Dilution | Date Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|
| **B46_062916_0-32 (A6G0072-37)** | | | **Matrix: Soil** | | **Batch: 6070122** | | | |
| **% Solids** | **79.8** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C | |
| **B46_062916_32-34 (A6G0072-38)** | | | **Matrix: Soil** | | **Batch: 6070122** | | | |
| **% Solids** | **73.7** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C | |
| **B5_062916_0-26 (A6G0072-42)** | | | **Matrix: Soil** | | **Batch: 6070122** | | | |
| **% Solids** | **78.8** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C | |
| **B5_062916_26-28 (A6G0072-43)** | | | **Matrix: Soil** | | **Batch: 6070122** | | | |
| **% Solids** | **74.7** | --- | 1.00 | % by Weight | 1 | 07/07/16 09:05 | EPA 8000C | |

Philip Nerenberg

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|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Silica Gel Cleanup

**Batch 6070089 - EPA 3546 (Fuels) w/Silica Gel+Acid (NWTPH)** **Soil**

**Blank (6070089-BLK1)** Prepared: 07/05/16 15:17 Analyzed: 07/05/16 23:15

**NWTPH-Dx/SG**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diesel | ND | --- | 25.0 | mg/kg wet | 1 | --- | --- | --- | --- | --- | --- | |
| Oil | ND | --- | 50.0 | " | " | --- | --- | --- | --- | --- | --- | |

*Surr: o-Terphenyl (Surr) Recovery: 97 % Limits: 50-150 % Dilution: 1x*

**LCS (6070089-BS1)** Prepared: 07/05/16 15:17 Analyzed: 07/05/16 23:35

**NWTPH-Dx/SG**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diesel | 130 | --- | 25.0 | mg/kg wet | 1 | 125 | --- | 104 | 76-115% | --- | --- | |

*Surr: o-Terphenyl (Surr) Recovery: 103 % Limits: 50-150 % Dilution: 1x*

**Duplicate (6070089-DUP1)** Prepared: 07/05/16 15:17 Analyzed: 07/06/16 00:15

**QC Source Sample: B16_062816_0-19 (A6G0072-03)**

**NWTPH-Dx/SG**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diesel | ND | --- | 29.3 | mg/kg dry | 1 | --- | ND | --- | --- | --- | 30% | |
| Oil | **72.3** | --- | 58.7 | " | " | --- | 135 | --- | --- | 61 | 30% | Q-05 |

*Surr: o-Terphenyl (Surr) Recovery: 92 % Limits: 50-150 % Dilution: 1x*

**Duplicate (6070089-DUP2)** Prepared: 07/05/16 15:18 Analyzed: 07/06/16 07:12

**QC Source Sample: B7_062916_13-15 (A6G0072-32)**

**NWTPH-Dx/SG**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diesel | ND | --- | 27.0 | mg/kg dry | 1 | --- | ND | --- | --- | --- | 30% | |
| Oil | ND | --- | 54.0 | " | " | --- | 147 | --- | --- | *** | 30% | Q-05 |

*Surr: o-Terphenyl (Surr) Recovery: 93 % Limits: 50-150 % Dilution: 1x*

**Batch 6070141 - EPA 3546 (Fuels) w/Silica Gel+Acid (NWTPH)** **Soil**

**Blank (6070141-BLK1)** Prepared: 07/06/16 17:38 Analyzed: 07/06/16 23:18

**NWTPH-Dx/SG**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Diesel | ND | --- | 25.0 | mg/kg wet | 1 | --- | --- | --- | --- | --- | --- | |
| Oil | ND | --- | 50.0 | " | " | --- | --- | --- | --- | --- | --- | |

*Surr: o-Terphenyl (Surr) Recovery: 95 % Limits: 50-150 % Dilution: 1x*

**LCS (6070141-BS1)** Prepared: 07/06/16 17:38 Analyzed: 07/06/16 23:37

**NWTPH-Dx/SG**

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Silica Gel Cleanup

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6070141 - EPA 3546 (Fuels) w/Silica Gel+Acid (NWTPH)** | | | | | | | **Soil** | | | | | |
| **LCS (6070141-BS1)** | | | | | | Prepared: 07/06/16 17:38 | Analyzed: 07/06/16 23:37 | | | | | |
| Diesel | 133 | --- | 25.0 | mg/kg wet | 1 | 125 | --- | 107 | 76-115% | --- | --- | |
| *Surr: o-Terphenyl (Surr)* | | | *Recovery: 101 %* | *Limits: 50-150 %* | | | *Dilution: 1x* | | | | | |
| **Duplicate (6070141-DUP1)** | | | | | | Prepared: 07/06/16 17:38 | Analyzed: 07/07/16 01:16 | | | | | |
| **QC Source Sample: B5_062916_26-28 (A6G0072-43)** | | | | | | | | | | | | |
| **NWTPH-Dx/SG** | | | | | | | | | | | | |
| Diesel | ND | --- | 31.6 | mg/kg dry | 1 | --- | ND | --- | --- | --- | 30% | |
| Oil | ND | --- | 63.1 | " | " | --- | ND | --- | --- | --- | 30% | |
| *Surr: o-Terphenyl (Surr)* | | | *Recovery: 93 %* | *Limits: 50-150 %* | | | *Dilution: 1x* | | | | | |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6070105 - EPA 5035A** | | | | | | | **Soil** | | | | | |
| **Blank (6070105-BLK1)** | | | | | Prepared: 07/06/16 10:07 | | Analyzed: 07/06/16 12:52 | | | | | |
| **NWTPH-Gx (MS)** | | | | | | | | | | | | |
| Gasoline Range Organics | ND | --- | 3.33 | mg/kg wet | 50 | --- | --- | --- | --- | --- | --- | |
| *Surr: 4-Bromofluorobenzene (Sur)* | | *Recovery:* | *108 %* | *Limits:* | *50-150 %* | *Dilution:* | *1x* | | | | | |
| *1,4-Difluorobenzene (Sur)* | | | *99 %* | | *50-150 %* | | *"* | | | | | |
| **LCS (6070105-BS2)** | | | | | Prepared: 07/06/16 10:07 | | Analyzed: 07/06/16 12:26 | | | | | |
| **NWTPH-Gx (MS)** | | | | | | | | | | | | |
| Gasoline Range Organics | 24.3 | --- | 5.00 | mg/kg wet | 50 | 25.0 | --- | 97 | 70-130% | --- | --- | |
| *Surr: 4-Bromofluorobenzene (Sur)* | | *Recovery:* | *107 %* | *Limits:* | *50-150 %* | *Dilution:* | *1x* | | | | | |
| *1,4-Difluorobenzene (Sur)* | | | *98 %* | | *50-150 %* | | *"* | | | | | |
| **Duplicate (6070105-DUP1)** | | | | | Prepared: 06/28/16 15:00 | | Analyzed: 07/06/16 15:20 | | | | | |
| **QC Source Sample: B16_062816_19-21 (A6G0072-04)** | | | | | | | | | | | | |
| **NWTPH-Gx (MS)** | | | | | | | | | | | | |
| Gasoline Range Organics | ND | --- | 6.83 | mg/kg dry | 50 | --- | ND | --- | --- | --- | 30% | |
| *Surr: 4-Bromofluorobenzene (Sur)* | | *Recovery:* | *110 %* | *Limits:* | *50-150 %* | *Dilution:* | *1x* | | | | | |
| *1,4-Difluorobenzene (Sur)* | | | *100 %* | | *50-150 %* | | *"* | | | | | |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6070113 - EPA 5035A** | | | | | | | **Soil** | | | | | |
| **Blank (6070113-BLK1)** | | | | | Prepared: 07/06/16 12:49 | | Analyzed: 07/06/16 14:52 | | | | | |
| **NWTPH-Gx (MS)** | | | | | | | | | | | | |
| Gasoline Range Organics | ND | --- | 3.33 | mg/kg wet | 50 | --- | --- | --- | --- | --- | --- | |
| *Surr: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 94 %* | *Limits: 50-150 %* | | | *Dilution: 1x* | | | | | |
| *1,4-Difluorobenzene (Sur)* | | | *106 %* | *50-150 %* | | | *"* | | | | | |
| **LCS (6070113-BS2)** | | | | | Prepared: 07/06/16 12:49 | | Analyzed: 07/06/16 14:27 | | | | | |
| **NWTPH-Gx (MS)** | | | | | | | | | | | | |
| Gasoline Range Organics | 19.4 | --- | 5.00 | mg/kg wet | 50 | 25.0 | --- | 78 | 70-130% | --- | --- | |
| *Surr: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 99 %* | *Limits: 50-150 %* | | | *Dilution: 1x* | | | | | |
| *1,4-Difluorobenzene (Sur)* | | | *103 %* | *50-150 %* | | | *"* | | | | | |
| **Duplicate (6070113-DUP1)** | | | | | Prepared: 06/28/16 16:20 | | Analyzed: 07/06/16 16:07 | | | | | |
| **QC Source Sample: B37_062816_11-13 (A6G0072-14)** | | | | | | | | | | | | |
| **NWTPH-Gx (MS)** | | | | | | | | | | | | |
| Gasoline Range Organics | ND | --- | 5.86 | mg/kg dry | 50 | --- | ND | --- | --- | --- | 30% | |
| *Surr: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 105 %* | *Limits: 50-150 %* | | | *Dilution: 1x* | | | | | |
| *1,4-Difluorobenzene (Sur)* | | | *112 %* | *50-150 %* | | | *"* | | | | | |
| **Duplicate (6070113-DUP2)** | | | | | Prepared: 06/29/16 10:40 | | Analyzed: 07/06/16 20:15 | | | | | |
| **QC Source Sample: B46_062916_0-32 (A6G0072-37)** | | | | | | | | | | | | |
| **NWTPH-Gx (MS)** | | | | | | | | | | | | |
| Gasoline Range Organics | ND | --- | 5.92 | mg/kg dry | 50 | --- | ND | --- | --- | --- | 30% | |
| *Surr: 4-Bromofluorobenzene (Sur)* | | | *Recovery: 108 %* | *Limits: 50-150 %* | | | *Dilution: 1x* | | | | | |
| *1,4-Difluorobenzene (Sur)* | | | *113 %* | *50-150 %* | | | *"* | | | | | |

|  |  |  |
|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** |  |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### BTEX Compounds by EPA 8260B

**Batch 6070113 - EPA 5035A** **Soil**

**Blank (6070113-BLK1)** Prepared: 07/06/16 12:49 Analyzed: 07/06/16 14:52

**5035/8260B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | --- | 6.67 | ug/kg wet | 50 | --- | --- | --- | --- | --- | --- |  |
| Toluene | ND | --- | 33.3 | " | " | --- | --- | --- | --- | --- | --- |  |
| Ethylbenzene | ND | --- | 16.7 | " | " | --- | --- | --- | --- | --- | --- |  |
| Xylenes, total | ND | --- | 50.0 | " | " | --- | --- | --- | --- | --- | --- |  |

*Surr: 1,4-Difluorobenzene (Surr) Recovery: 104 % Limits: 70-130 % Dilution: 1x*
*Toluene-d8 (Surr) 103 % 70-130 % "*
*4-Bromofluorobenzene (Surr) 101 % 70-130 % "*

**LCS (6070113-BS1)** Prepared: 07/06/16 12:49 Analyzed: 07/06/16 14:03

**5035/8260B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | 1030 | --- | 10.0 | ug/kg wet | 50 | 1000 | --- | 103 | 65-135% | --- | --- |  |
| Toluene | 966 | --- | 50.0 | " | " | " | --- | 97 | " | --- | --- |  |
| Ethylbenzene | 1060 | --- | 25.0 | " | " | " | --- | 106 | " | --- | --- |  |
| Xylenes, total | 3010 | --- | 75.0 | " | " | 3000 | --- | 100 | " | --- | --- |  |

*Surr: 1,4-Difluorobenzene (Surr) Recovery: 101 % Limits: 70-130 % Dilution: 1x*
*Toluene-d8 (Surr) 98 % 70-130 % "*
*4-Bromofluorobenzene (Surr) 92 % 70-130 % "*

**Duplicate (6070113-DUP1)** Prepared: 06/28/16 16:20 Analyzed: 07/06/16 16:07

**QC Source Sample: B37_062816_11-13 (A6G0072-14)**

**5035/8260B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | --- | 11.7 | ug/kg dry | 50 | --- | ND | --- | --- | --- | 30% |  |
| Toluene | ND | --- | 58.6 | " | " | --- | ND | --- | --- | --- | 30% |  |
| Ethylbenzene | ND | --- | 29.3 | " | " | --- | ND | --- | --- | --- | 30% |  |
| Xylenes, total | ND | --- | 88.0 | " | " | --- | ND | --- | --- | --- | 30% |  |

*Surr: 1,4-Difluorobenzene (Surr) Recovery: 108 % Limits: 70-130 % Dilution: 1x*
*Toluene-d8 (Surr) 103 % 70-130 % "*
*4-Bromofluorobenzene (Surr) 97 % 70-130 % "*

**Duplicate (6070113-DUP2)** Prepared: 06/29/16 10:40 Analyzed: 07/06/16 20:15

**QC Source Sample: B46_062916_0-32 (A6G0072-37)**

**5035/8260B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | --- | 11.8 | ug/kg dry | 50 | --- | ND | --- | --- | --- | 30% |  |

| | | |
|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### BTEX Compounds by EPA 8260B

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6070113 - EPA 5035A** | | | | | | | **Soil** | | | | | |
| **Duplicate (6070113-DUP2)** | | | | | | Prepared: 06/29/16 10:40 | Analyzed: 07/06/16 20:15 | | | | | |
| **QC Source Sample: B46_062916_0-32 (A6G0072-37)** | | | | | | | | | | | | |
| Toluene | ND | --- | 59.2 | " | " | --- | 52.1 | --- | --- | *** | 30% | Q-05 |
| Ethylbenzene | ND | --- | 29.6 | " | " | --- | ND | --- | --- | --- | 30% | |
| Xylenes, total | ND | --- | 88.8 | " | " | --- | ND | --- | --- | --- | 30% | |
| *Surr: 1,4-Difluorobenzene (Surr)* | | *Recovery:* | *109 %* | *Limits:* | *70-130 %* | *Dilution:* | *1x* | | | | | |
| *Toluene-d8 (Surr)* | | | *101 %* | | *70-130 %* | | *"* | | | | | |
| *4-Bromofluorobenzene (Surr)* | | | *95 %* | | *70-130 %* | | *"* | | | | | |
| **Matrix Spike (6070113-MS1)** | | | | | | Prepared: 06/29/16 11:30 | Analyzed: 07/06/16 21:53 | | | | | |
| **QC Source Sample: B5_062916_26-28 (A6G0072-43)** | | | | | | | | | | | | |
| **5035/8260B** | | | | | | | | | | | | |
| Benzene | 1530 | --- | 14.2 | ug/kg dry | 50 | 1420 | ND | 108 | 65-135% | --- | --- | |
| Toluene | 1420 | --- | 70.9 | " | " | " | ND | 100 | " | --- | --- | |
| Ethylbenzene | 1540 | --- | 35.4 | " | " | " | ND | 109 | " | --- | --- | |
| Xylenes, total | 4280 | --- | 106 | " | " | 4250 | ND | 101 | " | --- | --- | |
| *Surr: 1,4-Difluorobenzene (Surr)* | | *Recovery:* | *105 %* | *Limits:* | *70-130 %* | *Dilution:* | *1x* | | | | | |
| *Toluene-d8 (Surr)* | | | *97 %* | | *70-130 %* | | *"* | | | | | |
| *4-Bromofluorobenzene (Surr)* | | | *89 %* | | *70-130 %* | | *"* | | | | | |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Polychlorinated Biphenyls by EPA 8082A

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6070313 - EPA 3546** | | | | | | | **Soil** | | | | | |
| **Blank (6070313-BLK1)** | | | | | | Prepared: 07/12/16 14:57 | Analyzed: 07/13/16 10:57 | | | | | **C-07** |
| **EPA 8082A** | | | | | | | | | | | | |
| Aroclor 1016 | ND | --- | 9.09 | ug/kg wet | 1 | --- | --- | --- | --- | --- | --- | |
| Aroclor 1221 | ND | --- | 9.09 | " | " | --- | --- | --- | --- | --- | --- | |
| Aroclor 1232 | ND | --- | 9.09 | " | " | --- | --- | --- | --- | --- | --- | |
| Aroclor 1242 | ND | --- | 9.09 | " | " | --- | --- | --- | --- | --- | --- | |
| Aroclor 1248 | ND | --- | 9.09 | " | " | --- | --- | --- | --- | --- | --- | |
| Aroclor 1254 | ND | --- | 9.09 | " | " | --- | --- | --- | --- | --- | --- | |
| Aroclor 1260 | ND | --- | 9.09 | " | " | --- | --- | --- | --- | --- | --- | |
| *Surr: Decachlorobiphenyl (Surr)* | | *Recovery:* | *102 %* | *Limits: 72-126 %* | | | *Dilution: 1x* | | | | | |
| **LCS (6070313-BS1)** | | | | | | Prepared: 07/12/16 14:57 | Analyzed: 07/13/16 11:14 | | | | | **C-07** |
| **EPA 8082A** | | | | | | | | | | | | |
| Aroclor 1016 | 181 | --- | 10.0 | ug/kg wet | 1 | 250 | --- | 72 | 47-134% | --- | --- | |
| Aroclor 1260 | 242 | --- | 10.0 | " | " | " | --- | 97 | 53-140% | --- | --- | |
| *Surr: Decachlorobiphenyl (Surr)* | | *Recovery:* | *103 %* | *Limits: 72-126 %* | | | *Dilution: 1x* | | | | | |

| | | | |
|---|---|---|---|
| **Farallon Consulting** | Project: | **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: | 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: | Mark Havighorst | 08/15/16 17:27 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Organochlorine Pesticides by EPA 8081B

**Batch 6070282 - EPA 3546** **Soil**

**Blank (6070282-BLK1)** Prepared: 07/12/16 07:21 Analyzed: 07/13/16 09:23 **C-05**

**EPA 8081B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aldrin | ND | --- | 1.82 | ug/kg wet | 1 | --- | --- | --- | --- | --- | --- | |
| alpha-BHC | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| beta-BHC | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| delta-BHC | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| gamma-BHC (Lindane) | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| cis-Chlordane | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| trans-Chlordane | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| 4,4'-DDD | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| 4,4'-DDE | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| 4,4'-DDT | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| Dieldrin | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| Endosulfan I | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| Endosulfan II | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| Endosulfan sulfate | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| Endrin | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| Endrin Aldehyde | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| Endrin ketone | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| Heptachlor | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| Heptachlor epoxide | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| Methoxychlor | ND | --- | 5.45 | " | " | --- | --- | --- | --- | --- | --- | |
| Chlordane (Technical) | ND | --- | 54.5 | " | " | --- | --- | --- | --- | --- | --- | |
| Toxaphene (Total) | ND | --- | 54.5 | " | " | --- | --- | --- | --- | --- | --- | |

| Surr: | Recovery: | Limits: | Dilution: |
|---|---|---|---|
| *2,4,5,6-TCMX (Surr)* | *91 %* | *42-129 %* | *1x* |
| *Decachlorobiphenyl (Surr)* | *92 %* | *65-151 %* | *"* |

**Blank (6070282-BLK2)** Prepared: 07/12/16 07:21 Analyzed: 08/03/16 18:55 **C-07**

**EPA 8081B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,4'-DDD | ND | --- | 1.82 | ug/kg wet | 1 | --- | --- | --- | --- | --- | --- | |
| 2,4'-DDE | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| 2,4'-DDT | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |

| | | |
|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Organochlorine Pesticides by EPA 8081B

**Batch 6070282 - EPA 3546** **Soil**

**LCS (6070282-BS1)** Prepared: 07/12/16 07:21 Analyzed: 07/13/16 09:40

**EPA 8081B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aldrin | 43.2 | --- | 2.00 | ug/kg wet | 1 | 50.0 | --- | 86 | 45-136% | --- | --- | |
| alpha-BHC | 47.1 | --- | 2.00 | " | " | " | --- | 94 | 45-137% | --- | --- | |
| beta-BHC | 47.6 | --- | 2.00 | " | " | " | --- | 95 | 50-136% | --- | --- | |
| delta-BHC | 54.8 | --- | 2.00 | " | " | " | --- | 110 | 47-139% | --- | --- | |
| gamma-BHC (Lindane) | 46.6 | --- | 2.00 | " | " | " | --- | 93 | 49-135% | --- | --- | |
| cis-Chlordane | 45.6 | --- | 2.00 | " | " | " | --- | 91 | 54-133% | --- | --- | |
| trans-Chlordane | 46.6 | --- | 2.00 | " | " | " | --- | 93 | 53-135% | --- | --- | |
| 4,4'-DDD | 52.6 | --- | 2.00 | " | " | " | --- | 105 | 56-139% | --- | --- | |
| 4,4'-DDE | 48.2 | --- | 2.00 | " | " | " | --- | 96 | 56-134% | --- | --- | |
| 4,4'-DDT | 58.5 | --- | 2.00 | " | " | " | --- | 117 | 50-141% | --- | --- | |
| Dieldrin | 48.6 | --- | 2.00 | " | " | " | --- | 97 | 56-136% | --- | --- | |
| Endosulfan I | 47.4 | --- | 2.00 | " | " | " | --- | 95 | 52-132% | --- | --- | |
| Endosulfan II | 54.3 | --- | 2.00 | " | " | " | --- | 109 | 53-134% | --- | --- | |
| Endosulfan sulfate | 61.6 | --- | 2.00 | " | " | " | --- | 123 | 55-136% | --- | --- | Q-41 |
| Endrin | 51.7 | --- | 2.00 | " | " | " | --- | 103 | 56-140% | --- | --- | |
| Endrin Aldehyde | 54.0 | --- | 2.00 | " | " | " | --- | 108 | 35-137% | --- | --- | |
| Endrin ketone | 64.2 | --- | 2.00 | " | " | " | --- | 128 | 55-136% | --- | --- | Q-41 |
| Heptachlor | 47.3 | --- | 2.00 | " | " | " | --- | 95 | 47-136% | --- | --- | |
| Heptachlor epoxide | 41.6 | --- | 2.00 | " | " | " | --- | 83 | 52-136% | --- | --- | |
| Methoxychlor | 60.0 | --- | 6.00 | " | " | " | --- | 120 | 52-143% | --- | --- | |

*Surr: 2,4,5,6-TCMX (Surr) Recovery: 81 % Limits: 42-129 % Dilution: 1x*
*Decachlorobiphenyl (Surr) 98 % 65-151 % "*

**Duplicate (6070282-DUP1)** Prepared: 07/12/16 07:21 Analyzed: 07/13/16 10:50 **C-05**

**QC Source Sample: B16_062816_19-21 (A6G0072-04RE1)**

**EPA 8081B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aldrin | ND | --- | 2.52 | ug/kg dry | 1 | --- | ND | --- | --- | --- | 30% | |
| alpha-BHC | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| beta-BHC | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| delta-BHC | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| gamma-BHC (Lindane) | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Organochlorine Pesticides by EPA 8081B

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6070282 - EPA 3546** | | | | | | | **Soil** | | | | | |
| **Duplicate (6070282-DUP1)** | | | | | | Prepared: 07/12/16 07:21 | Analyzed: 07/13/16 10:50 | | | | | **C-05** |
| **QC Source Sample: B16_062816_19-21 (A6G0072-04RE1)** | | | | | | | | | | | | |
| cis-Chlordane | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| trans-Chlordane | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| 4,4'-DDD | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| 4,4'-DDE | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| 4,4'-DDT | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| Dieldrin | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| Endosulfan I | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| Endosulfan II | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| Endosulfan sulfate | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| Endrin | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| Endrin Aldehyde | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| Endrin ketone | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| Heptachlor | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| Heptachlor epoxide | ND | --- | 2.52 | " | " | --- | ND | --- | --- | --- | 30% | |
| Methoxychlor | ND | --- | 7.56 | " | " | --- | ND | --- | --- | --- | 30% | |
| Chlordane (Technical) | ND | --- | 75.6 | " | " | --- | ND | --- | --- | --- | 30% | |
| Toxaphene (Total) | ND | --- | 75.6 | " | " | --- | ND | --- | --- | --- | 30% | |

*Surr: 2,4,5,6-TCMX (Surr) Recovery: 79 % Limits: 42-129 % Dilution: 1x*

*Decachlorobiphenyl (Surr) 81 % 65-151 % "*

| | | |
|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Organochlorine Pesticides by EPA 8081B

**Batch 6070361 - EPA 3546/3640A (GPC)** **Soil**

**Blank (6070361-BLK1)** Prepared: 07/12/16 15:29 Analyzed: 07/14/16 11:45 **C-05**

**EPA 8081B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4,4'-DDD | ND | --- | 1.82 | ug/kg wet | 1 | --- | --- | --- | --- | --- | --- | |
| 4,4'-DDE | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| 4,4'-DDT | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |

*Surr: 2,4,5,6-TCMX (Surr) Recovery: 61 % Limits: 42-129 % Dilution: 1x*
*Decachlorobiphenyl (Surr) 91 % 65-151 % "*

**Blank (6070361-BLK2)** Prepared: 07/12/16 15:29 Analyzed: 08/03/16 19:47 **C-05**

**EPA 8081B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,4'-DDD | ND | --- | 1.82 | ug/kg wet | 1 | --- | --- | --- | --- | --- | --- | |
| 2,4'-DDE | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |
| 2,4'-DDT | ND | --- | 1.82 | " | " | --- | --- | --- | --- | --- | --- | |

**LCS (6070361-BS1)** Prepared: 07/12/16 15:29 Analyzed: 07/14/16 12:02 **C-05**

**EPA 8081B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4,4'-DDD | 49.0 | --- | 2.00 | ug/kg wet | 1 | 50.0 | --- | 98 | 56-139% | --- | --- | |
| 4,4'-DDE | 40.1 | --- | 2.00 | " | " | " | --- | 80 | 56-134% | --- | --- | |
| 4,4'-DDT | 47.1 | --- | 2.00 | " | " | " | --- | 94 | 50-141% | --- | --- | |

*Surr: 2,4,5,6-TCMX (Surr) Recovery: 66 % Limits: 42-129 % Dilution: 1x*
*Decachlorobiphenyl (Surr) 88 % 65-151 % "*

**Matrix Spike (6070361-MS1)** Prepared: 07/12/16 15:29 Analyzed: 07/14/16 13:29 **C-05**

**QC Source Sample: B5_062916_26-28 (A6G0072-43RE1)**

**EPA 8081B**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4,4'-DDD | 64.5 | --- | 2.47 | ug/kg dry | 1 | 61.7 | ND | 105 | 56-139% | --- | --- | |
| 4,4'-DDE | 58.5 | --- | 2.47 | " | " | " | ND | 95 | 56-134% | --- | --- | |
| 4,4'-DDT | 69.7 | --- | 2.47 | " | " | " | ND | 113 | 50-141% | --- | --- | |

*Surr: 2,4,5,6-TCMX (Surr) Recovery: 73 % Limits: 42-129 % Dilution: 1x*
*Decachlorobiphenyl (Surr) 91 % 65-151 % "*

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

**Batch 6070315 - EPA 3546** **Soil**

**Blank (6070315-BLK1)** Prepared: 07/12/16 15:27 Analyzed: 07/13/16 09:42

**EPA 8270D (SIM)**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | ND | --- | 8.33 | ug/kg wet | 1 | --- | --- | --- | --- | --- | --- | |
| Acenaphthylene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Anthracene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Benz(a)anthracene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(a)pyrene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(b)fluoranthene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(k)fluoranthene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(g,h,i)perylene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Chrysene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Dibenz(a,h)anthracene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Fluoranthene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Fluorene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Indeno(1,2,3-cd)pyrene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Naphthalene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Phenanthrene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Pyrene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |

*Surr: 2-Fluorobiphenyl (Surr) Recovery: 98 % Limits: 44-120 % Dilution: 1x*
*p-Terphenyl-d14 (Surr) 102 % 54-127 % "*

**LCS (6070315-BS1)** Prepared: 07/12/16 15:27 Analyzed: 07/13/16 10:11

**EPA 8270D (SIM)**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 637 | --- | 10.0 | ug/kg wet | 1 | 800 | --- | 80 | 40-122% | --- | --- | |
| Acenaphthylene | 621 | --- | 10.0 | " | " | " | --- | 78 | 32-132% | --- | --- | |
| Anthracene | 683 | --- | 10.0 | " | " | " | --- | 85 | 47-123% | --- | --- | |
| Benz(a)anthracene | 622 | --- | 10.0 | " | " | " | --- | 78 | 49-126% | --- | --- | |
| Benzo(a)pyrene | 624 | --- | 10.0 | " | " | " | --- | 78 | 45-129% | --- | --- | |
| Benzo(b)fluoranthene | 600 | --- | 10.0 | " | " | " | --- | 75 | 45-132% | --- | --- | |
| Benzo(k)fluoranthene | 659 | --- | 10.0 | " | " | " | --- | 82 | 47-132% | --- | --- | |
| Benzo(g,h,i)perylene | 527 | --- | 10.0 | " | " | " | --- | 66 | 43-134% | --- | --- | |
| Chrysene | 688 | --- | 10.0 | " | " | " | --- | 86 | 50-124% | --- | --- | |
| Dibenz(a,h)anthracene | 565 | --- | 10.0 | " | " | " | --- | 71 | 45-134% | --- | --- | |

| | | | |
|---|---|---|---|
| **Farallon Consulting** | Project: | **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: | 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: | Mark Havighorst | 08/15/16 17:27 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

**Batch 6070315 - EPA 3546** **Soil**

**LCS (6070315-BS1)** Prepared: 07/12/16 15:27 Analyzed: 07/13/16 10:11

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fluoranthene | 636 | --- | 10.0 | " | " | " | --- | 80 | 50-127% | --- | --- | |
| Fluorene | 636 | --- | 10.0 | " | " | " | --- | 80 | 43-125% | --- | --- | |
| Indeno(1,2,3-cd)pyrene | 668 | --- | 10.0 | " | " | " | --- | 84 | 45-133% | --- | --- | |
| Naphthalene | 627 | --- | 10.0 | " | " | " | --- | 78 | 35-123% | --- | --- | |
| Phenanthrene | 617 | --- | 10.0 | " | " | " | --- | 77 | 50-121% | --- | --- | |
| Pyrene | 638 | --- | 10.0 | " | " | " | --- | 80 | 47-127% | --- | --- | |

*Surr: 2-Fluorobiphenyl (Surr) Recovery: 87 % Limits: 44-120 % Dilution: 1x*

*p-Terphenyl-d14 (Surr) 88 % 54-127 % "*

**Matrix Spike (6070315-MS1)** Prepared: 07/12/16 15:27 Analyzed: 07/13/16 15:34

**QC Source Sample: B37_062816_0-11 (A6G0072-13)**

**EPA 8270D (SIM)**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 626 | --- | 9.80 | ug/kg dry | 1 | 784 | ND | 80 | 40-122% | --- | --- | |
| Acenaphthylene | 630 | --- | 9.80 | " | " | " | 25.7 | 77 | 32-132% | --- | --- | |
| Anthracene | 782 | --- | 9.80 | " | " | " | 76.2 | 90 | 47-123% | --- | --- | |
| Benz(a)anthracene | 791 | --- | 9.80 | " | " | " | 108 | 87 | 49-126% | --- | --- | |
| Benzo(a)pyrene | 796 | --- | 9.80 | " | " | " | 131 | 85 | 45-129% | --- | --- | |
| Benzo(b)fluoranthene | 769 | --- | 9.80 | " | " | " | 150 | 79 | 45-132% | --- | --- | |
| Benzo(k)fluoranthene | 782 | --- | 9.80 | " | " | " | 55.9 | 93 | 47-132% | --- | --- | |
| Benzo(g,h,i)perylene | 609 | --- | 9.80 | " | " | " | 115 | 63 | 43-134% | --- | --- | |
| Chrysene | 827 | --- | 9.80 | " | " | " | 164 | 85 | 50-124% | --- | --- | |
| Dibenz(a,h)anthracene | 636 | --- | 9.80 | " | " | " | 11.4 | 80 | 45-134% | --- | --- | |
| Fluoranthene | 921 | --- | 9.80 | " | " | " | 363 | 71 | 50-127% | --- | --- | |
| Fluorene | 687 | --- | 9.80 | " | " | " | 17.0 | 85 | 43-125% | --- | --- | |
| Indeno(1,2,3-cd)pyrene | 615 | --- | 9.80 | " | " | " | 99.9 | 66 | 45-133% | --- | --- | |
| Naphthalene | 546 | --- | 9.80 | " | " | " | ND | 70 | 35-123% | --- | --- | |
| Phenanthrene | 845 | --- | 9.80 | " | " | " | 328 | 66 | 50-121% | --- | --- | |
| Pyrene | 949 | --- | 9.80 | " | " | " | 423 | 67 | 47-127% | --- | --- | |

*Surr: 2-Fluorobiphenyl (Surr) Recovery: 76 % Limits: 44-120 % Dilution: 1x*

*p-Terphenyl-d14 (Surr) 94 % 54-127 % "*

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

**Batch 6070327 - EPA 3546** **Soil**

**Blank (6070327-BLK1)** Prepared: 07/13/16 06:35 Analyzed: 07/15/16 13:36

**EPA 8270D (SIM)**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | ND | --- | 8.33 | ug/kg wet | 1 | --- | --- | --- | --- | --- | --- | |
| Acenaphthylene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Anthracene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Benz(a)anthracene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(a)pyrene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(b)fluoranthene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(k)fluoranthene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Benzo(g,h,i)perylene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Chrysene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Dibenz(a,h)anthracene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Fluoranthene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Fluorene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Indeno(1,2,3-cd)pyrene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Naphthalene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Phenanthrene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |
| Pyrene | ND | --- | 8.33 | " | " | --- | --- | --- | --- | --- | --- | |

*Surr: 2-Fluorobiphenyl (Surr) Recovery: 89 % Limits: 44-120 % Dilution: 1x*
*p-Terphenyl-d14 (Surr) 126 % 54-127 % "*

**LCS (6070327-BS1)** Prepared: 07/13/16 06:35 Analyzed: 07/15/16 14:05

**EPA 8270D (SIM)**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 712 | --- | 10.0 | ug/kg wet | 1 | 800 | --- | 89 | 40-122% | --- | --- | |
| Acenaphthylene | 692 | --- | 10.0 | " | " | " | --- | 86 | 32-132% | --- | --- | |
| Anthracene | 783 | --- | 10.0 | " | " | " | --- | 98 | 47-123% | --- | --- | |
| Benz(a)anthracene | 683 | --- | 10.0 | " | " | " | --- | 85 | 49-126% | --- | --- | |
| Benzo(a)pyrene | 675 | --- | 10.0 | " | " | " | --- | 84 | 45-129% | --- | --- | |
| Benzo(b)fluoranthene | 707 | --- | 10.0 | " | " | " | --- | 88 | 45-132% | --- | --- | |
| Benzo(k)fluoranthene | 793 | --- | 10.0 | " | " | " | --- | 99 | 47-132% | --- | --- | |
| Benzo(g,h,i)perylene | 581 | --- | 10.0 | " | " | " | --- | 73 | 43-134% | --- | --- | |
| Chrysene | 720 | --- | 10.0 | " | " | " | --- | 90 | 50-124% | --- | --- | |
| Dibenz(a,h)anthracene | 610 | --- | 10.0 | " | " | " | --- | 76 | 45-134% | --- | --- | |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

**Batch 6070327 - EPA 3546** **Soil**

**LCS (6070327-BS1)** Prepared: 07/13/16 06:35 Analyzed: 07/15/16 14:05

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fluoranthene | 752 | --- | 10.0 | " | " | " | --- | 94 | 50-127% | --- | --- | |
| Fluorene | 730 | --- | 10.0 | " | " | " | --- | 91 | 43-125% | --- | --- | |
| Indeno(1,2,3-cd)pyrene | 570 | --- | 10.0 | " | " | " | --- | 71 | 45-133% | --- | --- | |
| Naphthalene | 705 | --- | 10.0 | " | " | " | --- | 88 | 35-123% | --- | --- | |
| Phenanthrene | 720 | --- | 10.0 | " | " | " | --- | 90 | 50-121% | --- | --- | |
| Pyrene | 740 | --- | 10.0 | " | " | " | --- | 93 | 47-127% | --- | --- | |

*Surr: 2-Fluorobiphenyl (Surr) Recovery: 84 % Limits: 44-120 % Dilution: 1x*
*p-Terphenyl-d14 (Surr) 119 % 54-127 % "*

**Matrix Spike (6070327-MS1)** Prepared: 07/13/16 06:35 Analyzed: 07/17/16 00:41

**QC Source Sample: B5_062916_0-26 (A6G0072-42)**
**EPA 8270D (SIM)**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 864 | --- | 11.7 | ug/kg dry | 1 | 939 | ND | 92 | 40-122% | --- | --- | |
| Acenaphthylene | 858 | --- | 11.7 | " | " | " | 38.1 | 87 | 32-132% | --- | --- | |
| Anthracene | 927 | --- | 11.7 | " | " | " | 51.8 | 93 | 47-123% | --- | --- | |
| Benz(a)anthracene | 881 | --- | 11.7 | " | " | " | 72.6 | 86 | 49-126% | --- | --- | |
| Benzo(a)pyrene | 897 | --- | 11.7 | " | " | " | 95.5 | 85 | 45-129% | --- | --- | |
| Benzo(b)fluoranthene | 904 | --- | 11.7 | " | " | " | 173 | 78 | 45-132% | --- | --- | |
| Benzo(k)fluoranthene | 870 | --- | 11.7 | " | " | " | 60.5 | 86 | 47-132% | --- | --- | |
| Benzo(g,h,i)perylene | 582 | --- | 11.7 | " | " | " | 126 | 49 | 43-134% | --- | --- | |
| Chrysene | 924 | --- | 11.7 | " | " | " | 134 | 84 | 50-124% | --- | --- | |
| Dibenz(a,h)anthracene | 697 | --- | 11.7 | " | " | " | 32.4 | 71 | 45-134% | --- | --- | |
| Fluoranthene | 1010 | --- | 11.7 | " | " | " | 154 | 91 | 50-127% | --- | --- | |
| Fluorene | 906 | --- | 11.7 | " | " | " | ND | 96 | 43-125% | --- | --- | |
| Indeno(1,2,3-cd)pyrene | 654 | --- | 11.7 | " | " | " | 164 | 52 | 45-133% | --- | --- | |
| Naphthalene | 815 | --- | 11.7 | " | " | " | 37.6 | 83 | 35-123% | --- | --- | |
| Phenanthrene | 903 | --- | 11.7 | " | " | " | 101 | 85 | 50-121% | --- | --- | |
| Pyrene | 1040 | --- | 11.7 | " | " | " | 151 | 94 | 47-127% | --- | --- | |

*Surr: 2-Fluorobiphenyl (Surr) Recovery: 92 % Limits: 44-120 % Dilution: 1x*
*p-Terphenyl-d14 (Surr) 95 % 54-127 % "*

| | | | |
|---|---|---|---|
| **Farallon Consulting** | Project: | **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: | 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: | Mark Havighorst | 08/15/16 17:27 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6070325 - EPA 3051A** | | | | | | | **Soil** | | | | | |
| **Blank (6070325-BLK1)** | | | | | | Prepared: 07/12/16 18:51 | Analyzed: 07/14/16 21:33 | | | | | |
| **EPA 6020A** | | | | | | | | | | | | |
| Arsenic | ND | --- | 1.00 | mg/kg wet | 10 | --- | --- | --- | --- | --- | --- | |
| Barium | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Cadmium | ND | --- | 0.200 | " | " | --- | --- | --- | --- | --- | --- | |
| Chromium | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Copper | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Lead | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Mercury | ND | --- | 0.0800 | " | " | --- | --- | --- | --- | --- | --- | |
| Selenium | ND | --- | 2.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Silver | ND | --- | 0.200 | " | " | --- | --- | --- | --- | --- | --- | |
| **LCS (6070325-BS1)** | | | | | | Prepared: 07/12/16 18:51 | Analyzed: 07/14/16 21:36 | | | | | |
| **EPA 6020A** | | | | | | | | | | | | |
| Arsenic | 52.0 | --- | 1.00 | mg/kg wet | 10 | 50.0 | --- | 104 | 80-120% | --- | --- | |
| Barium | 52.1 | --- | 1.00 | " | " | " | --- | 104 | " | --- | --- | |
| Cadmium | 52.5 | --- | 0.200 | " | " | " | --- | 105 | " | --- | --- | |
| Chromium | 50.5 | --- | 1.00 | " | " | " | --- | 101 | " | --- | --- | |
| Copper | 51.9 | --- | 1.00 | " | " | " | --- | 104 | " | --- | --- | |
| Lead | 53.5 | --- | 1.00 | " | " | " | --- | 107 | " | --- | --- | |
| Mercury | 1.12 | --- | 0.0800 | " | " | 1.00 | --- | 112 | " | --- | --- | |
| Selenium | 29.0 | --- | 2.00 | " | " | 25.0 | --- | 116 | " | --- | --- | |
| Silver | 26.4 | --- | 0.200 | " | " | " | --- | 106 | " | --- | --- | |
| **Matrix Spike (6070325-MS2)** | | | | | | Prepared: 07/12/16 18:51 | Analyzed: 07/14/16 23:06 | | | | | |
| **QC Source Sample: B50_062916_0-18-1 (A6G0072-20)** | | | | | | | | | | | | |
| **EPA 6020A** | | | | | | | | | | | | |
| Arsenic | 72.9 | --- | 1.39 | mg/kg dry | 10 | 69.5 | 3.36 | 100 | 75-125% | --- | --- | |
| Barium | 178 | --- | 1.39 | " | " | " | 117 | 88 | " | --- | --- | |
| Cadmium | 72.0 | --- | 0.278 | " | " | " | 0.270 | 103 | " | --- | --- | |
| Chromium | 94.1 | --- | 1.39 | " | " | " | 20.1 | 107 | " | --- | --- | |
| Copper | 93.6 | --- | 1.39 | " | " | " | 23.7 | 101 | " | --- | --- | |
| Lead | 85.6 | --- | 1.39 | " | " | " | 19.6 | 95 | " | --- | --- | |

Philip Nerenberg

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 6070325 - EPA 3051A** | | | | | | | **Soil** | | | | | |
| **Matrix Spike (6070325-MS2)** | | | | | | Prepared: 07/12/16 18:51 | Analyzed: 07/14/16 23:06 | | | | | |
| **QC Source Sample: B50_062916_0-18-1 (A6G0072-20)** | | | | | | | | | | | | |
| Mercury | 1.46 | --- | 0.111 | mg/kg dry | " | 1.39 | 0.0906 | 98 | " | --- | --- | |
| Selenium | 39.8 | --- | 2.78 | " | " | 34.7 | ND | 115 | " | --- | --- | |
| Silver | 35.2 | --- | 0.278 | " | " | " | 0.154 | 101 | " | --- | --- | |

Apex Labs

AMENDED REPORT

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

| | | |
|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Total Metals by EPA 6020 (ICPMS)

**Batch 6070334 - EPA 3051A** **Soil**

**Blank (6070334-BLK1)** Prepared: 07/13/16 08:01 Analyzed: 07/15/16 21:03

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EPA 6020A** | | | | | | | | | | | | |
| Arsenic | ND | --- | 1.00 | mg/kg wet | 10 | --- | --- | --- | --- | --- | --- | |
| Barium | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Cadmium | ND | --- | 0.200 | " | " | --- | --- | --- | --- | --- | --- | |
| Chromium | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Copper | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Lead | ND | --- | 0.200 | " | " | --- | --- | --- | --- | --- | --- | |
| Mercury | ND | --- | 0.0800 | " | " | --- | --- | --- | --- | --- | --- | |
| Selenium | ND | --- | 1.00 | " | " | --- | --- | --- | --- | --- | --- | |
| Silver | ND | --- | 0.200 | " | " | --- | --- | --- | --- | --- | --- | |

**LCS (6070334-BS1)** Prepared: 07/13/16 08:01 Analyzed: 07/15/16 21:05

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EPA 6020A** | | | | | | | | | | | | |
| Arsenic | 49.6 | --- | 1.00 | mg/kg wet | 10 | 50.0 | --- | 99 | 80-120% | --- | --- | |
| Barium | 50.2 | --- | 1.00 | " | " | " | --- | 100 | " | --- | --- | |
| Cadmium | 49.6 | --- | 0.200 | " | " | " | --- | 99 | " | --- | --- | |
| Chromium | 50.1 | --- | 1.00 | " | " | " | --- | 100 | " | --- | --- | |
| Copper | 50.4 | --- | 1.00 | " | " | " | --- | 101 | " | --- | --- | |
| Lead | 51.0 | --- | 0.200 | " | " | " | --- | 102 | " | --- | --- | |
| Mercury | 1.07 | --- | 0.0800 | " | " | 1.00 | --- | 107 | " | --- | --- | |
| Selenium | 26.4 | --- | 1.00 | " | " | 25.0 | --- | 106 | " | --- | --- | |
| Silver | 24.9 | --- | 0.200 | " | " | " | --- | 100 | " | --- | --- | |

Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Philip Nerenberg

Philip Nerenberg, Lab Director

| | | |
|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## QUALITY CONTROL (QC) SAMPLE RESULTS

### Percent Dry Weight

**Batch 6070122 - Total Solids (Dry Weight)** **Soil**

**Duplicate (6070122-DUP3)** Prepared: 07/06/16 12:47 Analyzed: 07/07/16 09:05

**QC Source Sample: B50_062916_0-18-1 (A6G0072-20)**

**EPA 8000C**

| Analyte | Result | MDL | Reporting Limit | Units | Dil. | Spike Amount | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % Solids | **78.9** | --- | 1.00 | % by Weight | 1 | --- | 79.3 | --- | --- | 0.5 | 10% | |

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

Philip Nerenberg

Philip Nerenberg, Lab Director

| **Farallon Consulting** | Project: | **Linnton Mill** | |
|---|---|---|---|
| 4380 SW Macadam Ave #500 | Project Number: | 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: | Mark Havighorst | 08/15/16 17:27 |

## SAMPLE PREPARATION INFORMATION

### Diesel and/or Oil Hydrocarbons by NWTPH-Dx with Silica Gel Cleanup

**Prep: EPA 3546 (Fuels) w/Silica Gel+Acid (NWTPH)**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 6070089 | | | | | | | |
| A6G0072-03 | Soil | NWTPH-Dx/SG | 06/28/16 15:00 | 07/05/16 15:17 | 11.85g/5mL | 10g/5mL | 0.84 |
| A6G0072-04 | Soil | NWTPH-Dx/SG | 06/28/16 15:00 | 07/05/16 15:17 | 11.68g/5mL | 10g/5mL | 0.86 |
| A6G0072-05 | Soil | NWTPH-Dx/SG | 06/28/16 15:10 | 07/05/16 15:17 | 10.72g/5mL | 10g/5mL | 0.93 |
| A6G0072-06 | Soil | NWTPH-Dx/SG | 06/28/16 15:10 | 07/05/16 15:17 | 10.46g/5mL | 10g/5mL | 0.96 |
| A6G0072-09 | Soil | NWTPH-Dx/SG | 06/28/16 15:40 | 07/05/16 15:17 | 10.77g/5mL | 10g/5mL | 0.93 |
| A6G0072-10 | Soil | NWTPH-Dx/SG | 06/28/16 15:40 | 07/05/16 15:17 | 10.77g/5mL | 10g/5mL | 0.93 |
| A6G0072-13 | Soil | NWTPH-Dx/SG | 06/28/16 16:20 | 07/05/16 15:17 | 11.46g/5mL | 10g/5mL | 0.87 |
| A6G0072-14 | Soil | NWTPH-Dx/SG | 06/28/16 16:20 | 07/05/16 15:17 | 10.37g/5mL | 10g/5mL | 0.96 |
| A6G0072-19 | Soil | NWTPH-Dx/SG | 06/29/16 08:40 | 07/05/16 15:17 | 11.73g/5mL | 10g/5mL | 0.85 |
| A6G0072-20 | Soil | NWTPH-Dx/SG | 06/29/16 08:40 | 07/05/16 15:18 | 11.28g/5mL | 10g/5mL | 0.89 |
| A6G0072-21 | Soil | NWTPH-Dx/SG | 06/29/16 08:40 | 07/05/16 15:18 | 10.13g/5mL | 10g/5mL | 0.99 |
| A6G0072-22 | Soil | NWTPH-Dx/SG | 06/29/16 08:40 | 07/05/16 15:18 | 11.52g/5mL | 10g/5mL | 0.87 |
| A6G0072-27 | Soil | NWTPH-Dx/SG | 06/29/16 09:30 | 07/05/16 15:18 | 11.51g/5mL | 10g/5mL | 0.87 |
| A6G0072-28 | Soil | NWTPH-Dx/SG | 06/29/16 09:30 | 07/05/16 15:18 | 11.23g/5mL | 10g/5mL | 0.89 |
| A6G0072-31 | Soil | NWTPH-Dx/SG | 06/29/16 10:00 | 07/05/16 15:18 | 10.89g/5mL | 10g/5mL | 0.92 |
| A6G0072-32 | Soil | NWTPH-Dx/SG | 06/29/16 10:00 | 07/05/16 15:18 | 11.64g/5mL | 10g/5mL | 0.86 |
| Batch: 6070141 | | | | | | | |
| A6G0072-37 | Soil | NWTPH-Dx/SG | 06/29/16 10:40 | 07/06/16 17:38 | 10.67g/5mL | 10g/5mL | 0.94 |
| A6G0072-38 | Soil | NWTPH-Dx/SG | 06/29/16 10:40 | 07/06/16 17:38 | 10.95g/5mL | 10g/5mL | 0.91 |
| A6G0072-42 | Soil | NWTPH-Dx/SG | 06/29/16 11:30 | 07/06/16 17:38 | 11.8g/5mL | 10g/5mL | 0.85 |
| A6G0072-43 | Soil | NWTPH-Dx/SG | 06/29/16 11:30 | 07/06/16 17:38 | 11.45g/5mL | 10g/5mL | 0.87 |

### Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

**Prep: EPA 5035A**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 6070105 | | | | | | | |
| A6G0072-04 | Soil | NWTPH-Gx (MS) | 06/28/16 15:00 | 06/28/16 15:00 | 6.44g/5mL | 5g/5mL | 0.78 |
| A6G0072-06 | Soil | NWTPH-Gx (MS) | 06/28/16 15:10 | 06/28/16 15:10 | 5.66g/5mL | 5g/5mL | 0.88 |
| A6G0072-09 | Soil | NWTPH-Gx (MS) | 06/28/16 15:40 | 06/28/16 15:40 | 5.35g/5mL | 5g/5mL | 0.94 |
| A6G0072-10 | Soil | NWTPH-Gx (MS) | 06/28/16 15:40 | 06/28/16 15:40 | 5.56g/5mL | 5g/5mL | 0.90 |
| Batch: 6070113 | | | | | | | |
| A6G0072-03 | Soil | NWTPH-Gx (MS) | 06/28/16 15:00 | 06/28/16 15:00 | 6.66g/5mL | 5g/5mL | 0.75 |
| A6G0072-05 | Soil | NWTPH-Gx (MS) | 06/28/16 15:10 | 06/28/16 15:10 | 5.104g/5mL | 5g/5mL | 0.98 |

| | | |
|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## SAMPLE PREPARATION INFORMATION

### Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

**Prep: EPA 5035A**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| A6G0072-13 | Soil | NWTPH-Gx (MS) | 06/28/16 16:20 | 06/28/16 16:20 | 5.71g/5mL | 5g/5mL | 0.88 |
| A6G0072-14 | Soil | NWTPH-Gx (MS) | 06/28/16 16:20 | 06/28/16 16:20 | 5.25g/5mL | 5g/5mL | 0.95 |
| A6G0072-19 | Soil | NWTPH-Gx (MS) | 06/29/16 08:40 | 06/29/16 08:40 | 6.26g/5mL | 5g/5mL | 0.80 |
| A6G0072-20 | Soil | NWTPH-Gx (MS) | 06/29/16 08:40 | 06/29/16 08:40 | 6.63g/5mL | 5g/5mL | 0.75 |
| A6G0072-21 | Soil | NWTPH-Gx (MS) | 06/29/16 08:40 | 06/29/16 08:40 | 5.97g/5mL | 5g/5mL | 0.84 |
| A6G0072-22 | Soil | NWTPH-Gx (MS) | 06/29/16 08:40 | 06/29/16 08:40 | 6.29g/5mL | 5g/5mL | 0.80 |
| A6G0072-27 | Soil | NWTPH-Gx (MS) | 06/29/16 09:30 | 06/29/16 09:30 | 6.28g/5mL | 5g/5mL | 0.80 |
| A6G0072-28 | Soil | NWTPH-Gx (MS) | 06/29/16 09:30 | 06/29/16 09:30 | 6.02g/5mL | 5g/5mL | 0.83 |
| A6G0072-31 | Soil | NWTPH-Gx (MS) | 06/29/16 10:00 | 06/29/16 10:00 | 6.49g/5mL | 5g/5mL | 0.77 |
| A6G0072-32 | Soil | NWTPH-Gx (MS) | 06/29/16 10:00 | 06/29/16 10:00 | 6.83g/5mL | 5g/5mL | 0.73 |
| A6G0072-37 | Soil | NWTPH-Gx (MS) | 06/29/16 10:40 | 06/29/16 10:40 | 6.73g/5mL | 5g/5mL | 0.74 |
| A6G0072-38 | Soil | NWTPH-Gx (MS) | 06/29/16 10:40 | 06/29/16 10:40 | 6.6g/5mL | 5g/5mL | 0.76 |
| A6G0072-42 | Soil | NWTPH-Gx (MS) | 06/29/16 11:30 | 06/29/16 11:30 | 6g/5mL | 5g/5mL | 0.83 |
| A6G0072-43 | Soil | NWTPH-Gx (MS) | 06/29/16 11:30 | 06/29/16 11:30 | 6.35g/5mL | 5g/5mL | 0.79 |

### BTEX Compounds by EPA 8260B

**Prep: EPA 5035A**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 6070113 | | | | | | | |
| A6G0072-28 | Soil | 5035/8260B | 06/29/16 09:30 | 06/29/16 09:30 | 6.02g/5mL | 5g/5mL | 0.83 |

### Polychlorinated Biphenyls by EPA 8082A

**Prep: EPA 3546**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 6070313 | | | | | | | |
| A6G0072-03 | Soil | EPA 8082A | 06/28/16 15:00 | 07/12/16 14:59 | 10.17g/5mL | 10g/5mL | 0.98 |
| A6G0072-13 | Soil | EPA 8082A | 06/28/16 16:20 | 07/12/16 14:59 | 10.56g/5mL | 10g/5mL | 0.95 |
| A6G0072-20 | Soil | EPA 8082A | 06/29/16 08:40 | 07/12/16 14:59 | 10.47g/5mL | 10g/5mL | 0.96 |
| A6G0072-21 | Soil | EPA 8082A | 06/29/16 08:40 | 07/12/16 14:59 | 10.74g/5mL | 10g/5mL | 0.93 |
| A6G0072-22 | Soil | EPA 8082A | 06/29/16 08:40 | 07/12/16 14:59 | 10.69g/5mL | 10g/5mL | 0.94 |
| A6G0072-28 | Soil | EPA 8082A | 06/29/16 09:30 | 07/12/16 14:59 | 10.4g/5mL | 10g/5mL | 0.96 |
| A6G0072-31 | Soil | EPA 8082A | 06/29/16 10:00 | 07/12/16 14:59 | 10.5g/5mL | 10g/5mL | 0.95 |
| A6G0072-32 | Soil | EPA 8082A | 06/29/16 10:00 | 07/12/16 14:59 | 10.81g/5mL | 10g/5mL | 0.93 |
| A6G0072-42 | Soil | EPA 8082A | 06/29/16 11:30 | 07/12/16 14:59 | 10.42g/5mL | 10g/5mL | 0.96 |

## SAMPLE PREPARATION INFORMATION

### Organochlorine Pesticides by EPA 8081B

**Prep: EPA 3546**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 6070282 | | | | | | | |
| A6G0072-04RE1 | Soil | EPA 8081B | 06/28/16 15:00 | 07/11/16 08:39 | 10.59g/10mL | 10g/5mL | 1.89 |
| A6G0072-04RE1 | Soil | EPA 8081B | 06/28/16 15:00 | 07/12/16 07:21 | 10.59g/10mL | 10g/5mL | 1.89 |
| A6G0072-28RE1 | Soil | EPA 8081B | 06/29/16 09:30 | 07/11/16 08:39 | 10.52g/10mL | 10g/5mL | 1.90 |
| A6G0072-28RE1 | Soil | EPA 8081B | 06/29/16 09:30 | 07/12/16 07:21 | 10.52g/10mL | 10g/5mL | 1.90 |

**Prep: EPA 3546/3640A (GPC)**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 6070361 | | | | | | | |
| A6G0072-38RE1 | Soil | EPA 8081B | 06/29/16 10:40 | 07/12/16 15:29 | 9.8g/10mL | 10g/5mL | 2.04 |
| A6G0072-43RE1 | Soil | EPA 8081B | 06/29/16 11:30 | 07/12/16 15:29 | 10.67g/10mL | 10g/5mL | 1.87 |
| A6G0072-43RE2 | Soil | EPA 8081B | 06/29/16 11:30 | 07/12/16 15:29 | 10.67g/10mL | 10g/5mL | 1.87 |

### Polyaromatic Hydrocarbons (PAHs) by EPA 8270D SIM

**Prep: EPA 3546**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 6070315 | | | | | | | |
| A6G0072-03 | Soil | EPA 8270D (SIM) | 06/28/16 15:00 | 07/12/16 15:27 | 11.56g/5mL | 10g/5mL | 0.87 |
| A6G0072-13 | Soil | EPA 8270D (SIM) | 06/28/16 16:20 | 07/12/16 15:27 | 11.94g/5mL | 10g/5mL | 0.84 |
| Batch: 6070327 | | | | | | | |
| A6G0072-20 | Soil | EPA 8270D (SIM) | 06/29/16 08:40 | 07/13/16 06:35 | 11.03g/5mL | 10g/5mL | 0.91 |
| A6G0072-21 | Soil | EPA 8270D (SIM) | 06/29/16 08:40 | 07/13/16 06:35 | 11.25g/5mL | 10g/5mL | 0.89 |
| A6G0072-22 | Soil | EPA 8270D (SIM) | 06/29/16 08:40 | 07/13/16 06:35 | 11.15g/5mL | 10g/5mL | 0.90 |
| A6G0072-28 | Soil | EPA 8270D (SIM) | 06/29/16 09:30 | 07/13/16 06:35 | 10.86g/5mL | 10g/5mL | 0.92 |
| A6G0072-31 | Soil | EPA 8270D (SIM) | 06/29/16 10:00 | 07/13/16 06:35 | 11.55g/5mL | 10g/5mL | 0.87 |
| A6G0072-32 | Soil | EPA 8270D (SIM) | 06/29/16 10:00 | 07/13/16 06:35 | 11.49g/5mL | 10g/5mL | 0.87 |
| A6G0072-42 | Soil | EPA 8270D (SIM) | 06/29/16 11:30 | 07/13/16 06:35 | 10.93g/5mL | 10g/5mL | 0.92 |

### Total Metals by EPA 6020 (ICPMS)

**Prep: EPA 3051A**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 6070325 | | | | | | | |
| A6G0072-03 | Soil | EPA 6020A | 06/28/16 15:00 | 07/12/16 18:51 | 0.46g/50mL | 0.5g/50mL | 1.09 |
| A6G0072-04 | Soil | EPA 6020A | 06/28/16 15:00 | 07/12/16 18:51 | 0.501g/50mL | 0.5g/50mL | 1.00 |

## SAMPLE PREPARATION INFORMATION

### Total Metals by EPA 6020 (ICPMS)

**Prep: EPA 3051A**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| A6G0072-05 | Soil | EPA 6020A | 06/28/16 15:10 | 07/12/16 18:51 | 0.475g/50mL | 0.5g/50mL | 1.05 |
| A6G0072-06 | Soil | EPA 6020A | 06/28/16 15:10 | 07/12/16 18:51 | 0.507g/50mL | 0.5g/50mL | 0.99 |
| A6G0072-09 | Soil | EPA 6020A | 06/28/16 15:40 | 07/12/16 18:51 | 0.502g/50mL | 0.5g/50mL | 1.00 |
| A6G0072-10 | Soil | EPA 6020A | 06/28/16 15:40 | 07/12/16 18:51 | 0.496g/50mL | 0.5g/50mL | 1.01 |
| A6G0072-13 | Soil | EPA 6020A | 06/28/16 16:20 | 07/12/16 18:51 | 0.515g/50mL | 0.5g/50mL | 0.97 |
| A6G0072-14 | Soil | EPA 6020A | 06/28/16 16:20 | 07/12/16 18:51 | 0.467g/50mL | 0.5g/50mL | 1.07 |
| A6G0072-19 | Soil | EPA 6020A | 06/29/16 08:40 | 07/12/16 18:51 | 0.482g/50mL | 0.5g/50mL | 1.04 |
| A6G0072-20 | Soil | EPA 6020A | 06/29/16 08:40 | 07/12/16 18:51 | 0.49g/50mL | 0.5g/50mL | 1.02 |
| Batch: 6070334 | | | | | | | |
| A6G0072-21 | Soil | EPA 6020A | 06/29/16 08:40 | 07/13/16 08:01 | 0.483g/50mL | 0.5g/50mL | 1.04 |
| A6G0072-22 | Soil | EPA 6020A | 06/29/16 08:40 | 07/13/16 08:01 | 0.484g/50mL | 0.5g/50mL | 1.03 |
| A6G0072-27 | Soil | EPA 6020A | 06/29/16 09:30 | 07/13/16 08:01 | 0.506g/50mL | 0.5g/50mL | 0.99 |
| A6G0072-28 | Soil | EPA 6020A | 06/29/16 09:30 | 07/13/16 08:01 | 0.501g/50mL | 0.5g/50mL | 1.00 |
| A6G0072-31 | Soil | EPA 6020A | 06/29/16 10:00 | 07/13/16 08:01 | 0.505g/50mL | 0.5g/50mL | 0.99 |
| A6G0072-32 | Soil | EPA 6020A | 06/29/16 10:00 | 07/13/16 08:01 | 0.503g/50mL | 0.5g/50mL | 0.99 |
| A6G0072-37 | Soil | EPA 6020A | 06/29/16 10:40 | 07/13/16 08:01 | 0.483g/50mL | 0.5g/50mL | 1.04 |
| A6G0072-38 | Soil | EPA 6020A | 06/29/16 10:40 | 07/13/16 08:01 | 0.502g/50mL | 0.5g/50mL | 1.00 |
| A6G0072-42 | Soil | EPA 6020A | 06/29/16 11:30 | 07/13/16 08:01 | 0.482g/50mL | 0.5g/50mL | 1.04 |
| A6G0072-43 | Soil | EPA 6020A | 06/29/16 11:30 | 07/13/16 08:01 | 0.515g/50mL | 0.5g/50mL | 0.97 |

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| Batch: 6070122 | | | | | | | |
| A6G0072-03 | Soil | EPA 8000C | 06/28/16 15:00 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-04 | Soil | EPA 8000C | 06/28/16 15:00 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-05 | Soil | EPA 8000C | 06/28/16 15:10 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-06 | Soil | EPA 8000C | 06/28/16 15:10 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-09 | Soil | EPA 8000C | 06/28/16 15:40 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-10 | Soil | EPA 8000C | 06/28/16 15:40 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-13 | Soil | EPA 8000C | 06/28/16 16:20 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-14 | Soil | EPA 8000C | 06/28/16 16:20 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-19 | Soil | EPA 8000C | 06/29/16 08:40 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-20 | Soil | EPA 8000C | 06/29/16 08:40 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |

Apex Labs

AMENDED REPORT

**12232 S.W. Garden Place**
**Tigard, OR 97223**
**503-718-2323 Phone**
**503-718-0333 Fax**

|  |  |  |
|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** |  |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |

## SAMPLE PREPARATION INFORMATION

### Percent Dry Weight

**Prep: Total Solids (Dry Weight)**

| Lab Number | Matrix | Method | Sampled | Prepared | Sample Initial/Final | Default Initial/Final | RL Prep Factor |
|---|---|---|---|---|---|---|---|
| A6G0072-21 | Soil | EPA 8000C | 06/29/16 08:40 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-22 | Soil | EPA 8000C | 06/29/16 08:40 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-27 | Soil | EPA 8000C | 06/29/16 09:30 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-28 | Soil | EPA 8000C | 06/29/16 09:30 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-31 | Soil | EPA 8000C | 06/29/16 10:00 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-32 | Soil | EPA 8000C | 06/29/16 10:00 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-37 | Soil | EPA 8000C | 06/29/16 10:40 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-38 | Soil | EPA 8000C | 06/29/16 10:40 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-42 | Soil | EPA 8000C | 06/29/16 11:30 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |
| A6G0072-43 | Soil | EPA 8000C | 06/29/16 11:30 | 07/06/16 12:47 | 1N/A/1N/A | 1N/A/1N/A | NA |

Apex Laboratories

Philip Nerenberg

Philip Nerenberg, Lab Director

## Notes and Definitions

Qualifiers:

| | |
|---|---|
| C-05 | Extract has undergone a GPC (Gel-Permeation Chromatography) cleanup per EPA 3640A. Reporting levels may be raised due to dilution necessary for cleanup. Sample Final Volume includes the GPC dilution factor, see the Prep page for details. |
| C-07 | Extract has undergone Sulfuric Acid Cleanup by EPA 3665A, Sulfur Cleanup by EPA 3660B, and Florisil Cleanup by EPA 3620B in order to minimize matrix interference. |
| F-03 | The result for this hydrocarbon range is elevated due to the presence of individual analyte peaks in the quantitation range that are not representative of the fuel pattern reported. |
| F-12 | The result for this hydrocarbon range is primarily due to the presence of individual analyte peaks in the quantitation range. No fuel pattern detected. |
| F-13 | The chromatographic pattern does not resemble the fuel standard used for quantitation |
| M-02 | Due to matrix interference, this analyte cannot be accurately quantified. The reported result is estimated. |
| P-10 | Result estimated due to the presence of multiple PCB Aroclors and/or matrix interference. |
| Q-05 | Analyses are not controlled on RPD values from sample and duplicate concentrations that are below 5 times the reporting level. |
| Q-41 | Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high. |
| V-15 | Sample aliquot was subsampled from the sample container. The subsampled aliquot was preserved in the laboratory within 48 hours of sampling. |

Notes and Conventions:

| | |
|---|---|
| DET | Analyte DETECTED |
| ND | Analyte NOT DETECTED at or above the reporting limit |
| NR | Not Reported |
| dry | Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry'designation are not dry weight corrected. |
| RPD | Relative Percent Difference |
| MDL | If MDL is not listed, data has been evaluated to the Method Reporting Limit only. |
| WMSC | Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C. |
| Batch QC | Unless specifically requested, this report contains only results for Batch QC derived from client samples included in this report. All analyses were performed with the appropriate Batch QC (including Sample Duplicates, Matrix Spikes and/or Matrix Spike Duplicates) in order to meet or exceed method and regulatory requirements. Any exceptions to this will be qualified in this report. Complete Batch QC results are available upon request. In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis. |
| Blank Policy | Apex assesses blank data for potential high bias down to a level equal to ½ the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.<br>For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor. |

Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.

| | |
|---|---|
| --- | QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc. |
| *** | Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND). |

# Apex Labs

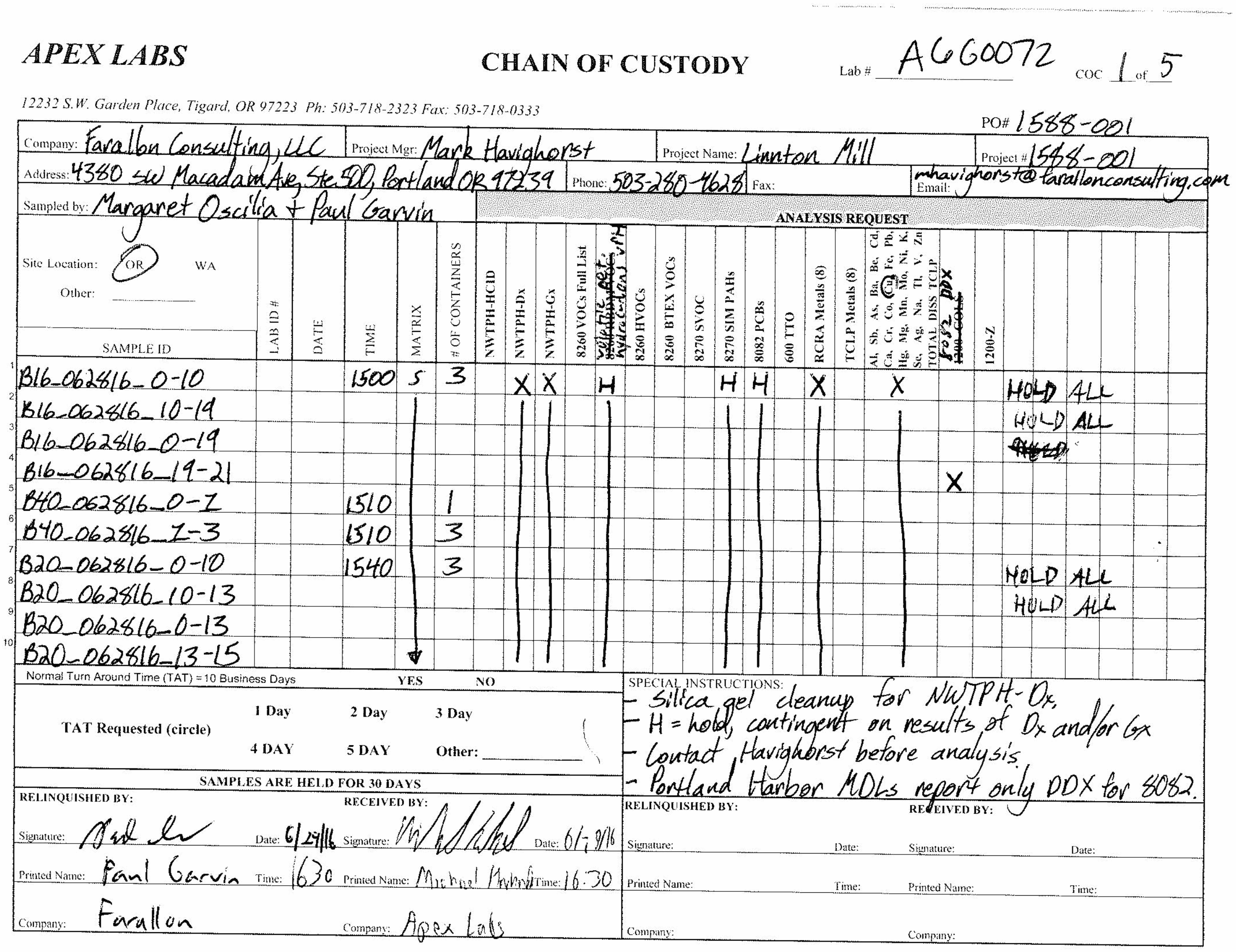
AMENDED REPORT

**12232 S.W. Garden Place**
**Tigard, OR 97223**
**503-718-2323 Phone**
**503-718-0333 Fax**

**Farallon Consulting**
4380 SW Macadam Ave #500
Portland, OR 97239

Project: **Linnton Mill**
Project Number: 1588-001
Project Manager: Mark Havighorst

**Reported:**
08/15/16 17:27



***APEX LABS*** **CHAIN OF CUSTODY** Lab # A6G0072 COC 1 of 5

*12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333*

PO# 1588-001

Company: Farallon Consulting, LLC
Project Mgr: Mark Havighorst
Project Name: Linnton Mill
Project # 1588-001
Address: 4380 SW Macadam Ave, Ste 500, Portland OR 97239
Phone: 503-280-4628
Fax:
Email: mhavighorst@farallonconsulting.com
Sampled by: Margaret Oscilia + Paul Garvin

Site Location: [✓ OR] WA
Other:

**ANALYSIS REQUEST**

| | SAMPLE ID | LAB ID # | DATE | TIME | MATRIX | # OF CONTAINERS | NWTPH-HCID | NWTPH-Dx | NWTPH-Gx | 8260 VOCs Full List | volatile pet. hydrocarbons VPH ~~8260 RBDM VOCs~~ | 8260 HVOCs | 8260 BTEX VOCs | 8270 SVOC | 8270 SIM PAHs | 8082 PCBs | 600 TTO | RCRA Metals (8) | TCLP Metals (8) | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS TCLP | 8082 PDX ~~1200 COLS~~ | 1200-Z | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B16_062816_0-10 | | | 1500 | S | 3 | | X | X | | H | | | | H | H | | X | | X | | | HOLD | ALL |
| 2 | B16_062816_10-19 | | | | ↓ | | | ↓ | ↓ | | ↓ | | | | ↓ | ↓ | | ↓ | | ↓ | | | HOLD | ALL |
| 3 | B16_062816_0-19 | | | | ↓ | | | ↓ | ↓ | | ↓ | | | | ↓ | ↓ | | ↓ | | ↓ | | | ~~HOLD~~ | |
| 4 | B16_062816_19-21 | | | | ↓ | | | ↓ | ↓ | | ↓ | | | | ↓ | ↓ | | ↓ | | ↓ | X | | | |
| 5 | B40_062816_0-1 | | | 1510 | ↓ | 1 | | ↓ | ↓ | | ↓ | | | | ↓ | ↓ | | ↓ | | ↓ | | | | |
| 6 | B40_062816_1-3 | | | 1510 | ↓ | 3 | | ↓ | ↓ | | ↓ | | | | ↓ | ↓ | | ↓ | | ↓ | | | | |
| 7 | B20_062816_0-10 | | | 1540 | ↓ | 3 | | ↓ | ↓ | | ↓ | | | | ↓ | ↓ | | ↓ | | ↓ | | | HOLD | ALL |
| 8 | B20_062816_10-13 | | | | ↓ | | | ↓ | ↓ | | ↓ | | | | ↓ | ↓ | | ↓ | | ↓ | | | HOLD | ALL |
| 9 | B20_062816_0-13 | | | | ↓ | | | ↓ | ↓ | | ↓ | | | | ↓ | ↓ | | ↓ | | ↓ | | | | |
| 10 | B20_062816_13-15 | | | | ↓ | | | ↓ | ↓ | | ↓ | | | | ↓ | ↓ | | ↓ | | ↓ | | | | |

Normal Turn Around Time (TAT) = 10 Business Days YES NO

**TAT Requested (circle)** **1 Day** **2 Day** **3 Day** **4 DAY** **5 DAY** **Other:** ____

**SAMPLES ARE HELD FOR 30 DAYS**

SPECIAL INSTRUCTIONS:
- Silica gel cleanup for NWTPH-Dx.
- H = hold, contingent on results of Dx and/or Gx
- Contact Havighorst before analysis.
- Portland Harbor MDLs report only DDX for 8082.

**RELINQUISHED BY:**
Signature: Date: 6/29/16
Printed Name: Paul Garvin Time: 1630
Company: Farallon

**RECEIVED BY:**
Signature: Date: 6/29/16
Printed Name: Michael [illegible] Time: 16:30
Company: Apex Labs

**RELINQUISHED BY:**
Signature: Date:
Printed Name: Time:
Company:

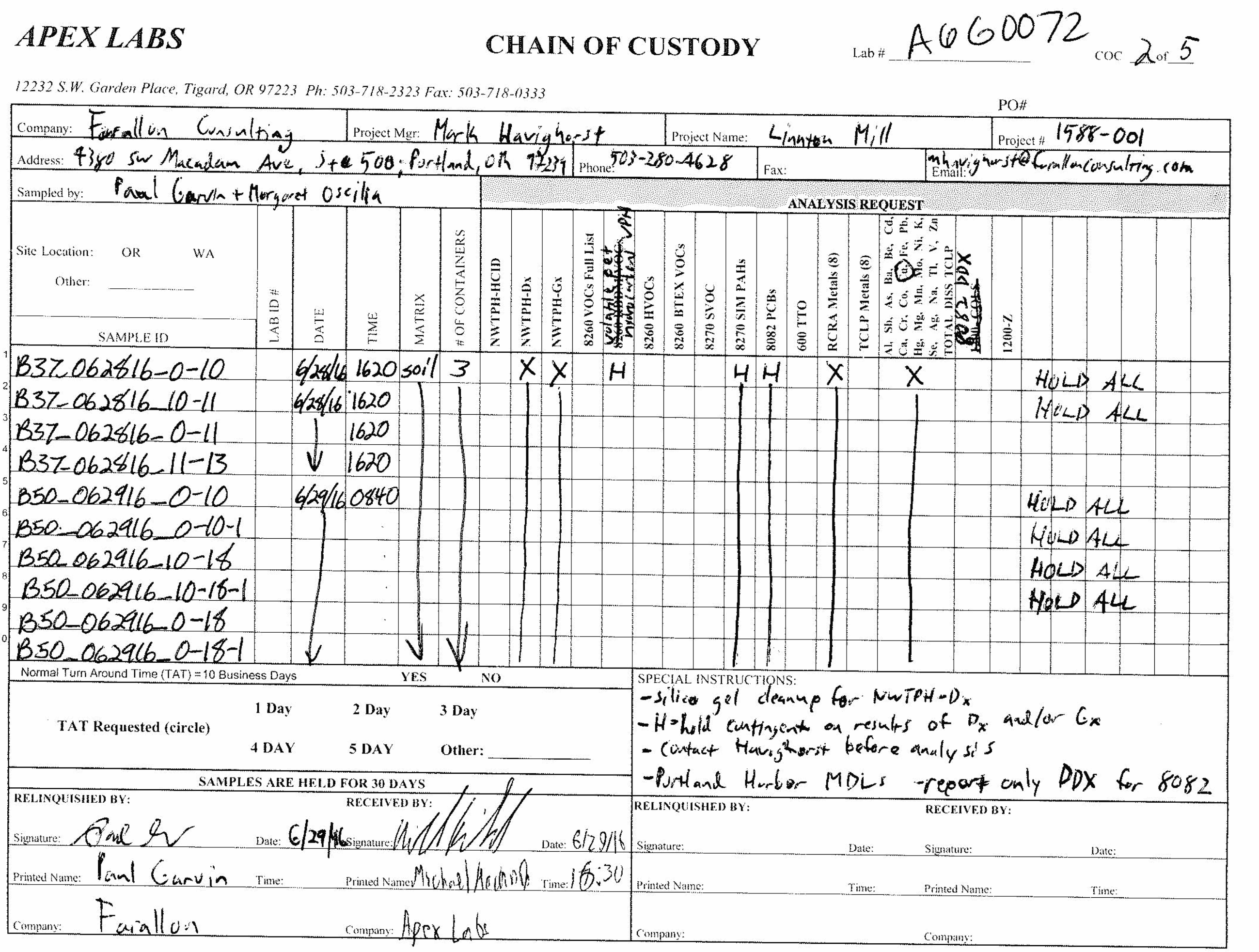
**RECEIVED BY:**
Signature: Date:
Printed Name: Time:
Company:

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Philip Nerenberg

Philip Nerenberg, Lab Director

|  |  |  |
|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** |  |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |



**APEX LABS**

**CHAIN OF CUSTODY**

Lab # A6G0072 COC 2 of 5

*12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333*

PO#

Company: Farallon Consulting
Project Mgr: Mark Havighorst
Project Name: Linnton Mill
Project # 1588-001
Address: 4380 SW Macadam Ave, Ste 500, Portland, OR 97239
Phone: 503-280-4628
Fax:
Email: mhavighorst@farallonconsulting.com
Sampled by: Paul Garvin + Margaret Oscilia

Site Location: OR WA
Other: ________

**ANALYSIS REQUEST**

| # | SAMPLE ID | LAB ID # | DATE | TIME | MATRIX | # OF CONTAINERS | NWTPH-HCID | NWTPH-Dx | NWTPH-Gx | 8260 VOCs Full List | volatile pet hydrocarbon VPH ~~8260 RBDM VOCs~~ | 8260 HVOCs | 8260 BTEX VOCs | 8270 SVOC | 8270 SIM PAHs | 8082 PCBs | 600 TTO | RCRA Metals (8) | TCLP Metals (8) | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS TCLP | 8082 DDX | 1200-Z |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B37_062816-0-10 |  | 6/28/16 | 1620 | soil | 3 |  | X | X |  | H |  |  |  | H | H |  | X |  | X |  |  | HOLD ALL |
| 2 | B37_062816_10-11 |  | 6/28/16 | 1620 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | HOLD ALL |
| 3 | B37_062816-0-11 |  |  | 1620 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 | B37_062816_11-13 |  |  | 1620 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5 | B50_062916_0-10 |  | 6/29/16 | 0840 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | HOLD ALL |
| 6 | B50_062916_0-10-1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | HOLD ALL |
| 7 | B50_062916_10-18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | HOLD ALL |
| 8 | B50_062916_10-18-1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | HOLD ALL |
| 9 | B50_062916_0-18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | HOLD ALL |
| 10 | B50_062916_0-18-1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

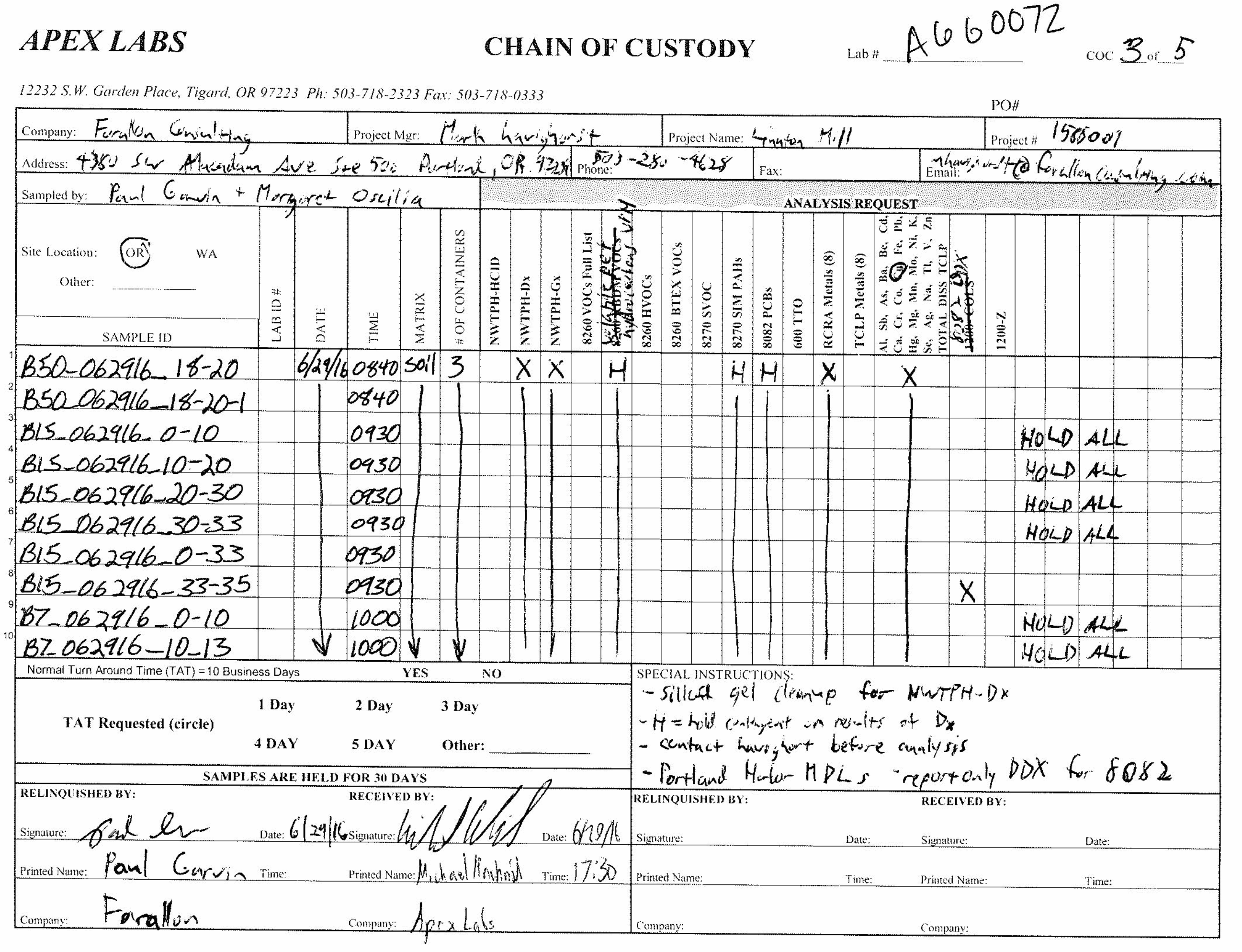
Normal Turn Around Time (TAT) = 10 Business Days YES NO

TAT Requested (circle) 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: ________

SPECIAL INSTRUCTIONS:
-silica gel cleanup for NWTPH-Dx
-H=hold contingent on results of Dx and/or Gx
- Contact Havighorst before analysis
-Portland Harbor MDLs -report only DDX for 8082

**SAMPLES ARE HELD FOR 30 DAYS**

|  |  |  |  |
|---|---|---|---|
| **RELINQUISHED BY:** | **RECEIVED BY:** | **RELINQUISHED BY:** | **RECEIVED BY:** |
| Signature: Paul G Date: 6/29/16 | Signature: Date: 6/29/16 | Signature: Date: | Signature: Date: |
| Printed Name: Paul Garvin Time: | Printed Name: Michael Holland Time: 16:30 | Printed Name: Time: | Printed Name: Time: |
| Company: Farallon | Company: Apex Lab | Company: | Company: |



**APEX LABS**

**CHAIN OF CUSTODY**

Lab # A660072

COC 3 of 5

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

PO#

Company: Farallon Consulting
Project Mgr: Mark Havighorst
Project Name: Linnton Mill
Project # 1588001
Address: 4380 SW Macadam Ave Ste 500 Portland, OR 97239
Phone: 503-280-4628
Fax:
Email: mhavighorst@farallonconsulting.com
Sampled by: Paul Garvin + Margaret Oscilia
Site Location: [✓ OR] WA
Other:

ANALYSIS REQUEST

| | SAMPLE ID | LAB ID # | DATE | TIME | MATRIX | # OF CONTAINERS | NWTPH-HCID | NWTPH-Dx | NWTPH-Gx | 8260 VOCs Full List | ~~8260 RBDM VOCs~~ volatile pet hydrocarbons VPH | 8260 HVOCs | 8260 BTEX VOCs | 8270 SVOC | 8270 SIM PAHs | 8082 PCBs | 600 TTO | RCRA Metals (8) | TCLP Metals (8) | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS TCLP | ~~1300 COLS~~ 8082 DDX | 1200-Z | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B50-062916_18-20 | | 6/29/16 | 0840 | soil | 3 | | X | X | | H | | | | H | H | | X | | X | | | | | | | | |
| 2 | B50_062916_18-20-1 | | \| | 0840 | \| | \| | | \| | \| | | \| | | | | \| | \| | | \| | | \| | | | | | | | | |
| 3 | B15_062916_0-10 | | \| | 0930 | \| | \| | | \| | \| | | \| | | | | \| | \| | | \| | | \| | | | HOLD | ALL | | | | |
| 4 | B15_062916_10-20 | | \| | 0930 | \| | \| | | \| | \| | | \| | | | | \| | \| | | \| | | \| | | | HOLD | ALL | | | | |
| 5 | B15_062916_20-30 | | \| | 0930 | \| | \| | | \| | \| | | \| | | | | \| | \| | | \| | | \| | | | HOLD | ALL | | | | |
| 6 | B15_062916_30-33 | | \| | 0930 | \| | \| | | \| | \| | | \| | | | | \| | \| | | \| | | \| | | | HOLD | ALL | | | | |
| 7 | B15_062916_0-33 | | \| | 0930 | \| | \| | | \| | \| | | \| | | | | \| | \| | | \| | | \| | | | | | | | | |
| 8 | B15_062916_33-35 | | \| | 0930 | \| | \| | | \| | \| | | \| | | | | \| | \| | | \| | | \| | X | | | | | | | |
| 9 | B7_062916_0-10 | | \| | 1000 | \| | \| | | \| | \| | | \| | | | | \| | \| | | \| | | \| | | | HOLD | ALL | | | | |
| 10 | B7_062916_10-13 | | ↓ | 1000 | ↓ | ↓ | | \| | \| | | \| | | | | \| | \| | | \| | | \| | | | HOLD | ALL | | | | |

Normal Turn Around Time (TAT) = 10 Business Days YES NO

TAT Requested (circle) 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: ______

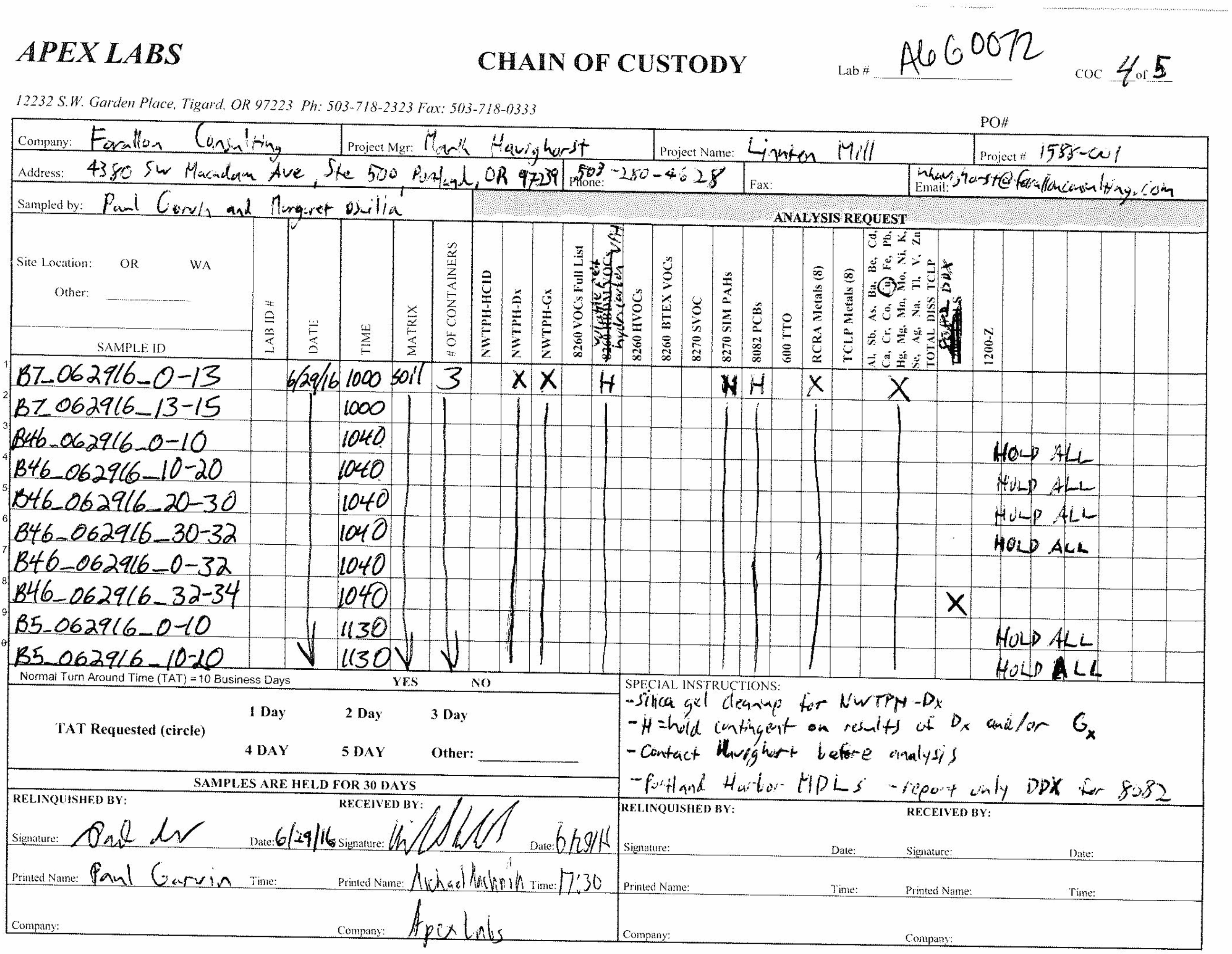
SAMPLES ARE HELD FOR 30 DAYS

SPECIAL INSTRUCTIONS:
- Silica gel cleanup for NWTPH-Dx
- H = hold contingent on results of Dx
- contact havighorst before analysis
- Portland Harbor MDLs - report only DDX for 8082

| RELINQUISHED BY: | | RECEIVED BY: | | RELINQUISHED BY: | | RECEIVED BY: | |
|---|---|---|---|---|---|---|---|
| Signature: | Date: 6/29/16 | Signature: | Date: 6/29/16 | Signature: | Date: | Signature: | Date: |
| Printed Name: Paul Garvin | Time: | Printed Name: Michael [illegible] | Time: 17:30 | Printed Name: | Time: | Printed Name: | Time: |
| Company: Farallon | | Company: Apex Labs | | Company: | | Company: | |

AMENDED REPORT

| | | |
|---|---|---|
| **Farallon Consulting** | Project: **Linnton Mill** | |
| 4380 SW Macadam Ave #500 | Project Number: 1588-001 | **Reported:** |
| Portland, OR 97239 | Project Manager: Mark Havighorst | 08/15/16 17:27 |



# APEX LABS

## CHAIN OF CUSTODY

Lab # A6G0072 COC 4 of 5

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

PO#

Company: Farallon Consulting Project Mgr: Mark Havighorst Project Name: Linnton Mill Project # 1588-001

Address: 4380 SW Macadam Ave, Ste 500 Portland, OR 97239 Phone: 503-280-4628 Fax: Email: mhavighorst@farallonconsulting.com

Sampled by: Paul Garvin and Margaret Oxilia

Site Location: OR WA

Other: ______

ANALYSIS REQUEST

| | SAMPLE ID | LAB ID # | DATE | TIME | MATRIX | # OF CONTAINERS | NWTPH-HCID | NWTPH-Dx | NWTPH-Gx | 8260 VOCs Full List | ~~8260 RBDM VOCs~~ volatile pet hydrocarbon VPH | 8260 HVOCs | 8260 BTEX VOCs | 8270 SVOC | 8270 SIM PAHs | 8082 PCBs | 600 TTO | RCRA Metals (8) | TCLP Metals (8) | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS TCLP | DDX | 1200-Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B7_062916_0-13 | | 6/29/16 | 1000 | soil | 3 | | X | X | | H | | | | H | H | | X | | X | | |
| 2 | B7_062916_13-15 | | ↓ | 1000 | ↓ | ↓ | | ↓ | ↓ | | ↓ | | | | ↓ | ↓ | | ↓ | | ↓ | | |
| 3 | B46_062916_0-10 | | | 1040 | | | | | | | | | | | | | | | | | | HOLD ALL |
| 4 | B46_062916_10-20 | | | 1040 | | | | | | | | | | | | | | | | | | HOLD ALL |
| 5 | B46_062916_20-30 | | | 1040 | | | | | | | | | | | | | | | | | | HOLD ALL |
| 6 | B46_062916_30-32 | | | 1040 | | | | | | | | | | | | | | | | | | HOLD ALL |
| 7 | B46_062916_0-32 | | | 1040 | | | | | | | | | | | | | | | | | | |
| 8 | B46_062916_32-34 | | | 1040 | | | | | | | | | | | | | | | | | X | |
| 9 | B5_062916_0-10 | | | 1130 | | | | | | | | | | | | | | | | | | HOLD ALL |
| 10 | B5_062916_10-20 | | | 1130 | | | | | | | | | | | | | | | | | | HOLD ALL |

Normal Turn Around Time (TAT) = 10 Business Days YES NO

TAT Requested (circle) 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: ______

SAMPLES ARE HELD FOR 30 DAYS

SPECIAL INSTRUCTIONS:
- Silica gel cleanup for NWTPH-Dx
- H = hold contingent on results of Dx and/or Gx
- Contact Havighorst before analysis
- Portland Harbor MDLs - report only DDX for 8082

| RELINQUISHED BY: | RECEIVED BY: | RELINQUISHED BY: | RECEIVED BY: |
|---|---|---|---|
| Signature: Paul Garvin Date: 6/29/16 | Signature: Date: 6/29/16 | Signature: Date: | Signature: Date: |
| Printed Name: Paul Garvin Time: | Printed Name: Michael Mackenzie Time: 17:30 | Printed Name: Time: | Printed Name: Time: |
| Company: | Company: Apex Labs | Company: | Company: |

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

# Apex Labs

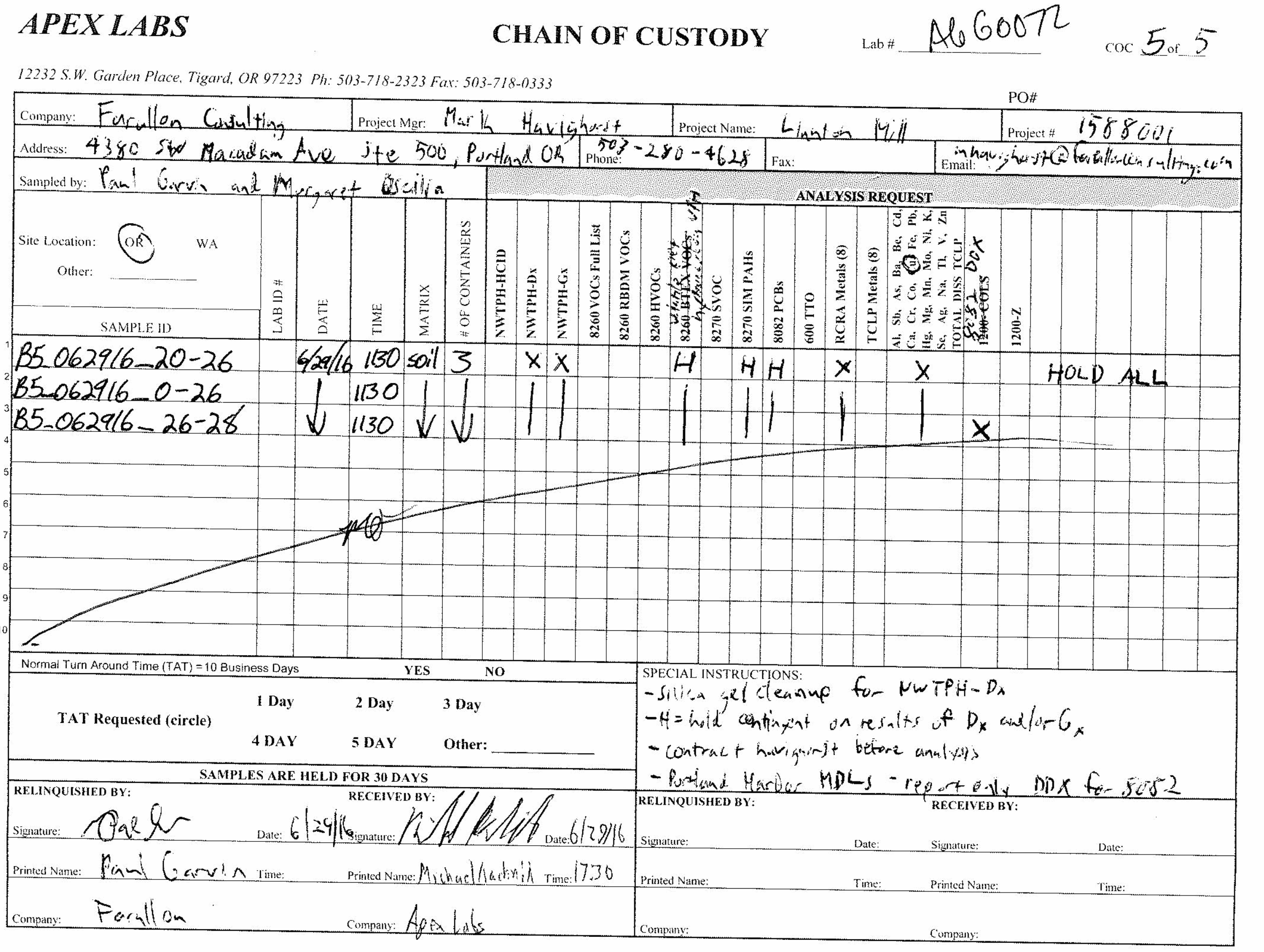
AMENDED REPORT

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

**Farallon Consulting**
4380 SW Macadam Ave #500
Portland, OR 97239

Project: **Linnton Mill**
Project Number: 1588-001
Project Manager: Mark Havighorst

**Reported:**
08/15/16 17:27



## APEX LABS

## CHAIN OF CUSTODY

Lab # A6G0072
COC 5 of 5

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

PO#

Company: Farallon Consulting
Project Mgr: Mark Havighorst
Project Name: Linnton Mill
Project # 1588001
Address: 4380 SW Macadam Ave ste 500, Portland OR
Phone: 503-280-4628
Fax:
Email: mhavighorst@farallonconsulting.com
Sampled by: Paul Garvin and Margaret Oscilia

Site Location: [✓ OR] WA
Other: ______

ANALYSIS REQUEST

| | SAMPLE ID | LAB ID # | DATE | TIME | MATRIX | # OF CONTAINERS | NWTPH-HCID | NWTPH-Dx | NWTPH-Gx | 8260 VOCs Full List | 8260 RBDM VOCs | 8260 HVOCs | ~~8260 BTEX VOCs~~ [illegible] | 8270 SVOC | 8270 SIM PAHs | 8082 PCBs | 600 TTO | RCRA Metals (8) | TCLP Metals (8) | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, [✓ Cu] Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS TCLP | ~~1200-COLS~~ 8082 DDX | 1200-Z | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B5_062916_20-26 | | 6/29/16 | 1130 | soil | 3 | | X | X | | | | H | | H | H | | X | | X | | | HOLD ALL |
| 2 | B5_062916_0-26 | | ↓ | 1130 | ↓ | ↓ | | ↓ | ↓ | | | | ↓ | | ↓ | ↓ | | ↓ | | ↓ | | | |
| 3 | B5_062916_26-28 | | ↓ | 1130 | ↓ | ↓ | | ↓ | ↓ | | | | ↓ | | ↓ | ↓ | | ↓ | | ↓ | X | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | |

MO

Normal Turn Around Time (TAT) = 10 Business Days YES NO

TAT Requested (circle) 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: ______

SAMPLES ARE HELD FOR 30 DAYS

SPECIAL INSTRUCTIONS:
- Silica gel cleanup for NWTPH-Dx
- H = hold contingent on results of Dx and/or Gx
- contact havighorst before analysis
- Portland Harbor MDLs - report only DDX for 8082

RELINQUISHED BY:
Signature: Date: 6/29/16
Printed Name: Paul Garvin Time:
Company: Farallon

RECEIVED BY:
Signature: Date: 6/29/16
Printed Name: Michael Nacknik Time: 1730
Company: Apex Labs

RELINQUISHED BY:
Signature: Date:
Printed Name: Time:
Company:

RECEIVED BY:
Signature: Date:
Printed Name: Time:
Company:

Philip Nerenberg

Philip Nerenberg, Lab Director

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

# APPENDIX C
# QUALITY ASSURANCE/ QUALITY CONTROL SUMMARY REPORT

NEW EXPOSED SURFACE INVESTIGATION REPORT
Linnton Mill Site Restoration
10504 Northwest Saint Helens Road
Portland, Oregon

Farallon PN: 1588-001

# QUALITY ASSURANCE/QUALITY CONTROL SUMMARY REPORT

## Appendix C of the New Exposed Surface Investigation Report

**LINNTON MILL SITE RESTORATION**
**10504 NORTHWEST SAINT HELENS ROAD**
**PORTLAND, OREGON**

**Submitted by:**
**Farallon Consulting, L.L.C.**
**4380 Southwest Macadam Avenue**
**Portland, Oregon 97239**

**Farallon PN: 1588-001**

**For:**
**Linnton Water Credits, LLC**
**337 17th Street**
**Oakland, California 94612**

November 11, 2016

Prepared by:

Margaret L. Oscilia, P.E.
Project Engineer

Mark Havighorst, P.E.
Senior Engineer

Reviewed by:

Craig W. Ware, R.G.
Principal Hydrogeologist

# TABLE OF CONTENTS

# TABLES

# 1.0 INTRODUCTION

This Quality Assurance/Quality Control Summary Report provides a summary of the quality assurance (QA) and quality control (QC) review performed for the New Exposed Surface Investigation conducted at the former Linnton Plywood Association plywood mill site at 10504 Northwest Saint Helens Road in Portland, Oregon (herein referred to as the Site). Details pertaining to the QA/QC review are presented below:

Farallon Project Name: Linnton Mill Site Restoration

Farallon Project No.: 1588-001

Laboratories: Apex Laboratories, LLC of Tigard, Oregon (Apex)
Fremont Analytical Inc. of Seattle, Washington

Laboratory Reference No.: 1588-01

Matrix: Soil

The QA/QC review was performed in accordance with the *New Exposed Surface Investigation Quality Assurance Project Plan* (QAPP), Appendix C of the *New Exposed Surface Investigation Work Plan, Linnton Mill Site Restoration, 10504 Northwest Saint Helens Road, Portland, Oregon* dated June 10, 2016, prepared by Farallon Consulting, L.L.C. (Farallon) (Work Plan). The review was performed to determine whether the field activities and laboratory analyses were of sufficient quality and quantity to meet the data quality objectives (DQOs) described in the QAPP, which included quantitation limits, precision, accuracy, representativeness, completeness, and comparability. This Quality Assurance/Quality Control Summary Report describes the data collection approach, analytical procedures, data management, QC procedures, performance audits, preventive maintenance, and corrective action performed in accordance with the QAPP, and presents Farallon's conclusions.

# 2.0 DATA COLLECTION APPROACH

Procedures described in the Sampling and Analysis Plan provided as Appendix B of the Work Plan were used to collect, preserve, transport, and store samples. Sampling was performed in accordance with generally accepted environmental practices, and sampling procedures met or exceeded current regulatory standards and guidelines. Sampling procedures were modified to satisfy amendments to current regulations, methods, or guidelines, if necessary. The data collection approach to ensure that project DQOs were met or exceeded included collection of soil samples and screening of results to evaluate for the presence of the contaminants of interest (COIs) identified for the Site near the final grade elevations of the restoration project.

# 3.0 ANALYTICAL PROCEDURES

Soil samples were analyzed for one or more of the following COIs identified in the Work Plan:

- Total petroleum hydrocarbons as gasoline-range organics by Northwest Method NWTPH-Gx;
- Total petroleum hydrocarbons as diesel-range organics and as oil-range organics by Northwest Method NWTPH-Dx using silica gel cleanup treatment;
- Resource Conservation and Recovery Act 8 metals and copper by U.S. Environmental Protection Agency (EPA) Method 6020;
- Polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270D SIM;
- Polychlorinated biphenyls (PCBs) by EPA Method 8082A; and
- Volatile petroleum hydrocarbons (VPHs) by NWVPH.

Samples were analyzed also for benzene, toluene, ethylbenzene, and xylenes by EPA Method 8260B, for selected organochlorine pesticides by EPA Method 8081B, and for percent dry weight by EPA Method 8000C. A summary of the soil samples and duplicates collected and the analytical methods used is provided in Table C-1.

Laboratory analyses were performed by Apex, who is certified by the Oregon Department of Environmental Quality (DEQ), and meets the QA/QC requirements of DEQ and EPA. The contact for Apex is:

Mr. Phil Nerenberg
Apex Laboratories, LLC
12232 Southwest Garden Place
Tigard, Oregon
Telephone: (503) 718-2323
e-mail: pnerenberg@apex-labs.com

A copy of the Laboratory Quality Assurance Manual from Apex is on file at the Farallon office for review and reference. Procedures specified in the manual were followed throughout the New Exposed Surface Investigation. Apex subcontracted Fremont Analytical of Seattle, Washington to analyze for VPHs. Fremont Analytical is certified by DEQ and meets the QA/QC requirements of DEQ and EPA.

## 4.0 DATA MANAGEMENT, REDUCTION, REVIEW, AND REPORTING

The procedures outlined in the QAPP for the inventory, control, storage, and retrieval of data collected were followed during performance of the New Exposed Surface Investigation. The procedures contained in the QAPP were designed to ensure that the integrity of the collected data was maintained for subsequent use. Moreover, project-tracking data (e.g., schedules, progress reports) were maintained to monitor, manage, and document the progress of the New Exposed Surface Investigation.

# 5.0 QUALITY CONTROL PROCEDURES

The QC procedures for field activities and laboratory analysis described in the QAPP were implemented during the New Exposed Surface Investigation. Field QC procedures included following standard operating procedures (SOPs), conducting equipment calibration and maintenance, collecting field QC samples, and documenting field activities. Laboratory analysis QC procedures included data reduction, evaluation, and reporting. The quality of laboratory data was assessed by sample transport and receipt conditions, method deviations, timeliness, method reporting limits (MRLs), precision, accuracy, representativeness, completeness, and comparability. The field and laboratory QC procedures are discussed in the following sections.

## 5.1 FIELD QUALITY CONTROL

Field QCs included implementation of the SOPs identified in the QAPP, collection of field QC samples, field documentation, and review of field records and sampling results.

### 5.1.1 Standard Operating Procedures

SOPs identified in the QAPP were implemented during the New Exposed Surface Investigation. There were no SOP modifications.

### 5.1.2 Equipment Calibration and Maintenance

Field equipment calibration and maintenance was conducted in accordance with manufacturer recommendations.

### 5.1.3 Field Quality Control Samples

Field QC samples (also referred to as field duplicate samples) were collected from original samples as splits from homogenized samples. The QAPP indicated that field duplicates were to be collected at a frequency of 10 percent of the total number of samples collected. A total of 225 samples were collected, and 24 field duplicate samples were collected, for a frequency of 10.6 percent. Of the total samples collected, 99 samples and 13 field duplicate samples were analyzed for at least one COI, for a field duplicate frequency of 13.1 percent of analyzed samples. Field duplicate samples collected and analyzed during the New Exposed Surface Investigation are presented in Table C-1.

### 5.1.4 Documentation

Field activities, including field equipment calibration and maintenance, sample collection, and sample handling and shipment, were documented on Field Report forms as described in the Work Plan Sampling and Analysis Plan. Farallon reviewed field records, and results from field observations and measurements to ensure that procedures were properly performed and documented. The field procedures were reviewed for:

- Completeness and legibility;
- Preparation and frequency of field QC samples;
- Equipment calibration and maintenance; and
- Chain of Custody forms.

Field forms were complete and legible, and contained adequate information. Field Chain of Custody forms were complete, signed, and dated. No issues with sample receipt conditions were indicated on the Chain of Custody forms or in the Analytical Case Narrative sections of the laboratory reports. The Analytical Case Narrative section of the Work Order No. A6G0072 report indicated that sample A6G0072-31 was incorrectly reported as B7_062916_10-13 on previous report versions. It was changed to the correct ID of B7_062916_0-13 on the revised report. All samples listed on the Chain of Custody forms were analyzed as indicated.

## 5.2 LABORATORY QUALITY CONTROL

Analytical laboratory QA/QC procedures were performed by Apex in accordance with the Laboratory Quality Assurance Manual. The laboratory QC limits are presented in Attachment 1 of the QAPP.

Laboratory notes indicated that a portion of the sample results were either estimated or biased high for specific constituents. Based on laboratory notes and additional QC sample results, these results are considered valid. The samples and associated constituents with analytical results that are either estimated or biased are summarized in Table C-2.

## 5.3 DATA QUALITY CONTROL

The data generated by Apex underwent two levels of evaluation: one by the laboratory, and one by Farallon. As specified in the Apex Laboratory Quality Assurance Manual, the laboratory performed initial data reduction, evaluation, and reporting. The analytical data then were reviewed and validated by Farallon under the supervision of the project QA/QC Officer for sample transport and receipt conditions, method deviations, timeliness, MRLs, precision, accuracy, representativeness, completeness, and comparability.

### 5.3.1 Sample Transport and Receipt Conditions

No issues with sample transport or receipt conditions were indicated on the Chain of Custody forms or in the Analytical Case Narrative Notes or the Definitions sections of the laboratory reports.

### 5.3.2 Method Deviations

There were no deviations from the laboratory analytical methods indicated in the QAPP.

### 5.3.3 Timeliness

Soil samples were extracted and analyzed within the recommended hold times shown on Table C-3, with the exceptions noted below.

Samples B2_062316_29.5-31, B_19_062316_30-32, B_30_062216_24-26, B_31_062316_34-36, and B35_062416_26-28 were re-analyzed for carcinogenic PAHs (cPAHs) by EPA Method 8270D SIM on July 28 or July 29, 2016, outside the recommended hold times of 14 days from sample collection to preparation, and 40 days from preparation to analysis. The re-analysis was performed in an effort to achieve MRLs, but did not result in lower MRLs. Therefore, these results for cPAHs were considered not usable for the New Exposed Surface Investigation, and invalid due to exceedances of the recommended preparation hold times.

The recommended hold time for VPHs by Method NWVPH in soil is 2 days from sample collection to preparation, and 14 days from sample collection to analysis. Sample B15_062916_33-35 was prepared 13 days after sample collection, and sample B44_062716_27-29 was prepared 11 days after sample collection, as shown in Table C-3. The samples were prepared outside the recommended hold time because they were ordered as follow-up analyses. The results for these samples are not valid, and were determined to be not usable for the New Exposed Surface Investigation.

### 5.3.4 Method Reporting Limits

Laboratory analyses were completed using the method detection limits (MDLs) and the MRLs described in QAPP Table 1. Laboratory MDL goals were met for all analytes. MRLs for individual COIs were less than applicable screening levels for individual COIs. The MDLs and the MRLs for soil sample analyses performed for the New Exposed Surface Investigation are consistent with commercially available laboratory methods, and the analyses were performed under routine conditions. Therefore, these data are considered usable for the New Exposed Surface Investigation, with the following exceptions:

- The MRLs for some cPAHs and PCBs as Aroclors were used to calculate total concentrations of cPAHs and PCBs, respectively. Some of these MRLs exceeded the Portland Harbor Superfund Site Preliminary Remediation Goals for calculated total concentrations of cPAHs and PCBs. Re-analysis was performed in an effort to achieve lower MRLs, but did not result in lower MRLs. Therefore, the results for PCBs are considered valid, but not usable for the New Exposed Surface Investigation.
- Results from the re-analysis of cPAHs were considered not usable for the New Exposed Surface Investigation, and invalid due to exceedances of the recommended preparation hold times.

### 5.3.5 Precision

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of two or more measurements compared to their average value, expressed as the relative percent difference (RPD). The QAPP specified that matrix spike duplicates be analyzed at a frequency of 1 per batch of 20 samples or fewer.

Precision is calculated from the results from the laboratory duplicate sample analyses. The RPD is based on laboratory-derived control limits applied to the laboratory duplicates. Although the RPD limits were exceeded for several laboratory duplicates, the results from the associated analytical methods are still considered valid based on laboratory notes and additional QC sample results.

### 5.3.6 Accuracy

Accuracy is a measure of the closeness (bias) of the measured value to the true value. The accuracy of chemical analytical results was assessed by laboratory matrix spikes and surrogates measured as the percent recovery, laboratory method blanks, and field duplicate samples.

#### 5.3.6.1 Matrix Spikes and Surrogate Recoveries

The QAPP specified that matrix spikes were to be analyzed at a frequency of 1 per batch of 20 samples or fewer. Quantitative percent recovery criteria for organic analyses were based on laboratory-derived control limits for surrogate recovery and matrix spike results. Although the percent recovery limits were exceeded for some matrix spikes, the results from the associated analytical methods are still considered valid based on laboratory notes and additional QC sample results.

#### 5.3.6.2 Laboratory Method Blanks

The laboratory ran method blanks at a minimum frequency of 5 percent or 1 per batch to assess potential contamination of the sample in the laboratory. Method blank concentrations were non-detect, and the results from the associated analytical methods are considered valid, with the exception of samples from SDG No. A6F0902 for lead and/or chromium. These samples were collected from boring numbers 12, 13, 19, 22, 23, 30, 38, 42, and 48, as indicated in Table C-2

Lead and/or chromium was detected at low concentrations exceeding MRLs in an associated laboratory blank. This association indicates that the concentrations of lead and/or chromium detected in these samples should be considered biased high. However, the concentrations of lead and chromium detected in the laboratory blank were low; therefore these results are considered valid for use in the New Exposed Surface Investigation Report.

### 5.3.7 Representativeness

Representativeness is a qualitative assessment of how closely the measured results reflect the actual concentration or distribution of the constituent concentrations in the matrix sampled. The sampling plan design, sample collection techniques, sample handling protocols, sample analysis methods, and data review procedures were implemented in a manner that ensured that the results obtained are representative of Site conditions, as addressed in the Work Plan Sampling and Analysis Plan and QAPP.

### 5.3.8 Completeness

Completeness is expressed as the ratio of valid results to the amount of data expected to be obtained under normal conditions. Completeness is determined by assessing the number of samples for the valid results obtained versus the number of samples submitted to the laboratory for analysis. Valid results are defined as results determined to be usable during the data QA/QC review process.

Results considered not usable to the New Exposed Surface Investigation Report were not included in the determination of data completeness. Excluding these samples, the completeness of the project data set is 100 percent.

### 5.3.9 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. EPA methods and procedures for both sample collection and laboratory analysis were used as the standard for the New Exposed Surface Investigation. The use of a standard makes the collected data comparable to both internal and other data generated.

# 6.0 PERFORMANCE AUDITS

Performance audits were completed for both sampling and analysis work. Field performance was monitored through regular review of Chain of Custody forms, Field Report forms, and field measurements. The Project Manager and/or the QA/QC Officer also performed periodic on-Site review of work in progress.

Because DEQ accreditation for each analysis performed by the analytical laboratory demonstrates the laboratory's ability to properly perform the requested methods, a system audit of the analytical laboratory was not conducted.

The Project Manager and/or the QA/QC Officer oversaw communication with the analytical laboratory on a frequent basis while samples were processed and analyzed. This involvement allowed Farallon to assess progress toward meeting the DQOs, and to take corrective action if problems arose. Corrective action is discussed in Section 8.

The analytical laboratory was responsible for identifying and correcting (as appropriate) any deviation from performance standards, as discussed in the Laboratory Quality Assurance Manual. The laboratory communicated to the Project Manager or the QA/QC Officer any deviations from the performance standards, and appropriate corrective action was taken during sample analysis.

# 7.0 PREVENTIVE MAINTENANCE

Field parameter analysis and measurement equipment was accompanied by operation and maintenance manuals describing procedures for calibration, operation, and troubleshooting. Spare parts and tools were included in each equipment storage case to minimize equipment downtime. All maintenance activities were documented on the project Field Report forms and/or in the equipment logbooks. A schedule of preventive maintenance activities was maintained.

# 8.0 CORRECTIVE ACTION

Corrective action was the joint responsibility of the Project Manager and the QA/QC Officer. No corrective action was necessary during field sampling activities, as no problems that may have compromised data quality were identified during field sampling activities. The corrective procedure conducted during data analysis consisted of re-analyzing select samples for at least one of the following constituents:

- cPAHs by EPA Method 8270D SIM;
- PCBs by EPA Method 8082A; and
- Select organochlorine pesticides by EPA Method 8081B.

Select samples were re-analyzed for cPAHs and PCBs to achieve lower MRLs, and for select organochlorine pesticides to obtain results for 2,4-DDT; 2,4-DDE; and 2,4-DDD. Final and valid analytical results are included and discussed in the New Exposed Surface Investigation Report.

# 9.0 CONCLUSIONS

The QA/QC review was performed in accordance with the QAPP to determine whether the field activities and laboratory analyses were of sufficient quality and quantity to meet the DQOs described in the QAPP, which included quantitation limits, precision, accuracy, representativeness, completeness, and comparability. All DQOs for the New Exposed Surface Investigation have been met. A sufficient number of representative samples were collected, and the precision, accuracy, and completeness of the resulting analytical data were sufficient to support the purpose of the New Exposed Surface Investigation. The data evaluated in this data quality review and used in the New Exposed Surface Investigation were deemed valid, with the following considerations:

- Laboratory notes indicated that a portion of the sample results were either estimated or biased high for specific constituents. Based on laboratory notes and additional QC sample results, these results are considered valid. The samples and associated constituents with analytical results that are either estimated or biased high are summarized in Table C-2.
- Samples B2_062316_29.5-31, B_19_062316_30-32, B_30_062216_24-26, B_31_062316_34-36, and B35_062416_26-28 were re-analyzed for cPAHs outside the recommended preparation hold time for EPA Method 8270D SIM. Therefore, these results are not considered valid. These samples were re-analyzed in an effort to achieve lower MRLs, although re-analysis did not result in lower MRLs. Therefore, the results were considered not usable for the New Exposed Surface Investigation, and were excluded from the data completeness determination.
- Samples B15_062916_33-35 and B44_062716_27-29 were prepared for follow-up analysis for VPHs outside the recommended hold time for Method NWVPH. Therefore, these results are not considered valid. It was determined that the VPH results were not usable for the New Exposed Surface Investigation, and they were excluded from the data completeness determination.
- Select samples were re-analyzed for PCBs to achieve lower MRLs, although re-analysis did not result in lower MRLs. Therefore, the results for PCBs are considered valid, but not usable for the New Exposed Surface Investigation, and were excluded from the data completeness determination.
- Although analytical results for multiple samples and constituents were biased high due to the sample matrix compositions or laboratory calibrations, the results are considered valid based on laboratory notes and additional QC sample results. These samples and associated constituents are presented in Table C-2.
- Although analytical results for multiple samples and constituents were estimated values due to the sample matrix composition or limited sample volume, the results are considered

valid based on laboratory notes and additional QC sample results. These samples and associated constituents are presented in Table C-2.

- Although the RPD limits were exceeded for multiple laboratory duplicates, the results from the associated analytical methods are still considered valid based on laboratory notes and additional QC sample results.
- Although the percent recovery limits were exceeded for some matrix spikes, the results from the associated analytical methods are still considered valid based on laboratory notes and additional QC sample results.
- Lead and chromium were detected at low concentrations exceeding the MRLs in a laboratory blank. The concentrations of lead and chromium in the associated samples were considered biased high, but are considered valid for use in the New Exposed Surface Investigation Report.

# TABLES

QUALITY ASSURANCE/QUALITY CONTROL
SUMMARY REPORT
Linnton Mill Site Restoration
10504 Northwest Saint Helens Road
Portland, Oregon

Farallon PN: 1588-001

# Table C-1
## Soil Samples Collected and Duplicates
## Linnton Mill Site Restoration
## Portland, Oregon
## Farallon PN: 1588-001

| Boring Number | Sample Identification | Sample Date and Time | Sample Delivery Group | Analytical Methods | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B1-062116-0-10 | 06/21/2016 08:50:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 1 | B1-062116-10-19 | 06/21/2016 08:50:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 1 | B1-062116-0-19 | 06/21/2016 08:50:00 | A6F0786 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 1 | B1-062116-19-21 | 06/21/2016 08:50:00 | A6F0786 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 2 | B2_062316_0-5 | 06/23/2016 17:00:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2 | B2_062316_10-20 | 06/23/2016 17:00:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2 | B2_062316_20-29.5 | 06/23/2016 17:00:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2 | B2_062316_0-29.5 | 06/23/2016 17:00:00 | A6F1000 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 2 | B2_062316_29.5-31 | 06/23/2016 17:00:00 | A6F1000 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 3 | B3_062716_0-10 | 06/27/2016 12:10:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 3 | B3_062716_10-20 | 06/27/2016 12:10:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 3 | B3_062716_20-28 | 06/27/2016 12:10:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 3 | B3_062716_0-28 | 06/27/2016 12:10:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | -- | EPA 8000C | -- | -- | -- |
| 3 | B3_062716_28-30 | 06/27/2016 12:10:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | -- | EPA 8000C | EPA 8081B | -- | -- |
| 4 | B4_062816_0-10 | 06/28/2016 12:15:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 4 | B4_062816_10-17 | 06/28/2016 12:15:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 4 | B4_062816_0-17 | 06/28/2016 12:15:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 4 | B4_062816_17-19 | 06/28/2016 12:15:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 5 | B5_062916_0-10 | 06/29/2016 11:30:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 5 | B5_062916_10-20 | 06/29/2016 11:30:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 5 | B5_062916_20-26 | 06/29/2016 11:30:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 5 | B5_062916_0-26 | 06/29/2016 11:30:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 5 | B5_062916_26-28 | 06/29/2016 11:30:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 6 | B_6_062316_0-6 | 06/23/2016 11:22:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 6 | B_6_062316_0-6-1 | 06/23/2016 11:22:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 6 | B_6_062316_6-8 | 06/23/2016 11:22:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 7 | B7_062916_0-10 | 06/29/2016 10:00:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 7 | B7_062916_0-13 | 06/29/2016 10:00:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 7 | B7_062916_0-13 | 06/29/2016 10:00:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 7 | B7_062916_13-15 | 06/29/2016 10:00:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 8 | B8_062716_0-10 | 06/27/2016 14:50:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 8 | B8_062716_10-14 | 06/27/2016 14:50:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 8 | B8_062716_0-14 | 06/27/2016 14:50:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | -- | EPA 8000C | -- | -- | -- |
| 8 | B8_062716_14-16 | 06/27/2016 14:50:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | -- | EPA 8000C | -- | -- | -- |
| 9 | B9_062816_0-10 | 06/28/2016 09:00:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 9 | B9_062816_0-10-1 | 06/28/2016 09:00:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 9 | B9_062816_10-19 | 06/28/2016 09:00:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 9 | B9_062816_10-19-1 | 06/28/2016 09:00:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 9 | B9_062816_0-19 | 06/28/2016 09:00:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 9 | B9_062816_0-19-1 | 06/28/2016 09:00:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 9 | B9_062816_19-21 | 06/28/2016 09:00:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 9 | B9_062816_19-21-1 | 06/28/2016 09:00:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 10 | B10-062116-2.5-7.5 | 06/21/2016 14:10:00 | A6F0786 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 10 | B10-062116-8-18 | 06/21/2016 14:10:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 10 | B10-062116-18-28 | 06/21/2016 14:10:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |

# Table C-1
# Soil Samples Collected and Duplicates
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Sample Date and Time | Sample Delivery Group | Analytical Methods | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | B10-062116-28-35 | 06/21/2016 14:10:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 10 | B10-062116-8-35 | 06/21/2016 14:10:00 | A6F0786 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 10 | B10-062116-35-37 | 06/21/2016 14:10:00 | A6F0786 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 11 | B11-062116-0-10 | 06/21/2016 12:10:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 11 | B11-062116-10-20 | 06/21/2016 12:10:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 11 | B11-062116-20-30 | 06/21/2016 12:10:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 11 | B11-062116-30-36 | 06/21/2016 12:10:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 11 | B11-062116-0-36 | 06/21/2016 12:10:00 | A6F0786 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 11 | B11-062116-36-38 | 06/21/2016 12:10:00 | A6F0786 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 12 | B_12_062316_0-10 | 06/23/2016 13:40:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 12 | B_12_062316_10-20 | 06/23/2016 13:40:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 12 | B_12_062316_0-20 | 06/23/2016 13:40:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 12 | B_12_062316_20-22 | 06/23/2016 13:40:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 13 | B_13_062216_0-10 | 06/22/2016 13:10:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 13 | B_13_062216_10-12 | 06/22/2016 13:10:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 13 | B_13_062216_0-12 | 06/22/2016 13:10:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 13 | B_13_062216_12-14 | 06/22/2016 13:10:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 14 | B14_062316_0-10 | 06/23/2016 11:00:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 14 | B14_062316_10-20 | 06/23/2016 11:00:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 14 | B14_062316_0-20 | 06/23/2016 11:00:00 | A6F1000 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 14 | B14_062316_20-22 | 06/23/2016 11:00:00 | A6F1000 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 15 | B15_062916_0-10 | 06/29/2016 09:30:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 15 | B15_062916_10-20 | 06/29/2016 09:30:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 15 | B15_062916_20-30 | 06/29/2016 09:30:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 15 | B15_062916_30-33 | 06/29/2016 09:30:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 15 | B15_062916_0-33 | 06/29/2016 09:30:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 15 | B15_062916_33-35 | 06/29/2016 09:30:00 | A6G0036, 1607062 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | EPA 8081B | 5035/8260B | NWVPH-VPH |
| 16 | B16_062816_0-10 | 06/28/2016 15:00:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 16 | B16_062816_10-19 | 06/28/2016 15:00:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 16 | B16_062816_0-19 | 06/28/2016 15:00:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 16 | B16_062816_19-21 | 06/28/2016 15:00:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 17 | B17-062116-0-4 | 06/21/2016 09:30:00 | A6F0786 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 17 | B17-062116-4-6 | 06/21/2016 09:30:00 | A6F0786 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 18 | B18_062716_0-10 | 06/27/2016 16:20:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 18 | B18_062716_10-20 | 06/27/2016 16:20:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 18 | B18_062716_20-26 | 06/27/2016 16:20:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 18 | B18_062716_0-26 | 06/27/2016 16:20:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | -- | EPA 8000C | EPA 8081B | -- | -- |
| 18 | B18_062716_26-28 | 06/27/2016 16:20:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | -- | EPA 8000C | EPA 8081B | -- | -- |
| 19 | B_19_062316_0-10 | 06/23/2016 14:45:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 19 | B_19_062316_10-20 | 06/23/2016 14:45:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 19 | B_19_062316_20-30 | 06/23/2016 14:45:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 19 | B_19_062316_0-30 | 06/23/2016 14:45:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 19 | B_19_062316_0-30-1 | 06/23/2016 14:45:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 19 | B_19_062316_30-32 | 06/23/2016 14:45:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |

# Table C-1
# Soil Samples Collected and Duplicates
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Sample Date and Time | Sample Delivery Group | Analytical Methods | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | B20_062816_0-10 | 06/28/2016 15:40:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 20 | B20_062816_10-13 | 06/28/2016 15:40:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 20 | B20_062816_0-13 | 06/28/2016 15:40:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 20 | B20_062816_13-15 | 06/28/2016 15:40:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 21 | B21_062416_0-10 | 06/24/2016 14:00:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 21 | B21_062416_10-11 | 06/24/2016 14:00:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 21 | B21_062416_11-13 | 06/24/2016 14:00:00 | A6F1000 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 22 | B_22_062216_0-10 | 06/22/2016 11:10:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22 | B_22_062216_10-20 | 06/22/2016 11:10:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22 | B_22_062216_20-29 | 06/22/2016 11:10:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22 | B_22_062216_0-29 | 06/22/2016 11:10:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 22 | B_22_062216_29-31 | 06/22/2016 11:10:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 23 | B_23_062216_0-10 | 06/22/2016 10:10:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 23 | B_23_062216_10-20 | 06/22/2016 10:10:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 23 | B_23_062216_20-30 | 06/22/2016 10:10:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 23 | B_23_062216_30-34 | 06/22/2016 10:10:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 23 | B_23_062216_0-30 | 06/22/2016 10:10:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 23 | B_23_062216_34-36 | 06/22/2016 10:10:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 24 | B24_062716_0-10 | 06/27/2016 14:40:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24 | B24_062716_0-10-1 | 06/27/2016 14:40:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24 | B24_062716_10-20 | 06/27/2016 14:40:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24 | B24_062716_10-20-1 | 06/27/2016 14:40:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24 | B24_062716_20-29 | 06/27/2016 14:40:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24 | B24_062716_20-29-1 | 06/27/2016 14:40:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24 | B24_062716_0-29 | 06/27/2016 14:40:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | -- | EPA 8000C | -- | -- | -- |
| 24 | B24_062716_0-29-1 | 06/27/2016 14:40:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | -- | EPA 8000C | -- | -- | -- |
| 24 | B24_062716_29-31 | 06/27/2016 14:40:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | -- | EPA 8000C | EPA 8081B | -- | -- |
| 24 | B24_062716_29-31-1 | 06/27/2016 14:40:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | -- | EPA 8000C | EPA 8081B | -- | -- |
| 25 | B25_062716_0-10 | 06/27/2016 09:15:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 25 | B25_062716_10-18 | 06/27/2016 09:15:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 25 | B25_062716_0-18 | 06/27/2016 09:15:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | -- | EPA 8000C | -- | -- | -- |
| 25 | B25_062716_18-20 | 06/27/2016 09:15:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | -- | EPA 8000C | -- | -- | -- |
| 26 | B26_062816_0-10 | 06/28/2016 11:05:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 26 | B26_062816_10-20 | 06/28/2016 11:05:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 26 | B26_062816_20-30 | 06/28/2016 11:05:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 26 | B26_062816_0-30 | 06/28/2016 11:05:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 26 | B26_062816_30-32 | 06/28/2016 11:05:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 27 | B27-062116-0-10 | 06/21/2016 10:30:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 27 | B27-062116-9-10 | 06/21/2016 10:30:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 27 | B27-062116-10-20 | 06/21/2016 10:30:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 27 | B27-062116-20-30 | 06/21/2016 10:30:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 27 | B27-062116-0-30 | 06/21/2016 10:30:00 | A6F0786 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 27 | B27-062116-31-33 | 06/21/2016 10:30:00 | A6F0786 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 28 | B28_062816_0-10 | 06/28/2016 14:00:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |

# Table C-1
# Soil Samples Collected and Duplicates
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Sample Date and Time | Sample Delivery Group | Analytical Methods | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 28 | B28_062816_10-20 | 06/28/2016 14:00:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 28 | B28_062816_20-23 | 06/28/2016 14:00:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 28 | B28_062816_0-23 | 06/28/2016 14:00:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 28 | B28_062816_23-25 | 06/28/2016 14:00:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 29 | B29-062116-0-10 | 06/21/2016 15:10:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 29 | B29-062116-10-20 | 06/21/2016 15:10:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 29 | B29-062116-20-30 | 06/21/2016 15:10:00 | A6F0786 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 29 | B29-062116-0-30 | 06/21/2016 15:10:00 | A6F0786 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 29 | B29-062116-30-32 | 06/21/2016 15:10:00 | A6F0786 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 30 | B_30_062216_0-10 | 06/22/2016 15:50:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 30 | B_30_062216_10-20 | 06/22/2016 15:50:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 30 | B_30_062216_20-24 | 06/22/2016 15:50:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 30 | B_30_062216_0-24 | 06/22/2016 15:50:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | | -- | -- |
| 30 | B_30_062216_24-26 | 06/22/2016 15:50:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 31 | B_31_062316_0-10 | 06/23/2016 10:20:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 31 | B_31_062316_10-20 | 06/23/2016 10:20:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 31 | B_31_062316_10-20 | 06/23/2016 10:20:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 31 | B_31_062316_10-20-1 | 06/23/2016 10:20:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 31 | B_31_062316_20-30 | 06/23/2016 10:20:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 31 | B_31_062316_30-34 | 06/23/2016 10:20:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 31 | B_31_062316_0-34 | 06/23/2016 10:20:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 31 | B_31_062316_34-36 | 06/23/2016 10:20:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 32 | B32_062816_0-6 | 06/28/2016 11:30:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 32 | B32_062816_0-6-1 | 06/28/2016 11:30:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 32 | B32_062816_6-8 | 06/28/2016 11:30:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 32 | B32_062816_6-8-1 | 06/28/2016 11:30:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 33 | B33_062716_0-10 | 06/27/2016 11:10:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 33 | B33_062716_10-15 | 06/27/2016 11:10:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 33 | B33_062716_0-15 | 06/27/2016 11:10:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | -- | EPA 8000C | -- | -- | -- |
| 33 | B33_062716_15-17 | 06/27/2016 11:10:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | -- | EPA 8000C | -- | -- | -- |
| 34 | B34_062416_0-10 | 06/24/2016 13:30:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 34 | B34_062416_10-20 | 06/24/2016 13:30:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 34 | B34_062416_20-30 | 06/24/2016 13:30:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 34 | B34_062416_30-34 | 06/24/2016 13:30:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 34 | B34_062416_0-34 | 06/24/2016 13:30:00 | A6F1000 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 34 | B34_062416_34-36 | 06/24/2016 13:30:00 | A6F1000 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 35 | B35_062416_0-10 | 06/24/2016 15:00:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 35 | B35_062416_10-20 | 06/24/2016 15:00:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 35 | B35_062416_20-26 | 06/24/2016 15:00:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 35 | B35_062416_0-26 | 06/24/2016 15:00:00 | A6F1000 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 35 | B35_062416_26-28 | 06/24/2016 15:00:00 | A6F1000 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 36 | B36_062416_0-10 | 06/24/2016 10:50:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 36 | B36_062416_10-20 | 06/24/2016 10:50:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 36 | B36_062416_20-30 | 06/24/2016 10:50:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |

# Table C-1
# Soil Samples Collected and Duplicates
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Sample Date and Time | Sample Delivery Group | Analytical Methods | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | B36_062416_30-33 | 06/24/2016 10:50:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 36 | B36_062416_0-33 | 06/24/2016 10:50:00 | A6F1000 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 36 | B36_062416_33-35 | 06/24/2016 10:50:00 | A6F1000 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 37 | B37_062816_0-10 | 06/28/2016 16:20:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 37 | B37_062816_10-11 | 06/28/2016 16:20:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 37 | B37_062816_0-11 | 06/28/2016 16:20:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 37 | B37_062816_11-13 | 06/28/2016 16:20:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 38 | B_38_062216_0-10 | 06/22/2016 14:50:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 38 | B_38_062216_10-20 | 06/22/2016 14:50:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 38 | B_38_062216_10-20-1 | 06/22/2016 14:50:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 38 | B_38_062216_20-26 | 06/22/2016 14:50:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 38 | B_38_062216_0-26 | 06/22/2016 14:50:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 38 | B_38_062216_26-28 | 06/22/2016 14:50:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 40 | B40_062816_0-1 | 06/28/2016 15:10:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 40 | B40_062816_1-3 | 06/28/2016 15:10:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 41 | B41_062416_0-10 | 06/24/2016 10:00:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 41 | B41_062416_10-20 | 06/24/2016 10:00:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 41 | B41_062416_20-30 | 06/24/2016 10:00:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 41 | B41_062416_30-33 | 06/24/2016 10:00:00 | A6F1000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 41 | B41_062416_0-33 | 06/24/2016 10:00:00 | A6F1000 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 41 | B41_062416_33-35 | 06/24/2016 10:00:00 | A6F1000 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 42 | B_42_062216_0-10 | 06/22/2016 11:40:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 42 | B_42_062216_10-18 | 06/22/2016 11:40:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 42 | B_42_062216_0-18 | 06/22/2016 11:40:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 42 | B_42_062216_0-18-1 | 06/22/2016 11:40:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 42 | B_42_062216_18-20 | 06/22/2016 11:40:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 43 | B43_062716_0-4 | 06/27/2016 08:30:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 43 | B43_062716_4-6 | 06/27/2016 08:30:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | -- | EPA 8000C | -- | -- | -- |
| 44 | B44_062716_0-10 | 06/27/2016 10:20:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 44 | B44_062716_10-20 | 06/27/2016 10:20:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 44 | B44_062716_0-20 | 06/27/2016 10:20:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 44 | B44_062716_20-27 | 06/27/2016 10:20:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 44 | B44_062716_0-27 | 06/27/2016 10:20:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | -- | EPA 8000C | -- | -- | -- |
| 44 | B44_062716_27-29 | 06/27/2016 10:20:00 | A6G0036, 1607062 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | -- | EPA 8000C | EPA 8081B | 5035/8260B | NWVPH-VPH |
| 45 | B45_062716_0-10 | 06/27/2016 09:35:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 45 | B45_062716_10-20 | 06/27/2016 09:35:00 | A6G0036 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 45 | B45_062716_0-20 | 06/27/2016 09:35:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | -- | EPA 8000C | -- | -- | -- |
| 45 | B45_062716_20-22 | 06/27/2016 09:35:00 | A6G0036 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | -- | EPA 8000C | EPA 8081B | -- | -- |
| 46 | B46_062916_0-10 | 06/29/2016 10:40:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 46 | B46_062916_10-20 | 06/29/2016 10:40:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 46 | B46_062916_20-30 | 06/29/2016 10:40:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 46 | B46_062916_30-32 | 06/29/2016 10:40:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 46 | B46_062916_0-32 | 06/29/2016 10:40:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 46 | B46_062916_32-34 | 06/29/2016 10:40:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |

# Table C-1
# Soil Samples Collected and Duplicates
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Sample Date and Time | Sample Delivery Group | Analytical Methods | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 47 | B47_062816_0-10 | 06/28/2016 10:00:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 47 | B47_062816_10-20 | 06/28/2016 10:00:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 47 | B47_062816_20-30 | 06/28/2016 10:00:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 47 | B47_062816_30-32 | 06/28/2016 10:00:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | -- | EPA 8081B | -- | -- |
| 47 | B47_062816_0-32 | 06/28/2016 10:00:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 47 | B47_062816_30-32 | 06/28/2016 10:00:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 47 | B47_062816_32-34 | 06/28/2016 10:00:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 48 | B_48_062216_0-10 | 06/22/2016 13:55:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 48 | B_48_062216_10-20 | 06/22/2016 13:55:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 48 | B_48_062216_20-27 | 06/22/2016 13:55:00 | A6F0902 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 48 | B_48_062216_0-27 | 06/22/2016 13:55:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 48 | B_48_062216_27-29 | 06/22/2016 13:55:00 | A6F0902 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | EPA 8081B | -- | -- |
| 49 | B49_062816_0-10 | 06/28/2016 08:30:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 49 | B49_062816_0-10-1 | 06/28/2016 08:30:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 49 | B49_062816_10-13 | 06/28/2016 08:30:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 49 | B49_062816_10-13-1 | 06/28/2016 08:30:00 | A6G0071 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 49 | B49_062816_0-13 | 06/28/2016 08:30:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 49 | B49_062816_0-13-1 | 06/28/2016 08:30:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 49 | B49_062816_13-15 | 06/28/2016 08:30:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 49 | B49_062816_13-15-1 | 06/28/2016 08:30:00 | A6G0071 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 50 | B50_062916_0-10 | 06/29/2016 08:40:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 50 | B50_062916_0-10-1 | 06/29/2016 08:40:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 50 | B50_062916_10-18 | 06/29/2016 08:40:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 50 | B50_062916_10-18-1 | 06/29/2016 08:40:00 | A6G0072 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 50 | B50_062916_0-18 | 06/29/2016 08:40:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | -- | -- | EPA 6020A | EPA 8000C | -- | -- | -- |
| 50 | B50_062916_0-18-1 | 06/29/2016 08:40:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 50 | B50_062916_18-20 | 06/29/2016 08:40:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |
| 50 | B50_062916_18-20-1 | 06/29/2016 08:40:00 | A6G0072 | NWTPH-Dx/SG | NWTPH-Gx (MS) | EPA 8082A | EPA 8270D (SIM) | EPA 6020A | EPA 8000C | -- | -- | -- |

NOTES:

-- denotes sample not analyzed.
Highlighting denotes field quality control sample collected.
The number 1 appended to the end of the sample identification denotes a duplicate sample
NWTPH-Dx/SG = DRO and ORO analyzed by Northwest Method NWTPH-Dx using silica gel cleanup treatment
NWTPH-Gx (MS) = GRO analyzed by Northwest Method NWTPH-Gx
EPA 8082A = PCBs analyzed by EPA Method 8082A
EPA 8270D (SIM) = PAHs analyzed by EPA Method 8270D SIM
EPA 6020A = RCRA 8 metals and copper analyzed by EPA Method 6020
EPA 8081B = Selected organochlorine pesticides analyzed by EPA Method 8081B
5035/8260B = BTEX compounds analyzed by EPA Method 8260B
NWVPH-VPH = VPH analyzed by NWVPH
EPA 8000C = Percent dry weight analyzed by EPA Method 8000C

BTEX = benzene, toluene, ethylbenzene, and xylenes
EPA = U.S. Environmental Protection Agency
DRO = total petroleum hydrocarbons (TPH) as diesel-range organics
GRO = TPH as gasoline-range organics
ORO = TPH as oil-range organics
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RCRA = Resource Conservation and Recover Act
VPH = volatile petroleum hydrocarbons

# Table C-2
# Valid Estimated Soil Sample Results
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Sample Date and Time | Sample Delivery Group | Contaminants of Interest and Compounds with Biased High Result | | Contaminants of Interest and Compounds with Estimated Result | | |
|---|---|---|---|---|---|---|---|---|
| 1 | B1-062116-0-10 | 06/21/2016 08:50:00 | A6F0786 | -- | -- | Various PAHs | -- | -- |
| 2 | B2_062316_0-29.5 | 06/23/2016 17:00:00 | A6F1000 | ORO | -- | Various PAHs | -- | -- |
| 2 | B2_062316_29.5-31 | 06/23/2016 17:00:00 | A6F1000 | ORO | -- | Various PAHs | -- | -- |
| 3 | B3_062716_0-28 | 06/27/2016 12:10:00 | A6G0036 | -- | -- | Aroclor 1254 | Aroclor 1260 | various PAHs |
| 3 | B3_062716_28-30 | 06/27/2016 12:10:00 | A6G0036 | -- | -- | ORO | GRO | various PAHs |
| 5 | B5_062916_0-26 | 06/29/2016 11:30:00 | A6G0072 | ORO | -- | Various PAHs | -- | -- |
| 7 | B7_062916_0-13 | 06/29/2016 10:00:00 | A6G0072 | -- | -- | Various PAHs | -- | -- |
| 7 | B7_062916_13-15 | 06/29/2016 10:00:00 | A6G0072 | ORO | -- | Various PAHs | -- | -- |
| 8 | B8_062716_0-14 | 06/27/2016 14:50:00 | A6G0036 | -- | -- | ORO | -- | -- |
| 8 | B8_062716_14-16 | 06/27/2016 14:50:00 | A6G0036 | -- | -- | DRO | -- | -- |
| 9 | B9_062816_19-21 | 06/28/2016 09:00:00 | A6G0071 | -- | -- | Various PAHs | -- | -- |
| 9 | B9_062816_19-21-1 | 06/28/2016 09:00:00 | A6G0071 | -- | -- | Various PAHs | -- | -- |
| 10 | B10-062116-2.5-7.5 | 06/21/2016 14:10:00 | A6F0786 | ORO | -- | Various PAHs | -- | -- |
| 12 | B_12_062316_0-20 | 06/23/2016 13:40:00 | A6F0902 | Lead | -- | Various PAHs | -- | -- |
| 12 | B_12_062316_20-22 | 06/23/2016 13:40:00 | A6F0902 | Lead | -- | Various PAHs | -- | -- |
| 13 | B_13_062216_0-12 | 06/22/2016 13:10:00 | A6F0902 | Lead | -- | -- | -- | -- |
| 13 | B_13_062216_12-14 | 06/22/2016 13:10:00 | A6F0902 | Lead | -- | -- | -- | -- |
| 14 | B14_062316_0-20 | 06/23/2016 11:00:00 | A6F1000 | -- | -- | Various PAHs | -- | -- |
| 15 | B15_062916_33-35 | 06/29/2016 09:30:00 | A6G0036, 1607062 | ORO | -- | GRO | Various PAHs | -- |
| 17 | B17-062116-4-6 | 06/21/2016 09:30:00 | A6F0786 | -- | -- | Aroclor 1260 | Various PAHs | -- |
| 18 | B18_062716_0-26 | 06/27/2016 16:20:00 | A6G0036 | -- | -- | ORO | 4,4'-DDT | -- |
| 19 | B_19_062316_0-30 | 06/23/2016 14:45:00 | A6F0902 | Lead | -- | Various PAHs | -- | -- |
| 19 | B_19_062316_0-30-1 | 06/23/2016 14:45:00 | A6F0902 | Lead | -- | Various PAHs | -- | -- |
| 22 | B_22_062216_0-29 | 06/22/2016 11:10:00 | A6F0902 | Lead | Chromium | -- | -- | -- |
| 22 | B_22_062216_29-31 | 06/22/2016 11:10:00 | A6F0902 | Lead | Chromium | -- | -- | -- |
| 23 | B_23_062216_0-30 | 06/22/2016 10:10:00 | A6F0902 | Lead | -- | -- | -- | -- |
| 23 | B_23_062216_34-36 | 06/22/2016 10:10:00 | A6F0902 | Lead | -- | -- | -- | -- |
| 24 | B24_062716_0-29 | 06/27/2016 14:40:00 | A6G0036 | -- | -- | DRO | ORO | -- |
| 24 | B24_062716_0-29-1 | 06/27/2016 14:40:00 | A6G0036 | -- | -- | ORO | -- | -- |
| 24 | B24_062716_29-31 | 06/27/2016 14:40:00 | A6G0036 | -- | -- | Various PAHs | -- | -- |
| 24 | B24_062716_29-31-1 | 06/27/2016 14:40:00 | A6G0036 | -- | -- | ORO | 4,4'-DDT | -- |
| 25 | B25_062716_0-18 | 06/27/2016 09:15:00 | A6G0036 | -- | -- | ORO | -- | -- |
| 29 | B29-062116-0-30 | 06/21/2016 15:10:00 | A6F0786 | -- | -- | Various PAHs | -- | -- |
| 30 | B_30_062216_0-24 | 06/22/2016 15:50:00 | A6F0902 | Lead | -- | Various PAHs | -- | -- |

# Table C-2
# Valid Estimated Soil Sample Results
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Sample Date and Time | Sample Delivery Group | Contaminants of Interest and Compounds with Biased High Result | | Contaminants of Interest and Compounds with Estimated Result | | |
|---|---|---|---|---|---|---|---|---|
| 30 | B_30_062216_24-26 | 06/22/2016 15:50:00 | A6F0902 | Lead | -- | Various PAHs | | -- |
| 31 | B_31_062316_34-36 | 06/23/2016 10:20:00 | A6F0902 | -- | -- | PCBs | Various PAHs | |
| 32 | B32_062816_6-8 | 06/28/2016 11:30:00 | A6G0071 | -- | -- | Various PAHs | -- | -- |
| 32 | B32_062816_6-8-1 | 06/28/2016 11:30:00 | A6G0071 | -- | -- | Various PAHs | -- | -- |
| 33 | B33_062716_0-15 | 06/27/2016 11:10:00 | A6G0036 | -- | -- | Aroclor 1260 | Various PAHs | -- |
| 33 | B33_062716_15-17 | 06/27/2016 11:10:00 | A6G0036 | -- | -- | Aroclor 1254 | Aroclor 1260 | Various PAHs |
| 34 | B34_062416_0-34 | 06/24/2016 13:30:00 | A6F1000 | -- | -- | Various PAHs | -- | -- |
| 35 | B35_062416_0-26 | 06/24/2016 15:00:00 | A6F1000 | -- | -- | Various PAHs | -- | -- |
| 35 | B35_062416_26-28 | 06/24/2016 15:00:00 | A6F1000 | -- | -- | Various PAHs | -- | -- |
| 37 | B37_062816_0-11 | 06/28/2016 16:20:00 | A6G0072 | -- | -- | Various PAHs | -- | -- |
| 38 | B_38_062216_0-26 | 06/22/2016 14:50:00 | A6F0902 | Lead | -- | -- | -- | -- |
| 38 | B_38_062216_26-28 | 06/22/2016 14:50:00 | A6F0902 | Lead | -- | -- | -- | -- |
| 41 | B41_062416_0-33 | 06/24/2016 10:00:00 | A6F1000 | -- | -- | Various PAHs | -- | -- |
| 42 | B_42_062216_0-18 | 06/22/2016 11:40:00 | A6F0902 | Lead | -- | -- | -- | -- |
| 42 | B_42_062216_0-18-1 | 06/22/2016 11:40:00 | A6F0902 | Lead | -- | -- | -- | -- |
| 42 | B_42_062216_18-20 | 06/22/2016 11:40:00 | A6F0902 | Lead | -- | -- | -- | -- |
| 43 | B43_062716_4-6 | 06/27/2016 08:30:00 | A6G0036 | -- | -- | Various PAHs | -- | -- |
| 44 | B44_062716_0-27 | 06/27/2016 10:20:00 | A6G0036 | -- | -- | GRO | Various PAHs | -- |
| 44 | B44_062716_27-29 | 06/27/2016 10:20:00 | A6G0036, 1607062 | -- | -- | ORO | GRO | -- |
| 45 | B45_062716_0-20 | 06/27/2016 09:35:00 | A6G0036 | -- | -- | ORO | -- | -- |
| 45 | B45_062716_20-22 | 06/27/2016 09:35:00 | A6G0036 | -- | -- | 4,4'-DDD | Various PAHs | -- |
| 47 | B47_062816_0-32 | 06/28/2016 10:00:00 | A6G0071 | -- | -- | Various PAHs | -- | -- |
| 48 | B_48_062216_0-27 | 06/22/2016 13:55:00 | A6F0902 | Lead | -- | -- | -- | -- |
| 48 | B_48_062216_27-29 | 06/22/2016 13:55:00 | A6F0902 | Lead | -- | -- | -- | -- |
| 50 | B50_062916_0-18-1 | 06/29/2016 08:40:00 | A6G0072 | -- | -- | Various PAHs | -- | -- |
| 50 | B50_062916_18-20 | 06/29/2016 08:40:00 | A6G0072 | ORO | -- | Aroclor 1254 | Aroclor 1260 | Various PAHs |
| 50 | B50_062916_18-20-1 | 06/29/2016 08:40:00 | A6G0072 | ORO | -- | Aroclor 1254 | Aroclor 1260 | Various PAHs |

NOTES:

-- denotes not applicable

The number 1 appended to the end of the sample identification denotes a duplicate sample

DRO = total petroleum hydrocarbons (TPH) as diesel-range organics
GRO = TPH as gasoline-range organics
ORO = TPH as oil-range organics
PAHs = polycyclic aromatic hydrocarbons

# Table C-3
# Soil Sample Hold Times
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Analytical Method | Sample Collection Date | Sample Preparation Date | Sample Preparation Time | Sample Analysis Date | Sample Analysis Time | Days between Sample Collection Date and Preparation Date | Days between Sample Collection Date and Analysis Date | Days between Sample Preparation Date and Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | B1-062116-0-19 | NWTPH-Dx/SG | 06/21/2016 08:50:00 | 06/28/16 | 15:58 | 06/30/16 | 00:52 | 7 | 9 | 2 |
| 1 | B1-062116-0-19 | NWTPH-Gx (MS) | 06/21/2016 08:50:00 | 06/21/16 | 08:50 | 06/27/16 | 17:01 | 0 | 6 | 6 |
| 1 | B1-062116-0-19 | EPA 6020A | 06/21/2016 08:50:00 | 07/07/16 | 12:39 | 07/07/16 | 16:29 | 16 | 16 | 0 |
| 1 | B1-062116-0-19 | EPA 8082A | 06/21/2016 08:50:00 | 07/11/16 | 10:04 | 07/11/16 | 16:10 | 20 | 20 | 0 |
| 1 | B1-062116-0-19 | EPA 8270D (SIM) | 06/21/2016 08:50:00 | 06/28/16 | 15:58 | 07/06/16 | 16:45 | 7 | 15 | 8 |
| 1 | B1-062116-0-19 | EPA 8000C | 06/21/2016 08:50:00 | 06/28/16 | 20:15 | 06/29/16 | 08:22 | 7 | 8 | 1 |
| 1 | B1-062116-19-21 | NWTPH-Dx/SG | 06/21/2016 08:50:00 | 06/28/16 | 15:58 | 06/30/16 | 01:32 | 7 | 9 | 2 |
| 1 | B1-062116-19-21 | NWTPH-Gx (MS) | 06/21/2016 08:50:00 | 06/21/16 | 08:50 | 06/27/16 | 17:34 | 0 | 6 | 6 |
| 1 | B1-062116-19-21 | EPA 6020A | 06/21/2016 08:50:00 | 07/07/16 | 12:39 | 07/07/16 | 16:32 | 16 | 16 | 0 |
| 1 | B1-062116-19-21 | EPA 8000C | 06/21/2016 08:50:00 | 06/28/16 | 20:15 | 06/29/16 | 08:22 | 7 | 8 | 1 |
| 2 | B2_062316_0-29.5 | NWTPH-Dx/SG | 06/23/2016 17:00:00 | 07/01/16 | 07:04 | 07/02/16 | 03:46 | 7 | 8 | 1 |
| 2 | B2_062316_0-29.5 | NWTPH-Gx (MS) | 06/23/2016 17:00:00 | 06/23/16 | 17:00 | 07/01/16 | 17:29 | 0 | 7 | 8 |
| 2 | B2_062316_0-29.5 | EPA 6020A | 06/23/2016 17:00:00 | 07/08/16 | 11:54 | 07/11/16 | 18:00 | 14 | 17 | 3 |
| 2 | B2_062316_0-29.5 | EPA 8082A | 06/23/2016 17:00:00 | 07/12/16 | 10:12 | 07/13/16 | 11:50 | 18 | 19 | 1 |
| 2 | B2_062316_0-29.5 | EPA 8270D (SIM) | 06/23/2016 17:00:00 | 07/07/16 | 13:32 | 07/08/16 | 14:54 | 13 | 14 | 1 |
| 2 | B2_062316_0-29.5 | EPA 8000C | 06/23/2016 17:00:00 | 07/01/16 | 12:21 | 07/05/16 | 07:58 | 7 | 11 | 4 |
| 2 | B2_062316_29.5-31 | NWTPH-Dx/SG | 06/23/2016 17:00:00 | 07/01/16 | 07:04 | 07/02/16 | 04:07 | 7 | 8 | 1 |
| 2 | B2_062316_29.5-31 | NWTPH-Gx (MS) | 06/23/2016 17:00:00 | 06/23/16 | 17:00 | 07/01/16 | 17:56 | 0 | 7 | 8 |
| 2 | B2_062316_29.5-31 | EPA 6020A | 06/23/2016 17:00:00 | 07/08/16 | 11:54 | 07/11/16 | 18:02 | 14 | 17 | 3 |
| 2 | B2_062316_29.5-31 | EPA 6020A | 06/23/2016 17:00:00 | 07/08/16 | 11:54 | 07/12/16 | 22:47 | 14 | 18 | 4 |
| 2 | B2_062316_29.5-31 | EPA 8081B | 06/23/2016 17:00:00 | 07/06/16 | 14:37 | 07/11/16 | 14:11 | 12 | 17 | 5 |
| 2 | B2_062316_29.5-31 | EPA 8081B | 06/23/2016 17:00:00 | 07/06/16 | 14:40 | 08/02/16 | 14:41 | 12 | 39 | 27 |
| 2 | B2_062316_29.5-31 | EPA 8082A | 06/23/2016 17:00:00 | 07/12/16 | 10:12 | 07/13/16 | 12:25 | 18 | 19 | 1 |
| 2 | B2_062316_29.5-31 | EPA 8082A | 06/23/2016 17:00:00 | 07/28/16 | 11:04 | 07/28/16 | 18:32 | 34 | 34 | 0 |
| 2 | B2_062316_29.5-31 | EPA 8270D (SIM) | 06/23/2016 17:00:00 | 07/07/16 | 13:32 | 07/08/16 | 15:23 | 13 | 14 | 1 |
| 2 | B2_062316_29.5-31 | EPA 8270D (SIM) | 06/23/2016 17:00:00 | 07/28/16 | 07:07 | 07/29/16 | 12:20 | **34** | 35 | 1 |
| 2 | B2_062316_29.5-31 | EPA 8000C | 06/23/2016 17:00:00 | 07/01/16 | 12:21 | 07/05/16 | 07:58 | 7 | 11 | 4 |
| 3 | B3_062716_0-28 | NWTPH-Dx/SG | 06/27/2016 12:10:00 | 07/05/16 | 07:05 | 07/06/16 | 07:52 | 7 | 8 | 1 |
| 3 | B3_062716_0-28 | NWTPH-Gx (MS) | 06/27/2016 12:10:00 | 06/27/16 | 12:10 | 07/05/16 | 12:52 | 0 | 7 | 8 |
| 3 | B3_062716_0-28 | EPA 8082A | 06/27/2016 12:10:00 | 07/12/16 | 10:06 | 07/13/16 | 22:21 | 14 | 15 | 1 |
| 3 | B3_062716_0-28 | EPA 8270D (SIM) | 06/27/2016 12:10:00 | 07/11/16 | 12:00 | 07/11/16 | 18:39 | 13 | 13 | 0 |
| 3 | B3_062716_0-28 | EPA 8000C | 06/27/2016 12:10:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 3 | B3_062716_28-30 | NWTPH-Dx/SG | 06/27/2016 12:10:00 | 07/05/16 | 07:05 | 07/06/16 | 08:13 | 7 | 8 | 1 |
| 3 | B3_062716_28-30 | NWTPH-Gx (MS) | 06/27/2016 12:10:00 | 06/27/16 | 12:10 | 07/05/16 | 13:17 | 0 | 7 | 8 |
| 3 | B3_062716_28-30 | EPA 8081B | 06/27/2016 12:10:00 | 07/06/16 | 14:40 | 07/11/16 | 14:18 | 8 | 13 | 5 |
| 3 | B3_062716_28-30 | EPA 8081B | 06/27/2016 12:10:00 | 07/06/16 | 14:40 | 08/02/16 | 17:34 | 8 | 35 | 27 |
| 3 | B3_062716_28-30 | EPA 8082A | 06/27/2016 12:10:00 | 07/12/16 | 10:06 | 07/13/16 | 23:32 | 14 | 15 | 1 |
| 3 | B3_062716_28-30 | EPA 8270D (SIM) | 06/27/2016 12:10:00 | 07/11/16 | 12:00 | 07/11/16 | 19:07 | 13 | 13 | 0 |
| 3 | B3_062716_28-30 | EPA 8000C | 06/27/2016 12:10:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 4 | B4_062816_0-17 | NWTPH-Dx/SG | 06/28/2016 12:15:00 | 07/05/16 | 11:09 | 07/06/16 | 07:12 | 6 | 7 | 1 |
| 4 | B4_062816_0-17 | NWTPH-Gx (MS) | 06/28/2016 12:15:00 | 06/28/16 | 12:15 | 07/06/16 | 06:47 | 0 | 7 | 8 |
| 4 | B4_062816_0-17 | EPA 6020A | 06/28/2016 12:15:00 | 07/11/16 | 12:32 | 07/11/16 | 20:51 | 12 | 12 | 0 |
| 4 | B4_062816_0-17 | EPA 6020A | 06/28/2016 12:15:00 | 07/11/16 | 12:32 | 07/13/16 | 00:15 | 12 | 14 | 2 |
| 4 | B4_062816_0-17 | EPA 8000C | 06/28/2016 12:15:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 6 | 7 | 1 |
| 4 | B4_062816_17-19 | NWTPH-Dx/SG | 06/28/2016 12:15:00 | 07/05/16 | 11:09 | 07/06/16 | 07:32 | 6 | 7 | 1 |
| 4 | B4_062816_17-19 | NWTPH-Gx (MS) | 06/28/2016 12:15:00 | 06/28/16 | 12:15 | 07/06/16 | 07:11 | 0 | 7 | 8 |
| 4 | B4_062816_17-19 | EPA 6020A | 06/28/2016 12:15:00 | 07/11/16 | 12:32 | 07/11/16 | 20:54 | 12 | 12 | 0 |
| 4 | B4_062816_17-19 | EPA 6020A | 06/28/2016 12:15:00 | 07/11/16 | 12:32 | 07/13/16 | 00:18 | 12 | 14 | 2 |
| 4 | B4_062816_17-19 | EPA 8081B | 06/28/2016 12:15:00 | 07/08/16 | 07:26 | 07/12/16 | 14:41 | 9 | 13 | 4 |

# Table C-3
# Soil Sample Hold Times
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Analytical Method | Sample Collection Date | Sample Preparation Date | Sample Preparation Time | Sample Analysis Date | Sample Analysis Time | Days between Sample Collection Date and Preparation Date | Days between Sample Collection Date and Analysis Date | Days between Sample Preparation Date and Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 4 | B4_062816_17-19 | EPA 8081B | 06/28/2016 12:15:00 | 07/08/16 | 07:26 | 08/03/16 | 18:20 | 9 | 35 | 26 |
| 4 | B4_062816_17-19 | EPA 8000C | 06/28/2016 12:15:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 6 | 7 | 1 |
| 5 | B5_062916_0-26 | NWTPH-Dx/SG | 06/29/2016 11:30:00 | 07/06/16 | 17:38 | 07/07/16 | 00:37 | 7 | 8 | 1 |
| 5 | B5_062916_0-26 | NWTPH-Gx (MS) | 06/29/2016 11:30:00 | 06/29/16 | 11:30 | 07/06/16 | 21:04 | 0 | 7 | 7 |
| 5 | B5_062916_0-26 | EPA 6020A | 06/29/2016 11:30:00 | 07/13/16 | 08:01 | 07/15/16 | 22:16 | 14 | 16 | 2 |
| 5 | B5_062916_0-26 | EPA 8082A | 06/29/2016 11:30:00 | 07/12/16 | 14:59 | 07/14/16 | 01:00 | 13 | 15 | 2 |
| 5 | B5_062916_0-26 | EPA 8270D (SIM) | 06/29/2016 11:30:00 | 07/13/16 | 06:35 | 07/17/16 | 00:14 | 14 | 18 | 4 |
| 5 | B5_062916_0-26 | EPA 8000C | 06/29/2016 11:30:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 5 | B5_062916_26-28 | NWTPH-Dx/SG | 06/29/2016 11:30:00 | 07/06/16 | 17:38 | 07/07/16 | 00:57 | 7 | 8 | 1 |
| 5 | B5_062916_26-28 | NWTPH-Gx (MS) | 06/29/2016 11:30:00 | 06/29/16 | 11:30 | 07/06/16 | 21:29 | 0 | 7 | 7 |
| 5 | B5_062916_26-28 | EPA 6020A | 06/29/2016 11:30:00 | 07/13/16 | 08:01 | 07/15/16 | 22:18 | 14 | 16 | 2 |
| 5 | B5_062916_26-28 | EPA 8081B | 06/29/2016 11:30:00 | 07/12/16 | 15:29 | 07/14/16 | 13:12 | 13 | 15 | 2 |
| 5 | B5_062916_26-28 | EPA 8081B | 06/29/2016 11:30:00 | 07/12/16 | 15:29 | 08/03/16 | 20:39 | 13 | 35 | 22 |
| 5 | B5_062916_26-28 | EPA 8000C | 06/29/2016 11:30:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 6 | B_6_062316_0-6 | NWTPH-Dx/SG | 06/23/2016 11:22:00 | 06/30/16 | 10:12 | 07/01/16 | 00:43 | 7 | 8 | 1 |
| 6 | B_6_062316_0-6 | NWTPH-Gx (MS) | 06/23/2016 11:22:00 | 06/23/16 | 11:22 | 06/30/16 | 16:41 | 0 | 7 | 7 |
| 6 | B_6_062316_0-6 | EPA 6020A | 06/23/2016 11:22:00 | 07/07/16 | 12:39 | 07/07/16 | 17:41 | 14 | 14 | 0 |
| 6 | B_6_062316_0-6 | EPA 8000C | 06/23/2016 11:22:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 7 | 8 | 1 |
| 6 | B_6_062316_0-6-1 | NWTPH-Dx/SG | 06/23/2016 11:22:00 | 06/30/16 | 10:12 | 07/01/16 | 01:04 | 7 | 8 | 1 |
| 6 | B_6_062316_0-6-1 | NWTPH-Gx (MS) | 06/23/2016 11:22:00 | 06/23/16 | 11:22 | 06/30/16 | 17:07 | 0 | 7 | 7 |
| 6 | B_6_062316_0-6-1 | EPA 6020A | 06/23/2016 11:22:00 | 07/07/16 | 12:39 | 07/07/16 | 17:44 | 14 | 14 | 0 |
| 6 | B_6_062316_0-6-1 | EPA 8000C | 06/23/2016 11:22:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 7 | 8 | 1 |
| 6 | B_6_062316_6-8 | NWTPH-Dx/SG | 06/23/2016 11:22:00 | 06/30/16 | 10:12 | 07/01/16 | 01:26 | 7 | 8 | 1 |
| 6 | B_6_062316_6-8 | NWTPH-Gx (MS) | 06/23/2016 11:22:00 | 06/23/16 | 11:22 | 06/30/16 | 18:26 | 0 | 7 | 7 |
| 6 | B_6_062316_6-8 | EPA 6020A | 06/23/2016 11:22:00 | 07/07/16 | 12:39 | 07/07/16 | 18:06 | 14 | 14 | 0 |
| 6 | B_6_062316_6-8 | EPA 8000C | 06/23/2016 11:22:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 7 | 8 | 1 |
| 7 | B7_062916_0-13 | NWTPH-Dx/SG | 06/29/2016 10:00:00 | 07/05/16 | 15:18 | 07/06/16 | 06:32 | 6 | 7 | 1 |
| 7 | B7_062916_0-13 | NWTPH-Gx (MS) | 06/29/2016 10:00:00 | 06/29/16 | 10:00 | 07/06/16 | 19:01 | 0 | 7 | 7 |
| 7 | B7_062916_0-13 | EPA 6020A | 06/29/2016 10:00:00 | 07/13/16 | 08:01 | 07/15/16 | 22:04 | 14 | 16 | 2 |
| 7 | B7_062916_0-13 | EPA 8082A | 06/29/2016 10:00:00 | 07/12/16 | 14:59 | 07/13/16 | 23:50 | 13 | 14 | 1 |
| 7 | B7_062916_10-13 | EPA 8270D (SIM) | 06/29/2016 10:00:00 | 07/13/16 | 06:35 | 07/16/16 | 22:23 | 14 | 17 | 3 |
| 7 | B7_062916_10-13 | EPA 8000C | 06/29/2016 10:00:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 7 | B7_062916_13-15 | NWTPH-Dx/SG | 06/29/2016 10:00:00 | 07/05/16 | 15:18 | 07/06/16 | 06:52 | 6 | 7 | 1 |
| 7 | B7_062916_13-15 | NWTPH-Gx (MS) | 06/29/2016 10:00:00 | 06/29/16 | 10:00 | 07/06/16 | 19:26 | 0 | 7 | 7 |
| 7 | B7_062916_13-15 | EPA 6020A | 06/29/2016 10:00:00 | 07/13/16 | 08:01 | 07/15/16 | 22:07 | 14 | 16 | 2 |
| 7 | B7_062916_13-15 | EPA 8082A | 06/29/2016 10:00:00 | 07/12/16 | 14:59 | 07/14/16 | 00:25 | 13 | 15 | 2 |
| 7 | B7_062916_13-15 | EPA 8270D (SIM) | 06/29/2016 10:00:00 | 07/13/16 | 06:35 | 07/16/16 | 22:51 | 14 | 17 | 3 |
| 7 | B7_062916_13-15 | EPA 8000C | 06/29/2016 10:00:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 8 | B8_062716_0-14 | NWTPH-Dx/SG | 06/27/2016 14:50:00 | 07/05/16 | 07:05 | 07/06/16 | 11:49 | 7 | 8 | 1 |
| 8 | B8_062716_0-14 | NWTPH-Gx (MS) | 06/27/2016 14:50:00 | 06/27/16 | 14:50 | 07/05/16 | 16:08 | 0 | 7 | 8 |
| 8 | B8_062716_0-14 | EPA 8000C | 06/27/2016 14:50:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 8 | B8_062716_14-16 | NWTPH-Dx/SG | 06/27/2016 14:50:00 | 07/05/16 | 07:05 | 07/06/16 | 11:27 | 7 | 8 | 1 |
| 8 | B8_062716_14-16 | NWTPH-Gx (MS) | 06/27/2016 14:50:00 | 06/27/16 | 14:50 | 07/05/16 | 15:43 | 0 | 7 | 8 |
| 8 | B8_062716_14-16 | EPA 8000C | 06/27/2016 14:50:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 9 | B9_062816_0-19 | NWTPH-Dx/SG | 06/28/2016 09:00:00 | 07/05/16 | 11:09 | 07/06/16 | 01:34 | 7 | 8 | 1 |
| 9 | B9_062816_0-19 | NWTPH-Gx (MS) | 06/28/2016 09:00:00 | 06/28/16 | 09:00 | 07/05/16 | 20:02 | 0 | 7 | 7 |
| 9 | B9_062816_0-19 | EPA 6020A | 06/28/2016 09:00:00 | 07/11/16 | 12:32 | 07/11/16 | 19:50 | 13 | 13 | 0 |
| 9 | B9_062816_0-19 | EPA 6020A | 06/28/2016 09:00:00 | 07/11/16 | 12:32 | 07/12/16 | 23:23 | 13 | 14 | 1 |
| 9 | B9_062816_0-19 | EPA 8000C | 06/28/2016 09:00:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |

# Table C-3
# Soil Sample Hold Times
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Analytical Method | Sample Collection Date | Sample Preparation Date | Sample Preparation Time | Sample Analysis Date | Sample Analysis Time | Days between Sample Collection Date and Preparation Date | Days between Sample Collection Date and Analysis Date | Days between Sample Preparation Date and Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | B9_062816_0-19-1 | NWTPH-Dx/SG | 06/28/2016 09:00:00 | 07/05/16 | 11:09 | 07/06/16 | 01:54 | 7 | 8 | 1 |
| 9 | B9_062816_0-19-1 | NWTPH-Gx (MS) | 06/28/2016 09:00:00 | 06/28/16 | 09:00 | 07/06/16 | 01:06 | 0 | 8 | 8 |
| 9 | B9_062816_0-19-1 | EPA 6020A | 06/28/2016 09:00:00 | 07/11/16 | 12:32 | 07/11/16 | 19:52 | 13 | 13 | 0 |
| 9 | B9_062816_0-19-1 | EPA 6020A | 06/28/2016 09:00:00 | 07/11/16 | 12:32 | 07/12/16 | 23:25 | 13 | 14 | 1 |
| 9 | B9_062816_0-19-1 | EPA 8000C | 06/28/2016 09:00:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 9 | B9_062816_19-21 | NWTPH-Dx/SG | 06/28/2016 09:00:00 | 07/05/16 | 11:09 | 07/06/16 | 02:14 | 7 | 8 | 1 |
| 9 | B9_062816_19-21 | NWTPH-Gx (MS) | 06/28/2016 09:00:00 | 06/28/16 | 09:00 | 07/06/16 | 01:31 | 0 | 8 | 8 |
| 9 | B9_062816_19-21 | EPA 6020A | 06/28/2016 09:00:00 | 07/11/16 | 12:32 | 07/11/16 | 20:10 | 13 | 13 | 0 |
| 9 | B9_062816_19-21 | EPA 6020A | 06/28/2016 09:00:00 | 07/11/16 | 12:32 | 07/12/16 | 23:34 | 13 | 14 | 1 |
| 9 | B9_062816_19-21 | EPA 8082A | 06/28/2016 09:00:00 | 07/12/16 | 10:06 | 07/14/16 | 00:43 | 14 | 16 | 2 |
| 9 | B9_062816_19-21 | EPA 8270D (SIM) | 06/28/2016 09:00:00 | 07/12/16 | 15:27 | 07/13/16 | 12:07 | 14 | 15 | 1 |
| 9 | B9_062816_19-21 | EPA 8000C | 06/28/2016 09:00:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 9 | B9_062816_19-21-1 | NWTPH-Dx/SG | 06/28/2016 09:00:00 | 07/05/16 | 11:09 | 07/06/16 | 02:34 | 7 | 8 | 1 |
| 9 | B9_062816_19-21-1 | NWTPH-Gx (MS) | 06/28/2016 09:00:00 | 06/28/16 | 09:00 | 07/06/16 | 01:55 | 0 | 8 | 8 |
| 9 | B9_062816_19-21-1 | EPA 6020A | 06/28/2016 09:00:00 | 07/11/16 | 12:32 | 07/11/16 | 20:13 | 13 | 13 | 0 |
| 9 | B9_062816_19-21-1 | EPA 6020A | 06/28/2016 09:00:00 | 07/11/16 | 12:32 | 07/12/16 | 23:37 | 13 | 14 | 1 |
| 9 | B9_062816_19-21-1 | EPA 8082A | 06/28/2016 09:00:00 | 07/12/16 | 10:06 | 07/14/16 | 01:18 | 14 | 16 | 2 |
| 9 | B9_062816_19-21-1 | EPA 8270D (SIM) | 06/28/2016 09:00:00 | 07/12/16 | 15:27 | 07/13/16 | 12:37 | 14 | 15 | 1 |
| 9 | B9_062816_19-21-1 | EPA 8000C | 06/28/2016 09:00:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 10 | B10-062116-2.5-7.5 | NWTPH-Dx/SG | 06/21/2016 14:10:00 | 06/28/16 | 15:58 | 06/29/16 | 23:32 | 6 | 7 | 1 |
| 10 | B10-062116-2.5-7.5 | NWTPH-Gx (MS) | 06/21/2016 14:10:00 | 06/21/16 | 15:10 | 06/27/16 | 22:58 | 0 | 5 | 6 |
| 10 | B10-062116-2.5-7.5 | EPA 6020A | 06/21/2016 14:10:00 | 07/07/16 | 12:39 | 07/07/16 | 17:29 | 15 | 15 | 0 |
| 10 | B10-062116-2.5-7.5 | EPA 8082A | 06/21/2016 14:10:00 | 07/12/16 | 14:57 | 07/13/16 | 11:32 | 20 | 21 | 1 |
| 10 | B10-062116-2.5-7.5 | EPA 8270D (SIM) | 06/21/2016 14:10:00 | 06/28/16 | 15:58 | 07/06/16 | 18:15 | 6 | 14 | 8 |
| 10 | B10-062116-2.5-7.5 | EPA 8000C | 06/21/2016 14:10:00 | 06/28/16 | 20:15 | 06/29/16 | 08:22 | 6 | 7 | 1 |
| 10 | B10-062116-35-37 | NWTPH-Dx/SG | 06/21/2016 14:10:00 | 06/28/16 | 15:58 | 06/29/16 | 22:33 | 6 | 7 | 1 |
| 10 | B10-062116-35-37 | NWTPH-Gx (MS) | 06/21/2016 14:10:00 | 06/21/16 | 14:10 | 06/27/16 | 21:20 | 0 | 5 | 6 |
| 10 | B10-062116-35-37 | EPA 6020A | 06/21/2016 14:10:00 | 07/07/16 | 12:39 | 07/07/16 | 17:10 | 15 | 15 | 0 |
| 10 | B10-062116-35-37 | EPA 8081B | 06/21/2016 14:10:00 | 06/29/16 | 16:56 | 06/30/16 | 19:17 | 7 | 8 | 1 |
| 10 | B10-062116-35-37 | EPA 8081B | 06/21/2016 14:10:00 | 06/29/16 | 16:56 | 08/01/16 | 22:07 | 7 | 40 | 33 |
| 10 | B10-062116-35-37 | EPA 8000C | 06/21/2016 14:10:00 | 06/28/16 | 20:15 | 06/29/16 | 08:22 | 6 | 7 | 1 |
| 10 | B10-062116-8-35 | NWTPH-Dx/SG | 06/21/2016 14:10:00 | 06/28/16 | 15:58 | 06/29/16 | 22:13 | 6 | 7 | 1 |
| 10 | B10-062116-8-35 | NWTPH-Gx (MS) | 06/21/2016 14:10:00 | 06/21/16 | 14:10 | 06/27/16 | 22:09 | 0 | 5 | 6 |
| 10 | B10-062116-8-35 | EPA 6020A | 06/21/2016 14:10:00 | 07/07/16 | 12:39 | 07/07/16 | 17:07 | 15 | 15 | 0 |
| 10 | B10-062116-8-35 | EPA 8000C | 06/21/2016 14:10:00 | 06/28/16 | 20:15 | 06/29/16 | 08:22 | 6 | 7 | 1 |
| 11 | B11-062116-0-36 | NWTPH-Dx/SG | 06/21/2016 12:10:00 | 06/28/16 | 15:58 | 06/29/16 | 21:33 | 6 | 7 | 1 |
| 11 | B11-062116-0-36 | NWTPH-Gx (MS) | 06/21/2016 12:10:00 | 06/21/16 | 12:10 | 06/27/16 | 20:06 | 0 | 5 | 6 |
| 11 | B11-062116-0-36 | EPA 6020A | 06/21/2016 12:10:00 | 07/07/16 | 12:39 | 07/07/16 | 17:02 | 15 | 15 | 0 |
| 11 | B11-062116-0-36 | EPA 8000C | 06/21/2016 12:10:00 | 06/28/16 | 20:15 | 06/29/16 | 08:22 | 6 | 7 | 1 |
| 11 | B11-062116-36-38 | NWTPH-Dx/SG | 06/21/2016 12:10:00 | 06/28/16 | 15:58 | 06/29/16 | 21:53 | 6 | 7 | 1 |
| 11 | B11-062116-36-38 | NWTPH-Gx (MS) | 06/21/2016 12:10:00 | 06/21/16 | 12:10 | 06/27/16 | 20:31 | 0 | 5 | 6 |
| 11 | B11-062116-36-38 | EPA 6020A | 06/21/2016 12:10:00 | 07/07/16 | 12:39 | 07/07/16 | 17:05 | 15 | 15 | 0 |
| 11 | B11-062116-36-38 | EPA 8081B | 06/21/2016 12:10:00 | 06/29/16 | 16:56 | 06/30/16 | 19:00 | 7 | 8 | 1 |
| 11 | B11-062116-36-38 | EPA 8081B | 06/21/2016 12:10:00 | 06/29/16 | 16:56 | 08/01/16 | 21:50 | 7 | 40 | 33 |
| 11 | B11-062116-36-38 | EPA 8000C | 06/21/2016 12:10:00 | 06/28/16 | 20:15 | 06/29/16 | 08:22 | 6 | 7 | 1 |
| 12 | B_12_062316_0-20 | NWTPH-Dx/SG | 06/23/2016 13:40:00 | 06/30/16 | 10:12 | 07/01/16 | 02:09 | 6 | 7 | 1 |
| 12 | B_12_062316_0-20 | NWTPH-Gx (MS) | 06/23/2016 13:40:00 | 06/23/16 | 13:40 | 06/30/16 | 19:18 | 0 | 6 | 7 |
| 12 | B_12_062316_0-20 | EPA 6020A | 06/23/2016 13:40:00 | 07/08/16 | 08:48 | 07/11/16 | 13:20 | 14 | 17 | 3 |
| 12 | B_12_062316_0-20 | EPA 6020A | 06/23/2016 13:40:00 | 07/12/16 | 09:04 | 07/13/16 | 13:12 | 18 | 19 | 1 |

# Table C-3
# Soil Sample Hold Times
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Analytical Method | Sample Collection Date | Sample Preparation Date | Sample Preparation Time | Sample Analysis Date | Sample Analysis Time | Days between Sample Collection Date and Preparation Date | Days between Sample Collection Date and Analysis Date | Days between Sample Preparation Date and Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 12 | B_12_062316_0-20 | EPA 8082A | 06/23/2016 13:40:00 | 07/11/16 | 10:04 | 07/11/16 | 17:21 | 17 | 17 | 0 |
| 12 | B_12_062316_0-20 | EPA 8270D (SIM) | 06/23/2016 13:40:00 | 07/07/16 | 11:44 | 07/07/16 | 20:16 | 13 | 13 | 0 |
| 12 | B_12_062316_0-20 | EPA 8000C | 06/23/2016 13:40:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 6 | 7 | 1 |
| 12 | B_12_062316_20-22 | NWTPH-Dx/SG | 06/23/2016 13:40:00 | 06/30/16 | 10:12 | 07/01/16 | 01:47 | 6 | 7 | 1 |
| 12 | B_12_062316_20-22 | NWTPH-Gx (MS) | 06/23/2016 13:40:00 | 06/23/16 | 13:40 | 06/30/16 | 18:52 | 0 | 6 | 7 |
| 12 | B_12_062316_20-22 | EPA 6020A | 06/23/2016 13:40:00 | 07/08/16 | 08:48 | 07/11/16 | 13:17 | 14 | 17 | 3 |
| 12 | B_12_062316_20-22 | EPA 6020A | 06/23/2016 13:40:00 | 07/12/16 | 09:04 | 07/13/16 | 13:10 | 18 | 19 | 1 |
| 12 | B_12_062316_20-22 | EPA 8082A | 06/23/2016 13:40:00 | 07/11/16 | 10:04 | 07/11/16 | 16:46 | 17 | 17 | 0 |
| 12 | B_12_062316_20-22 | EPA 8270D (SIM) | 06/23/2016 13:40:00 | 07/07/16 | 11:44 | 07/07/16 | 19:48 | 13 | 13 | 0 |
| 12 | B_12_062316_20-22 | EPA 8000C | 06/23/2016 13:40:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 6 | 7 | 1 |
| 13 | B_13_062216_0-12 | NWTPH-Dx/SG | 06/22/2016 13:10:00 | 06/30/16 | 11:31 | 07/01/16 | 10:24 | 7 | 8 | 1 |
| 13 | B_13_062216_0-12 | NWTPH-Gx (MS) | 06/22/2016 13:10:00 | 06/22/16 | 13:10 | 07/01/16 | 00:37 | 0 | 8 | 9 |
| 13 | B_13_062216_0-12 | EPA 6020A | 06/22/2016 13:10:00 | 07/08/16 | 08:48 | 07/11/16 | 15:22 | 15 | 18 | 3 |
| 13 | B_13_062216_0-12 | EPA 6020A | 06/22/2016 13:10:00 | 07/12/16 | 09:04 | 07/13/16 | 14:29 | 19 | 20 | 1 |
| 13 | B_13_062216_0-12 | EPA 8082A | 06/22/2016 13:10:00 | 07/11/16 | 13:50 | 07/12/16 | 12:06 | 18 | 19 | 1 |
| 13 | B_13_062216_0-12 | EPA 8270D (SIM) | 06/22/2016 13:10:00 | 07/06/16 | 16:05 | 07/07/16 | 13:30 | 13 | 14 | 1 |
| 13 | B_13_062216_0-12 | EPA 8000C | 06/22/2016 13:10:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 7 | 8 | 1 |
| 13 | B_13_062216_12-14 | NWTPH-Dx/SG | 06/22/2016 13:10:00 | 06/30/16 | 11:31 | 07/01/16 | 10:02 | 7 | 8 | 1 |
| 13 | B_13_062216_12-14 | NWTPH-Gx (MS) | 06/22/2016 13:10:00 | 06/22/16 | 13:10 | 06/30/16 | 22:49 | 0 | 7 | 8 |
| 13 | B_13_062216_12-14 | EPA 6020A | 06/22/2016 13:10:00 | 07/08/16 | 08:48 | 07/11/16 | 15:19 | 15 | 18 | 3 |
| 13 | B_13_062216_12-14 | EPA 6020A | 06/22/2016 13:10:00 | 07/12/16 | 09:04 | 07/13/16 | 14:26 | 19 | 20 | 1 |
| 13 | B_13_062216_12-14 | EPA 8000C | 06/22/2016 13:10:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 7 | 8 | 1 |
| 14 | B14_062316_0-20 | NWTPH-Dx/SG | 06/23/2016 11:00:00 | 07/01/16 | 07:04 | 07/02/16 | 04:29 | 8 | 9 | 1 |
| 14 | B14_062316_0-20 | NWTPH-Gx (MS) | 06/23/2016 11:00:00 | 06/23/16 | 11:00 | 07/01/16 | 18:23 | 0 | 8 | 8 |
| 14 | B14_062316_0-20 | EPA 6020A | 06/23/2016 11:00:00 | 07/08/16 | 11:54 | 07/11/16 | 18:05 | 15 | 18 | 3 |
| 14 | B14_062316_0-20 | EPA 8082A | 06/23/2016 11:00:00 | 07/12/16 | 10:06 | 07/13/16 | 13:01 | 19 | 20 | 1 |
| 14 | B14_062316_0-20 | EPA 8270D (SIM) | 06/23/2016 11:00:00 | 07/07/16 | 13:32 | 07/08/16 | 15:52 | 14 | 15 | 1 |
| 14 | B14_062316_0-20 | EPA 8000C | 06/23/2016 11:00:00 | 07/01/16 | 12:21 | 07/05/16 | 07:58 | 8 | 12 | 4 |
| 14 | B14_062316_20-22 | NWTPH-Dx/SG | 06/23/2016 11:00:00 | 07/05/16 | 07:05 | 07/06/16 | 03:56 | 12 | 13 | 1 |
| 14 | B14_062316_20-22 | NWTPH-Gx (MS) | 06/23/2016 11:00:00 | 06/23/16 | 11:00 | 07/01/16 | 22:53 | 0 | 8 | 8 |
| 14 | B14_062316_20-22 | EPA 6020A | 06/23/2016 11:00:00 | 07/08/16 | 11:54 | 07/11/16 | 18:08 | 15 | 18 | 3 |
| 14 | B14_062316_20-22 | EPA 8000C | 06/23/2016 11:00:00 | 07/01/16 | 18:56 | 07/05/16 | 07:58 | 8 | 12 | 4 |
| 15 | B15_062916_0-33 | NWTPH-Dx/SG | 06/29/2016 09:30:00 | 07/05/16 | 15:18 | 07/06/16 | 05:53 | 6 | 7 | 1 |
| 15 | B15_062916_0-33 | NWTPH-Gx (MS) | 06/29/2016 09:30:00 | 06/29/16 | 09:30 | 07/06/16 | 18:11 | 0 | 7 | 7 |
| 15 | B15_062916_0-33 | EPA 6020A | 06/29/2016 09:30:00 | 07/13/16 | 08:01 | 07/15/16 | 21:49 | 14 | 16 | 2 |
| 15 | B15_062916_0-33 | EPA 8000C | 06/29/2016 09:30:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 15 | B15_062916_33-35 | NWTPH-Dx/SG | 06/29/2016 09:30:00 | 07/05/16 | 15:18 | 07/06/16 | 06:13 | 6 | 7 | 1 |
| 15 | B15_062916_33-35 | NWTPH-Gx (MS) | 06/29/2016 09:30:00 | 06/29/16 | 09:30 | 07/06/16 | 18:36 | 0 | 7 | 7 |
| 15 | B15_062916_33-35 | EPA 6020A | 06/29/2016 09:30:00 | 07/13/16 | 08:01 | 07/15/16 | 21:52 | 14 | 16 | 2 |
| 15 | B15_062916_33-35 | EPA 8081B | 06/29/2016 09:30:00 | 07/12/16 | 07:21 | 07/13/16 | 17:22 | 13 | 14 | 1 |
| 15 | B15_062916_33-35 | EPA 8081B | 06/29/2016 09:30:00 | 07/11/16 | 08:39 | 08/03/16 | 19:30 | 12 | 35 | 23 |
| 15 | B15_062916_33-35 | EPA 8082A | 06/29/2016 09:30:00 | 07/12/16 | 14:59 | 07/13/16 | 23:14 | 13 | 14 | 1 |
| 15 | B15_062916_33-35 | SW8260B | 06/29/2016 09:30:00 | 06/29/16 | 09:30 | 07/06/16 | 18:36 | 0 | 7 | 7 |
| 15 | B15_062916_33-35 | EPA 8270D (SIM) | 06/29/2016 09:30:00 | 07/13/16 | 06:35 | 07/16/16 | 21:56 | 14 | 17 | 3 |
| 15 | B15_062916_33-35 | EPA 8000C | 06/29/2016 09:30:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 15 | B15_062916_33-35 | NWVPH-VPH | 06/29/2016 09:30:00 | 7/12/2016 |  | 7/12/2016 | 14:36 | **13** | 13 | 0 |
| 16 | B16_062816_0-19 | NWTPH-Dx/SG | 06/28/2016 15:00:00 | 07/05/16 | 15:17 | 07/05/16 | 23:55 | 6 | 6 | 0 |
| 16 | B16_062816_0-19 | NWTPH-Gx (MS) | 06/28/2016 15:00:00 | 06/28/16 | 15:00 | 07/06/16 | 23:06 | 0 | 7 | 8 |
| 16 | B16_062816_0-19 | EPA 6020A | 06/28/2016 15:00:00 | 07/12/16 | 18:51 | 07/14/16 | 22:28 | 13 | 15 | 2 |

# Table C-3
# Soil Sample Hold Times
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Analytical Method | Sample Collection Date | Sample Preparation Date | Sample Preparation Time | Sample Analysis Date | Sample Analysis Time | Days between Sample Collection Date and Preparation Date | Days between Sample Collection Date and Analysis Date | Days between Sample Preparation Date and Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | B16_062816_0-19 | EPA 8082A | 06/28/2016 15:00:00 | 07/12/16 | 14:59 | 07/13/16 | 19:41 | 13 | 14 | 1 |
| 16 | B16_062816_0-19 | EPA 8270D (SIM) | 06/28/2016 15:00:00 | 07/12/16 | 15:27 | 07/13/16 | 14:36 | 13 | 14 | 1 |
| 16 | B16_062816_0-19 | EPA 8000C | 06/28/2016 15:00:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 16 | B16_062816_19-21 | NWTPH-Dx/SG | 06/28/2016 15:00:00 | 07/05/16 | 15:17 | 07/06/16 | 00:34 | 6 | 7 | 1 |
| 16 | B16_062816_19-21 | NWTPH-Gx (MS) | 06/28/2016 15:00:00 | 06/28/16 | 15:00 | 07/06/16 | 14:53 | 0 | 7 | 8 |
| 16 | B16_062816_19-21 | EPA 6020A | 06/28/2016 15:00:00 | 07/12/16 | 18:51 | 07/14/16 | 22:31 | 13 | 15 | 2 |
| 16 | B16_062816_19-21 | EPA 8081B | 06/28/2016 15:00:00 | 07/12/16 | 07:21 | 07/13/16 | 10:33 | 13 | 14 | 1 |
| 16 | B16_062816_19-21 | EPA 8081B | 06/28/2016 15:00:00 | 07/11/16 | 08:39 | 08/03/16 | 19:13 | 12 | 35 | 23 |
| 16 | B16_062816_19-21 | EPA 8000C | 06/28/2016 15:00:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 17 | B17-062116-0-4 | NWTPH-Dx/SG | 06/21/2016 09:30:00 | 06/28/16 | 15:58 | 06/30/16 | 01:52 | 7 | 9 | 2 |
| 17 | B17-062116-0-4 | NWTPH-Gx (MS) | 06/21/2016 09:30:00 | 06/21/16 | 09:30 | 06/27/16 | 17:59 | 0 | 6 | 6 |
| 17 | B17-062116-0-4 | EPA 6020A | 06/21/2016 09:30:00 | 07/07/16 | 12:39 | 07/07/16 | 16:35 | 16 | 16 | 0 |
| 17 | B17-062116-0-4 | EPA 8000C | 06/21/2016 09:30:00 | 06/28/16 | 20:15 | 06/29/16 | 08:22 | 7 | 8 | 1 |
| 17 | B17-062116-4-6 | NWTPH-Dx/SG | 06/21/2016 09:30:00 | 06/28/16 | 15:58 | 06/30/16 | 02:12 | 7 | 9 | 2 |
| 17 | B17-062116-4-6 | NWTPH-Gx (MS) | 06/21/2016 09:30:00 | 06/21/16 | 09:30 | 06/27/16 | 18:50 | 0 | 6 | 6 |
| 17 | B17-062116-4-6 | EPA 6020A | 06/21/2016 09:30:00 | 07/07/16 | 12:39 | 07/07/16 | 16:47 | 16 | 16 | 0 |
| 17 | B17-062116-4-6 | EPA 8082A | 06/21/2016 09:30:00 | 07/11/16 | 10:04 | 07/11/16 | 17:21 | 20 | 20 | 0 |
| 17 | B17-062116-4-6 | EPA 8270D (SIM) | 06/21/2016 09:30:00 | 06/28/16 | 15:58 | 07/06/16 | 17:14 | 7 | 15 | 8 |
| 17 | B17-062116-4-6 | EPA 8000C | 06/21/2016 09:30:00 | 06/28/16 | 20:15 | 06/29/16 | 08:22 | 7 | 8 | 1 |
| 18 | B18_062716_0-26 | NWTPH-Dx/SG | 06/27/2016 16:20:00 | 07/05/16 | 07:05 | 07/06/16 | 12:32 | 7 | 8 | 1 |
| 18 | B18_062716_0-26 | NWTPH-Gx (MS) | 06/27/2016 16:20:00 | 06/27/16 | 16:20 | 07/05/16 | 17:22 | 0 | 7 | 8 |
| 18 | B18_062716_0-26 | EPA 8081B | 06/27/2016 16:20:00 | 07/08/16 | 07:26 | 07/11/16 | 12:51 | 10 | 13 | 3 |
| 18 | B18_062716_0-26 | EPA 8081B | 06/27/2016 16:20:00 | 07/08/16 | 07:26 | 07/11/16 | 17:10 | 10 | 13 | 3 |
| 18 | B18_062716_0-26 | EPA 8081B | 06/27/2016 16:20:00 | 07/08/16 | 07:26 | 08/02/16 | 18:44 | 10 | 35 | 25 |
| 18 | B18_062716_0-26 | EPA 8000C | 06/27/2016 16:20:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 18 | B18_062716_26-28 | NWTPH-Dx/SG | 06/27/2016 16:20:00 | 07/05/16 | 07:05 | 07/06/16 | 12:11 | 7 | 8 | 1 |
| 18 | B18_062716_26-28 | NWTPH-Gx (MS) | 06/27/2016 16:20:00 | 06/27/16 | 16:20 | 07/05/16 | 16:32 | 0 | 7 | 8 |
| 18 | B18_062716_26-28 | EPA 8081B | 06/27/2016 16:20:00 | 07/06/16 | 14:40 | 07/08/16 | 13:16 | 8 | 10 | 2 |
| 18 | B18_062716_26-28 | EPA 8081B | 06/27/2016 16:20:00 | 07/06/16 | 14:40 | 08/02/16 | 18:26 | 8 | 35 | 27 |
| 18 | B18_062716_26-28 | EPA 8000C | 06/27/2016 16:20:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 19 | B_19_062316_0-30 | NWTPH-Dx/SG | 06/23/2016 14:45:00 | 06/30/16 | 10:12 | 07/01/16 | 02:30 | 6 | 7 | 1 |
| 19 | B_19_062316_0-30 | NWTPH-Gx (MS) | 06/23/2016 14:45:00 | 06/23/16 | 14:45 | 06/30/16 | 19:44 | 0 | 6 | 7 |
| 19 | B_19_062316_0-30 | EPA 6020A | 06/23/2016 14:45:00 | 07/08/16 | 08:48 | 07/11/16 | 13:23 | 14 | 17 | 3 |
| 19 | B_19_062316_0-30 | EPA 6020A | 06/23/2016 14:45:00 | 07/12/16 | 09:04 | 07/13/16 | 13:15 | 18 | 19 | 1 |
| 19 | B_19_062316_0-30 | EPA 8082A | 06/23/2016 14:45:00 | 07/11/16 | 10:04 | 07/11/16 | 17:57 | 17 | 17 | 0 |
| 19 | B_19_062316_0-30 | EPA 8270D (SIM) | 06/23/2016 14:45:00 | 07/07/16 | 11:44 | 07/07/16 | 20:46 | 13 | 13 | 0 |
| 19 | B_19_062316_0-30 | EPA 8000C | 06/23/2016 14:45:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 6 | 7 | 1 |
| 19 | B_19_062316_0-30-1 | NWTPH-Dx/SG | 06/23/2016 14:45:00 | 06/30/16 | 10:12 | 07/01/16 | 02:52 | 6 | 7 | 1 |
| 19 | B_19_062316_0-30-1 | NWTPH-Gx (MS) | 06/23/2016 14:45:00 | 06/23/16 | 14:45 | 06/30/16 | 20:10 | 0 | 6 | 7 |
| 19 | B_19_062316_0-30-1 | EPA 6020A | 06/23/2016 14:45:00 | 07/08/16 | 08:48 | 07/11/16 | 13:26 | 14 | 17 | 3 |
| 19 | B_19_062316_0-30-1 | EPA 6020A | 06/23/2016 14:45:00 | 07/12/16 | 09:04 | 07/13/16 | 13:18 | 18 | 19 | 1 |
| 19 | B_19_062316_0-30-1 | EPA 8082A | 06/23/2016 14:45:00 | 07/11/16 | 13:50 | 07/12/16 | 09:09 | 17 | 18 | 1 |
| 19 | B_19_062316_0-30-1 | EPA 8270D (SIM) | 06/23/2016 14:45:00 | 07/07/16 | 11:44 | 07/07/16 | 21:14 | 13 | 13 | 0 |
| 19 | B_19_062316_0-30-1 | EPA 8000C | 06/23/2016 14:45:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 6 | 7 | 1 |
| 19 | B_19_062316_30-32 | NWTPH-Dx/SG | 06/23/2016 14:45:00 | 06/30/16 | 10:12 | 07/01/16 | 03:13 | 6 | 7 | 1 |
| 19 | B_19_062316_30-32 | NWTPH-Gx (MS) | 06/23/2016 14:45:00 | 06/23/16 | 14:45 | 06/30/16 | 20:36 | 0 | 6 | 7 |
| 19 | B_19_062316_30-32 | EPA 6020A | 06/23/2016 14:45:00 | 07/08/16 | 08:48 | 07/11/16 | 14:24 | 14 | 17 | 3 |
| 19 | B_19_062316_30-32 | EPA 6020A | 06/23/2016 14:45:00 | 07/12/16 | 09:04 | 07/13/16 | 13:36 | 18 | 19 | 1 |
| 19 | B_19_062316_30-32 | EPA 8081B | 06/23/2016 14:45:00 | 07/06/16 | 14:35 | 07/11/16 | 10:54 | 12 | 17 | 5 |

# Table C-3
# Soil Sample Hold Times
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Analytical Method | Sample Collection Date | Sample Preparation Date | Sample Preparation Time | Sample Analysis Date | Sample Analysis Time | Days between Sample Collection Date and Preparation Date | Days between Sample Collection Date and Analysis Date | Days between Sample Preparation Date and Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 19 | B_19_062316_30-32 | EPA 8081B | 06/23/2016 14:45:00 | 07/06/16 | 14:40 | 08/02/16 | 14:24 | 12 | 39 | 27 |
| 19 | B_19_062316_30-32 | EPA 8082A | 06/23/2016 14:45:00 | 07/11/16 | 13:50 | 07/12/16 | 09:44 | 17 | 18 | 1 |
| 19 | B_19_062316_30-32 | EPA 8082A | 06/23/2016 14:45:00 | 07/28/16 | 11:04 | 07/28/16 | 16:42 | 34 | 34 | 0 |
| 19 | B_19_062316_30-32 | EPA 8270D (SIM) | 06/23/2016 14:45:00 | 07/07/16 | 11:44 | 07/08/16 | 11:59 | 13 | 14 | 1 |
| 19 | B_19_062316_30-32 | EPA 8270D (SIM) | 06/23/2016 14:45:00 | 07/28/16 | 07:07 | 07/29/16 | 10:52 | **34** | 35 | 1 |
| 19 | B_19_062316_30-32 | EPA 8000C | 06/23/2016 14:45:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 6 | 7 | 1 |
| 20 | B20_062816_0-13 | NWTPH-Dx/SG | 06/28/2016 15:40:00 | 07/05/16 | 15:17 | 07/06/16 | 01:54 | 6 | 7 | 1 |
| 20 | B20_062816_0-13 | NWTPH-Gx (MS) | 06/28/2016 15:40:00 | 06/28/16 | 15:40 | 07/06/16 | 16:49 | 0 | 7 | 8 |
| 20 | B20_062816_0-13 | EPA 6020A | 06/28/2016 15:40:00 | 07/12/16 | 18:51 | 07/14/16 | 22:40 | 13 | 15 | 2 |
| 20 | B20_062816_0-13 | EPA 8000C | 06/28/2016 15:40:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 20 | B20_062816_13-15 | NWTPH-Dx/SG | 06/28/2016 15:40:00 | 07/05/16 | 15:17 | 07/06/16 | 02:14 | 6 | 7 | 1 |
| 20 | B20_062816_13-15 | NWTPH-Gx (MS) | 06/28/2016 15:40:00 | 06/28/16 | 15:40 | 07/06/16 | 17:29 | 0 | 7 | 8 |
| 20 | B20_062816_13-15 | EPA 6020A | 06/28/2016 15:40:00 | 07/12/16 | 18:51 | 07/14/16 | 22:43 | 13 | 15 | 2 |
| 20 | B20_062816_13-15 | EPA 8000C | 06/28/2016 15:40:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 21 | B21_062416_11-13 | NWTPH-Dx/SG | 06/24/2016 14:00:00 | 07/01/16 | 07:04 | 07/02/16 | 01:36 | 6 | 7 | 1 |
| 21 | B21_062416_11-13 | NWTPH-Gx (MS) | 06/24/2016 14:00:00 | 06/24/16 | 14:00 | 07/01/16 | 21:32 | 0 | 6 | 7 |
| 21 | B21_062416_11-13 | EPA 6020A | 06/24/2016 14:00:00 | 07/08/16 | 11:54 | 07/11/16 | 17:50 | 13 | 16 | 3 |
| 21 | B21_062416_11-13 | EPA 8000C | 06/24/2016 14:00:00 | 07/01/16 | 12:21 | 07/05/16 | 07:58 | 6 | 10 | 4 |
| 22 | B_22_062216_0-29 | NWTPH-Dx/SG | 06/22/2016 11:10:00 | 06/30/16 | 11:31 | 07/01/16 | 05:44 | 8 | 9 | 1 |
| 22 | B_22_062216_0-29 | NWTPH-Gx (MS) | 06/22/2016 11:10:00 | 06/22/16 | 11:10 | 07/01/16 | 00:10 | 0 | 9 | 9 |
| 22 | B_22_062216_0-29 | EPA 6020A | 06/22/2016 11:10:00 | 07/08/16 | 08:48 | 07/11/16 | 15:31 | 16 | 19 | 3 |
| 22 | B_22_062216_0-29 | EPA 8000C | 06/22/2016 11:10:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 8 | 9 | 1 |
| 22 | B_22_062216_29-31 | NWTPH-Dx/SG | 06/22/2016 11:10:00 | 06/30/16 | 11:31 | 07/01/16 | 10:45 | 8 | 9 | 1 |
| 22 | B_22_062216_29-31 | NWTPH-Gx (MS) | 06/22/2016 11:10:00 | 06/22/16 | 11:10 | 06/30/16 | 23:16 | 0 | 8 | 8 |
| 22 | B_22_062216_29-31 | EPA 6020A | 06/22/2016 11:10:00 | 07/08/16 | 08:48 | 07/11/16 | 15:25 | 16 | 19 | 3 |
| 22 | B_22_062216_29-31 | EPA 8081B | 06/22/2016 11:10:00 | 07/06/16 | 14:35 | 07/11/16 | 12:21 | 14 | 19 | 5 |
| 22 | B_22_062216_29-31 | EPA 8081B | 06/22/2016 11:10:00 | 07/06/16 | 14:40 | 08/02/16 | 00:08 | 14 | 41 | 27 |
| 22 | B_22_062216_29-31 | EPA 8000C | 06/22/2016 11:10:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 8 | 9 | 1 |
| 23 | B_23_062216_0-30 | NWTPH-Dx/SG | 06/22/2016 10:10:00 | 06/30/16 | 10:12 | 07/01/16 | 06:05 | 8 | 9 | 1 |
| 23 | B_23_062216_0-30 | NWTPH-Gx (MS) | 06/22/2016 10:10:00 | 06/22/16 | 10:10 | 06/30/16 | 23:07 | 0 | 8 | 8 |
| 23 | B_23_062216_0-30 | EPA 6020A | 06/22/2016 10:10:00 | 07/08/16 | 08:48 | 07/11/16 | 14:44 | 16 | 19 | 3 |
| 23 | B_23_062216_0-30 | EPA 6020A | 06/22/2016 10:10:00 | 07/12/16 | 09:04 | 07/13/16 | 13:50 | 20 | 21 | 1 |
| 23 | B_23_062216_0-30 | EPA 8000C | 06/22/2016 10:10:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 8 | 9 | 1 |
| 23 | B_23_062216_34-36 | NWTPH-Dx/SG | 06/22/2016 10:10:00 | 06/30/16 | 10:12 | 07/01/16 | 05:44 | 8 | 9 | 1 |
| 23 | B_23_062216_34-36 | NWTPH-Gx (MS) | 06/22/2016 10:10:00 | 06/22/16 | 10:10 | 06/30/16 | 22:43 | 0 | 8 | 8 |
| 23 | B_23_062216_34-36 | EPA 6020A | 06/22/2016 10:10:00 | 07/08/16 | 08:48 | 07/11/16 | 14:41 | 16 | 19 | 3 |
| 23 | B_23_062216_34-36 | EPA 6020A | 06/22/2016 10:10:00 | 07/12/16 | 09:04 | 07/13/16 | 13:45 | 20 | 21 | 1 |
| 23 | B_23_062216_34-36 | EPA 8081B | 06/22/2016 10:10:00 | 07/06/16 | 14:35 | 07/11/16 | 11:29 | 14 | 19 | 5 |
| 23 | B_23_062216_34-36 | EPA 8081B | 06/22/2016 10:10:00 | 07/06/16 | 14:40 | 08/01/16 | 23:16 | 14 | 40 | 26 |
| 23 | B_23_062216_34-36 | EPA 8000C | 06/22/2016 10:10:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 8 | 9 | 1 |
| 24 | B24_062716_0-29 | NWTPH-Dx/SG | 06/27/2016 14:40:00 | 07/05/16 | 07:05 | 07/06/16 | 10:44 | 7 | 8 | 1 |
| 24 | B24_062716_0-29 | NWTPH-Gx (MS) | 06/27/2016 14:40:00 | 06/27/16 | 14:40 | 07/05/16 | 14:30 | 0 | 7 | 8 |
| 24 | B24_062716_0-29 | EPA 8000C | 06/27/2016 14:40:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 24 | B24_062716_0-29-1 | NWTPH-Dx/SG | 06/27/2016 14:40:00 | 07/05/16 | 07:05 | 07/06/16 | 11:06 | 7 | 8 | 1 |
| 24 | B24_062716_0-29-1 | NWTPH-Gx (MS) | 06/27/2016 14:40:00 | 06/27/16 | 14:40 | 07/05/16 | 14:54 | 0 | 7 | 8 |
| 24 | B24_062716_0-29-1 | EPA 8000C | 06/27/2016 14:40:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 24 | B24_062716_29-31 | NWTPH-Dx/SG | 06/27/2016 14:40:00 | 07/05/16 | 07:05 | 07/06/16 | 10:01 | 7 | 8 | 1 |
| 24 | B24_062716_29-31 | NWTPH-Gx (MS) | 06/27/2016 14:40:00 | 06/27/16 | 14:40 | 07/05/16 | 13:41 | 0 | 7 | 8 |
| 24 | B24_062716_29-31 | EPA 8081B | 06/27/2016 14:40:00 | 07/06/16 | 14:40 | 07/11/16 | 14:35 | 8 | 13 | 5 |

# Table C-3
# Soil Sample Hold Times
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Analytical Method | Sample Collection Date | Sample Preparation Date | Sample Preparation Time | Sample Analysis Date | Sample Analysis Time | Days between Sample Collection Date and Preparation Date | Days between Sample Collection Date and Analysis Date | Days between Sample Preparation Date and Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 24 | B24_062716_29-31 | EPA 8081B | 06/27/2016 14:40:00 | 07/06/16 | 14:40 | 07/11/16 | 17:45 | 8 | 13 | 5 |
| 24 | B24_062716_29-31 | EPA 8081B | 06/27/2016 14:40:00 | 07/06/16 | 14:40 | 08/02/16 | 17:52 | 8 | 35 | 27 |
| 24 | B24_062716_29-31 | EPA 8082A | 06/27/2016 14:40:00 | 07/12/16 | 10:06 | 07/14/16 | 00:07 | 14 | 16 | 2 |
| 24 | B24_062716_29-31 | EPA 8270D (SIM) | 06/27/2016 14:40:00 | 07/11/16 | 12:00 | 07/11/16 | 19:36 | 13 | 13 | 0 |
| 24 | B24_062716_29-31 | EPA 8000C | 06/27/2016 14:40:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 24 | B24_062716_29-31-1 | NWTPH-Dx/SG | 06/27/2016 14:40:00 | 07/05/16 | 07:05 | 07/06/16 | 10:23 | 7 | 8 | 1 |
| 24 | B24_062716_29-31-1 | NWTPH-Gx (MS) | 06/27/2016 14:40:00 | 06/27/16 | 14:40 | 07/05/16 | 14:05 | 0 | 7 | 8 |
| 24 | B24_062716_29-31-1 | EPA 8081B | 06/27/2016 14:40:00 | 07/06/16 | 14:40 | 07/11/16 | 14:53 | 8 | 13 | 5 |
| 24 | B24_062716_29-31-1 | EPA 8081B | 06/27/2016 14:40:00 | 07/06/16 | 14:40 | 07/11/16 | 18:03 | 8 | 13 | 5 |
| 24 | B24_062716_29-31-1 | EPA 8081B | 06/27/2016 14:40:00 | 07/06/16 | 14:40 | 08/02/16 | 18:09 | 8 | 35 | 27 |
| 24 | B24_062716_29-31-1 | EPA 8000C | 06/27/2016 14:40:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 25 | B25_062716_0-18 | NWTPH-Dx/SG | 06/27/2016 09:15:00 | 07/05/16 | 07:05 | 07/06/16 | 05:00 | 8 | 9 | 1 |
| 25 | B25_062716_0-18 | NWTPH-Gx (MS) | 06/27/2016 09:15:00 | 06/27/16 | 09:15 | 07/02/16 | 04:43 | 0 | 5 | 5 |
| 25 | B25_062716_0-18 | EPA 8000C | 06/27/2016 09:15:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 8 | 9 | 1 |
| 25 | B25_062716_18-20 | NWTPH-Dx/SG | 06/27/2016 09:15:00 | 07/05/16 | 07:05 | 07/06/16 | 05:22 | 8 | 9 | 1 |
| 25 | B25_062716_18-20 | NWTPH-Gx (MS) | 06/27/2016 09:15:00 | 06/27/16 | 09:15 | 07/02/16 | 05:09 | 0 | 5 | 5 |
| 25 | B25_062716_18-20 | EPA 8000C | 06/27/2016 09:15:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 8 | 9 | 1 |
| 26 | B26_062816_0-30 | NWTPH-Dx/SG | 06/28/2016 11:05:00 | 07/05/16 | 11:09 | 07/06/16 | 03:53 | 7 | 8 | 1 |
| 26 | B26_062816_0-30 | NWTPH-Gx (MS) | 06/28/2016 11:05:00 | 06/28/16 | 11:05 | 07/06/16 | 03:57 | 0 | 8 | 8 |
| 26 | B26_062816_0-30 | EPA 6020A | 06/28/2016 11:05:00 | 07/11/16 | 12:32 | 07/11/16 | 20:24 | 13 | 13 | 0 |
| 26 | B26_062816_0-30 | EPA 6020A | 06/28/2016 11:05:00 | 07/11/16 | 12:32 | 07/12/16 | 23:58 | 13 | 14 | 1 |
| 26 | B26_062816_0-30 | EPA 8000C | 06/28/2016 11:05:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 26 | B26_062816_30-32 | NWTPH-Dx/SG | 06/28/2016 11:05:00 | 07/05/16 | 11:09 | 07/06/16 | 05:33 | 7 | 8 | 1 |
| 26 | B26_062816_30-32 | NWTPH-Gx (MS) | 06/28/2016 11:05:00 | 06/28/16 | 11:05 | 07/06/16 | 04:21 | 0 | 8 | 8 |
| 26 | B26_062816_30-32 | EPA 6020A | 06/28/2016 11:05:00 | 07/11/16 | 12:32 | 07/11/16 | 20:27 | 13 | 13 | 0 |
| 26 | B26_062816_30-32 | EPA 6020A | 06/28/2016 11:05:00 | 07/11/16 | 12:32 | 07/13/16 | 00:00 | 13 | 15 | 2 |
| 26 | B26_062816_30-32 | EPA 8081B | 06/28/2016 11:05:00 | 07/12/16 | 15:29 | 07/14/16 | 12:19 | 14 | 16 | 2 |
| 26 | B26_062816_30-32 | EPA 8081B | 06/28/2016 11:05:00 | 07/12/16 | 15:29 | 08/03/16 | 20:05 | 14 | 36 | 22 |
| 26 | B26_062816_30-32 | EPA 8000C | 06/28/2016 11:05:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 27 | B27-062116-0-30 | NWTPH-Dx/SG | 06/21/2016 10:30:00 | 06/28/16 | 15:58 | 06/30/16 | 02:51 | 7 | 9 | 2 |
| 27 | B27-062116-0-30 | NWTPH-Gx (MS) | 06/21/2016 10:30:00 | 06/21/16 | 10:30 | 06/27/16 | 19:15 | 0 | 6 | 6 |
| 27 | B27-062116-0-30 | EPA 6020A | 06/21/2016 10:30:00 | 07/07/16 | 12:39 | 07/07/16 | 16:56 | 16 | 16 | 0 |
| 27 | B27-062116-0-30 | EPA 8000C | 06/21/2016 10:30:00 | 06/28/16 | 20:15 | 06/29/16 | 08:22 | 7 | 8 | 1 |
| 27 | B27-062116-31-33 | NWTPH-Dx/SG | 06/21/2016 10:30:00 | 06/28/16 | 15:58 | 06/30/16 | 03:11 | 7 | 9 | 2 |
| 27 | B27-062116-31-33 | NWTPH-Gx (MS) | 06/21/2016 10:30:00 | 06/21/16 | 10:30 | 06/27/16 | 19:41 | 0 | 6 | 6 |
| 27 | B27-062116-31-33 | EPA 6020A | 06/21/2016 10:30:00 | 07/07/16 | 12:39 | 07/07/16 | 16:59 | 16 | 16 | 0 |
| 27 | B27-062116-31-33 | EPA 8081B | 06/21/2016 10:30:00 | 06/29/16 | 16:56 | 06/30/16 | 18:42 | 8 | 9 | 1 |
| 27 | B27-062116-31-33 | EPA 8081B | 06/21/2016 10:30:00 | 06/29/16 | 16:56 | 08/01/16 | 21:33 | 8 | 41 | 33 |
| 27 | B27-062116-31-33 | EPA 8000C | 06/21/2016 10:30:00 | 06/28/16 | 20:15 | 06/29/16 | 08:22 | 7 | 8 | 1 |
| 28 | B28_062816_0-23 | NWTPH-Dx/SG | 06/28/2016 14:00:00 | 07/05/16 | 11:09 | 07/06/16 | 07:52 | 6 | 7 | 1 |
| 28 | B28_062816_0-23 | NWTPH-Gx (MS) | 06/28/2016 14:00:00 | 06/28/16 | 14:00 | 07/06/16 | 07:36 | 0 | 7 | 8 |
| 28 | B28_062816_0-23 | EPA 6020A | 06/28/2016 14:00:00 | 07/11/16 | 12:32 | 07/11/16 | 20:57 | 12 | 12 | 0 |
| 28 | B28_062816_0-23 | EPA 6020A | 06/28/2016 14:00:00 | 07/11/16 | 12:32 | 07/13/16 | 00:21 | 12 | 14 | 2 |
| 28 | B28_062816_0-23 | EPA 8000C | 06/28/2016 14:00:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 6 | 7 | 1 |
| 28 | B28_062816_23-25 | NWTPH-Dx/SG | 06/28/2016 14:00:00 | 07/05/16 | 18:03 | 07/06/16 | 07:32 | 6 | 7 | 1 |
| 28 | B28_062816_23-25 | NWTPH-Gx (MS) | 06/28/2016 14:00:00 | 06/28/16 | 14:00 | 07/06/16 | 08:00 | 0 | 7 | 8 |
| 28 | B28_062816_23-25 | EPA 6020A | 06/28/2016 14:00:00 | 07/11/16 | 12:32 | 07/11/16 | 21:00 | 12 | 12 | 0 |
| 28 | B28_062816_23-25 | EPA 6020A | 06/28/2016 14:00:00 | 07/11/16 | 12:32 | 07/13/16 | 00:24 | 12 | 14 | 2 |
| 28 | B28_062816_23-25 | EPA 8081B | 06/28/2016 14:00:00 | 07/08/16 | 07:26 | 07/12/16 | 14:59 | 9 | 13 | 4 |
| 28 | B28_062816_23-25 | EPA 8081B | 06/28/2016 14:00:00 | 07/08/16 | 07:26 | 08/03/16 | 18:38 | 9 | 35 | 26 |
| 28 | B28_062816_23-25 | EPA 8000C | 06/28/2016 14:00:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 6 | 7 | 1 |

# Table C-3
# Soil Sample Hold Times
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Analytical Method | Sample Collection Date | Sample Preparation Date | Sample Preparation Time | Sample Analysis Date | Sample Analysis Time | Days between Sample Collection Date and Preparation Date | Days between Sample Collection Date and Analysis Date | Days between Sample Preparation Date and Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 29 | B29-062116-0-30 | NWTPH-Dx/SG | 06/21/2016 15:10:00 | 06/28/16 | 15:58 | 06/29/16 | 22:53 | 6 | 7 | 1 |
| 29 | B29-062116-0-30 | NWTPH-Gx (MS) | 06/21/2016 15:10:00 | 06/21/16 | 15:10 | 06/27/16 | 21:45 | 0 | 5 | 6 |
| 29 | B29-062116-0-30 | EPA 6020A | 06/21/2016 15:10:00 | 07/07/16 | 12:39 | 07/07/16 | 17:13 | 15 | 15 | 0 |
| 29 | B29-062116-0-30 | EPA 8082A | 06/21/2016 15:10:00 | 07/11/16 | 10:04 | 07/11/16 | 17:57 | 19 | 19 | 0 |
| 29 | B29-062116-0-30 | EPA 8270D (SIM) | 06/21/2016 15:10:00 | 06/28/16 | 15:58 | 07/06/16 | 17:45 | 6 | 14 | 8 |
| 29 | B29-062116-0-30 | EPA 8000C | 06/21/2016 15:10:00 | 06/28/16 | 20:15 | 06/29/16 | 08:22 | 6 | 7 | 1 |
| 29 | B29-062116-30-32 | NWTPH-Dx/SG | 06/21/2016 15:10:00 | 06/28/16 | 15:58 | 06/29/16 | 23:12 | 6 | 7 | 1 |
| 29 | B29-062116-30-32 | NWTPH-Gx (MS) | 06/21/2016 15:10:00 | 06/21/16 | 15:10 | 06/27/16 | 20:55 | 0 | 5 | 6 |
| 29 | B29-062116-30-32 | EPA 6020A | 06/21/2016 15:10:00 | 07/07/16 | 12:39 | 07/07/16 | 17:26 | 15 | 15 | 0 |
| 29 | B29-062116-30-32 | EPA 8081B | 06/21/2016 15:10:00 | 06/29/16 | 16:56 | 06/30/16 | 19:35 | 7 | 8 | 1 |
| 29 | B29-062116-30-32 | EPA 8081B | 06/21/2016 15:10:00 | 06/29/16 | 16:56 | 08/01/16 | 22:24 | 7 | 40 | 33 |
| 29 | B29-062116-30-32 | EPA 8000C | 06/21/2016 15:10:00 | 06/28/16 | 20:15 | 06/29/16 | 08:22 | 6 | 7 | 1 |
| 30 | B_30_062216_0-24 | NWTPH-Dx/SG | 06/22/2016 15:50:00 | 06/30/16 | 10:12 | 07/01/16 | 12:25 | 7 | 8 | 1 |
| 30 | B_30_062216_0-24 | NWTPH-Gx (MS) | 06/22/2016 15:50:00 | 06/22/16 | 15:50 | 06/30/16 | 22:17 | 0 | 7 | 8 |
| 30 | B_30_062216_0-24 | EPA 6020A | 06/22/2016 15:50:00 | 07/08/16 | 08:48 | 07/11/16 | 14:38 | 15 | 18 | 3 |
| 30 | B_30_062216_0-24 | EPA 6020A | 06/22/2016 15:50:00 | 07/12/16 | 09:04 | 07/13/16 | 13:42 | 19 | 20 | 1 |
| 30 | B_30_062216_0-24 | EPA 8082A | 06/22/2016 15:50:00 | 07/11/16 | 13:50 | 07/12/16 | 10:55 | 18 | 19 | 1 |
| 30 | B_30_062216_0-24 | EPA 8270D (SIM) | 06/22/2016 15:50:00 | 07/06/16 | 16:05 | 07/07/16 | 14:58 | 13 | 14 | 1 |
| 30 | B_30_062216_0-24 | EPA 8000C | 06/22/2016 15:50:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 7 | 8 | 1 |
| 30 | B_30_062216_24-26 | NWTPH-Dx/SG | 06/22/2016 15:50:00 | 06/30/16 | 10:12 | 07/01/16 | 03:35 | 7 | 8 | 1 |
| 30 | B_30_062216_24-26 | NWTPH-Gx (MS) | 06/22/2016 15:50:00 | 06/22/16 | 15:50 | 06/30/16 | 21:27 | 0 | 7 | 8 |
| 30 | B_30_062216_24-26 | EPA 6020A | 06/22/2016 15:50:00 | 07/08/16 | 08:48 | 07/11/16 | 14:27 | 15 | 18 | 3 |
| 30 | B_30_062216_24-26 | EPA 6020A | 06/22/2016 15:50:00 | 07/12/16 | 09:04 | 07/13/16 | 13:39 | 19 | 20 | 1 |
| 30 | B_30_062216_24-26 | EPA 8081B | 06/22/2016 15:50:00 | 07/06/16 | 14:35 | 07/11/16 | 11:11 | 13 | 18 | 5 |
| 30 | B_30_062216_24-26 | EPA 8081B | 06/22/2016 15:50:00 | 07/06/16 | 14:40 | 08/01/16 | 22:59 | 13 | 39 | 26 |
| 30 | B_30_062216_24-26 | EPA 8082A | 06/22/2016 15:50:00 | 07/11/16 | 13:50 | 07/12/16 | 10:20 | 18 | 19 | 1 |
| 30 | B_30_062216_24-26 | EPA 8082A | 06/22/2016 15:50:00 | 07/28/16 | 11:04 | 07/28/16 | 17:18 | 35 | 35 | 0 |
| 30 | B_30_062216_24-26 | EPA 8270D (SIM) | 06/22/2016 15:50:00 | 07/06/16 | 16:05 | 07/07/16 | 12:01 | 13 | 14 | 1 |
| 30 | B_30_062216_24-26 | EPA 8270D (SIM) | 06/22/2016 15:50:00 | 07/28/16 | 07:07 | 07/29/16 | 11:21 | **35** | 36 | 1 |
| 30 | B_30_062216_24-26 | EPA 8000C | 06/22/2016 15:50:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 7 | 8 | 1 |
| 31 | B_31_062316_0-34 | NWTPH-Dx/SG | 06/23/2016 10:20:00 | 06/30/16 | 10:12 | 06/30/16 | 23:38 | 7 | 7 | 0 |
| 31 | B_31_062316_0-34 | NWTPH-Gx (MS) | 06/23/2016 10:20:00 | 06/23/16 | 10:20 | 06/30/16 | 15:22 | 0 | 7 | 7 |
| 31 | B_31_062316_0-34 | EPA 6020A | 06/23/2016 10:20:00 | 07/07/16 | 12:39 | 07/07/16 | 17:36 | 14 | 14 | 0 |
| 31 | B_31_062316_0-34 | EPA 8000C | 06/23/2016 10:20:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 7 | 8 | 1 |
| 31 | B_31_062316_34-36 | NWTPH-Dx/SG | 06/23/2016 10:20:00 | 06/30/16 | 10:12 | 07/01/16 | 00:21 | 7 | 8 | 1 |
| 31 | B_31_062316_34-36 | NWTPH-Gx (MS) | 06/23/2016 10:20:00 | 06/23/16 | 10:20 | 06/30/16 | 16:14 | 0 | 7 | 7 |
| 31 | B_31_062316_34-36 | EPA 6020A | 06/23/2016 10:20:00 | 07/07/16 | 12:39 | 07/07/16 | 17:39 | 14 | 14 | 0 |
| 31 | B_31_062316_34-36 | EPA 8081B | 06/23/2016 10:20:00 | 07/06/16 | 14:35 | 07/08/16 | 12:06 | 13 | 15 | 2 |
| 31 | B_31_062316_34-36 | EPA 8081B | 06/23/2016 10:20:00 | 07/06/16 | 14:40 | 08/02/16 | 14:06 | 13 | 40 | 27 |
| 31 | B_31_062316_34-36 | EPA 8082A | 06/23/2016 10:20:00 | 07/11/16 | 10:04 | 07/11/16 | 16:10 | 18 | 18 | 0 |
| 31 | B_31_062316_34-36 | EPA 8270D (SIM) | 06/23/2016 10:20:00 | 07/07/16 | 11:44 | 07/07/16 | 18:50 | 14 | 14 | 0 |
| 31 | B_31_062316_34-36 | EPA 8270D (SIM) | 06/23/2016 10:20:00 | 07/28/16 | 07:07 | 07/28/16 | 19:52 | **35** | 35 | 0 |
| 31 | B_31_062316_34-36 | EPA 8000C | 06/23/2016 10:20:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 7 | 8 | 1 |
| 32 | B32_062816_0-6 | NWTPH-Dx/SG | 06/28/2016 11:30:00 | 07/05/16 | 11:09 | 07/06/16 | 05:53 | 7 | 8 | 1 |
| 32 | B32_062816_0-6 | NWTPH-Gx (MS) | 06/28/2016 11:30:00 | 06/28/16 | 11:30 | 07/06/16 | 04:46 | 0 | 8 | 8 |
| 32 | B32_062816_0-6 | EPA 6020A | 06/28/2016 11:30:00 | 07/11/16 | 12:32 | 07/11/16 | 20:30 | 13 | 13 | 0 |
| 32 | B32_062816_0-6 | EPA 6020A | 06/28/2016 11:30:00 | 07/11/16 | 12:32 | 07/13/16 | 00:03 | 13 | 15 | 2 |
| 32 | B32_062816_0-6 | EPA 8000C | 06/28/2016 11:30:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 32 | B32_062816_0-6-1 | NWTPH-Dx/SG | 06/28/2016 11:30:00 | 07/05/16 | 11:09 | 07/06/16 | 06:13 | 7 | 8 | 1 |

# Table C-3
# Soil Sample Hold Times
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Analytical Method | Sample Collection Date | Sample Preparation Date | Sample Preparation Time | Sample Analysis Date | Sample Analysis Time | Days between Sample Collection Date and Preparation Date | Days between Sample Collection Date and Analysis Date | Days between Sample Preparation Date and Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 32 | B32_062816_0-6-1 | NWTPH-Gx (MS) | 06/28/2016 11:30:00 | 06/28/16 | 11:30 | 07/06/16 | 05:10 | 0 | 8 | 8 |
| 32 | B32_062816_0-6-1 | EPA 6020A | 06/28/2016 11:30:00 | 07/11/16 | 12:32 | 07/11/16 | 20:33 | 13 | 13 | 0 |
| 32 | B32_062816_0-6-1 | EPA 6020A | 06/28/2016 11:30:00 | 07/11/16 | 12:32 | 07/13/16 | 00:06 | 13 | 15 | 2 |
| 32 | B32_062816_0-6-1 | EPA 8000C | 06/28/2016 11:30:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 32 | B32_062816_6-8 | NWTPH-Dx/SG | 06/28/2016 11:30:00 | 07/05/16 | 11:09 | 07/06/16 | 06:32 | 7 | 8 | 1 |
| 32 | B32_062816_6-8 | NWTPH-Gx (MS) | 06/28/2016 11:30:00 | 06/28/16 | 11:30 | 07/06/16 | 05:34 | 0 | 8 | 8 |
| 32 | B32_062816_6-8 | EPA 6020A | 06/28/2016 11:30:00 | 07/11/16 | 12:32 | 07/11/16 | 20:36 | 13 | 13 | 0 |
| 32 | B32_062816_6-8 | EPA 6020A | 06/28/2016 11:30:00 | 07/11/16 | 12:32 | 07/13/16 | 00:09 | 13 | 15 | 2 |
| 32 | B32_062816_6-8 | EPA 8082A | 06/28/2016 11:30:00 | 07/12/16 | 10:06 | 07/14/16 | 02:29 | 14 | 16 | 2 |
| 32 | B32_062816_6-8 | EPA 8270D (SIM) | 06/28/2016 11:30:00 | 07/12/16 | 15:27 | 07/13/16 | 13:36 | 14 | 15 | 1 |
| 32 | B32_062816_6-8 | EPA 8000C | 06/28/2016 11:30:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 32 | B32_062816_6-8-1 | NWTPH-Dx/SG | 06/28/2016 11:30:00 | 07/05/16 | 11:09 | 07/06/16 | 06:52 | 7 | 8 | 1 |
| 32 | B32_062816_6-8-1 | NWTPH-Gx (MS) | 06/28/2016 11:30:00 | 06/28/16 | 11:30 | 07/06/16 | 06:23 | 0 | 8 | 8 |
| 32 | B32_062816_6-8-1 | EPA 6020A | 06/28/2016 11:30:00 | 07/11/16 | 12:32 | 07/11/16 | 20:48 | 13 | 13 | 0 |
| 32 | B32_062816_6-8-1 | EPA 6020A | 06/28/2016 11:30:00 | 07/11/16 | 12:32 | 07/13/16 | 00:12 | 13 | 15 | 2 |
| 32 | B32_062816_6-8-1 | EPA 8082A | 06/28/2016 11:30:00 | 07/12/16 | 14:57 | 07/13/16 | 19:06 | 14 | 15 | 1 |
| 32 | B32_062816_6-8-1 | EPA 8270D (SIM) | 06/28/2016 11:30:00 | 07/12/16 | 15:27 | 07/13/16 | 14:06 | 14 | 15 | 1 |
| 32 | B32_062816_6-8-1 | EPA 8000C | 06/28/2016 11:30:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 33 | B33_062716_0-15 | NWTPH-Dx/SG | 06/27/2016 11:10:00 | 07/05/16 | 07:05 | 07/06/16 | 07:09 | 8 | 9 | 1 |
| 33 | B33_062716_0-15 | NWTPH-Gx (MS) | 06/27/2016 11:10:00 | 06/27/16 | 11:10 | 07/05/16 | 12:03 | 0 | 8 | 8 |
| 33 | B33_062716_0-15 | EPA 8082A | 06/27/2016 11:10:00 | 07/12/16 | 10:06 | 07/13/16 | 21:10 | 15 | 16 | 1 |
| 33 | B33_062716_0-15 | EPA 8270D (SIM) | 06/27/2016 11:10:00 | 07/11/16 | 12:00 | 07/11/16 | 17:40 | 14 | 14 | 0 |
| 33 | B33_062716_0-15 | EPA 8000C | 06/27/2016 11:10:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 8 | 9 | 1 |
| 33 | B33_062716_15-17 | NWTPH-Dx/SG | 06/27/2016 11:10:00 | 07/05/16 | 07:05 | 07/06/16 | 07:30 | 8 | 9 | 1 |
| 33 | B33_062716_15-17 | NWTPH-Gx (MS) | 06/27/2016 11:10:00 | 06/27/16 | 11:10 | 07/05/16 | 12:28 | 0 | 8 | 8 |
| 33 | B33_062716_15-17 | EPA 8082A | 06/27/2016 11:10:00 | 07/12/16 | 10:06 | 07/13/16 | 21:46 | 15 | 16 | 1 |
| 33 | B33_062716_15-17 | EPA 8270D (SIM) | 06/27/2016 11:10:00 | 07/11/16 | 12:00 | 07/11/16 | 18:09 | 14 | 14 | 0 |
| 33 | B33_062716_15-17 | EPA 8000C | 06/27/2016 11:10:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 8 | 9 | 1 |
| 34 | B34_062416_0-34 | NWTPH-Dx/SG | 06/24/2016 13:30:00 | 07/01/16 | 07:04 | 07/02/16 | 00:53 | 6 | 7 | 1 |
| 34 | B34_062416_0-34 | NWTPH-Gx (MS) | 06/24/2016 13:30:00 | 06/24/16 | 13:30 | 07/01/16 | 16:34 | 0 | 6 | 7 |
| 34 | B34_062416_0-34 | EPA 6020A | 06/24/2016 13:30:00 | 07/08/16 | 11:54 | 07/11/16 | 17:45 | 13 | 16 | 3 |
| 34 | B34_062416_0-34 | EPA 6020A | 06/24/2016 13:30:00 | 07/08/16 | 11:54 | 07/12/16 | 22:42 | 13 | 17 | 4 |
| 34 | B34_062416_0-34 | EPA 8082A | 06/24/2016 13:30:00 | 07/12/16 | 10:12 | 07/13/16 | 10:39 | 17 | 18 | 1 |
| 34 | B34_062416_0-34 | EPA 8270D (SIM) | 06/24/2016 13:30:00 | 07/07/16 | 13:32 | 07/08/16 | 13:57 | 12 | 13 | 1 |
| 34 | B34_062416_0-34 | EPA 8000C | 06/24/2016 13:30:00 | 07/01/16 | 12:21 | 07/05/16 | 07:58 | 6 | 10 | 4 |
| 34 | B34_062416_34-36 | NWTPH-Dx/SG | 06/24/2016 13:30:00 | 07/01/16 | 07:04 | 07/02/16 | 00:32 | 6 | 7 | 1 |
| 34 | B34_062416_34-36 | NWTPH-Gx (MS) | 06/24/2016 13:30:00 | 06/24/16 | 13:30 | 07/01/16 | 16:08 | 0 | 6 | 7 |
| 34 | B34_062416_34-36 | EPA 6020A | 06/24/2016 13:30:00 | 07/08/16 | 11:54 | 07/11/16 | 17:02 | 13 | 16 | 3 |
| 34 | B34_062416_34-36 | EPA 8081B | 06/24/2016 13:30:00 | 07/06/16 | 14:37 | 07/11/16 | 13:14 | 11 | 16 | 5 |
| 34 | B34_062416_34-36 | EPA 8081B | 06/24/2016 13:30:00 | 07/06/16 | 14:40 | 08/02/16 | 15:33 | 11 | 38 | 27 |
| 34 | B34_062416_34-36 | EPA 8000C | 06/24/2016 13:30:00 | 07/01/16 | 12:21 | 07/05/16 | 07:58 | 6 | 10 | 4 |
| 35 | B35_062416_0-26 | NWTPH-Dx/SG | 06/24/2016 15:00:00 | 07/01/16 | 11:10 | 07/02/16 | 04:50 | 6 | 7 | 1 |
| 35 | B35_062416_0-26 | NWTPH-Gx (MS) | 06/24/2016 15:00:00 | 06/24/16 | 15:00 | 07/01/16 | 18:50 | 0 | 6 | 7 |
| 35 | B35_062416_0-26 | EPA 6020A | 06/24/2016 15:00:00 | 07/08/16 | 11:54 | 07/11/16 | 18:11 | 13 | 16 | 3 |
| 35 | B35_062416_0-26 | EPA 6020A | 06/24/2016 15:00:00 | 07/08/16 | 11:54 | 07/12/16 | 22:50 | 13 | 17 | 4 |
| 35 | B35_062416_0-26 | EPA 8082A | 06/24/2016 15:00:00 | 07/12/16 | 10:06 | 07/13/16 | 13:36 | 17 | 18 | 1 |
| 35 | B35_062416_0-26 | EPA 8270D (SIM) | 06/24/2016 15:00:00 | 07/07/16 | 13:32 | 07/08/16 | 16:22 | 12 | 13 | 1 |
| 35 | B35_062416_0-26 | EPA 8000C | 06/24/2016 15:00:00 | 07/01/16 | 12:21 | 07/05/16 | 07:58 | 6 | 10 | 4 |
| 35 | B35_062416_26-28 | NWTPH-Dx/SG | 06/24/2016 15:00:00 | 07/01/16 | 07:04 | 07/02/16 | 03:24 | 6 | 7 | 1 |

# Table C-3
# Soil Sample Hold Times
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Analytical Method | Sample Collection Date | Sample Preparation Date | Sample Preparation Time | Sample Analysis Date | Sample Analysis Time | Days between Sample Collection Date and Preparation Date | Days between Sample Collection Date and Analysis Date | Days between Sample Preparation Date and Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 35 | B35_062416_26-28 | NWTPH-Gx (MS) | 06/24/2016 15:00:00 | 06/24/16 | 15:00 | 07/01/16 | 22:26 | 0 | 6 | 7 |
| 35 | B35_062416_26-28 | EPA 6020A | 06/24/2016 15:00:00 | 07/08/16 | 11:54 | 07/11/16 | 17:57 | 13 | 16 | 3 |
| 35 | B35_062416_26-28 | EPA 6020A | 06/24/2016 15:00:00 | 07/08/16 | 11:54 | 07/12/16 | 22:45 | 13 | 17 | 4 |
| 35 | B35_062416_26-28 | EPA 8081B | 06/24/2016 15:00:00 | 07/06/16 | 14:37 | 07/11/16 | 13:31 | 11 | 16 | 5 |
| 35 | B35_062416_26-28 | EPA 8081B | 06/24/2016 15:00:00 | 07/06/16 | 14:40 | 08/02/16 | 15:50 | 11 | 38 | 27 |
| 35 | B35_062416_26-28 | EPA 8082A | 06/24/2016 15:00:00 | 07/12/16 | 10:12 | 07/13/16 | 11:14 | 17 | 18 | 1 |
| 35 | B35_062416_26-28 | EPA 8082A | 06/24/2016 15:00:00 | 07/28/16 | 11:04 | 07/28/16 | 17:55 | 33 | 33 | 0 |
| 35 | B35_062416_26-28 | EPA 8270D (SIM) | 06/24/2016 15:00:00 | 07/07/16 | 13:32 | 07/08/16 | 14:26 | 12 | 13 | 1 |
| 35 | B35_062416_26-28 | EPA 8270D (SIM) | 06/24/2016 15:00:00 | 07/28/16 | 07:07 | 07/29/16 | 11:51 | 33 | 34 | 1 |
| 35 | B35_062416_26-28 | EPA 8000C | 06/24/2016 15:00:00 | 07/01/16 | 12:21 | 07/05/16 | 07:58 | 6 | 10 | 4 |
| 36 | B36_062416_0-33 | NWTPH-Dx/SG | 06/24/2016 10:50:00 | 07/01/16 | 07:04 | 07/02/16 | 01:15 | 7 | 8 | 1 |
| 36 | B36_062416_0-33 | NWTPH-Gx (MS) | 06/24/2016 10:50:00 | 06/24/16 | 10:50 | 07/01/16 | 17:01 | 0 | 7 | 7 |
| 36 | B36_062416_0-33 | EPA 6020A | 06/24/2016 10:50:00 | 07/08/16 | 11:54 | 07/11/16 | 17:47 | 14 | 17 | 3 |
| 36 | B36_062416_0-33 | EPA 8000C | 06/24/2016 10:50:00 | 07/01/16 | 12:21 | 07/05/16 | 07:58 | 7 | 11 | 4 |
| 36 | B36_062416_33-35 | NWTPH-Dx/SG | 06/24/2016 10:50:00 | 07/01/16 | 07:04 | 07/02/16 | 00:10 | 7 | 8 | 1 |
| 36 | B36_062416_33-35 | NWTPH-Gx (MS) | 06/24/2016 10:50:00 | 06/24/16 | 10:50 | 07/01/16 | 15:41 | 0 | 7 | 7 |
| 36 | B36_062416_33-35 | EPA 6020A | 06/24/2016 10:50:00 | 07/08/16 | 11:54 | 07/11/16 | 17:30 | 14 | 17 | 3 |
| 36 | B36_062416_33-35 | EPA 8081B | 06/24/2016 10:50:00 | 07/06/16 | 14:37 | 07/11/16 | 12:56 | 12 | 17 | 5 |
| 36 | B36_062416_33-35 | EPA 8081B | 06/24/2016 10:50:00 | 07/06/16 | 14:40 | 08/02/16 | 15:16 | 12 | 39 | 27 |
| 36 | B36_062416_33-35 | EPA 8000C | 06/24/2016 10:50:00 | 07/01/16 | 12:21 | 07/05/16 | 07:58 | 7 | 11 | 4 |
| 37 | B37_062816_0-11 | NWTPH-Dx/SG | 06/28/2016 16:20:00 | 07/05/16 | 15:17 | 07/06/16 | 02:34 | 6 | 7 | 1 |
| 37 | B37_062816_0-11 | NWTPH-Gx (MS) | 06/28/2016 16:20:00 | 06/28/16 | 16:20 | 07/06/16 | 22:42 | 0 | 7 | 8 |
| 37 | B37_062816_0-11 | EPA 6020A | 06/28/2016 16:20:00 | 07/12/16 | 18:51 | 07/14/16 | 22:46 | 13 | 15 | 2 |
| 37 | B37_062816_0-11 | EPA 8082A | 06/28/2016 16:20:00 | 07/12/16 | 14:59 | 07/13/16 | 20:17 | 13 | 14 | 1 |
| 37 | B37_062816_0-11 | EPA 8270D (SIM) | 06/28/2016 16:20:00 | 07/12/16 | 15:27 | 07/13/16 | 15:05 | 13 | 14 | 1 |
| 37 | B37_062816_0-11 | EPA 8000C | 06/28/2016 16:20:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 37 | B37_062816_11-13 | NWTPH-Dx/SG | 06/28/2016 16:20:00 | 07/05/16 | 15:17 | 07/06/16 | 02:54 | 6 | 7 | 1 |
| 37 | B37_062816_11-13 | NWTPH-Gx (MS) | 06/28/2016 16:20:00 | 06/28/16 | 16:20 | 07/06/16 | 15:42 | 0 | 7 | 8 |
| 37 | B37_062816_11-13 | EPA 6020A | 06/28/2016 16:20:00 | 07/12/16 | 18:51 | 07/14/16 | 22:49 | 13 | 15 | 2 |
| 37 | B37_062816_11-13 | EPA 8000C | 06/28/2016 16:20:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 38 | B_38_062216_0-26 | NWTPH-Dx/SG | 06/22/2016 14:50:00 | 06/30/16 | 10:12 | 07/01/16 | 07:52 | 7 | 8 | 1 |
| 38 | B_38_062216_0-26 | NWTPH-Gx (MS) | 06/22/2016 14:50:00 | 06/22/16 | 14:50 | 06/30/16 | 21:28 | 0 | 7 | 8 |
| 38 | B_38_062216_0-26 | EPA 6020A | 06/22/2016 14:50:00 | 07/08/16 | 08:48 | 07/11/16 | 14:59 | 15 | 18 | 3 |
| 38 | B_38_062216_0-26 | EPA 6020A | 06/22/2016 14:50:00 | 07/12/16 | 09:04 | 07/13/16 | 14:15 | 19 | 20 | 1 |
| 38 | B_38_062216_0-26 | EPA 8082A | 06/22/2016 14:50:00 | 07/11/16 | 13:50 | 07/12/16 | 11:31 | 18 | 19 | 1 |
| 38 | B_38_062216_0-26 | EPA 8270D (SIM) | 06/22/2016 14:50:00 | 07/06/16 | 16:05 | 07/07/16 | 13:01 | 13 | 14 | 1 |
| 38 | B_38_062216_0-26 | EPA 8000C | 06/22/2016 14:50:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 7 | 8 | 1 |
| 38 | B_38_062216_26-28 | NWTPH-Dx/SG | 06/22/2016 14:50:00 | 06/30/16 | 10:12 | 07/01/16 | 07:31 | 7 | 8 | 1 |
| 38 | B_38_062216_26-28 | NWTPH-Gx (MS) | 06/22/2016 14:50:00 | 06/22/16 | 14:50 | 06/30/16 | 20:51 | 0 | 7 | 8 |
| 38 | B_38_062216_26-28 | EPA 6020A | 06/22/2016 14:50:00 | 07/08/16 | 08:48 | 07/11/16 | 14:56 | 15 | 18 | 3 |
| 38 | B_38_062216_26-28 | EPA 6020A | 06/22/2016 14:50:00 | 07/12/16 | 09:04 | 07/13/16 | 14:03 | 19 | 20 | 1 |
| 38 | B_38_062216_26-28 | EPA 8081B | 06/22/2016 14:50:00 | 07/06/16 | 14:35 | 07/11/16 | 11:46 | 13 | 18 | 5 |
| 38 | B_38_062216_26-28 | EPA 8081B | 06/22/2016 14:50:00 | 07/06/16 | 14:40 | 08/01/16 | 23:33 | 13 | 39 | 26 |
| 38 | B_38_062216_26-28 | EPA 8000C | 06/22/2016 14:50:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 7 | 8 | 1 |
| 40 | B40_062816_0-1 | NWTPH-Dx/SG | 06/28/2016 15:10:00 | 07/05/16 | 15:17 | 07/06/16 | 01:14 | 6 | 7 | 1 |
| 40 | B40_062816_0-1 | NWTPH-Gx (MS) | 06/28/2016 15:10:00 | 06/28/16 | 15:10 | 07/06/16 | 15:17 | 0 | 7 | 8 |
| 40 | B40_062816_0-1 | EPA 6020A | 06/28/2016 15:10:00 | 07/12/16 | 18:51 | 07/14/16 | 22:34 | 13 | 15 | 2 |
| 40 | B40_062816_0-1 | EPA 8000C | 06/28/2016 15:10:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 40 | B40_062816_1-3 | NWTPH-Dx/SG | 06/28/2016 15:10:00 | 07/05/16 | 15:17 | 07/06/16 | 01:34 | 6 | 7 | 1 |

## Table C-3
## Soil Sample Hold Times
## Linnton Mill Site Restoration
## Portland, Oregon
## Farallon PN: 1588-001

| Boring Number | Sample Identification | Analytical Method | Sample Collection Date | Sample Preparation Date | Sample Preparation Time | Sample Analysis Date | Sample Analysis Time | Days between Sample Collection Date and Preparation Date | Days between Sample Collection Date and Analysis Date | Days between Sample Preparation Date and Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 40 | B40_062816_1-3 | NWTPH-Gx (MS) | 06/28/2016 15:10:00 | 06/28/16 | 15:10 | 07/06/16 | 16:06 | 0 | 7 | 8 |
| 40 | B40_062816_1-3 | EPA 6020A | 06/28/2016 15:10:00 | 07/12/16 | 18:51 | 07/14/16 | 22:37 | 13 | 15 | 2 |
| 40 | B40_062816_1-3 | EPA 8000C | 06/28/2016 15:10:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 8 | 8 | 1 |
| 40 | B41_062416_0-33 | NWTPH-Dx/SG | 06/24/2016 10:00:00 | 07/01/16 | 07:04 | 07/01/16 | 23:27 | 7 | 7 | 0 |
| 41 | B41_062416_0-33 | NWTPH-Gx (MS) | 06/24/2016 10:00:00 | 06/24/16 | 10:00 | 07/01/16 | 14:23 | 0 | 7 | 7 |
| 41 | B41_062416_0-33 | EPA 6020A | 06/24/2016 10:00:00 | 07/08/16 | 11:54 | 07/11/16 | 17:20 | 14 | 17 | 3 |
| 41 | B41_062416_0-33 | EPA 8082A | 06/24/2016 10:00:00 | 07/12/16 | 10:12 | 07/12/16 | 18:54 | 18 | 18 | 0 |
| 41 | B41_062416_0-33 | EPA 8270D (SIM) | 06/24/2016 10:00:00 | 07/07/16 | 13:32 | 07/08/16 | 13:28 | 13 | 14 | 1 |
| 41 | B41_062416_0-33 | EPA 8000C | 06/24/2016 10:00:00 | 07/01/16 | 12:21 | 07/05/16 | 07:58 | 7 | 11 | 4 |
| 41 | B41_062416_33-35 | NWTPH-Dx/SG | 06/24/2016 10:00:00 | 07/01/16 | 07:04 | 07/01/16 | 23:49 | 7 | 7 | 0 |
| 41 | B41_062416_33-35 | NWTPH-Gx (MS) | 06/24/2016 10:00:00 | 06/24/16 | 10:00 | 07/01/16 | 15:15 | 0 | 7 | 7 |
| 41 | B41_062416_33-35 | EPA 6020A | 06/24/2016 10:00:00 | 07/08/16 | 11:54 | 07/11/16 | 17:23 | 14 | 17 | 3 |
| 41 | B41_062416_33-35 | EPA 8081B | 06/24/2016 10:00:00 | 07/06/16 | 14:37 | 07/11/16 | 12:39 | 12 | 17 | 5 |
| 41 | B41_062416_33-35 | EPA 8081B | 06/24/2016 10:00:00 | 07/06/16 | 14:40 | 08/02/16 | 14:58 | 12 | 39 | 27 |
| 41 | B41_062416_33-35 | EPA 8000C | 06/24/2016 10:00:00 | 07/01/16 | 12:21 | 07/05/16 | 07:58 | 7 | 11 | 4 |
| 42 | B_42_062216_0-18 | NWTPH-Dx/SG | 06/22/2016 11:40:00 | 06/30/16 | 10:12 | 07/01/16 | 06:48 | 8 | 9 | 1 |
| 42 | B_42_062216_0-18 | NWTPH-Gx (MS) | 06/22/2016 11:40:00 | 06/22/16 | 11:40 | 06/30/16 | 19:44 | 0 | 8 | 8 |
| 42 | B_42_062216_0-18 | EPA 6020A | 06/22/2016 11:40:00 | 07/08/16 | 08:48 | 07/11/16 | 14:50 | 16 | 19 | 3 |
| 42 | B_42_062216_0-18 | EPA 6020A | 06/22/2016 11:40:00 | 07/12/16 | 09:04 | 07/13/16 | 13:57 | 20 | 21 | 1 |
| 42 | B_42_062216_0-18 | EPA 8000C | 06/22/2016 11:40:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 8 | 9 | 1 |
| 42 | B_42_062216_0-18-1 | NWTPH-Dx/SG | 06/22/2016 11:40:00 | 06/30/16 | 10:12 | 07/01/16 | 07:10 | 8 | 9 | 1 |
| 42 | B_42_062216_0-18-1 | NWTPH-Gx (MS) | 06/22/2016 11:40:00 | 06/22/16 | 11:40 | 06/30/16 | 20:24 | 0 | 8 | 8 |
| 42 | B_42_062216_0-18-1 | EPA 6020A | 06/22/2016 11:40:00 | 07/08/16 | 08:48 | 07/11/16 | 14:53 | 16 | 19 | 3 |
| 42 | B_42_062216_0-18-1 | EPA 6020A | 06/22/2016 11:40:00 | 07/12/16 | 09:04 | 07/13/16 | 14:00 | 20 | 21 | 1 |
| 42 | B_42_062216_0-18-1 | EPA 8000C | 06/22/2016 11:40:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 8 | 9 | 1 |
| 42 | B_42_062216_18-20 | NWTPH-Dx/SG | 06/22/2016 11:40:00 | 06/30/16 | 10:12 | 07/01/16 | 06:27 | 8 | 9 | 1 |
| 42 | B_42_062216_18-20 | NWTPH-Gx (MS) | 06/22/2016 11:40:00 | 06/22/16 | 11:40 | 06/30/16 | 18:36 | 0 | 8 | 8 |
| 42 | B_42_062216_18-20 | EPA 6020A | 06/22/2016 11:40:00 | 07/08/16 | 08:48 | 07/11/16 | 14:47 | 16 | 19 | 3 |
| 42 | B_42_062216_18-20 | EPA 6020A | 06/22/2016 11:40:00 | 07/12/16 | 09:04 | 07/13/16 | 13:54 | 20 | 21 | 1 |
| 42 | B_42_062216_18-20 | EPA 8000C | 06/22/2016 11:40:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 8 | 9 | 1 |
| 43 | B43_062716_4-6 | NWTPH-Dx/SG | 06/27/2016 08:30:00 | 07/05/16 | 07:05 | 07/06/16 | 04:39 | 8 | 9 | 1 |
| 43 | B43_062716_4-6 | NWTPH-Gx (MS) | 06/27/2016 08:30:00 | 06/27/16 | 08:30 | 07/02/16 | 04:16 | 0 | 5 | 5 |
| 43 | B43_062716_4-6 | EPA 8082A | 06/27/2016 08:30:00 | 07/12/16 | 10:06 | 07/13/16 | 19:24 | 15 | 16 | 1 |
| 43 | B43_062716_4-6 | EPA 8270D (SIM) | 06/27/2016 08:30:00 | 07/11/16 | 12:00 | 07/11/16 | 15:43 | 14 | 14 | 0 |
| 43 | B43_062716_4-6 | EPA 8000C | 06/27/2016 08:30:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 8 | 9 | 1 |
| 44 | B44_062716_0-27 | NWTPH-Dx/SG | 06/27/2016 10:20:00 | 07/05/16 | 07:05 | 07/06/16 | 06:26 | 8 | 9 | 1 |
| 44 | B44_062716_0-27 | NWTPH-Gx (MS) | 06/27/2016 10:20:00 | 06/27/16 | 10:20 | 07/05/16 | 10:50 | 0 | 8 | 8 |
| 44 | B44_062716_0-27 | EPA 8082A | 06/27/2016 10:20:00 | 07/12/16 | 10:06 | 07/13/16 | 20:35 | 15 | 16 | 1 |
| 44 | B44_062716_0-27 | EPA 8270D (SIM) | 06/27/2016 10:20:00 | 07/11/16 | 12:00 | 07/11/16 | 17:10 | 14 | 14 | 0 |
| 44 | B44_062716_0-27 | EPA 8000C | 06/27/2016 10:20:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 8 | 9 | 1 |
| 44 | B44_062716_27-29 | NWTPH-Dx/SG | 06/27/2016 10:20:00 | 07/05/16 | 07:05 | 07/06/16 | 06:48 | 8 | 9 | 1 |
| 44 | B44_062716_27-29 | NWTPH-Gx (MS) | 06/27/2016 10:20:00 | 06/27/16 | 10:20 | 07/05/16 | 11:39 | 0 | 8 | 8 |
| 44 | B44_062716_27-29 | EPA 8081B | 06/27/2016 10:20:00 | 07/06/16 | 14:40 | 07/11/16 | 14:01 | 9 | 14 | 5 |
| 44 | B44_062716_27-29 | EPA 8081B | 06/27/2016 10:20:00 | 07/06/16 | 14:40 | 08/02/16 | 17:17 | 9 | 36 | 27 |
| 44 | B44_062716_27-29 | SW8260B | 06/27/2016 10:20:00 | 06/27/16 | 10:20 | 07/05/16 | 11:39 | 0 | 8 | 8 |
| 44 | B44_062716_27-29 | EPA 8000C | 06/27/2016 10:20:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 8 | 9 | 1 |
| 44 | B44_062716_27-29 | NWVPH-VPH | 6/27/2016 10:20 | 7/8/2016 |  | 7/8/2016 | 16:14 | **11** | 11 | 0 |
| 45 | B45_062716_0-20 | NWTPH-Dx/SG | 06/27/2016 09:35:00 | 07/05/16 | 07:05 | 07/06/16 | 05:43 | 8 | 9 | 1 |
| 45 | B45_062716_0-20 | NWTPH-Gx (MS) | 06/27/2016 09:35:00 | 06/27/16 | 09:35 | 07/02/16 | 05:36 | 0 | 5 | 5 |

# Table C-3
# Soil Sample Hold Times
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Analytical Method | Sample Collection Date | Sample Preparation Date | Sample Preparation Time | Sample Analysis Date | Sample Analysis Time | Days between Sample Collection Date and Preparation Date | Days between Sample Collection Date and Analysis Date | Days between Sample Preparation Date and Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 45 | B45_062716_0-20 | EPA 8000C | 06/27/2016 09:35:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 8 | 9 | 1 |
| 45 | B45_062716_20-22 | NWTPH-Dx/SG | 06/27/2016 09:35:00 | 07/05/16 | 07:05 | 07/06/16 | 06:05 | 8 | 9 | 1 |
| 45 | B45_062716_20-22 | NWTPH-Gx (MS) | 06/27/2016 09:35:00 | 06/27/16 | 09:35 | 07/05/16 | 16:57 | 0 | 8 | 8 |
| 45 | B45_062716_20-22 | EPA 8081B | 06/27/2016 09:35:00 | 07/06/16 | 14:40 | 07/11/16 | 14:29 | 9 | 14 | 5 |
| 45 | B45_062716_20-22 | EPA 8081B | 06/27/2016 09:35:00 | 07/06/16 | 14:40 | 08/02/16 | 16:07 | 9 | 36 | 27 |
| 45 | B45_062716_20-22 | EPA 8082A | 06/27/2016 09:35:00 | 07/12/16 | 10:06 | 07/13/16 | 19:59 | 15 | 16 | 1 |
| 45 | B45_062716_20-22 | EPA 8270D (SIM) | 06/27/2016 09:35:00 | 07/11/16 | 12:00 | 07/11/16 | 16:12 | 14 | 14 | 0 |
| 45 | B45_062716_20-22 | EPA 8000C | 06/27/2016 09:35:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 8 | 9 | 1 |
| 46 | B46_062916_0-32 | NWTPH-Dx/SG | 06/29/2016 10:40:00 | 07/06/16 | 17:38 | 07/06/16 | 23:57 | 7 | 7 | 0 |
| 46 | B46_062916_0-32 | NWTPH-Gx (MS) | 06/29/2016 10:40:00 | 06/29/16 | 10:40 | 07/06/16 | 19:51 | 0 | 7 | 7 |
| 46 | B46_062916_0-32 | EPA 6020A | 06/29/2016 10:40:00 | 07/13/16 | 08:01 | 07/15/16 | 22:10 | 14 | 16 | 2 |
| 46 | B46_062916_0-32 | EPA 8000C | 06/29/2016 10:40:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 46 | B46_062916_32-34 | NWTPH-Dx/SG | 06/29/2016 10:40:00 | 07/06/16 | 17:38 | 07/07/16 | 00:17 | 7 | 8 | 1 |
| 46 | B46_062916_32-34 | NWTPH-Gx (MS) | 06/29/2016 10:40:00 | 06/29/16 | 10:40 | 07/06/16 | 20:40 | 0 | 7 | 7 |
| 46 | B46_062916_32-34 | EPA 6020A | 06/29/2016 10:40:00 | 07/13/16 | 08:01 | 07/15/16 | 22:13 | 14 | 16 | 2 |
| 46 | B46_062916_32-34 | EPA 8081B | 06/29/2016 10:40:00 | 07/12/16 | 15:29 | 07/14/16 | 12:54 | 13 | 15 | 2 |
| 46 | B46_062916_32-34 | EPA 8081B | 06/29/2016 10:40:00 | 07/12/16 | 15:29 | 08/03/16 | 20:22 | 13 | 35 | 22 |
| 46 | B46_062916_32-34 | EPA 8000C | 06/29/2016 10:40:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 47 | B47_062816_0-32 | NWTPH-Dx/SG | 06/28/2016 10:00:00 | 07/05/16 | 11:09 | 07/06/16 | 03:13 | 7 | 8 | 1 |
| 47 | B47_062816_0-32 | NWTPH-Gx (MS) | 06/28/2016 10:00:00 | 06/28/16 | 10:00 | 07/06/16 | 02:44 | 0 | 8 | 8 |
| 47 | B47_062816_0-32 | EPA 6020A | 06/28/2016 10:00:00 | 07/11/16 | 12:32 | 07/11/16 | 20:19 | 13 | 13 | 0 |
| 47 | B47_062816_0-32 | EPA 6020A | 06/28/2016 10:00:00 | 07/11/16 | 12:32 | 07/12/16 | 23:43 | 13 | 14 | 1 |
| 47 | B47_062816_0-32 | EPA 8082A | 06/28/2016 10:00:00 | 07/12/16 | 10:06 | 07/14/16 | 01:54 | 14 | 16 | 2 |
| 47 | B47_062816_0-32 | EPA 8270D (SIM) | 06/28/2016 10:00:00 | 07/12/16 | 15:27 | 07/13/16 | 13:06 | 14 | 15 | 1 |
| 47 | B47_062816_0-32 | EPA 8000C | 06/28/2016 10:00:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 47 | B47_062816_30-32 | NWTPH-Dx/SG | 06/28/2016 10:00:00 | 07/05/16 | 11:09 | 07/06/16 | 02:54 | 7 | 8 | 1 |
| 47 | B47_062816_30-32 | NWTPH-Gx (MS) | 06/28/2016 10:00:00 | 06/28/16 | 10:00 | 07/06/16 | 02:19 | 0 | 8 | 8 |
| 47 | B47_062816_30-32 | EPA 6020A | 06/28/2016 10:00:00 | 07/11/16 | 12:32 | 07/11/16 | 20:16 | 13 | 13 | 0 |
| 47 | B47_062816_30-32 | EPA 6020A | 06/28/2016 10:00:00 | 07/11/16 | 12:32 | 07/12/16 | 23:40 | 13 | 14 | 1 |
| 47 | B47_062816_30-32 | EPA 8081B | 06/28/2016 10:00:00 | 07/08/16 | 07:26 | 07/12/16 | 13:49 | 10 | 14 | 4 |
| 47 | B47_062816_30-32 | EPA 8081B | 06/28/2016 10:00:00 | 07/08/16 | 07:26 | 08/02/16 | 19:01 | 10 | 35 | 25 |
| 47 | B47_062816_30-32 | EPA 8000C | 06/28/2016 10:00:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 47 | B47_062816_32-34 | NWTPH-Dx/SG | 06/28/2016 10:00:00 | 07/05/16 | 11:09 | 07/06/16 | 03:33 | 7 | 8 | 1 |
| 47 | B47_062816_32-34 | NWTPH-Gx (MS) | 06/28/2016 10:00:00 | 06/28/16 | 10:00 | 07/06/16 | 03:32 | 0 | 8 | 8 |
| 47 | B47_062816_32-34 | EPA 6020A | 06/28/2016 10:00:00 | 07/11/16 | 12:32 | 07/11/16 | 20:22 | 13 | 13 | 0 |
| 47 | B47_062816_32-34 | EPA 6020A | 06/28/2016 10:00:00 | 07/11/16 | 12:32 | 07/12/16 | 23:46 | 13 | 14 | 1 |
| 47 | B47_062816_32-34 | EPA 8081B | 06/28/2016 10:00:00 | 07/08/16 | 07:26 | 07/12/16 | 14:06 | 10 | 14 | 4 |
| 47 | B47_062816_32-34 | EPA 8081B | 06/28/2016 10:00:00 | 07/08/16 | 07:26 | 08/02/16 | 19:18 | 10 | 35 | 25 |
| 47 | B47_062816_32-34 | EPA 8000C | 06/28/2016 10:00:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 48 | B_48_062216_0-27 | NWTPH-Dx/SG | 06/22/2016 13:55:00 | 06/30/16 | 11:31 | 07/01/16 | 09:40 | 7 | 8 | 1 |
| 48 | B_48_062216_0-27 | NWTPH-Gx (MS) | 06/22/2016 13:55:00 | 06/22/16 | 13:55 | 06/30/16 | 22:22 | 0 | 7 | 8 |
| 48 | B_48_062216_0-27 | EPA 6020A | 06/22/2016 13:55:00 | 07/08/16 | 08:48 | 07/11/16 | 15:04 | 15 | 18 | 3 |
| 48 | B_48_062216_0-27 | EPA 6020A | 06/22/2016 13:55:00 | 07/12/16 | 09:04 | 07/13/16 | 14:23 | 19 | 20 | 1 |
| 48 | B_48_062216_0-27 | EPA 8000C | 06/22/2016 13:55:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 7 | 8 | 1 |
| 48 | B_48_062216_27-29 | NWTPH-Dx/SG | 06/22/2016 13:55:00 | 06/30/16 | 10:12 | 07/01/16 | 08:14 | 7 | 8 | 1 |
| 48 | B_48_062216_27-29 | NWTPH-Gx (MS) | 06/22/2016 13:55:00 | 06/22/16 | 13:55 | 06/30/16 | 21:55 | 0 | 7 | 8 |
| 48 | B_48_062216_27-29 | EPA 6020A | 06/22/2016 13:55:00 | 07/08/16 | 08:48 | 07/11/16 | 15:02 | 15 | 18 | 3 |
| 48 | B_48_062216_27-29 | EPA 6020A | 06/22/2016 13:55:00 | 07/12/16 | 09:04 | 07/13/16 | 14:21 | 19 | 20 | 1 |
| 48 | B_48_062216_27-29 | EPA 8081B | 06/22/2016 13:55:00 | 07/06/16 | 14:35 | 07/11/16 | 12:04 | 13 | 18 | 5 |

# Table C-3
# Soil Sample Hold Times
# Linnton Mill Site Restoration
# Portland, Oregon
# Farallon PN: 1588-001

| Boring Number | Sample Identification | Analytical Method | Sample Collection Date | Sample Preparation Date | Sample Preparation Time | Sample Analysis Date | Sample Analysis Time | Days between Sample Collection Date and Preparation Date | Days between Sample Collection Date and Analysis Date | Days between Sample Preparation Date and Analysis Date |
|---|---|---|---|---|---|---|---|---|---|---|
| 48 | B_48_062216_27-29 | EPA 8081B | 06/22/2016 13:55:00 | 07/06/16 | 14:40 | 08/01/16 | 23:51 | 13 | 39 | 26 |
| 48 | B_48_062216_27-29 | EPA 8000C | 06/22/2016 13:55:00 | 06/30/16 | 13:59 | 07/01/16 | 08:03 | 7 | 8 | 1 |
| 49 | B49_062816_0-13 | NWTPH-Dx/SG | 06/28/2016 08:30:00 | 07/05/16 | 11:09 | 07/05/16 | 23:55 | 7 | 7 | 0 |
| 49 | B49_062816_0-13 | NWTPH-Gx (MS) | 06/28/2016 08:30:00 | 06/28/16 | 08:30 | 07/05/16 | 18:35 | 0 | 7 | 7 |
| 49 | B49_062816_0-13 | EPA 6020A | 06/28/2016 08:30:00 | 07/12/16 | 12:23 | 07/12/16 | 21:25 | 14 | 14 | 0 |
| 49 | B49_062816_0-13 | EPA 8000C | 06/28/2016 08:30:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 49 | B49_062816_0-13-1 | NWTPH-Dx/SG | 06/28/2016 08:30:00 | 07/05/16 | 11:09 | 07/06/16 | 00:34 | 7 | 8 | 1 |
| 49 | B49_062816_0-13-1 | NWTPH-Gx (MS) | 06/28/2016 08:30:00 | 06/28/16 | 08:30 | 07/05/16 | 19:00 | 0 | 7 | 7 |
| 49 | B49_062816_0-13-1 | EPA 6020A | 06/28/2016 08:30:00 | 07/12/16 | 12:23 | 07/12/16 | 21:28 | 14 | 14 | 0 |
| 49 | B49_062816_0-13-1 | EPA 8000C | 06/28/2016 08:30:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 49 | B49_062816_13-15 | NWTPH-Dx/SG | 06/28/2016 08:30:00 | 07/05/16 | 11:09 | 07/06/16 | 00:54 | 7 | 8 | 1 |
| 49 | B49_062816_13-15 | NWTPH-Gx (MS) | 06/28/2016 08:30:00 | 06/28/16 | 08:30 | 07/05/16 | 19:24 | 0 | 7 | 7 |
| 49 | B49_062816_13-15 | EPA 6020A | 06/28/2016 08:30:00 | 07/11/16 | 12:32 | 07/11/16 | 19:44 | 13 | 13 | 0 |
| 49 | B49_062816_13-15 | EPA 6020A | 06/28/2016 08:30:00 | 07/11/16 | 12:32 | 07/12/16 | 23:08 | 13 | 14 | 1 |
| 49 | B49_062816_13-15 | EPA 8000C | 06/28/2016 08:30:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 49 | B49_062816_13-15-1 | NWTPH-Dx/SG | 06/28/2016 08:30:00 | 07/05/16 | 11:09 | 07/06/16 | 01:14 | 7 | 8 | 1 |
| 49 | B49_062816_13-15-1 | NWTPH-Gx (MS) | 06/28/2016 08:30:00 | 06/28/16 | 08:30 | 07/05/16 | 19:08 | 0 | 7 | 7 |
| 49 | B49_062816_13-15-1 | EPA 6020A | 06/28/2016 08:30:00 | 07/11/16 | 12:32 | 07/11/16 | 19:47 | 13 | 13 | 0 |
| 49 | B49_062816_13-15-1 | EPA 6020A | 06/28/2016 08:30:00 | 07/11/16 | 12:32 | 07/12/16 | 23:20 | 13 | 14 | 1 |
| 49 | B49_062816_13-15-1 | EPA 8000C | 06/28/2016 08:30:00 | 07/05/16 | 12:22 | 07/06/16 | 08:57 | 7 | 8 | 1 |
| 50 | B50_062916_0-18 | NWTPH-Dx/SG | 06/29/2016 08:40:00 | 07/05/16 | 15:17 | 07/06/16 | 03:13 | 6 | 7 | 1 |
| 50 | B50_062916_0-18 | NWTPH-Gx (MS) | 06/29/2016 08:40:00 | 06/29/16 | 08:40 | 07/06/16 | 16:32 | 0 | 7 | 7 |
| 50 | B50_062916_0-18 | EPA 6020A | 06/29/2016 08:40:00 | 07/12/16 | 18:51 | 07/14/16 | 22:52 | 13 | 15 | 2 |
| 50 | B50_062916_0-18 | EPA 8000C | 06/29/2016 08:40:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 50 | B50_062916_0-18-1 | NWTPH-Dx/SG | 06/29/2016 08:40:00 | 07/05/16 | 15:18 | 07/06/16 | 03:33 | 6 | 7 | 1 |
| 50 | B50_062916_0-18-1 | NWTPH-Gx (MS) | 06/29/2016 08:40:00 | 06/29/16 | 08:40 | 07/06/16 | 16:57 | 0 | 7 | 7 |
| 50 | B50_062916_0-18-1 | EPA 6020A | 06/29/2016 08:40:00 | 07/12/16 | 18:51 | 07/14/16 | 23:03 | 13 | 15 | 2 |
| 50 | B50_062916_0-18-1 | EPA 8082A | 06/29/2016 08:40:00 | 07/12/16 | 14:59 | 07/13/16 | 20:52 | 13 | 14 | 1 |
| 50 | B50_062916_0-18-1 | EPA 8270D (SIM) | 06/29/2016 08:40:00 | 07/13/16 | 06:35 | 07/16/16 | 20:32 | 14 | 17 | 3 |
| 50 | B50_062916_0-18-1 | EPA 8000C | 06/29/2016 08:40:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 50 | B50_062916_18-20 | NWTPH-Dx/SG | 06/29/2016 08:40:00 | 07/05/16 | 15:18 | 07/06/16 | 03:53 | 6 | 7 | 1 |
| 50 | B50_062916_18-20 | NWTPH-Gx (MS) | 06/29/2016 08:40:00 | 06/29/16 | 08:40 | 07/06/16 | 17:21 | 0 | 7 | 7 |
| 50 | B50_062916_18-20 | EPA 6020A | 06/29/2016 08:40:00 | 07/13/16 | 08:01 | 07/15/16 | 21:43 | 14 | 16 | 2 |
| 50 | B50_062916_18-20 | EPA 8082A | 06/29/2016 08:40:00 | 07/12/16 | 14:59 | 07/13/16 | 21:28 | 13 | 14 | 1 |
| 50 | B50_062916_18-20 | EPA 8270D (SIM) | 06/29/2016 08:40:00 | 07/13/16 | 06:35 | 07/16/16 | 21:00 | 14 | 17 | 3 |
| 50 | B50_062916_18-20 | EPA 8000C | 06/29/2016 08:40:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |
| 50 | B50_062916_18-20-1 | NWTPH-Dx/SG | 06/29/2016 08:40:00 | 07/05/16 | 15:18 | 07/06/16 | 04:13 | 6 | 7 | 1 |
| 50 | B50_062916_18-20-1 | NWTPH-Gx (MS) | 06/29/2016 08:40:00 | 06/29/16 | 08:40 | 07/06/16 | 17:46 | 0 | 7 | 7 |
| 50 | B50_062916_18-20-1 | EPA 6020A | 06/29/2016 08:40:00 | 07/13/16 | 08:01 | 07/15/16 | 21:46 | 14 | 16 | 2 |
| 50 | B50_062916_18-20-1 | EPA 8082A | 06/29/2016 08:40:00 | 07/12/16 | 14:59 | 07/13/16 | 22:03 | 13 | 14 | 1 |
| 50 | B50_062916_18-20-1 | EPA 8270D (SIM) | 06/29/2016 08:40:00 | 07/13/16 | 06:35 | 07/16/16 | 21:28 | 14 | 17 | 3 |
| 50 | B50_062916_18-20-1 | EPA 8000C | 06/29/2016 08:40:00 | 07/06/16 | 12:47 | 07/07/16 | 09:05 | 7 | 8 | 1 |

NOTES:

Highlighting denotes the sample was reanalyzed.

Highlighting and **bold** denote that the recommended hold time was exceeded.

The number 1 appended to the end of the sample identification denotes a duplicate sample

NWTPH-Dx/SG = DRO and ORO analyzed by Northwest Method NWTPH-Dx using silica gel cleanup treatment
NWTPH-Gx (MS) = GRO analyzed by Northwest Method NWTPH-Gx (MS)
EPA 8082A = PCBs analyzed by EPA Method 8082A
EPA 8270D (SIM) = PAHs analyzed by EPA Method 8270D SIM
EPA 6020A = RCRA 8 metals and copper analyzed by EPA Method 6020
EPA 8081B = Selected organochlorine pesticides analyzed by EPA Method 8081B
5035/8260B = BTEX compounds analyzed by EPA Method 8260B
NWVPH-VPH = VPH analyzed by NWVPH
EPA 8000C = Percent dry weight analyzed by EPA Method 8000C

BTEX = benzene, toluene, ethylbenzene, and xylenes
DRO = total petroleum hydrocarbons (TPH) as diesel-range organics
EPA = U.S. Environmental Protection Agency
GRO = TPH as gasoline-range organics
ORO = TPH as oil-range organics
PAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
RCRA = Resource Conservation and Recover Act
VPH = volatile petroleum hydrocarbons

# ATTACHMENT A
# OCTOBER 5, 2016 DEQ COMMENTS

RESPONSE TO OREGON DEPARTMENT OF
ENVIRONMENTAL QUALITY COMMENTS ON
DRAFT NEW EXPOSED SURFACE INVESTIGATION REPORT
Linnton Mill Site Restoration
Portland, Oregon

Farallon PN: 1588-001

# Comments on New Exposed Surface Investigation Report (September 8, 2016)
# Former Linnton Plywood Association Property
# Portland, Oregon
# ECSI No. 2373[1]

- Section 4.1: Farallon reports that access restrictions caused selected borings to be relocated to other grid cells. The study area was largely vacant at the time of the investigation and the nature of these limitations is not discussed in the text of the report, however (e.g., vegetation, limited space, wet or muddy conditions, slope stability, etc.). Please clarify.

- Section 4.1.2: This section indicates that additional composite samples were collected to support development of the Environmental Medial Management Plan (EMMP), although they were not analyzed for constituents of interest. Please provide information regarding these samples and how they will be used to inform future work at the property.

- Sections 5.1 through 5.3: As a general comment, it is noted in several locations that the 90% UCL of the arithmetic mean is "similar to background concentrations". The meaning of this term is not well explained in the report. How is the degree of similarity defined? What constitutes a determination that a value is similar to the background level?

- Table 2: Farallon cites a Risk-Based Concentration (RBC) of 11,000 mg/kg as a comparison standard for Oil-Range Organics (ORO). However, that RBC is specific to mineral/insulating oil and is not intended to be used as a generic RBC for heavy oil-range hydrocarbons. To properly evaluate ORO would require calculation of a site-specific RBC using VPH/EPH data and data for selected volatile organic compound (VOC) constituents (Method 2) as detailed in Section 3.1.5.2 of DEQ's Risk-Based Decision Making guidance.

- Section 5.1 and Table 3: As a general comment, Farallon does not include the 90% upper confidence limit (UCL) of the arithmetic mean calculation for selected constituents, despite the fact that the appropriate number of samples was collected. While DEQ realizes that this is likely due to the fact that the detected values did not individually exceed applicable screening standards, it would be helpful to see all relevant calculations when reviewing the data tables.

- Section 5.1 and Table 3: The 90% UCL of the arithmetic mean for lead in the Excavated Unit exceeded regional background, Level II Screening Level Values (SLVs) and Joint Source Control Strategy (JSCS) SLVs. Although DEQ realizes this material will, by definition, be removed as part of the planned earthwork activities, it will still likely end up somewhere in the URA. What are the implications of material containing this "average" value of lead being placed in the upland areas?

- Why was a weight-of-evidence evaluation similar to that performed for PAHs in the URA not performed for lead in the Excavated Unit?

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[1] Comments provided in e-mail message regarding Comments on Draft New Exposed Surface Investigation Report – Former Linnton Plywood Association Property (2373) sent October 5, 2016 from Jeff K. Schatz, R.G., Oregon Department of Environmental Quality. To Mark B. Havighorst and Craig Ware, Farallon Consulting, L.L.C., and Andrew Gregg, Linnton Water Credits LLC.

- Similarly, the 90% UCL of the arithmetic mean of several Polynuclear Aromatic Hydrocarbons (PAHs) were detected in soil from the Excavated Unit (B12 and B50) at levels above the JSCS SLVs. No additional weight-of-evidence evaluation was performed to rule out risks from PAHs, however.

- DEQ notes that the screening value for toxic equivalency PAHs (TECs) is the same as the benzo(a) pyrene RBC and this value may be used in Table 4.

- Section 5.2.5: this section says that ARA soil samples collected from borings B24 and B35 exceed the PRG for total PCBs. However, examination of Table 5 indicates that the borings with Total PCB exceedances of the PRG are B24 and B31. The information in one or both of these locations should be checked for consistency.

- Section 5.3.3: Although the Magnitude of Exceedance above SLV is calculated and presented in a table, no discussion is provided about the values ranging between 1.4x and 7.7x. What conclusions can/should be drawn from these values?

- Section 5.3.2: Farallon correctly states that the 90% UCL of the arithmetic mean for copper in the URA (120.3 mg/kg) exceeds the Level II SLV. However, it is not similar to the background level for copper (34 mg/kg) as indicated.

- Section 6.2.1: Farallon states that despite levels of PAHs, total PCBs and/or organochlorine pesticides (total DDx) in soil from borings B2, B3, B15, B24, B31 and B35 in the ARA exceeding sediment PRGs, EPA is unlikely to require cleanup of near-shore sediments. EPA would likely want to weigh in on this conclusion, however.

- Section 6.2.1: In the event that soil in the ARA is to be capped in a manner similar to Enhanced Natural Recovery, it would have to be demonstrated that the post-construction hydrodynamics of this environment are suitable to ensure the long-term stability of a thin-layer cap.

- Section 6.2.2: Farallon does not give details regarding the likely disposition of the soil proposed to be over-excavated in the vicinity of borings B2, B3, B15, B24 and B35 in the ARA. Will the excavated material be disposed off-site or put in the URA but encapsulated/capped? DEQ understands these details may be further discussed in the EMMP in preparation.

- Section 5.3.3 of QA/QC Summary Report: This section indicates that several samples were analyzed for PAHs out of hold time and therefore considered “usable and invalid”. However, these data show up in Table 4 with no accompanying notes. While an exceedance of hold time for PAHs is not considered to be major problem, the results should be qualified appropriately in the table.

# ATTACHMENT B
# NEW EXPOSED SURFACE INVESTIGATION REPORT

RESPONSE TO OREGON DEPARTMENT OF
ENVIRONMENTAL QUALITY COMMENTS ON
DRAFT NEW EXPOSED SURFACE INVESTIGATION REPORT
Linnton Mill Site Restoration
Portland, Oregon

Farallon PN: 1588-001

November 11, 2016

Mr. Jeff K. Schatz, R.G.
Oregon Department of Environmental Quality
Northwest Region
700 Northeast Multnomah Street, Suite 600
Portland, Oregon 97232

**BY E-MAIL ONLY**

**RE: RESPONSE TO OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY COMMENTS ON DRAFT NEW EXPOSED SURFACE INVESTIGATION REPORT**
**LINNTON MILL SITE RESTORATION, PORTLAND, OREGON**
**ECSI FILE NO. 2373**
**FARALLON PN: 1588-001**

Dear Mr. Schatz:

Farallon Consulting, L.L.C. (Farallon) has prepared this letter on behalf of Linnton Water Credits LLC to provide responses to comments from the Oregon Department of Environmental Quality (DEQ)[1] (Attachment A) regarding the Draft New Exposed Surface Investigation Report, Linnton Mill Site Restoration, Portland, Oregon dated September 8, 2016, prepared by Farallon (Report) for the former Linnton Plywood Association plywood mill site at 10504 Northwest Saint Helens Road in Portland, Oregon (herein referred to as the Site). DEQ comments are provided below in italics, followed by Farallon responses in plain font. An updated Report, which has been revised based on DEQ comments and the responses to comments included in this letter, is provided as Attachment B.

## DEQ COMMENTS – OCTOBER 5, 2016

### GENERAL COMMENTS – WORK PLAN

*1) Section 4.1: Farallon reports that access restrictions caused selected borings to be relocated to other grid cells. The study area was largely vacant at the time of the investigation and the nature of these limitations is not discussed in the text of the report, however (e.g., vegetation, limited space, wet or muddy conditions, slope stability, etc.). Please clarify.*

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[1] Comments provided in e-mail message regarding Comments on Draft New Exposed Surface Investigation Report – Former Linnton Plywood Association Property (2373) sent October 5, 2016 from Jeff K. Schatz, R.G., Oregon Department of Environmental Quality. To Mark B. Havighorst and Craig Ware, Farallon Consulting, L.L.C., and Andrew Gregg, Linnton Water Credits LLC.

Response:

The boring planned for grid cell F9 was relocated to grid cell H9 due to misalignment of the sampling grid. Specifically, grid cell F9 was outside the planned restoration area, whereas grid cell H9 is within the planned restoration area.

Borings planned for advancement in grid cells L3, O3, and R3 were relocated to grid cells L4, O4, and R4 The boring planned for advancement in grid cell I3 was eliminated due to interferences from riverbank riprap and potential slope instability.

The boring planned for grid cell H8 was relocated to grid cell I8 to increase the number of samples collected from the aquatic restoration unit (ARA).

Report Section 4.1 has been updated to include this information.

*2) Section 4.1.2: This section indicates that additional composite samples were collected to support development of the Environmental Medial Management Plan (EMMP), although they were not analyzed for constituents of interest. Please provide information regarding these samples and how they will be used to inform future work at the property.*

Two types of samples were collected from the excavated soil unit: excavation composite samples were collected from the entirety of the soil unit extending from the existing ground surface to the design elevation; and additional composite samples were collected in the excavated soil unit at approximately 10-foot intervals to further discretize the distribution of contaminants of interest (COIs) in the event that COI concentrations in the excavation composite samples posed an unacceptable risk to potential human and ecological receptors. Excavation composite sample data indicated that soil from the excavated soil unit did not pose an unacceptable risk to potential human and ecological receptors based on the following factors:

- The concentrations of COIs were less than applicable screening levels;
- The 90 percent upper confidence limit (UCL) of the arithmetic mean of the concentrations of COIs in the excavation composite samples were less than applicable screening levels; or
- A weight-of-evidence evaluation demonstrated that COI concentrations exceeding screening levels do not pose an unacceptable risk to potential human and ecological receptors.

Accordingly, the additional composite samples were not analyzed, and will not be used to inform future work at the property. Report Sections 4.1.2 and 4.1.4 have been updated to clarify the intent for collecting additional composite samples.

*3) Sections 5.1 through 5.3: As a general comment, it is noted in several locations that the 90% UCL of the arithmetic mean is "similar to background concentrations". The meaning of this term is not well explained in the report. How is the degree of similarity defined? What constitutes a determination that a value is similar to the background level?*

Response:

The term "similar to" is generally used to describe concentrations within one order of magnitude of the background concentration. The term is not intended to represent a statistical measurement of similarity. To avoid confusion, the term "similar to" has been removed from the Report and replaced with text that adds clarity to the comparison of detected metals concentrations with default background concentrations.

*4) Table 2: Farallon cites a Risk-Based Concentration (RBC) of 11,000 mg/kg as a comparison standard for Oil-Range Organics (ORO). However, that RBC is specific to mineral/insulating oil and is not intended to be used as a generic RBC for heavy oil-range hydrocarbons. To properly evaluate ORO would require calculation of a site-specific RBC using VPH/EPH data and data for selected volatile organic compound (VOC) constituents (Method 2) as detailed in Section 3.1.5.2 of DEQ's Risk-Based Decision Making guidance.*

Response:

Thank you for the information. Follow-up analysis of samples in which ORO is detected for VOCs, volatile petroleum hydrocarbons (VPH), and extractable petroleum hydrocarbons (EPH) was not part of the DEQ-approved New Exposed Surface Investigation Work Plan dated June 10, 2016 prepared by Farallon. Therefore, analysis for VOCs, VPH, or EPH was not performed. In the absence of VOC, VPH, and EPH data, detected ORO concentrations were compared with the RBC for mineral/insulating oil. The detected ORO concentrations were less than the ORO RBC.

*5) Section 5.1 and Table 3: As a general comment, Farallon does not include the 90% upper confidence limit (UCL) of the arithmetic mean calculation for selected constituents, despite the fact that the appropriate number of samples was collected. While DEQ realizes that this is likely due to the fact that the detected values did not individually exceed applicable screening standards, it would be helpful to see all relevant calculations when reviewing the data tables.*

Response:

DEQ is correct that 90 percent UCLs were calcuated only for excavated soil unit COIs for which an appropriate number of samples were collected, and detected concentrations exceeded applicable screening levels; specifically, arsenic, cadmium, lead, and PAHs. Because the 90 percent UCLs for other COIs are not relevant in evaluating whether these COIs may pose an unacceptable risk to potential human and ecological receptors, they were not calcualted. However, for continuity, Farallon has updated Table 3 to include 90 percent UCLs for the metals that were not detected at concentrations exceeding screening levels.

*6) Section 5.1 and Table 3: The 90% UCL of the arithmetic mean for lead in the Excavated Unit exceeded regional background, Level II Screening Level Values (SLVs) and Joint Source Control Strategy (JSCS) SLVs. Although DEQ realizes this material will, by definition, be removed as part of the planned earthwork activities, it will still likely end up somewhere in the URA. What are the implications of material containing this "average" value of lead being placed in the upland areas?*

Response:

A weight-of-evidence evaluation for lead has been added to Report Section 5.1.2. The weight-of-evidence evaluation describes the potential risk related to re-use of soil with lead concentrations exceeding Level II SLVs and JSCS SLVs as fill in the URA.

*7) Why was a weight-of-evidence evaluation similar to that performed for PAHs in the URA not performed for lead in the Excavated Unit?*

Response:

A weight-of-evidence evaluation for lead in the excavated unit has been added to Report Section 5.1.2.

*8) Similarly, the 90% UCL of the arithmetic mean of several Polynuclear Aromatic Hydrocarbons (PAHs) were detected in soil from the Excavated Unit (B12 and B50) at levels above the JSCS SLVs. No additional weight-of-evidence evaluation was performed to rule out risks from PAHs, however.*

Response:

The 90 percent UCL of the arithmetic mean exceeds the SLVs for only indeno(1,2,3-cd)pyrene in the excavated unit. A weight-of-evidence evaluation for indeno(1,2,3-cd)pyrene in the excavated unit has been added to Report Section 5.1.3.

*9) DEQ notes that the screening value for toxic equivalency PAHs (TECs) is the same as the benzo(a) pyrene RBC and this value may be used in Table 4.*

Response:

Noted.

*10) Section 5.2.5: this section says that ARA soil samples collected from borings B24 and B35 exceed the PRG for total PCBs. However, examination of Table 5 indicates that the borings with Total PCB exceedances of the PRG are B24 and B31. The information in one or both of these locations should be checked for consistency.*

Response:

Report Section 5.2.5 text has been corrected to indicate that total PCBs in ARA soil samples collected from borings B24 and B31 exceed the PRG.

*11) Section 5.3.3: Although the Magnitude of Exceedance above SLV is calculated and presented in a table, no discussion is provided about the values ranging between 1.4x and 7.7x. What conclusions can/should be drawn from these values?*

Response:

Report Section 5.3.3 has been updated to include an evaluation of the magnitude of exceedance values ranging from 1.4x to 7.7x.

*12) Section 5.3.2: Farallon correctly states that the 90% UCL of the arithmetic mean for copper in the URA (120.3 mg/kg) exceeds the Level II SLV. However, it is not similar to the background level for copper (34 mg/kg) as indicated.*

Response:

A weight-of-evidence evaluation for copper in the URA has been added to Report Section 5.3.2.

*13) Section 6.2.1: Farallon states that despite levels of PAHs, total PCBs and/or organochlorine pesticides (total DDx) in soil from borings B2, B3, B15, B24, B31 and B35 in the ARA exceeding sediment PRGs, EPA is unlikely to require cleanup of near-shore sediments. EPA would likely want to weigh in on this conclusion, however.*

Response:

Noted.

*14) Section 6.2.1: In the event that soil in the ARA is to be capped in a manner similar to Enhanced Natural Recovery, it would have to be demonstrated that the post-construction hydrodynamics of this environment are suitable to ensure the long-term stability of a thin-layer cap.*

Response:

Noted.

*15) Section 6.2.2: Farallon does not give details regarding the likely disposition of the soil proposed to be over-excavated in the vicinity of borings B2, B3, B15, B24 and B35 in the ARA. Will the excavated material be disposed off-site or put in the URA but encapsulated/capped? DEQ understands these details may be further discussed in the EMMP in preparation.*

Response:

The disposition of the soil proposed to be over-excavated in the vicinity of borings B2, B3, B15, B2, and B35 in the ARA has not been determined, but will be further discussed in the EMMP.

*16) Section 5.3.3 of QA/QC Summary Report: This section indicates that several samples were analyzed for PAHs out of hold time and therefore considered "usable and invalid". However, these data show up in Table 4 with no accompanying notes. While an exceedance of hold time for PAHs is not considered to be major problem, the results should be qualified appropriately in the table.*

Response:

Section 5.3.3 of the QA/QC Summary Report indicates that samples B2_062316_29.5-31, B_19_062316_30-32, B_30_062216_24-26, B_31_062316_34-36, and B35_062416_26-28 were re-analyzed outside the recommended hold time; therefore, the results of the re-analysis were considered not usable and invalid. Therefore, the analytical results for these invalid PAH analyses are not presented in Table 4. Table 4 presents only data from the primary analysis, and not the re-analysis of samples B2_062316_29.5-31, B_19_062316_30-32, B_30_062216_24-26, B_31_062316_34-36, and B35_062416_26-28.

## CLOSING

Farallon anticipates preparing an EMMP by December 2016 that incorporates the sampling results described in New Exposed Surface Investigation Report. Your timely review of the revised Report is appreciated. Please contact the undersigned at (503) 295-0800 if you have questions or need additional information.

Sincerely,

**Farallon Consulting, L.L.C.**

Mark Havighorst, P.E.
Senior Engineer

Craig Ware, R.G.
Principal Hydrogeologist

Attachments: Attachment A, October 5, 2016 DEQ Comments
Attachment B, New Exposed Surface Investigation Report

cc: Andrew Gregg, Linnton Water Credits LLC (by e-mail)

MH/CW:bjj

# Exhibit I. Forecast Settlement Credits Value for Linnton Neighborhood Restoration Site (3/3/14)

PORTLAND HARBOR
*Natural Resource Trustee Council*

Andrew Gregg
RestorCap
2726 Walnut Ave.
Signal Hill, CA 90755

**Sent via email**

March 3, 2014

RE: Forecast Settlement Credits Value for Linnton Neighborhood Restoration Site

Dear Andy:

I am writing on behalf of the Portland Harbor Natural Resources Trustee Council (Trustee Council) to memorialize the Forecast Settlement Credits Value (FSCV) for the Linnton Neighborhood restoration site.

Pursuant to the Memorandum of Agreement (MOA) entered into by Montclair Environmental Management, Inc. dba RestorCap, Inc. (RestorCap) and the Trustee Council, we have been exploring the development of a restoration project at the former Linnton Plywood Association site (the Covered Project) located near the northwestern end of the Willamette River. We have had several meetings to discuss RestorCap's proposed design for the Covered Project, as well as the FSCV. The Trustee Council's current understanding of the current condition and proposed design is attached to this letter (Attachment A). The MOA defines the FSCV as

> a determination of the value a habitat restoration project subject to this MOA is expected to generate taking into account the project's anticipated habitat benefits beyond the Project Baseline Condition.[1] Forecast Settlement Credits Value will be estimated based on discounted service acre years ("DSAYs"), or such other measurement of value that the Trustees employ for determining NRD [(natural resource damages)] for the Site and pursuing claims against liable parties for such damages. (MOA at 2, ¶ 1.3)

The Trustee Council made the following assumptions regarding the project in determining the FSCV of the Covered Project:

- The base year is 2011 to stay consistent with the Trustee Council's injury HEA calculation, and the project will be implemented in 2015.
- RestorCap has not clarified ownership within the restoration site footprint with the Oregon Department of State Lands (DSL). The Trustees expect RestorCap to work with

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[1] As defined MOA at 2-7, ¶ 1.1, Project Baseline Condition is "the habitat conditions at the location of a habitat restoration project taking into account remedial measures that are, or are reasonably anticipated to be, required by the U.S. Environmental Protection Agency under CERCLA.

DSL to address this issue to ultimately determine any necessary allocation of restoration credits. The Trustee Council will not provide credit for restoration that cannot be protected and managed for restoration purposes in perpetuity. Therefore, any estimated credit that would be generated on DSL-owned intertidal or submerged lands is conditional upon the establishment of a conservation easement or other mechanism that will permanently protect the land.

- After review of RestorCap's initial assessment of Project Baseline Condition, the Trustees reclassified 0.065 acres of riparian, forested habitat as outside the historic floodplain based on GIS data.
- The Trustees assumed the current value of the shallow water habitat adjacent to the active channel margin (ACM) in the northern section of the site in current condition is 0.5 instead of the 0.1 value that RestorCap proposed. This adjustment was made because currently the adjacent shoreline habitat is gently sloped and not armored, and the only proposed work in this area is removal of pilings. Impacts to shallow water habitat quality from pilings in adjacent shoreline habitat are more limited than impacts from rip rap and concrete along the shoreline. Active piling removal will still improve the habitat value in that area to 1.0.
- Consistent with the Trustee Council's approach to considering extra habitat credit for provision of critical refuge, we have included a twenty-five percent credit bonus to the off-channel, ACM, and shallow water habitats where active restoration is occurring (50 DSAYs), and a ten percent bonus to shallow water habitat where only piling removal is taking place (10 DSAYs).

The Trustee Council also notes that the proposed project is currently in an early stage of design and permitting has not yet been initiated. Therefore, the materials provided by RestorCap lack detail in key areas, including the location and morphology of Forest Park tributaries entering the project area, the location and potential habitat impacts of any recreational features or access points, and the location and potential habitat impacts of any features to treat or contain contamination at the site or from adjacent sites. Any of these elements could impact the potential credit value of the proposed project. In order to obtain the most accurate FSCV for the project, the Trustee Council recommends that the project sponsor request a revised FSCV when the project reaches a more mature design stage.

The Trustee Council directed Industrial Economics, Inc. to prepare the attached spreadsheet documenting the FSCV for the Covered Project (Attachment B). Based on the assumptions outlined above, the FSCV for the Covered Project is 511 DSAYs. Again, this FSCV is based on RestorCap's proposed design shown in Attachment A. Pursuant to the MOA, the FSCV for the Covered Project may be adjusted upward or downward to arrive at a Final Settlement Credits Value. *See* MOA at 3, ¶ 3.2.

The Trustee Council looks forward to continuing to work with you to develop the Covered Project. We believe this project would benefit numerous species of fish and wildlife as well as other natural resources in the lower Willamette River. We would like to note that the MOA between RestorCap and the Trustee Council is limited in scope and further collaboration may require an addendum to the MOA or a separate MOA. *See* MOA at 4, ¶ 3.3.

If you have any questions about the FSCV, please do not hesitate to contact me at 503.753.1310.

Sincerely,

Erin Madden

Erin Madden

cc (via email):
Trustee Council Representatives

**GENERAL INPUTS**

| | |
|---|---|
| 3.0% | Discount Rate |
| 2011 | Base Year (2011 matches Portland Harbor debit) |
| 2015 | Restoration Start Year |
| 2315 | Model End Year |

| | | | |
|---|---|---|---|
| Total Acres in site boundary | 26.43 | DSAYs/acre | 17.0 |
| Acres with restoration change | 26.43 | | |
| % of site modified | 100.0% | | |

## Current Habitats

**Total** **39.8**

| Habitat type | Acres Converted | Habitat quality adj factor | | PV DSAYs per acre converted | Quality Adj. PV DSAYs per acre converted | Quality Adj. PV DSAYs |
|---|---|---|---|---|---|---|
| ACM; Covered | 0.14 | 0.1 | | 30.5 | 3.1 | 0.4 |
| ACM; Pilings not allowing light | 0.64 | 0.05 | | 30.5 | 1.5 | 1.0 |
| ACM; Riprap | 0.49 | 0.1 | | 30.5 | 3.1 | 1.5 |
| ACM; slope>11; vegetated invasive | 0.13 | 0.09 | | 30.5 | 2.7 | 0.4 |
| ACM; slope>11; unvegetated | 0.41 | 0.1 | | 30.5 | 3.1 | 1.3 |
| Riparian; Invasive | 1.74 | 0.1 | | 30.5 | 3.1 | 5.3 |
| Riparian; Outside Floodplain; Forested | 0.09 | 0.5 | | 30.5 | 15.3 | 1.4 |
| Riparian; Unvegetated/Paved/Buildings | 6.93 | 0 | | 30.5 | - | - |
| Shallow: covered | 0.22 | 0.5 | | 30.5 | 15.3 | 3.4 |
| Shallow; riprap or concrete | 3.75 | 0.1 | **Area where only pilings are being removed and shoreline is being improved. | 30.5 | 3.1 | 11.4 |
| Shallow; gravel or natural rock; degraded | 0.84 | 0.5 | **Area where only pilings are being removed (northern part of site). | 30.5 | 15.3 | 12.8 |
| Upland; Outside Floodplain; Invasive | 0.59 | 0.05 | | 30.5 | 1.5 | 0.9 |
| Upland; Unvegetated/Paved/Buildings | 10.46 | 0 | | 30.5 | - | - |
| NA | 0.00 | 0 | | 30.5 | - | - |
| NA | 0.00 | 0 | | 30.5 | - | - |
| NA | 0.00 | 0 | | 30.5 | - | - |

## Restored Habitats

**Total** **488.9**

| Habitat type | Acres Restored | Habitat quality adj factor | Restoration Trajectory | Credit Segment 1 PV DSAYs per acre | Credit Segment 2 PV DSAYs per acre | Credit Segment 3 PV DSAYs per acre | Total PV DSAYs per acre restored | Total Quality Adj. PV DSAYs per acre restored | Quality Adj. PV DSAYs | |
|---|---|---|---|---|---|---|---|---|---|---|
| ACM; slope<11; unvegetated | 2.05 | 0.8 | 1 | 0.9 | 29.6 | - | 30.5 | 24.4 | 50.0 | |
| ACM; slope<11; vegetated native | 0.90 | 1 | 3 | 1.7 | 27.9 | - | 29.6 | 29.6 | 26.7 | |
| Embayment/cove with tributary | 4.34 | 1 | 1 | 0.9 | 29.6 | - | 30.5 | 30.5 | 132.3 | |
| Riparian; Outside Floodplain; Forested | 9.39 | 0.5 | 10/40 | 3.3 | 11.9 | 9.3 | 24.5 | 12.2 | 115.0 | |
| Shallow; gravel or natural rock | 0.86 | 1 | 1 | 0.9 | 29.6 | - | 30.5 | 30.5 | 26.2 | **Area where only pilings are being removed (northern part of site). |
| Shallow; gravel or natural rock | 3.95 | 1 | 1 | 0.9 | 29.6 | - | 30.5 | 30.5 | 120.5 | **Area where only pilings are being removed and shoreline is being improved. |
| Upland; Outside Floodplain; Forested | 4.94 | 0.15 | 10/40 | 3.3 | 11.9 | 9.3 | 24.5 | 3.7 | 18.1 | |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - | |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - | |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - | |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - | |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - | |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - | |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - | |

## TOTAL CREDIT (Restored minus Current)

**449.1**

Acres check -0.005359

**Bonus DSAYs** **61.69**

-25% Bonus is applied to off-channel, ACM, and shallow water where active restoration is occurring. %10 bonus applied in shallow water where only piling removal and shoreline restoration is taking place.

**Credit DSAYS with** **510.78**

**GENERAL INPUTS**

| | |
|---|---|
| 3.0% | Discount Rate |
| 2011 | Base Year (2011 matches Portland Harbor debit) |
| 2015 | Restoration Start Year |
| 2315 | Model End Year |

| | | | |
|---|---|---|---|
| Total Acres in site boundary | 26.43 | DSAYs/acre | 7.8 |
| Acres with restoration change | 8.14 | | |
| % of site modified | 30.8% | | |

## Current Habitats

**Total** 10.1

| Habitat type | Acres Converted | Habitat quality adj factor | PV DSAYs per acre converted | Quality Adj. PV DSAYs per acre converted | Quality Adj. PV DSAYs |
|---|---|---|---|---|---|
| ACM; Covered | 0.14 | 0.1 | 30.5 | 3.1 | 0.4 |
| ACM; Pilings not allowing light | 0.64 | 0.05 | 30.5 | 1.5 | 1.0 |
| ACM; Riprap | 0.49 | 0.1 | 30.5 | 3.1 | 1.5 |
| ACM; slope>11; unvegetated | 0.41 | 0.1 | 30.5 | 3.1 | 1.3 |
| Riparian; Invasive | 1.74 | 0.1 | 30.5 | 3.1 | 5.3 |
| Riparian; Unvegetated/Paved/Buildings | 2.02 | 0 | 30.5 | - | - |
| Shallow: covered | 0.22 | 0.1 | 30.5 | 3.1 | 0.7 |
| Upland; Unvegetated/Paved/Buildings | 2.38 | 0 | 30.5 | - | - |
| Riparian; Outside Floodplain; Forested | 0.09 | 0.5 | 30.5 | - | - |
| NA | 0.00 | 0 | 30.5 | - | - |
| NA | 0.00 | 0 | 30.5 | - | - |
| NA | 0.00 | 0 | | | |

## Restored Habitats

**Total** 215.7

| Habitat type | Acres Restored | Habitat quality adj factor | Restoration Trajectory | Credit Segment 1 PV DSAYs per acre | Credit Segment 2 PV DSAYs per acre | Credit Segment 3 PV DSAYs per acre | Total PV DSAYs per acre restored | Total Quality Adj. PV DSAYs per acre restored | Quality Adj. PV DSAYs |
|---|---|---|---|---|---|---|---|---|---|
| ACM; slope<11; unvegetated | 2.05 | 0.8 | 1 | 0.9 | 29.6 | - | 30.5 | 24.4 | 50.0 |
| ACM; slope<11; vegetated native | 0.90 | 1 | 3 | 1.7 | 27.9 | - | 29.6 | 29.6 | 26.7 |
| Embayment/cove with tributary | 4.34 | 1 | 1 | 0.9 | 29.6 | - | 30.5 | 30.5 | 132.3 |
| Shallow; gravel or natural rock | 0.22 | 1 | 1 | 0.9 | 29.6 | - | 30.5 | 30.5 | 6.7 |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - |

## TOTAL CREDIT (Restored minus Current)

205.6

Acres check -0.627697

**DSAYs** 51.39

**GENERAL INPUTS**

| | |
|---|---|
| 3.0% | Discount Rate |
| 2011 | Base Year (2011 matches Portland Harbor debit) |
| 2015 | Restoration Start Year |
| 2315 | Model End Year |

| | | | |
|---|---|---|---|
| Total Acres in site boundary | 26.43 | DSAYs/acre | 3.9 |
| Acres with restoration change | 3.75 | | |
| % of site modified | 14.2% | | |

## Current Habitats

**Total** 11.4

| Habitat type | Acres Converted | Habitat quality adj factor | | PV DSAYs per acre converted | Quality Adj. PV DSAYs per acre converted | Quality Adj. PV DSAYs |
|---|---|---|---|---|---|---|
| Shallow; riprap or concrete | 3.75 | 0.1 | **Area where only pilings are being removed and shoreline is being improved. | 30.5 | 3.1 | 11.4 |
| NA | 0.00 | 0 | | 30.5 | - | - |
| NA | 0.00 | 0 | | 30.5 | - | - |

## Restored Habitats

**Total** 114.4

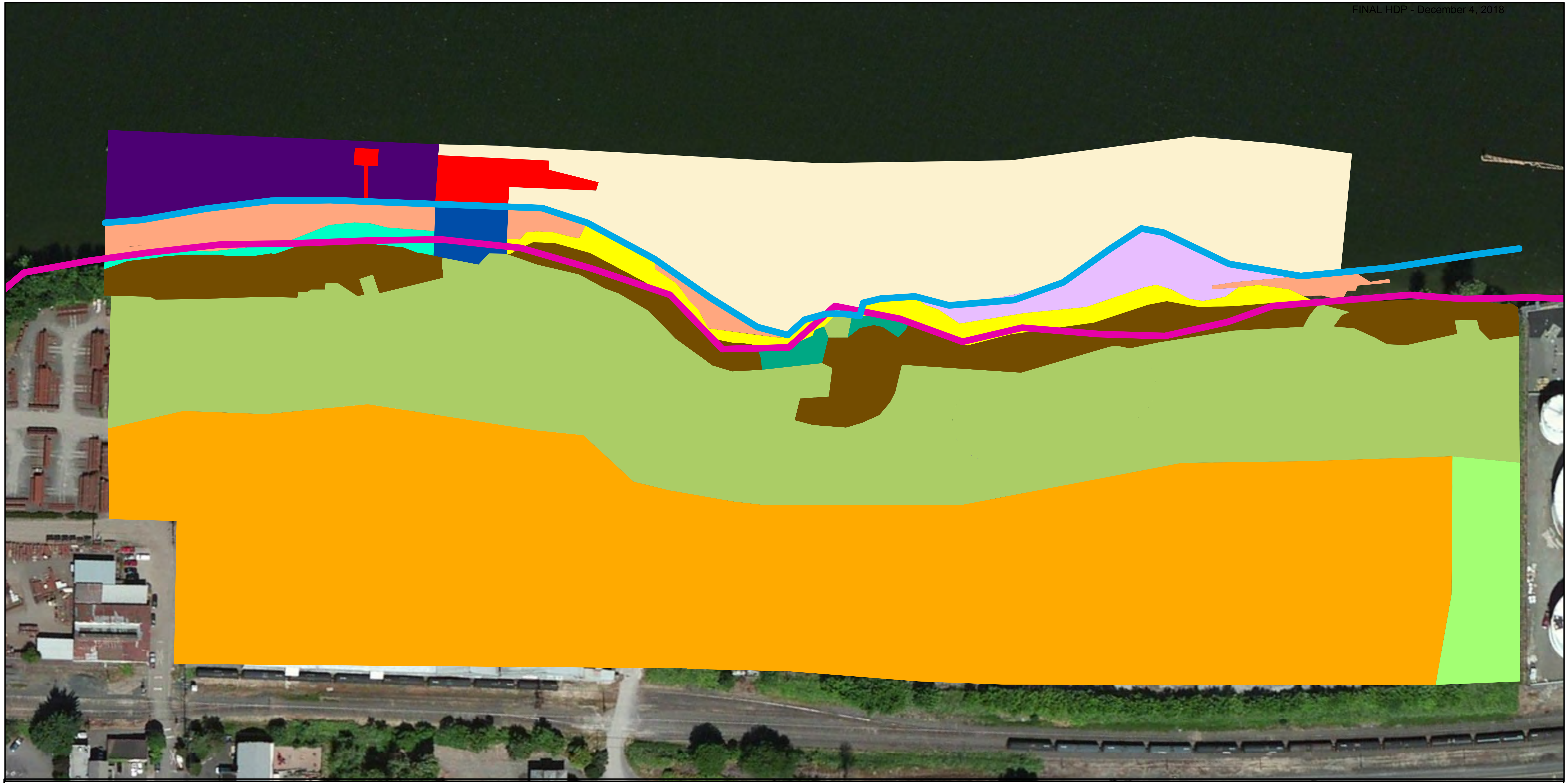
| Habitat type | Acres Restored | Habitat quality adj factor | Restoration Trajectory | Credit Segment 1 PV DSAYs per acre | Credit Segment 2 PV DSAYs per acre | Credit Segment 3 PV DSAYs per acre | Total PV DSAYs per acre restored | Total Quality Adj. PV DSAYs per acre restored | Quality Adj. PV DSAYs | |
|---|---|---|---|---|---|---|---|---|---|---|
| Shallow; gravel or natural rock | 3.75 | 1 | 1 | 0.9 | 29.6 | - | 30.5 | 30.5 | 114.4 | **Area where only pilings are being removed and shoreline is being improved. |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - | |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - | |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - | |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - | |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - | |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - | |
| NA | 0.00 | 0 | NA | NA | NA | NA | - | - | - | |

## TOTAL CREDIT (Restored minus Current)

**102.9**

Acres check 0

**Bonus DSAYs** 10.29



## Habitat

- 🟧 ACM; Pilings not allowing light
- 🟨 ACM; Riprap
- 🟦 ACM; covered
- 🟪 ACM; slope>11; unvegetated
- 🟩 ACM; slope>11; vegetated invasive
- 🟫 Riparian; Invasive
- 🟩 Riparian; Outside Floodplain; Forested
- 🟩 Riparian; Unvegetated/Paved/Buildings
- 🟥 Shallow; covered
- 🟪 Shallow; gravel or natural rock; degraded
- ⬜ Shallow; riprap or concrete
- 🟩 Upland; Outside Floodplain; Invasive
- 🟧 Upland; Unvegetated/Paved/Buildings

- ━ Ordinary Low Water Line
- ▭ Historic Floodplain

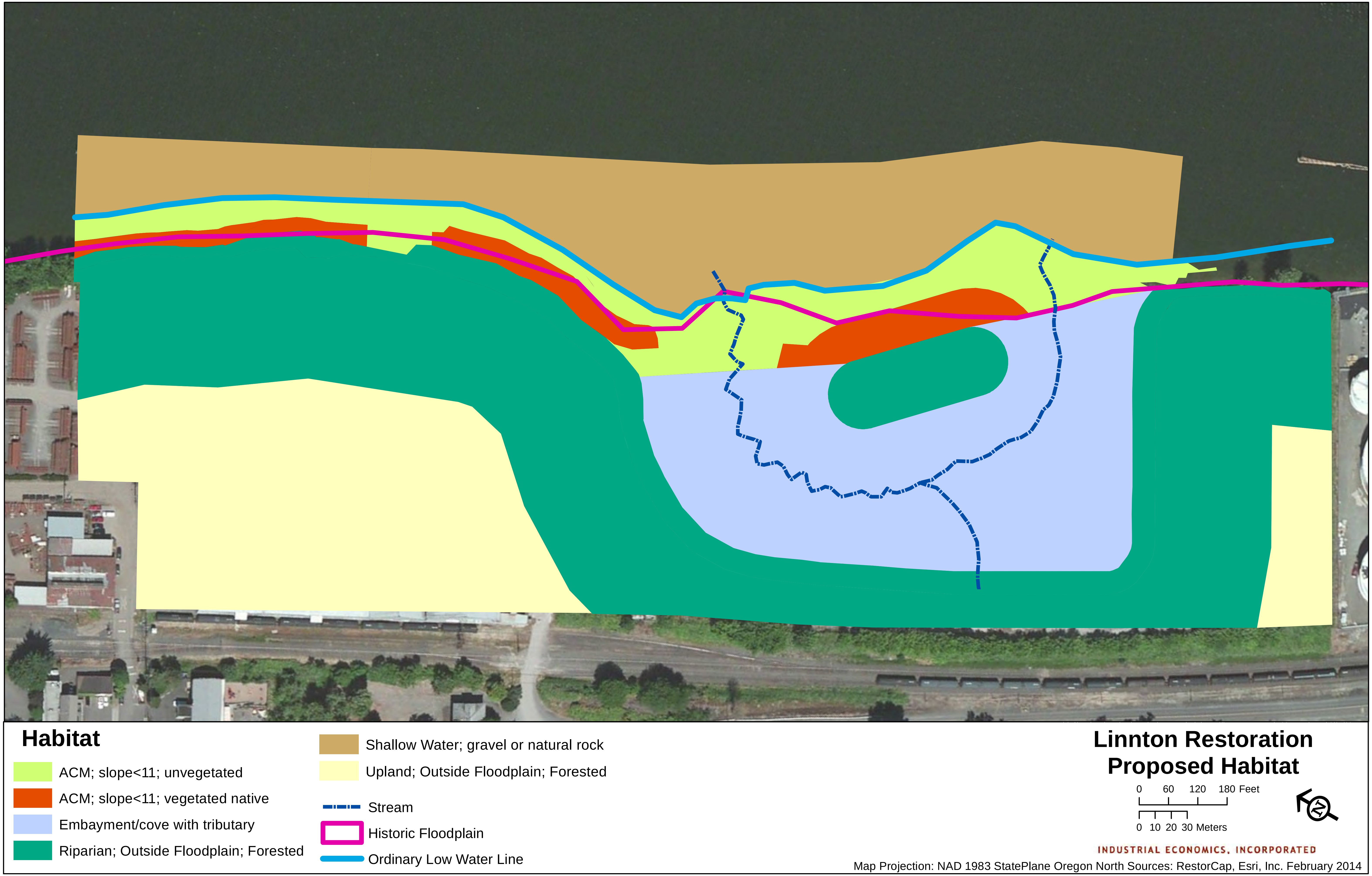
## Linnton Restoration Current Habitat

0 60 120 180 Feet

0 10 20 30 Meters

**INDUSTRIAL ECONOMICS, INCORPORATED**

Map Projection: NAD 1983 StatePlane Oregon North Sources: RestorCap, Esri, Inc. February 2014



## Linnton Restoration Proposed Habitat

Map Projection: NAD 1983 StatePlane Oregon North Sources: RestorCap, Esri, Inc. February 2014

# Exhibit J. Comparison of soil sampling results against Restoration Contamination Benchmarks Memorandum (2/1/17)

# MEMORANDUM | February 1, 2017

**TO** Andrew Gregg, RestorCap

**FROM** Portland Harbor Trustee Council Restoration Committee

**SUBJECT** Comparison of soil sampling results against Restoration Contamination Benchmarks

## INTRODUCTION

Restoration projects proposed in the context of the Portland Harbor Natural Resource Damage Assessment and Restoration (NRDAR) may occur in areas that contain some contamination. To assess the potential exposure to and adverse effects of that contamination on juvenile Chinook and other potentially injured ("target") species, the Portland Harbor Natural Resource Trustee Council (Trustee Council) reviews project-specific information as it relates to a suite of chemical and physical characteristics.

If detected contaminant concentrations within a project area are below the Restoration Contamination Benchmarks identified in the Trustee Council's September 27, 2016 memorandum "Addressing Restoration Project Site Contamination: Credit Reduction Approach Summary," no further review of these data is required, as no contaminant-related reduction in ecological services is expected. If, however, contaminant concentrations exceed Restoration Contamination Benchmarks, the Trustee Council will determine if the project is still eligible for NRDAR credit, and if so, present the project developer with a suite of options related to the detected contaminant concentrations.

This document describes the results of this process as applied to the Linnton Mill Restoration Project Site (the Site) based upon soil sample analyses presented in the September 8, 2016 draft report, "New Exposed Surface Investigation Report, Linnton Mill Site Restoration." A sediment sampling plan for the Site is currently under development, and will be implemented during construction. The Trustee Council will conduct a corollary analysis of those sampling results at that time to determine if sediment contamination on the Site is expected to cause a loss in target resource services, and what corresponding steps could be completed to address those potential losses.

## DATA REVIEW PROCESS AND RESULTS

### APPROACH

The results of soil sample contaminant analyses presented in the September 8, 2016 draft report, "New Exposed Surface Investigation Report, Linnton Mill Site Restoration" were compared to the Trustee Council's Restoration Contamination Benchmarks to evaluate whether contamination present in Site samples may cause a loss in the ecological services provided by target resources following restoration.[1] For this analysis, the following guidelines apply:

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[1] The Restoration Contamination Benchmarks are identified in the Trustee Council's September 27, 2016 memorandum, "Addressing Restoration Project Site Contamination: Credit Reduction Approach Summary."

- Although all samples were compared to the Restoration Contamination Benchmarks, the focus of the analysis is on contamination in habitats that represent an exposure threat to target species (i.e., the leave surface of habitats such as active channel margins, open water habitats, and sediments, etc.);
- The substances of concern (SOCs) evaluated from the available Site data include: polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), cadmium, copper, lead, mercury, dichlorodiphenyltrichloroethane (DDT), dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethylene (DDE);[2] and
- Non-detect samples were incorporated into the analysis. Non-detected single analytes (e.g., lead, mercury) were assumed to be one half of the method detection limit (MDL). Non-detect samples that represent an individual component of a calculated result (e.g., total PCBs, total PAHs) were treated as follows:
    - For calculated SOC results for which at least one individual analyte had a detected concentration, the total concentration for that sample is the sum of the concentrations of detected analytes for that SOC (i.e, non-detects are assumed to be equal to zero).
    - For calculated SOC results for which all individual analytes (e.g., all Aroclors) were non-detects, the total concentration for that sample is assumed to be one half of the value of the MDL for the individual analyte with the highest MDL (e.g., half the concentration of the Aroclor with the highest MDL for that sample).

### DATA LIMITATIONS

The soil contaminant data available for the Site is characterized by several limitations, which are discussed below:

- **Soil samples were not analyzed for three of the Trustee Council's SOCs, including bis (2-Ethylhexyl) phthalate, tributyltin (TBT), and 4-methlyphenol**. The Trustee Council commented on the suite of contaminants to be addressed under the Site sampling plan. It was an oversight on the Trustee Council's part that the comments did not identify these contaminants as being of interest. As conveyed by the project developer' consultants during an October 17, 2016 conference call, the source control evaluation, which informed development of the soil sampling plan, did not identify specific sources of these contaminants at the Site. Further, the sampling plan, developed as part of the Perspective Purchasers Agreement, was reviewed by DEQ, who confirmed there is no specific reason to believe that these substances may be present at elevated levels on Site. As such, the Trustee Council is comfortable moving forward without information on the omitted SOCs.

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[2] Projects developers should bear in mind that any additional contaminants identified at levels that may be injurious to site resources (e.g., during construction) will need to be addressed in coordination with the Trustee Council and ODEQ, and may result in a reduction in available credit.

- **Soil samples in the upland restoration habitat area were not tested for the suite of pesticides (DDD, DDE, DDT) requested by the Trustee Council.** All samples within the Trustee Council's primary area of concern (aquatic and active channel margin habitat to which Chinook salmon would be directly exposed) were analyzed for these contaminants, and levels of these contaminants in the upland habitat is not a high priority for this analysis. Therefore, the Trustee Council does not require pesticide testing for samples outside of the aquatic habitat to proceed with the contaminant review or crediting process.
- **Soil samples were only tested for PAHs and PCBs if diesel range or oil range organics were detected in the samples.** The scope of work for the sampling investigation was developed relative to source control evaluation performed at the site. DEQ considered the approach to be acceptable and appropriate given potential sources of PAHs and PCBs at the site, and does not believe other sources of these contaminants warrant investigation. The Trustee Council is therefore comfortable with the screening approach as presented.

### RESULTS

Contaminant concentrations exceeding Restoration Contamination Benchmarks were detected in 16 soil samples across three SOCs: lead, copper, and total PAHs (see Exhibits 1 and 2). Nine of the soil samples with contaminant concentrations exceeding benchmarks, ranging from five to 20 percent service loss, were found in soil that will be excavated during construction, five samples ranging from five to 20 percent service loss were found in what will be the new upland restoration area surface, and two samples, each with a five percent service loss, were found in what will be the new aquatic restoration area surface (see Exhibit 3). For this analysis, the two PAH exceedances of the five percent service loss benchmark located in the new aquatic restoration area surface (R9 and T2) are of primary concern and indicate the presence of contamination in the proposed habitat used by target species.

### EXHIBIT 1. RESTORATION CONTAMINATION BENCHMARKS FOR SUBSTANCES OF CONCERN EXCEEDING BENCHMARKS IN SITE SAMPLES

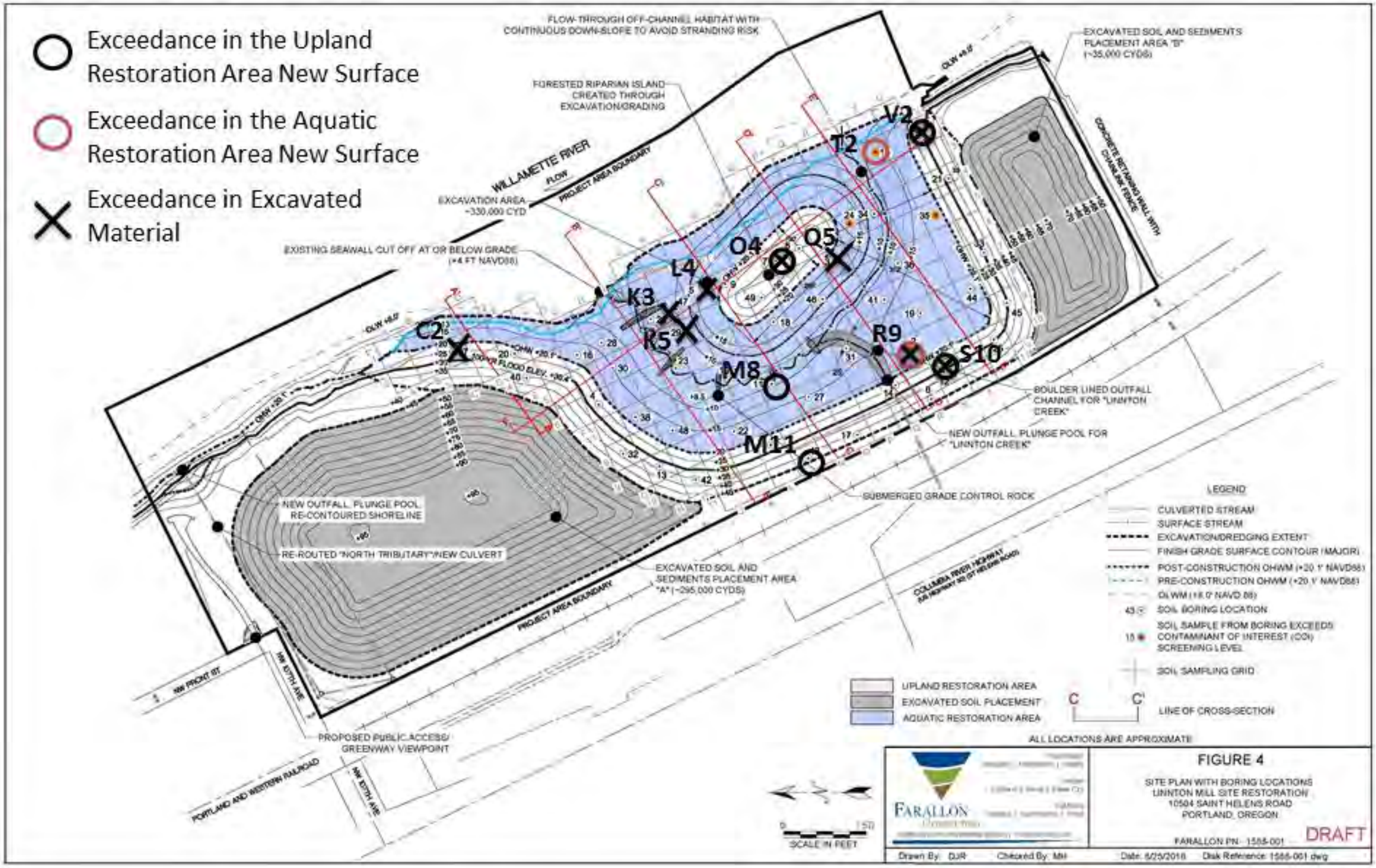
| SOC | RESTORATION CONTAMINATION BENCHMARKS (MG/KG) | % SERVICE LOSS |
|---|---:|---:|
| Copper | 270 | 5% |
| | 390 | 10% |
| | 530 | 15% |
| | 1,300 | 20% |
| Lead | 360 | 5% |
| | 450 | 10% |
| | 530 | 15% |
| | 1,200 | 20% |
| PAH | 1 | 5% |
| | 5 | 10% |
| | 10 | 20% |
| | 22.5 | 40% |
| | 69 | 60% |
| | 100 | 80% |

### EXHIBIT 2. SUMMARY OF RESTORATION CONTAMINATION BENCHMARK EXCEEDENCES

| SOC | RESTORATION CONTAMINATION BENCHMARKS (MG/KG) | MEASURED VALUE (MG/KG) | PERCENT SERVICE LOSS | SAMPLE ID | LOCATION/UNIT |
|---|---:|---:|---:|---|---|
| Lead | 1,200 | 1,430 | 20% | B47 | K3/Excavated Material |
| Copper | 270 | 300 | 5% | B11 | M8/Upland Restoration Area Surface |
| | 390 | 524 | 10% | B43 | M11/Upland Restoration Area |
| PAH | 1 | 1.13 | 5% | B12 | S10/Upland Restoration Area Surface |
| | 1 | 1.28 | 5% | B29 | K5/Excavated Material |
| | 1 | 1.22 | 5% | B3 | Q5/Excavated Material |
| | **1** | **1.34** | **5%** | **B2** | **R9/Aquatic Restoration Area Surface** |
| | 1 | 1.38 | 5% | B7 | O4/Excavated Material |
| | 1 | 1.39 | 5% | B5 | L4/Excavated Material |
| | 1 | 1.57 | 5% | B2 | R9/Excavated Material |
| | **1** | **1.97** | **5%** | **B15** | **T2/Aquatic Restoration Area Surface** |
| | 1 | 2.07 | 5% | B37 | C2/Excavated Material |
| | 5 | 7.34 | 10% | B50 | V2/Excavated Material |
| | 5 | 9.33 | 10% | B7 | O4/Upland Restoration Area Surface |
| | 10 | 15.13 | 20% | B12 | S10/Excavated Material |
| | 10 | 20.01 | 20% | B50 | V2/Upland Restoration Area Surface |

Note:
Bolded text indicates an exceedence in the anticipated surface of the aquatic restoration area.

## EXHIBIT 3. LOCATION OF SOIL SAMPLES WITH RESTORATION CONTAMINATION BENCHMARK EXCEEDENCES



## NEXT STEPS

Given that contamination in excess of the Restoration Contamination Benchmarks will be present at the leave surface in habitats of specific concern following restoration activities, the Trustee Council has identified the following options:

1. Accept a reduction in the total credit that may be achieved through planned restoration activities commensurate with the level of contamination anticipated to be left on site in habitats accessible to Chinook salmon and other target species, to be calculated per the process described in the Trustee Council's September 27, 2016 memorandum "Addressing Restoration Project Site Contamination: Credit Reduction Approach Summary."

2. Revise the existing restoration design to eliminate the potential for exposure of target species to residual contamination; or

3. Implement a Trustee Council-approved sampling plan prior to construction to better characterize the potential exposure of target species. For example, if a developer is concerned that existing sampling data overstate the true nature and extent of contamination on site, the developer may elect to implement additional sampling. Through a Trustee Council-approved sampling plan, developers would have the opportunity to collect and analyze additional samples that better characterize the levels and types of contamination to which target species may be exposed.

In this case, RestorCap has stated that the contamination found at Site will be addressed by over-excavation and placement of clean fill during construction (i.e., Option 2). Assuming these actions occur, the Trustee Council does not anticipate a credit reduction related to residual contamination for areas sampled and presented in the September 8, 2016 report.

RestorCap has also indicated that additional sampling and analysis of Site sediments will be conducted during construction, and that these data will more completely characterize Site SOC levels. The Trustee Council will review the results of this sampling event once they are available. If this mid-construction sediment sampling either does not identify additional contamination in exceedence of Restoration Contamination Benchmarks, or RestorCap addresses areas of exceedence by over-excavation and placement of clean fill, the Trustee Council will not apply a contaminant-related reduction in project credit. However, should RestorCap not address exceedences in this manner, the Trustee Council will identify potential next steps and, if appropriate, will apply a corresponding reduction in project credit at that time.

# Appendix 1. Credit Release Schedule

# Appendix 1
# Credit Release Schedule

Upon LWC's compliance with all applicable requirements set forth in this section, and verification of completed requirements by the Trustee Council, credits will be released for transfer in accordance with the schedule set forth herein. The actual number of credits shall be determined by the Trustee Council based upon verification that the project was constructed as designed, the results of the contamination review following implementation of the during-construction sediment sampling event, and attainment of the final Performance Standards. Credits shall be released as follows:

1. 15% release upon completion of the following:
   a. Execution of the Department of State Lands (DSL) lease;
   b. Recording the upland interim deed restriction;
   c. Establishment of construction security bond, including Adaptive Management Set-Aside costs;
   d. Establishment of IMCS security bond; and
   e. Establishment of the Lamprey Monitoring (years 15 and 20) bond.

2. 35% release upon completion of the following:
   a. Trustee Council review of the as-built drawings and additional requested information to document project completion; and
   b. Establishment of the Adaptive Management Set-Aside escrow account.

3. 30% release upon achievement of Year 3 Performance Standards.

4. 10% release upon achievement of Year 5 Performance Standards.

5. 10% release upon completion of the following:
   a. Recording conservation easement deed(s) for uplands and DSL lands;
   b. Approval of a Site-Specific Long-Term Stewardship Plan;
   c. Fully-funded Long-Term Stewardship Fund;
   d. Achievement of Year 10 Performance Standards; and
   e. Full advanced payment for years 15 and 20 Lamprey Monitoring Events.

# Appendix 2. Construction Performance Bond

# CONSTRUCTION PERFORMANCE AND ADAPTIVE MANAGEMENT SET-ASIDE ESCROW ACCOUNT BOND

Bond No. _____ — _____

KNOW ALL BY THESE PRESENTS:

That we, Linnton Water Credits LLC, as Principal, hereinafter called Principal, and _________________________, a _________ corporation, as Surety, hereinafter called Surety, are held and firmly bound unto the National Oceanic and Atmospheric Administration (NOAA) on behalf of, the United States Department of Commerce, the United States Fish and Wildlife Service, on behalf of the Department of the Interior, the Oregon Department of Fish and Wildlife, the Confederated Tribes of the Grand Ronde Community of Oregon, the Confederated Tribes of Siletz Indians, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe (collectively, the "Obligee"), in the amount of **$6,287,116.98** for the payment of which sum, well and truly to be made, the said Principal and Surety bind themselves, and their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal and the Obligee have developed a document entitled "Memorandum of Agreement Between the Natural Resources Trustees and RestorCap for Providing Technical Assistance Related to Habitat Restoration Projects Toward Future Settlement of Natural Resource Damage Claims at the Portland Harbor CERCLA Site" dated May 16, 2013, as assigned to RestorCap Development LLC on December 8, 2015, hereinafter called the "MOA."

WHEREAS, Principal and Obligee have developed a document titled "Linnton Mill Restoration Site, Restoration Plan" dated [x] , and hereinafter called the "Restoration Plan". The Restoration Plan sets forth requirements regarding the implementation, monitoring, operation and management, and stewardship of a natural resource restoration project for the site located at 10504 NW St. Helens Road in Portland, Oregon (the "Restoration Project").

WHEREAS, such Restoration Plan includes approved 100% design documents for the natural resource restoration project (the "100% Design").

WHEREAS, under the Restoration Plan, the Principal must provide financial assurance to guarantee the construction of the Restoration Project in accordance with the 100% Design and in accordance with the Restoration Plan (the "Guaranteed Work").

WHEREAS, in accordance with the provisions set forth in Restoration Plan, the Obligee shall determine Principal's compliance with the terms and conditions of such Guaranteed Work by comparison of the 100% Design against as-built drawings of the completed project and in accordance with the Restoration Plan.

WHEREAS, in accordance with the provisions set forth in the Restoration Plan, the Principal must establish and fully fund an Adaptive Management Set-Aside Escrow Account in the amount of $**593,851.22**.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if Principal shall promptly, faithfully, fully and finally (a) complete the Guaranteed Work in accordance with the 100% Design and the Restoration Plan; and (b) establish and fully fund the Adaptive Management Set-Aside Escrow Account in accordance with the Restoration Plan, the Surety's obligation shall be null and void, otherwise to remain in full force and effect.

PROVIDED, HOWEVER, That:

1. The Surety shall become liable on the obligation evidenced hereby only upon receipt of a written notice from the Obligee that the Obligee has determined that the Principal has failed to perform the Guaranteed Workand/or failed to establish and fully fund the Adaptive Management Set-Aside Escrow Account. Such notice shall include a description of the Principal's failure to perform and shall be forwarded to the Principal, with a copy to the Surety, within thirty (30) days after the Obligee has finally determined the Principal is in default under the terms of the Restoration Plan. The notice to the Surety shall be delivered to Surety at its Home Office in accordance with the notice requirements of paragraph 8 below.

   In the event of default, the Surety shall tender to the Obligee funds sufficient (as determined by the Obligee) to pay the cost, or remaining costs, of the Guaranteed Workand/or the Adaptive Management Set-Aside Escrow, as applicable, up to an amount not to exceed the penal sum of this Performance Bond. In no event shall the Surety be liable for fines, penalties, or forfeitures assessed against the Principal.

2. Any action, lawsuit or proceeding that may arise pursuant to this Performance Bond must be instituted in the US District Court for the District of Oregon. No action, lawsuit or proceeding under the Performance Bond shall be had or maintained against the Surety unless the same be filed and properly served upon the Surety within one year from the effective date of the cancellation of the Performance Bond.

3. No right of action shall accrue under this Performance Bond to or for the use of a person or entity other than the Obligee, and its successors and assigns.

4. The aggregate liability of the surety is limited to the penal sum stated herein regardless

of the number or amount of claims brought against this Performance Bond and regardless of the number of years this Performance Bond remains in force. The liability of the Surety shall not be discharged by any payment or succession of payments hereunder, unless and until such payment or payments shall amount in the aggregate to the Total Dollar Amount of this Performance Bond. The Surety's aggregate liability hereunder shall in no event exceed the amount set forth above.

5. Any modification, revision, or amendment which may be made in the terms of the Guaranteed Work or in the work to be done thereunder, or any extension of the Guaranteed Work, or the establishment and funding of the Adaptive Management Set-Aside Escrow or other forbearance on the part of either the Principal or Obligee to the other, shall not in any way release the Principal and the Surety, or either of them, or their heirs, executors, administrators, successors or assigns from liability hereunder. The Surety hereby expressly waives notice of any change, revision, or amendment to the Guaranteed Work or establishment and funding of the Adaptive Management Set-Aside Escrowor to any related obligations between the Principal and Obligee.

6. The Surety hereby agrees that the obligations of the Surety under this Performance Bond shall be in no way impaired or affected by any winding up, insolvency, bankruptcy or reorganization of the Principal or by any other arrangement or rearrangement of the Principal for the benefit of creditors.

7. The Surety will notify the Obligee in writing of any of the following events: (a) the filing by the Surety of a petition seeking to take advantage of any laws relating to bankruptcy, insolvency, reorganization, winding up or composition or adjustment of debts; (b) the Surety's consent to (or failure to contest in a timely manner) any petition filed against it in an involuntary case under such bankruptcy or other laws; (c) the Surety's application for (or consent to or failure to contest in a timely manner) the appointment of, or the taking of possession by, a receiver, custodian, trustee, liquidator, or the like of itself or of all or a substantial part of its assets; (d) the Surety's making a general assignment for the benefit of creditors; or (e) the Surety's taking any corporate action for the purpose of effecting any of the foregoing. Such notice shall be provided to the Obligee within five (5) days of the occurance of any of the above events so as to provide the Obligee time to respond.

8. All notices, consents, approvals and requests required or permitted hereunder shall be given in writing and shall be effective for all purposes if hand delivered or sent by (a) certified or registered United States mail, postage prepaid, return receipt requested or (b) expedited prepaid delivery service, either commercial or United

States Postal Service, with proof of attempted delivery, to the address shown in this Performance Bond. Notice to Obligee shall not be effective unless notice is sent to the Restoration Center, National Marine Fisheries Service, Oregon Field Office NOAA, 1201 NE Lloyd Blvd., Portland, OR 97232-2182, Attn: Megan Callahan-Grant. Any Notice to the Surety shall not be effective unless sent by the National Marine Fisheries Service, Oregon Field Office NOAA, 1201 NE Lloyd Blvd., Portland, OR 97232-2182 or an authorized NOAA representative. All notices, elections, requests and demands under this Performance Bond shall be effective and deemed received upon the earliest of (a) the actual receipt of the same by personal delivery or otherwise, (b) one business day after being deposited with a nationally recognized overnight courier service as required above, or (c) three business days after being deposited in the United States mail as required above. Rejection or other refusal to accept or the inability to deliver because of changed address of which no notice was given as herein required shall be deemed to be receipt of the notice, election, request, or demand sent.

9. Any provision in this Performance Bond that conflicts with any applicable statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or legal requirement shall be deemed incorporated herein.

10. The Principal may terminate this Performance Bond only by sending written notice of termination to the Surety and to the Obligee; provided, however, that no such termination shall become effective unless and until the Surety receives written authorization for termination of this Performance Bond by the Obligee.

11. Obligee will authorize termination of this Performance Bond if a) Obligee certifies the completion of the Guarantee Work, and establishment and full funding of an Adaptive Management Set-Aside Escrow Accrount; or b) the Surety and/or Principal establishes a replacement financial assurance mechanism satisfactory to the Obligee.

IN WITNESS WHEREOF the said Principal and Surety have signed and sealed this instrument on this ____ day of _______________

Linnton Water Credits, LLC
Principal

_______________________________________________
By Name/Title

________________________
Surety

_______________________________________________
By Name/Title

***BOND RELEASE- Bond Number _______________***

***Effective the date shown below, the Obligee confirms that the required work has been completed and accepted. We hereby fully release and exonerate this bond.***

____________________________________

*Date*

____________________________________

*Signature*

____________________________________

*Name / Title*

# Appendix 3. Adaptive Management Set-Aside Escrow Account

# ADAPTIVE MANAGEMENT SET-ASIDE ESCROW AGREEMENT

This Adaptive Management Set-Aside Escrow Agreement ("Escrow Agreement") is made and entered into this ______ day of ______, 2018 by Linnton Water Credits, LLC ("LWC"); the National Oceanic and Atmospheric Administration ("NOAA"), on behalf of the Department of Commerce; and _____ ("Escrow Agent").

WHEREAS, LWC and the Portland Harbor Trustee Council, comprised of NOAA, the United States Department of Commerce, the United States Department of the Interior, the Oregon Department of Fish and Wildlife, the Confederated Tribes of the Grand Ronde Community of Oregon, the Confederated Tribes of Siletz Indians, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe, developed a document titled "Memorandum of Agreement Between the Natural Resources Trustees and RestorCap for Providing Technical Assistance Related to Habitat Restoration Projects Toward Future Settlement of Natural Resource Damage Claims at the Portland Harbor CERCLA Site" dated May 16, 2013, as assigned to RestorCap Development, LLC on December 8, 2015, hereinafter called the "MOA."

WHEREAS, LWC has proposed a natural resource restoration project for the site located at 10504 NW St. Helens Road in Portland, Oregon.

WHEREAS, In collaboration with the Trustee Council, LWC has developed the Linnton Mill Restoration Site Restoration Plan (the "Restoration Plan").

WHEREAS, the First Addendum to the MOA, dated ______, 2018 (the "MOA Addendum"), provides the Trustee Council's approval of the "Restoration Plan" and LWC's agreement to implement the Linnton Restoration Site Project ("the Project") pursuant to the Restoration Plan.

WHEREAS, as required by the Restoration Plan, LWC must provide financial assurance to ensure sufficient funds to conduct adaptive management activities for the Project to ensure that the Project meets the post-construction performance standards (set forth in in Exhibit B, Site Specifc Performance Plan, Sections 4 and 8, of the Restoration Plan (the "Adaptive Management Requirements").

NOW, THEREFORE, in consideration of the mutual promises contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the undersigned parties hereto agree as follows:

## SECTION 1. Appointment of Escrow Agent.

LWC and NOAA hereby appoint _________ to serve as Escrow Agent under the Agreement on the terms and conditions set forth herein.

## SECTION 2: Term.

The term of this Escrow Agreement is from the Effective Date until one of the following occurs: (a) a determination by NOAA pursuant to Section 3(f) that the Adaptive Management Requirements have been met, or (b) disbursement by the Escrow Agent of all remaining Escrow Funds to NOAA pursuant to Section 3(e) following a determination by NOAA that LWC has failed to meet the Adaptive Management Requirements. The term of this Escrow Agreement is hereafter referred to as the Performance Period.

## SECTION 3. The Escrow Fund, Release of Funds and Termination

(a) On the Effective Date of this Agreement, and at the time of the execution of this Agreement by LWC, LWC shall tender $593,851.22 to the Escrow Agent for deposit in a separate bank account maintained by the Escrow Agent solely for purposes of this Agreement ("Escrow Deposit").

(b) All funds received by the Escrow Agent pursuant to the terms of these Escrow Instructions shall be held and disbursed in accordance with the terms and conditions of this Agreement. Escrow Agent shall invest the Escrow Deposit in an interest bearing account at a federally-insured financial institution to be selected by LWC and to be identified in writing to NOAA. Funds may only be used by the Parties to meet Adaptive Management Requirements.

(c) All interest earned on such Escrow Deposit (together with the Escrow Deposit, the "Escrow Funds") shall be available for purposes of this Escrow Agreement.

(d) On an annual basis, the Escrow Agent shall disburse funds as NOAA shall direct, as follows:

(i) Commencing one year from the Effective Date of this Agreement and on an annual basis, NOAA will direct in writing that the Escrow Agent shall disburse an amount from the Escrow Account to LWC in payment for LWC's annual expenditures for Adaptive Management Requirements. The disbursement shall be made to _______ [Bank Account].

(ii) Thirty (30) days prior to the scheduled annual disbursement noted in Section 3(d)(i), LWC shall notify NOAA in writing of the amount of its expenditures for the prior year spent on Adaptive Management Requirements. Such notification shall itemize the costs and shall include the underlying documentation supporting the disbursement request.

(iii) If NOAA objects to an annual disbursement for any reason, NOAA will notify the Escrow Agent and LWC of their objections and the specifics of the deficiency in writing at least five (5) working days prior to the date of the scheduled annual disbursement. NOAA will provide LWC fifteen (15) working days to cure such deficiency, or such time frame as the parties may agree.

(iv) If after such time frame, LWC is not able to cure the deficiency in a manner reasonably satisfactory to NOAA, NOAA will direct the Escrow Agent in writing not to disburse any disputed funds to LWC unless and until NOAA subsequently advises the Escrow Agent in writing that the deficiency has been remedied.

(v) If LWC does cure the deficiency to the satisfaction of NOAA, NOAA will notify LWC and Escrow Agent that there are no further objections to the annual disbursement, and Escrow Agent shall release the scheduled amount to the LWC bank account identified in Section 3(d)(i).

If, at the end of the Performance Period, NOAA determines that the Project has met its post-construction performance standards and there are funds remaining in the Escrow Account, NOAA will direct in writing that the Escrow Agent shall disburse any remaining funds from the Escrow Account to LWC, and the Escrow Account shall be terminated.

(e) Failure to Meet Adaptive Management Requirements. Apart from the annual disbursements described in Section 3(d), if NOAA determines that LWC has failed to meet Adaptive Management Requirements, within thirty (30) days of determining there is such a failure, NOAA shall notify LWC in writing and shall specify the nature of the deficiency. LWC shall have fifteen (15) working days (unless NOAA's written notice specifies a longer period) from the date of NOAA's notice to satisfy the Adaptive Management Requirements as required by NOAA. In the event LWC is able to cure the deficiency within the time frame allowed to the satisfaction of NOAA, NOAA shall send a second written notice of this determination to LWC. In the event LWC fails or is unable to cure the deficiencies specified by NOAA, the following remedies, as appropriate, are available:

(1) If this Escrow Agreement has not become part of a consent decree, entered in United States district court for the district of Oregon, resolving liability of one or more parties for natural resource damages, NOAA may notify the Escrow Agent of such failure, and the Escrow Agent shall release the remainder of the funds in the Escrow Account to a member of the Portland Harbor Trustee Council identified by NOAA, into an account established by that member of the Portland Harbor Trustee Council for the purpose of receiving the funds from the Escrow Agent. Following such disbursement of funds, the Escrow Account shall be terminated; or

(2) At such time as this Escrow Agreement becomes part of a consent decree, entered in United States district court for the district of Oregon, resolving liability of one or more parties for natural resource damages, NOAA may notify the Escrow Agent of such failure, and the Escrow Agent shall release the remainder of the funds in the Escrow Account to NOAA into an account to be determined by NOAA. Following such disbursement of funds, the Escrow Account shall be terminated.

(f) Apart from the annual disbursements described in Section 3(d), if NOAA determines that all Adaptive Management Requirements have been fully satisfied, NOAA will notify LWC of this determination and will direct in writing that the Escrow Agent disburse any remaining funds from the Escrow Account to LWC, and the Escrow Account shall be terminated. NOAA will make such a determination within 120 days of

LWC's requesting the same.

SECTION 4. Miscellaneous

(a) Escrow Agent Performance. Escrow Agent shall only perform such duties as are expressly set forth in this Agreement. Escrow Agent may resign from its duties or obligations hereunder by giving written notice thirty (30) days in advance of such resignation to LWC and NOAA. Advanced written notice shall specify a date when such resignation shall take effect, but no such resignation shall be effective until at least thirty (30) days following the date on which Escrow Agent provided notice. In the event that LWC and NOAA have not appointed a new escrow agent under this Agreement and provision has not been made to transfer the Escrow Account to such new escrow agent prior to the effective date of the resignation of Escrow Agent, then Escrow Agent may appoint a second escrow agent which shall be a commercial bank organized under the laws of the United States or the State of _______ and having a combined capital and surplus of at least $50 million. In the event that Escrow Agent appoints a second escrow agent, the Escrow Agent shall ensure that the second escrow agent signs this Escrow Agreement prior to any transfer of Escrow Funds to the second escrow agent.

(b) Effective Date. The Effective Date of this Agreement is the date by which it is executed by LWC and the funds are deposited with the Escrow Agent.

(c) Notices. Any written notices required in this Escrow Agreement shall be effective for all purposes if hand delivered or sent by (a) certified or registered United States mail, postage prepaid, return receipt requested, or (b) expedited prepaid delivery service, either commercial or United States Postal Service, with proof of attempted delivery, to the addresses noted below:

Restoration Center
National Marine Fisheries Service
Oregon Field Office NOAA
1201 NE Lloyd Blvd.
Portland, OR 97232-2182

Attn: Megan Callahan-Grant

Linnton Water Credits LLC
c/o Restorcap, LLC
Attention: Mr. Robert Marinai
337 17th Street, Suite 200
Oakland, CA 94612
Telephone: (510) 326-7131

Escrow Agent:
________________________
________________________
________________________

NOAA, LWC and/or Escrow Agent may change the address to which notices or other written communications to them are to be given by giving notice as required under this Paragraph.

(d) Dispute resolution and Jurisdiction. Disputes shall be resolved under this Escrow Agreement according to the following provision, as appropriate:

(1) If this Escrow Agreement has not become part of a consent decree, entered in United States district court for the district of Oregon, resolving liability of one or more parties for natural resource damages, the the following provisions apply: NOAA and LWC will attempt to resolve any disputes among themselves informally. In any dispute, NOAA has sole discretion to determine whether LWC has satisfied the Adaptive Management Requirements during the Performance Period but at all times shall exercise such discretion reasonably. With respect to any other disputes that cannot be resolved informally, any action, lawsuit, or proceeding that may arise regarding this Escrow Agreement, unless otherwise specified in this Escrow Agreement, must be instituted in the US District Court for the District of Oregon; or

(2) At such time as this Escrow Agreement becomes part of a consent decree, entered in United States district court for the district of Oregon, resolving liability of one or more parties for natural resource damages, the the following provisions apply: resolution of all disputes regarding the Escrow Agreement shall be according to the dispute resolution provisions of the consent decree. No action, lawsuit, or proceeding may be brought in any other court or forum to resolve disputes regarding the Escrow Agreement.

(e) Modifications to Adaptive Management Requirements. Both LWC and NOAA recognize that the Adaptive Management Requirements may be modified, revised, or amended during the Performance Period. Any such modifications to the Adaptive Management Requirements are hereby incorporated by reference into this Escrow Agreement.

(f) Conflicts with consent decree provisions. At such time as this Escrow Agreement becomes part of a consent decree, entered in United States district court for the district of Oregon, resolving liability of one or more parties for natural resource damages, if there are any conflicts between the provisions in this Escrow Agreement and the provisions in the consent decree, the provisions in the consent decree shall govern.

IN WITNESS WHEREOF, this Escrow Agreement has been executed by the parties with the Effective Date as defined in the Escrow Agreement.

National Oceanic and Atmospheric Administration

________________________________________

By Name/Title

Linnton Water Credits, LLC

By Name/Title

Escrow Agent

By Name/Title

# Appendix 4. Credit Sales Agreement

## AGREEMENT FOR SALE OF HABITAT CREDITS
## (Linnton Restoration Project)

This Agreement is made and entered into this____________day of________, 2018 by and between Linnton Water Credits, LLC ("Seller") and ____________, ("Buyer") as follows:

### RECITALS

A. Seller has entitlements to the restoration project located at 10504 NW St. Helens Road, Portland, Oregon ("Linnton Restoration Project" or "Project") located in Multnomah County, Oregon;

B. The Portland Harbor Natural Resource Trustee Council (the "Trustee Council") has acknowledged that the Project, if implemented according to the Linnton Restoration Project Restoration Plan submitted to the Trustee Council on _________ and approved by the Trustee Council on________ (the "Linnton Restoration Plan"), will provide Habitat Credits that may be proposed by the Trustee Council as part of a natural resource damages settlement, subject to approval by all appropriate public officials, public review and comment, and court approval ("NRDA Credits");

C. Seller is currently seeking approval from the local Interagency Review Team (the "IRT") for certain of such Habitat Credits to alternatively be used as either Riverine or Palustrine Habitat Credits under Section 404 of the Clean Water Act and applicable State of Oregon law ("404 Mitigation Credits"), it being understood that such 404 Mitigation Credits are considered a subset of such Habitat Credits, and must be used either as NRDA Credits, or as 404 Mitigation Credits, but not both; and

D. Buyer desires to purchase from Seller, and Seller desires to sell to Buyer, __________ NRDA Credits.

### NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:

1. Seller hereby agrees to sell to Buyer, and Buyer hereby agrees to purchase from Seller, _Habitat Credits for the purchase price of $________________("Purchase Price"). Such purchase and sale will occur on or before _____________ ("Purchase Date").

2. Buyer shall, on the date of this Agreement, deliver to Seller a non-refundable earnest money deposit in the amount of $________ ("Earnest Money Deposit") by wire transfer of immediately available funds to the account of Seller specified to Buyer in writing.

3. Upon receipt of the Purchase Price, Seller will deliver to Buyer an executed Bill of Sale in the

form attached hereto and marked Exhibit "A." The Purchase Price for said Habitat Credits (less the amount of the Earnest Money Deposit) shall be paid by wire transfer of immediately available funds to the account of Seller specified to Buyer in writing.

4. The sale and transfer herein is not intended as a sale or transfer to Buyer of a security, license, lease, easement, or possessory or non-possessory interest in real property, nor the granting of any interest of the foregoing.

5. Buyer shall have no obligation whatsoever by reason of the purchase of the Habitat Credits to support, pay for, monitor, report on, sustain, continue in perpetuity, or otherwise be obligated or liable for the success or continued expense or maintenance in perpetuity of the Habitat Credits sold, or the Project. As required by law, Seller shall monitor and make reports to the appropriate agency or agencies on the status of any Habitat Credits sold to Buyer.

   Seller shall be fully and completely responsible for satisfying any and all conditions placed on the Project or the Habitat Credits by all state or federal jurisdictional agencies. Seller shall indemnify Buyer of and from all such liabilities and obligations. Notwithstanding the foregoing, Buyer shall not take any action that in any way threatens or interferes with the success or maintenance of the Project or the Habitat Credits or interferes with the satisfaction of any condition placed on the Project or the Habitat Credits by any state or federal jurisdictional agencies. Buyer shall indemnify Seller, its affiliates, and their respective officers and employees from any costs or liabilities arising out of any such action taken by Buyer.

6. If, on the Purchase Date, Seller is for any reason unable to sell the Habitat Credits in a manner consistent with the representations and warranties provided in the Bill of Sale, Buyer, as its sole remedy, shall have the option to either (a) extend the Purchase Date for a period of up to 180 days (which date may not be extended more than once hereunder without the consent of Seller, which consent may be withheld for any reason); or (b) request refund of the Earnest Money Deposit, which Seller shall return within 30 days of such request.

7. If requested by the Trustees, Restoration Implementer will be a party to any natural resource damages settlement accepting the credits, the final form and substance of which shall be subject to the approval of Restoration Implementer and the Trustees, each in their sole and absolute discretion.

8. Buyer must deliver the Purchase Price to Seller on or before the Purchase Date. After this date, this Agreement will be considered null and void and Seller shall have no further obligations hereunder unless Seller in its sole discretion agrees to extend the Purchase Date. Further, in such case Seller is entitled to retain the Earnest Money Deposit

9. Upon purchase of the Habitat Credits specified above, Seller shall (i) assign a specific and unique serial number to each Habitat Credit sold; and (ii) submit such serial numbers to the Trustee

Council. Each Habitat Credit may be used to satisfy natural resource damages liability as a NRDA Credit or, as appropriate, provide 404 Mitigation Credit; however, a Habitat Credit may be applied toward only natural resource damages liability as a NRDA Credit as decribed in the recitals or be used as a 404 Mitigation Credit, but cannot be used for both purposes. Seller shall coordinate with the Trustee Council to maintain a Credit Ledger that tracks Habitat Credits by serial number, and designates whether such credits are used as NRDA Credits, or as 404 Mitigation Credits (Riverine or Palustrine).

10. This Agreement and all matters arising hereunder or in connection herewith shall be governed by and construed in accordance with the internal laws of the State of Oregon without reference to conflict of laws principles. Each of Buyer and Seller hereby irrevocably and unconditionally submits, for itself and its property, to the exclusive jurisdiction of the United States District Court for the District of Oregon (and if jurisdiction in the United States District Court for the District of Oregon shall be unavailable, the state court of the State of Oregon sitting in Portland, Oregon), and any appellate court from any thereof, in any action or proceeding arising out of or relating to this Agreement or the transactions contemplated hereby. EACH PARTY IRREVOCABLY AND UNCONDITIONALLY WAIVES THE RIGHT TO A TRIAL BY JURY IN ANY ACTION, SUIT OR PROCEEDING RELATING TO A DISPUTE ARISING OUT OF OR RELATING TO THIS AGREEMENT AND FOR ANY COUNTERCLAIM WITH RESPECT THERETO.

11. This Agreement may not be assigned or transferred by either party without the prior written consent of the other party which consent may be withheld in such party’s sole discretion.

12. This Agreement may be executed in one or more counterparts, each of which will be deemed an original, but all of which together will constitute one and the same instrument. A facsimile or other electronic transmission of this Agreement bearing a signature on behalf of a party will be legal and binding on such party.

13. This Agreement constitutes the entire agreement and understanding of the parties with respect to the subject matter hereof, and supersedes all other prior and contemporaneous agreements, whether written or oral, between the parties.

IN WITNESS WHEREOF, the parties have executed this Agreement the day and year first above written.

**SELLER**

**LINNTON WATER CREDITS, LLC**

By: ____________________________

Name: ____________________________

Its: ____________________________

**BUYER**

**(BUYER NAME HERE)**

By: ____________________________

Name: ____________________________

Its: ____________________________

# Exhibit A
# Bill of Sale

In consideration of $ ________, receipt of which is hereby acknowledged, Linnton Water Credits, LLC (“Seller”) does hereby sell, transfer and assign to ____________ (“Buyer”) ______Habitat Credits from the Project pursuant to the terms of that certain Agreement for Sale of Habitat Credits, dated as of [DATE] (the “Purchase Agreement”), by and between Seller and Buyer. Any capitalized terms used herein and not otherwise defined herein shall have the meaning ascribed thereto in the Purchase Agreement.

The Habitat Credits are identified by the following serial numbers:

(ADD SERIAL NUMBERS OF ALL CREDITS SOLD)

Seller represents and warrants that it has good title to the Habitat Credits, has good right to sell the same, and that they are free and clear from all claims, liens, or encumbrances.

Seller covenants and agrees with Buyer to warrant and defend the sale of the Habitat Credits herein described against all and every person and persons whomsoever lawfully claiming or to claim the same.

DATED: _______
LINNTON WATER CREDITS, LLC

By:___________________________
Name: ________________________
Its:___________________________

# Appendix 5. Department of State Lands Lease

# STATE OF OREGON
# DEPARTMENT OF STATE LANDS
## SUBMERGED AND SUBMERSIBLE LAND LEASE

59501-RAML

The State of Oregon, by and through the Oregon State Land Board and the Department of State Lands (”State”), hereby leases to the person(s) herein named (”Lessee”), the following described lands on the terms and conditions stated herein (the “Lease”):

| NAME of LESSEE: | ADDRESS: |
|---|---|
| Linnton Water Credits, LLC<br>a California limited<br>liability company | 10504 NW St Helens Road<br>Portland, OR 97231 |

Legal classification of Lessee is a limited liability company,

Lands situated in Multnomah County more fully described as follows:

> A portion of the Solomon Richards DLC No. 47, located in the Southwest 1/4 and the Northwest 1/4 of Section 2, Township 1 North, Range 1 West, Willamette Meridian, City of Portland, Multnomah County, Oregon, being more particularly described as follows:
>
> Beginning at a 4-1/4 inch aluminum disc at the Witness Corner 801.70 feet westerly of the Southeast Corner of the Solomon Richards D.L.C.; thence North 62º10’31” East 78.13 feet; thence South 26º38’14” East 395.96 feet; thence along the southeast line of the tract per Book 828 Page 214 (Recorded December 7, 1971) and the southwesterly projection thereof North 62º10’31” East 837.87 feet to a 5/8 inch iron rod at the most easterly corner thereof and the True Point of Beginning; thence along the Line of Ordinary Low Water of the Willamette River North 35°51’32” West 57.90 feet; thence continuing along said line North 37°08’09” West 108.70 feet; thence continuing along said line North 33°48’34” West 63.12 feet; thence continuing along said line North 33°27’02” West 50.40 feet; thence continuing along said line North 18°40’18” West 93.36 feet; thence continuing along said line North 06°08’59” West 120.23 feet; thence continuing along said line North 62°53’37” West 126.83 feet; thence continuing along said line North 39°56’48” West 121.78 feet; thence continuing along said line North 19°24’56” West 65.97 feet;

thence continuing along said line North 35°03’34” West 66.15 feet;
thence continuing along said line South 85°47’44” West 9.27 feet;
thence continuing along said line North 38°42’11” West 72.40 feet;
thence continuing along said line North 70°15’33” West 29.28 feet;
thence continuing along said line North 13°40’32” West 39.67 feet;
thence continuing along said line North 05°17’02” East 157.78 feet;
thence continuing along said line North 03°43’28” West 156.71 feet;
thence continuing along said line North 26°09’09” West 275.82 feet;
thence continuing along said line North 34°05’17” West 282.63 feet to the most northerly corner of the tract per Book 1029 Page 1716 (Recorded March 3, 1975); thence leaving said line North 63°49’06” East 118.33 feet; thence South 25°54’56” East 494.64 feet; thence South 26°36’12” East 656.75 feet; thence South 35°45’08” East 234.00 feet; thence South 22°01’49” East 417.94 feet; thence South 62°10’32” West 97.98 feet to the True Point of Beginning.

The above described tract contains 5.57 acres, more or less.

*This description is used to establish the approximate location and extent of the area subject to this Department of State Lands authorized use and was not prepared by a licensed surveyor. All locations, bearings, and distances were developed in the Oregon Coordinate Reference System Standard; Oregon Statewide Lambert Conformal Conic, NAD 1983, International Feet, GRS 1980 Spheroid.*

Hereinafter referred to as the “Leasehold”.

## SECTION 1 - LEASE TERM; RENEWAL; TERMINATION

1.1 Term: This Lease will continue for a period of 10 years commencing on Insert start date, the month and date of which will be known as the “Lease Anniversary Date,” and expiring on Insert end date, unless terminated earlier as provided under Section 1.4 or Section 7.2 below.

1.2 [Reserved]

1.3 [Reserved]

1.4 Termination Upon Mutual Consent: This Lease may be terminated by mutual written consent of Lessee and State.

1.5 Holdover: If Lessee does not vacate the Leasehold at the expiration or upon termination of the Lease, State may treat Lessee as a tenant from month to month, subject to all of the provisions of this Lease except the provisions for term and Rent. State may unilaterally establish a new Rent for the month-to-month tenancy, payable monthly in advance. If a month-to-month tenancy results from holdover by Lessee under this Section, the tenancy will be terminable at the end of any monthly rental period upon Notice from State given not less than 30 days prior to the termination date specified in the Notice.

## SECTION 2 – RENT; OTHER ASSESSMENTS

2.1 Initial Annual Rent: The rental payment to be paid by Lessee to State (the "Rent") for the first year of the Lease is $36,829.80, based on a 50% Site Diminishment Impact value. Receipt of the first year's Rent is hereby acknowledged.

| | Use Class | Area (square ft.) | SDI | Annual Rent |
|---|---|---|---|---|
| a) | Construction and Maintenance of Restoration Project to Enhance and Protect Conservation Value | 214,751 square feet | 50% | $36,829.80 |
| | | | **TOTAL** | $36,829.80 |

2.2 Annual Rent: The Rent will be paid annually in accordance with the provisions of OAR 141-145-0060(3)(d) in effect at the time. Each payment is due on the Lease Anniversary Date established in Section 1.1.

The Rent payments shall be credited towards compensation due to the State at the time a Conservation Easement is placed on the Leasehold as provided in Section 9.

2.3 Address for Rent Payments: Until State provides notice of a change in address (using a method described in Section 10.4), Lessee shall deliver all Rent payments to the following address:

Department of State Lands
775 Summer St. NE, Suite 100
Salem, OR 97301-1279

2.4 Assessments: Lessee shall pay all taxes or assessments, or both, that are levied against the Leasehold, whether or not such taxes or assessments, or both, have been levied in the past against the Leasehold or State by the assessing agency.

2.5 Liens: With the exception of mortgages or other security interests authorized by State under Section 6, Lessee shall immediately cause to be discharged any lien or other charge placed on the Leasehold or its Improvements, arising directly or indirectly out of Lessee's actions. State may terminate this Lease if Lessee fails to discharge any lien or charge or provide State with a sufficient bond covering the full amount of the lien after ten days Notice to do so by State. Lessee shall pay and indemnify State for all costs, damages or charges of whatsoever nature, including reasonable attorney's fees, necessary to discharge such liens or charges whether the costs, damages or charges are incurred prior or subsequent to any termination of this Lease.

2.6 Late Charges and Interest: Late payments by Lessee of Rent and other charges due under the Lease will cause State to incur costs and other damages not otherwise addressed in this Lease, the exact amount of which will be difficult to ascertain, including costs associated with administrative processing and accounting. In recognition of the foregoing, the parties agree that, notwithstanding other remedies permitted under the Lease and in addition to these remedies, if Lessee has not made full payment of amounts due within 20 days of the date payment is due, Lessee shall pay an additional charge equal to five percent of the amount of the late Rent or other charge. In addition, all amounts due and owing under this Lease, including late charges, will bear interest at the lower of: (a) the highest interest rate allowable by law, or (b) 12% per year.

## SECTION 3 - USE AND RESTRICTIONS ON USE

3.1 Authorized Use: This Lease grants to Lessee the right to use the Leasehold for the specific purpose(s) described below in accordance with the Lease terms and conditions, including, without limitation, the restrictions on use in Section 3.2.

The purpose of this Lease is to provide Lessee a possessory interest in the Leasehold so that Lessee may remove existing pilings and other derelict in-water structures from the Leasehold, place a minimum of six inches of clean sand over the areas where the pilings are removed as required by the U.S. Environmental Protection Agency for piling removal activities in the Portland Harbor Superfund Site, and otherwise restore and mitigate resources injured within the Portland Harbor Superfund Site, consistent with the Linnton Mill Site Restoration Plan and any substantive updates and revisions thereto upon approval by DSL in as much as they relate to the leasehold, which approval shall not be unreasonably delayed nor withheld (the “Linnton Restoration Plan”) (attached hereto as Exhibit A). The Plan also sets forth the restoration of the real property adjacent to the Leasehold; this Lease provides Lessee access across the Leasehold to this upland restoration site to facilitate implementation of the Linnton Restoration Plan.

3.2 Restrictions on Use: Lessee shall:

3.2.1 comply with all applicable local, state and federal laws and regulations affecting the Leasehold and its use, including local comprehensive land use planning and zoning ordinances, and correct at Lessee's own expense any failure of compliance created through Lessee's fault or by reason of Lessee's use;

3.2.2 dispose of all waste in a proper manner and not allow debris, garbage or other refuse to accumulate within the Leasehold, and, if Lessee allows debris, garbage or other refuse to accumulate within the Leasehold, allow

State to remove the debris, garbage and other refuse, and collect the cost of such removal from Lessee;

3.2.3 not cut, destroy or remove, or permit to be cut, destroyed or removed, any vegetation that may be upon the Leasehold except with written permission of State, and promptly report to State the cutting or removal of vegetation by other persons;

3.2.4 conduct all operations within the Leasehold in a manner that is compatible with the preservation and enhancement of native species and their habitats in a manner consistent with the conservation purposes and performance standards set for in the Linnton Restoration Plan; and

3.2.5 not unreasonably interfere with the public's trust rights of commerce, navigation, fishing or recreation;

3.2.6 not unreasonably interfere with tribal access to the Leasehold for any purpose protected by federal law.

3.3 Condition of Leasehold and Improvements: Lessee represents that it has inspected the Leasehold and all buildings, docks, pilings, floats, gangways, and similar structures or improvements (each an "Improvement"), if any, and accepts the Leasehold and all Improvements in their present condition, AS IS. State has made no oral or written representations concerning the condition of the Leasehold or its Improvements, if any, nor their fitness or suitability for any purpose.

3.4 Limitation on Improvements: Lessee may not construct or place upon the Leasehold any Improvement that exceeds $15,000 in cost or value unless Lessee has first obtained the prior written authorization of State or the Improvement is exempt under OAR 141-082-0265. State shall not unreasonably withhold or delay its approval for Improvements consistent with the purposes of this Lease. All Improvements must be consistent with the authorized use(s) of this Lease stated in Section 3.1 and in compliance with all applicable laws, regulations, and ordinances as stated in Section 3.2.1.

3.5 Disposition of Unauthorized Improvements or Structures: Lessee shall remove all unauthorized Improvements from the Leasehold upon receiving Notice from State. If Lessee fails to remove such unauthorized Improvements within a reasonable time (not to exceed 90 days), the State may remove the Improvements at Lessee's cost and expense.

3.6 Removal of Authorized Improvements: Lessee shall remove all authorized Improvements within 90 days after the termination or expiration of the Lease or modification of the Lease under Section 4.2, unless otherwise agreed by the parties or the Improvement is exempt under OAR 141-082-0265. Lessee is responsible for any damage done to the Leasehold as a result of the removal of any Improvement. Any Improvement remaining on the Leasehold after the 90 days will at the option of State become the property of State, unless otherwise agreed by the parties.

3.7 Liability:

3.7.1 Lessee shall defend, indemnify and hold State harmless from and against all claims, demands, actions, suits, judgment, losses, damages, penalties, fines, costs, and expenses, including expert witness fees and costs and attorney's fees in an administrative proceeding, at trial, or on appeal ("Claims") arising from, in whole or in part, any operations conducted or allowed by Lessee on the Leasehold. As used in this Section 3.7 only, "State" means the State of Oregon and its boards, commissions, agencies, officers, employees, contractors, and agents. Lessee shall have control of the defense and settlement of any Claim; however, neither Lessee nor any attorney engaged by Lessee shall defend the Claim in the name of the State, nor purport to act as legal representative of State, without the approval of the Attorney General, nor shall Lessee settle any Claim on behalf of State without the approval of the Attorney General. State may, at its election and expense, assume its own defense and settlement in the event that State determines that Lessee is prohibited from defending State, that Lessee is not adequately defending the State's interests, or that an important governmental principle is at issue and the State desires to assume its own defense.

3.8 Waste Water Disposal: In addition to any other applicable laws and regulations, Lessee shall obtain any permits required by state or local authorities and shall comply with Oregon Department of Environmental Quality and Oregon State Marine Board requirements for sewage collection and waste water disposal for boats and floating structures.

3.9 Hazardous Substances:

3.9.1 Lessee shall not use, store, or dispose of, or allow the use, storage, or disposal within the Leasehold of any material that may pose a threat to human health or the environment, including without limitation, hazardous substances, pesticides, herbicides, or petroleum products (a "Hazardous Substance") except in strict compliance with applicable laws, regulations and manufacturer's instructions, and Lessee shall take all necessary precautions to protect human health and the environment and to prevent the release of any Hazardous Substance on or from the Leasehold.

3.9.2 Lessee shall keep and maintain accurate and complete records of the amount of all Hazardous Substances stored or used on the Leasehold, and shall immediately notify State of any release or threatened release of any Hazardous Substance on or from the Leasehold or otherwise arising from Lessee's operations or activities on the Leasehold.

3.9.3 If any Hazardous Substance is released, and the release arises from, in whole or in part, any operations conducted or allowed by Lessee on the Leasehold, Lessee shall promptly and fully remediate the release in accordance with state and federal regulations and requirements. If Lessee fails to so remediate, State may remove and remediate any release of a Hazardous Substance on or from the Leasehold or arising from operations or activities conducted or allowed by Lessee on the Leasehold and collect the cost of removal or remediation from Lessee either as additional Rent or as damages.

3.9.4 In addition to any duty to indemnify specified elsewhere in this Lease, Lessee shall indemnify State to the fullest extent allowed by Oregon law against any claim or costs arising from or related to a release of a Hazardous Substance arising from, in whole or in part, any operations conducted or allowed by Lessee on the Leasehold.

3.10 Weed Control: Lessee shall control plant pests and diseases and noxious weeds, including aquatic weeds, within the Leasehold in a manner consistent with the Linnton Restoration Plan and as directed by the local county weed control district, the Oregon Department of Agriculture or any other governmental authority which has authority for the prevention or control, or both, of noxious weeds, plant pests or diseases, or as may be authorized or directed by State.

## SECTION 4 - MODIFICATION OF LEASEHOLD AREA OR USE

4.1 Change of Leasehold Area or Use: Lessee may request that State amend the Lease to expand or reduce the size, or change the authorized use, of the Leasehold using a form provided by State. However, no such amendment will be effective unless authorized in writing by State. State shall process and review requests to amend the Lease in the same manner as a new lease application.

4.2 Special Conditions Applicable to Reductions in Leasehold Area. This Lease may be amended to reduce the Leasehold area only if the portion of the Leasehold to be removed from the Lease does not contain any Improvement. If the amendment results in a reduction of Rent due under the Lease, the reduction will be effective commencing on the Lease Anniversary Date that falls at least 12 months after the later of: (a) the date of the reduction in the Leasehold area; or (b) the date on which the amendment is fully executed.

4.3 Lessee Liable for Violations. Notwithstanding any reduction in the Leasehold area under this section, Lessee shall remain liable for any violation of Section 3.8 or 3.9 occurring on lands removed from the Leasehold prior to the amendment removing such lands.

## SECTION 5 – RESERVATIONS

5.1 Lessor Access: State reserves a right of access to the Leasehold, which, the State may exercise at all reasonable times to inspect and manage the State's interest in the Leasehold and to evaluate and ensure compliance with the terms and conditions of this Lease. State may examine pertinent records of Lessee for the purpose of ensuring compliance with the Lease.

5.2 [Reserved]

5.3 Easements and Other Access Authorizations: State reserves the right at any time to grant easements across the Leasehold for tunnels, telephone and fiber optic cable lines, pipelines, power lines, or other lawful purpose, along with the right of ingress and egress for these purposes, so long as the granting of such easement does not unreasonably interfere with Lessee's use(s) authorized in this Lease and subject to the inclusion in any such grant of easement a requirement that the easement holder ensure that exercise of their easement rights does not unreasonably interfere with Lessee's use(s) authorized in this Lease or with any future Conservation Easement terms as provided in Section 9.

In addition to the conditions of easement granting described above, State will not grant an easement for the following activities or otherwise authorize third-party access to the Leasehold for the purpose of engaging in any of the following activities:

A. Construction, reconstruction or placement of any permanent building or structure.

B. Unseasonable watering; use of fertilizers, biocides, or other agricultural chemicals; incompatible fire protection activities; and any and all other uses which may adversely affect the conservation purposes of the Linnton Restoration Plan.

C. Grazing or agricultural activity of any kind.

D. Commercial or industrial uses.

E. Depositing or accumulating soil, trash, ashes, refuse, waste, bio-solids or any other material.

F. Filling, dumping, excavating, draining, dredging, mining, drilling, removing, exploring for or extracting minerals, loam, gravel, soil, rock, sand or other material on or to a depth of 100 feet below the surface of the Property, or granting or authorizing surface entry for any of these purposes of the Property, or granting or authorizing surface entry for any of these purposes.

G. Altering the surface or general topography of the Property, including building roads, paving or otherwise covering the Property with concrete, asphalt, or any other impervious material.

H. Removing, destroying, or cutting trees, shrubs or other vegetation, except as required for implementation of the Linnton Restoration Plan or the

Long-Term Stewardship Plan.

I. Use of motor vehicles, except as required for implementation of the Linnton Restoration Plan.

J. Transferring any water, mineral, or air rights necessary to maintain or restore the biological resources of the Property.

K. Planting, introduction, or dispersal of invasive or exotic plant or animal species.

L. Manipulating, impounding or altering any natural watercourse, body of water or water circulation on the Property, other than those actions set forth under the Linnton Restoration Plan, and any activities or uses detrimental to water quality, including but not limited to degradation or pollution of any surface or sub-surface waters.

M. Permitting a general right of access to the Property beyond public trust access rights.

N. Hunting.

O. Trapping of native species.

5.4 <u>Trustee Council Access</u>: Lessee shall allow representatives from the Portland Harbor Superfund Site Trustee Council ("Trustee Council") access upon reasonable notice to the Leasehold to monitor Lessee's compliance with the Lease and Lessee's implementation of the Linnton Restoration Plan.

5.5 <u>Public Access and Recreational Use</u>: All state-owned submerged and submersible land must remain available and open to the public for commerce, navigation, fishing and recreation unless restricted or closed by State to public entry pursuant to the provisions of applicable Oregon Administrative Rules. Lessee may request State, but State is not obligated, to close the Leasehold to public entry or restrict recreational use by the public on all or portions of the Leasehold to protect persons or property from harm arising from or in connection with Lessee's activities. Lessee may post signage and erect fencing approved in advance by State on an around the Property as necessary during the construction to protect the Property from interference or damage arising for public entry and to protect persons from harm arising from or in connection with the construction. Lessee shall be responsible for installing and maintaining, at Lessee's expense all signage and fencing required.

This reservation does not grant the public any right to use or occupy, without Lessee's permission, Lessee-owned property or structures or Improvements authorized under this Lease.

5.6 Tribal Access: Nothing in this Lease affects tribal access to the Leasehold that is protected under federal law.

5.57 Other: State reserves all other rights not expressly granted to Lessee under this Lease.

## SECTION 6 – ASSIGNMENTS; SUBLEASES

6.1 Assignment and Sublease:

6.1.1 Except as provided at Section 7.5, Lessee may not assign this Lease or sublease the Leasehold or any portion of the Leasehold nor enter into any third party agreement respecting the Lease or the Leasehold without first obtaining the prior written consent of State pursuant to the requirements of the applicable Oregon Administrative Rules. Requests must be in writing using an application form prescribed by State. The application must be received by State at least 30 calendar days prior to the proposed effective date of the sublease or assignment. State shall make a good faith effort to complete its review of Lessee's application within 30 days following receipt. If the application is incomplete, or if State requests additional information concerning the proposed assignment or sublease, the time period for reviewing applications may be extended and the proposed sublease or assignment may be delayed pending the completion of such review.

6.1.2 State reserves the right to condition its consent to an assignment or sublease as State deems reasonably prudent, including the right to require changes to the terms of this Lease. Each assignee, sublessee, and third party interest will be required to comply with all of Lessee's obligations under this Lease, and the applicable Oregon Administrative Rules. Lessee will remain liable for the performance of all obligations under this Lease unless State's written consent expressly releases Lessee from further liability.

6.1.3 For the purposes of this section, if Lessee is a corporation or partnership or limited liability company, the transfer of any corporate stock or partnership or membership interest (including by operation of law) will be deemed an assignment subject to the provisions of this section if the result of the transfer is a change of management control or controlling interest in Lessee.

6.1.4 Lessee may not grant a mortgage or security interest in this Lease without prior written consent of State, which consent shall not be unreasonably withheld. Any subsequent assignment by the creditor will require the prior written approval of State.

[Reserved]

## SECTION 7 – DEFAULT

7.1 Default: The following are events of default:

7.1.1 Failure of Lessee to pay any rent, tax, reimbursement or other charge or payment due under the Lease within 20 days after the date payment is due. For the purposes of this subsection, if the due date for payment is not otherwise stated in this Lease or otherwise defined in statute or administrative rule, payment is due on the date set forth in the Notice from State to Lessee informing Lessee of its obligation to pay the charge or payment.

7.1.2 Failure of Lessee to comply with any non-payment-related term or condition or obligation of the Lease within 30 days after Notice by State specifying the nature of the deficiency, or, in the event of an emergency, within the time specified by State to resolve the emergency. Upon timely request from Lessee, State may in its good faith discretion permit the deadline for curing non-compliance to be extended if it finds that: (1) the default cannot reasonably be cured within the 30 day period; (2) the interests of State will not be harmed by an extension; (3) default was not due to the willful act or gross negligence of Lessee; and (4) State and Lessee mutually agree upon a written plan and timeline for curing the non-compliance.

7.1.3 Any of the following:

a) insolvency of Lessee;
b) the filing by Lessee of a voluntary petition in bankruptcy;
c) an adjudication that Lessee is bankrupt or the appointment of a receiver of the properties of Lessee;
d) the filing of any involuntary petition of bankruptcy and failure of Lessee to secure a dismissal of the petition within 30 days after filing; or
e) attachment of or the levying of execution on the Leasehold interest and failure of Lessee to secure discharge of the attachment or release of the levy of execution within ten days.

If Lessee consists of two or more individuals or business entities, the events of default specified in this paragraph apply to each individual or entity unless within ten days after an event of default occurs the remaining individuals or entities produce evidence satisfactory to State that they have unconditionally acquired the interest of the one causing the default. If the Lease has been assigned under Section 6 of this Lease, the events of default specified in this subsection apply only with respect to the one then exercising the rights of Lessee under the Lease.

7.1.4 Notwithstanding the above, if State in good faith believes that a material default has occurred which may imperil State's rights in the land or the discharge of its Constitutional obligations with respect to the land, State may declare an immediate default without any right of Lessee to cure the deficiency.

7.2 <u>Termination of Occupancy Upon Default</u>: State may terminate Lessee's right to occupy the Leasehold for any default by Lessee that remains uncured past the time provided in Section 7.1. State shall exercise its right to terminate Lessee's occupancy under this section by providing Notice to Lessee of the default and of State's intent to terminate Lessee's right of occupancy under the Lease upon the date provided in the Notice. State may recover from Lessee all costs arising out of State's re-entry and, if State and Lessee mutually agree to terminate the Lease as provided in Section 1.4, all costs of re-letting the Leasehold. If State and Lessee mutually agree to terminate the Lease, State may recover the amount of unpaid rent that otherwise would have been required to be paid under the Lease from the date of default until a new Lease has been secured or, if State and Lessee do not agree to terminate the Lease and State is unable to secure another lessee for the Leasehold, until such time as the Lease expires. Lessee shall dispose of all Improvements as specified in Section 3.6 of this Lease.

7.3 State's Right to Cure Defaults:

7.3.1 If Lessee fails to perform any obligation under this Lease, State may perform the obligation of the Lease 30 days after providing Notice to Lessee. All of State's expenditures to carry out the obligation must be reimbursed by Lessee on demand with interest at the rate of one percent per month accrued from the date of expenditure by State.

7.3.2 Notwithstanding Section 7.3.1, if any violation of a term or condition of this Lease, including without limitation use of the Leasehold in a manner not permitted under the Lease, is causing or threatens to cause personal injury or damage to the Leasehold or other property, or if damage to the Leasehold arises from some other cause, State may immediately enter upon the Leasehold and take such action as it deems necessary to stop the use or mitigate the injury or damage. If the injury or damage is due to a violation of the terms or conditions of this Lease, Lessee will be liable for all costs incurred by State as a result of the violation and the action taken by State to mitigate the injury or damage. State, at its option, may send Notice to Lessee of the violation and, upon receipt of the Notice, Lessee shall immediately cease the violation and repair the injury or correct all damage caused by the violation. State's failure to provide Notice of a violation may not be deemed a waiver of the violation by State or authorization to Lessee to continue or fail to correct the violation. Upon receipt of a Notice of violation, Lessee shall provide a copy of said Notice of violation to the Trustee Council per Section 10.4.

7.5 Assignment to Trustee Council

7.5.1 In the event of default resulting in the Termination of Occupancy per Section 7.2, prior to terminating this Lease, State shall offer to the Trustee Council the assignment of this Lease and provide 30 days for the Trustee Council to accept or reject the offer.

## SECTION 8 – INSURANCE; BONDS

8.1 Insurance: Lessee shall maintain during the term of this Lease, the required insurance coverages described in attached Exhibit B.

8.2 Bond: State reserves the right to require Lessee to furnish a surety bond or an equivalent cash deposit or certificate of deposit to the State, in an amount to be determined by State in the exercise of its reasonable discretion, and which names the State of Oregon as co-owner to ensure that Lessee will perform in accordance with all terms and conditions of the Lease.

## SECTION 9 - ADDITIONAL CONDITIONS AND STIPULATIONS

9.1 Holder: By the end of the Term, Lessee shall identify a “Holder” pursuant to ORS 271.715 (3), so that State and the Holder may execute and place across the Leasehold an OAR 141-145-0015(4) Conservation Easement. Failure by Lessee to identify a Holder, as specified in this Section, shall constitute an event of default per Section 7.1, unless such failure is the result of the State’s unreasonably refusing to execute said Conservation Easement.

## SECTION 10 - MISCELLANEOUS

10.1 Entire agreement: This Lease, together with the attached exhibits and attachments, constitutes the entire agreement between the parties. No waiver, consent, modification or change of terms of this Lease will bind either party unless in writing. Such waiver, consent, modification or change, if made, will be effective only in the specific instance and for the specific purpose given, and will be valid and binding only if it is signed by each party. There are no understandings, agreements or representations, oral or written, not specified herein regarding this Lease. This Lease supersedes all prior or existing lease or rental agreements between the parties with respect to the Leasehold described in this Lease.

10.2 No Partnership: State is not a partner nor in a joint venture with Lessee in connection with any business carried on in connection with this Lease or the Leasehold and has no obligation for Lessee's debts or other liabilities.

10.3 Non-Waiver: Waiver by either party of strict performance of any provisions of this Lease will not be a waiver nor prejudice the party's right to require strict performance of the same provision in the future or of any other provision.

10.4 Notices:

10.4.1 Any communication required by the terms of this Lease to be given in writing (hereafter, a “Notice”) must be given or be served by:

a) depositing the same in the United States mail, postage prepaid; registered or certified mail, with return receipt requested; or
b) personal delivery service with all charges billed to shipper; or

c) expedited delivery service with all charges billed to shipper; or
d) prepaid telegram, telex or facsimile;

addressed to the party for whom the Notice is intended at the address set forth below or at such other address as the party may designate from time to time.

For Notices to Tenant:

Linnton Water Credits, LLC
c/o RestorCap, LLC
Attention: Robert Marinai
333 17th Street, Suite 200
Oakland, CA 94612

For Notices to Landlord:

Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279

For copies of Notices to Trustee Council:

National Oceanic and Atmospheric Administration
Restoration Center
National Marine Fisheries Service, Oregon Field Office NOAA
1201 NE Lloyd Blvd.
Portland, OR 97323-2182
Attn: Megan Callahan Grant

10.4.2 Notice is deemed received:

a) upon receipt if sent by telegram, telex or facsimile or if personally delivered (as long as delivery is confirmed by the receiving telex or facsimile operator, including electronic confirmation of receipt, or by the courier delivery service, as the case may be); or
b) three business days after the date of deposit in a post office or other official depository under the care and custody of the United States Postal Service, if sent by United States mail; or
c) on the date of delivery by any expedited delivery service, or
d) on the date any party declines to accept any Notice given as provided in this section.

10.4.3 Each party shall have an address, for Notice purposes, that is within the continental United States and, if any party resides outside the continental United States, the party shall designate an agent for the purpose of receiving Notices whose address is within the continental United States. Any party may change its address for the purpose of receiving Notices by delivering a Notice of the change of address to the other party as described in this section 10.4.

10.4.4 Communications between the parties that are not required by this Lease to be in writing may be by any mutually acceptable method.

10.5 Governing Law; Venue: This Lease and all matters related to the rights and responsibilities of the parties under it are governed by and subject to the laws of the State of Oregon and the administrative rules of the Department of State Lands and the State Land Board, as they may change from time to time. The Oregon Administrative Rules contain terms and conditions which relate to the rights and responsibilities of the parties under this Lease, and all such terms and conditions (as they may change from time to time) are hereby incorporated by reference and made a part of this Lease. Any claim, action, suit or proceeding (collectively, a "Claim") between State and Lessee that arises from or relates to the Lease must be brought and conducted solely and exclusively within the Circuit Court of Marion County for the State of Oregon; except that, if a Claim must be brought in a federal forum, then unless otherwise prohibited by law it must be brought and conducted solely and exclusively within the United States District Court for the District of Oregon. However, in no way is this section or any other provision of this Lease to be construed as a waiver by the State of Oregon of any form of defense or immunity, whether it is sovereign immunity, governmental immunity, immunity based on the Eleventh Amendment to the Constitution of the United States, or otherwise, from any Claim or from the jurisdiction of any court. Lessee, by execution of this Lease, hereby consents to the personal jurisdiction of all such courts.

10.6 Binding on Successors: This Lease is binding on and will inure to the benefit of the successors and assigns of the parties to it, but nothing in this section may be construed as a consent by State to any disposition or transfer of the Lease or any interest in it by Lessee except as otherwise expressly provided in this Lease.

10.7 Nondiscrimination: The Leasehold must be used in a manner, and for such purposes, that assure fair and nondiscriminatory treatment of all persons without respect to race, creed, color, religion, handicap, disability, age, gender, sexual orientation, or national origin.

10.8 Right To Sue More Than Once: State may sue periodically to recover damages accrued to date and no action for damages will bar later actions for damages subsequently accruing.

10.9 Remedies Cumulative: The remedies contained in this Lease are in addition to, and do not exclude, any other remedy available at law or in equity, and the exercise by either party of any one or more of its remedies does not preclude the exercise by it at the same or different times of any other remedies for the same default or breach by the other party.

10.10 Attorney Fees: If suit or action is instituted in connection with any controversy arising out of or in connection with this Lease, the prevailing party is entitled to recover all costs and disbursements incurred, including such sums as the court may adjudge reasonable as attorney fees at trial and on any appeal of the suit or action, and in any bankruptcy case or proceedings.  State's obligation under this section is subject to the limitations of  Article XI, Section 7 of the Oregon Constitution.

10.11 Exhibits:  All Exhibits to which reference is made in this Lease are incorporated in this Lease by the respective references to them, whether or not they are actually attached.  References to "this Lease" include matters incorporated by reference.

10.12 Survival.  Termination or expiration of the Lease will not extinguish or prejudice State's right to enforce the provisions of this Lease relating to indemnification, access to records, governing law, venue and consent to jurisdiction.

Lessee, by the signature below of its authorized representative, hereby acknowledges that Lessee has read this Lease, understands it and agrees to be bound by its terms and conditions.

| | |
|---|---|
| **STATE:**<br>The State of Oregon, acting by and through the Oregon State Land Board and the Department of State Lands<br>775 Summer ST NE, STE 100<br>Salem, OR  97301-1279 | **LESSEE:**<br>Linnton Water Credits, LLC<br>Limited Liability Company<br>337 17th Street, Suite 200<br>Oakland, CA 94612 |
| DSL Authorized Signature/ Printed Name | Signature/Title<br>(Note requirement below) |
| Date | Date<br>Note: If Lessee is a corporation, partnership, limited liability company or other form of business entity, signer warrants that s/he has the authority to sign the Lease on behalf of such entity by resolution of its Board of Directors or equivalent, or through delegation of authority to the signer. |

CHOOSE NOTARY BLOCK

FOR COMMERCIAL LESSEE

STATE OF )

) ss.

County of _______________________)

The foregoing instrument was acknowledged before me this _________________day of

____________________, ____________, by ___________________________________________ _______

(name of officer or agent of corporation)

the _______________________ of _______________________________________________, _______

(title of officer or agent) (name of business entity)

a _________________________ _______________________________________________ _______

(state or place of incorporation) (corporation, general partnership, limited liability company, etc.)

on behalf of said ______________________________________________.

(corporation, general partnership, limited liability company, etc.)

Signature

My commission expires________

# Exhibit A
# Linnton Mill Site Restoration Plan

[Linnton Mill Restoration Site Restoration Plan to be inserted into executed DSL Lease]

## Exhibit B
## INSURANCE REQUIREMENTS

Lessee shall obtain at Lessee's expense the insurance specified in this section prior to performing under this Lease and shall maintain it in full force and at its own expense throughout the duration of this Lease, as required by any extended reporting period or tail coverage requirements, and all warranty periods that apply. Lessee shall obtain the following insurance from insurance companies or entities that are authorized to transact the business of insurance and issue coverage in the State of Oregon and that are acceptable to State. Coverage shall be primary and non-contributory with any other insurance and self-insurance, with the exception of Professional Liability and Workers' Compensation. Lessee shall pay for all deductibles, self-insured retention and self-insurance, if any.

### WORKERS' COMPENSATION & EMPLOYERS' LIABILITY

All employers, including Lessee, that employ subject workers, as defined in ORS 656.027, shall comply with ORS 656.017 and provide workers' compensation insurance coverage for those workers, unless they meet the requirement for an exemption under ORS 656.126(2). Lessee shall require and ensure that each of its subcontractors complies with these requirements. If Lessee is a subject employer, as defined in ORS 656.023, Lessee shall also obtain employers' liability insurance coverage with limits not less than $2,000,000 each accident. If Lessee is an employer subject to any other state's workers' compensation law, Contactor shall provide workers' compensation insurance coverage for its employees as required by applicable workers' compensation laws including employers' liability insurance coverage with limits not less than $2,000,000 and shall require and ensure that each of its out-of-state subcontractors complies with these requirements.

In addition to Workers' Compensation Insurance coverage that satisfies ORS 656.017, Lessee shall obtain and keep in effect at its own expense, throughout the Term of this Lease and any extensions, insurance coverages adequate to satisfy and discharge all responsibilities and liabilities, including but not limited to liabilities that are subject to, and coverages required by, the Longshore and Harbor Workers Compensation Act, 33 USC §§ 901 to 950, the Jones Act, 46 USC Appx §688 with limits of no less than $2,000,000, and ORS 654.305 to 654.336.

### COMMERCIAL GENERAL LIABILITY:
**☒Required ☐ Not required**

Commercial General Liability Insurance covering bodily injury and property damage in a form and with coverage that are satisfactory to the State. This insurance shall include personal and advertising injury liability, products and completed operations, contractual liability coverage for the indemnity provided under this Lease, and have no limitation of coverage to designated premises, project or operation. Coverage shall be written on an occurrence basis in an amount of not less than $2,000,000 per occurrence. Annual aggregate limit shall not be less than $4,000,000.

**AUTOMOBILE LIABILITY INSURANCE:**
**☐Required ☒ Not required**

Automobile Liability Insurance covering Lessee's business use including coverage for all owned, non-owned, or hired vehicles with a combined single limit of not less than $1,000,000 for bodily injury and property damage. This coverage may be written in combination with the Commercial General Liability Insurance (with separate limits for Commercial General Liability and Automobile Liability).

**LESSEE'S POLLUTION LIABILITY including endorsements for transportation and non-owned disposal site:**
**☒Required ☐ Not required**

Lessee's Pollution Liability Insurance covering Lessee's or appropriate subcontractor's liability for bodily injury, property damage, loss of use of property, government ordered cleanup costs, natural resource damage, environmental damage, asbestos environmental or natural resource damage resulting from sudden, accidental and gradual pollution and related cleanup costs incurred by Lessee or subcontractor if the coverage is obtained by the subcontractor, all arising out of the work performed (including transportation risk and non-owned disposal site) under this Lease is required. Combined single limit per occurrence shall not be less than $2,000,000. Annual aggregate limit shall not be less than $4,000,000.

**MARINE PROTECTION AND INDEMNITY COVERAGE:**
**☐Required ☒ Not required**

Lessee shall obtain, at Lessee's expense, and keep in effect during the Term of the Lease, Marine Protection and Indemnity Coverage. Combined single limit per occurrence shall not be less than $________. Annual aggregate limit shall not be less than $4,000,000.

**CRIME PROTECTION COVERAGE: EMPLOYEE DISHONESTY or FIDELITY BOND**
**☐Required ☒ Not required**

Employee Dishonesty or Fidelity Bond coverages for funding, grants, or habitat-credits provided to the Lessee under their care, custody and control. Coverage limits shall not be less than $ _______________.

**UMBRELLA INSURANCE:**
**☐Required ☒ Not required**

Umbrella coverage in the sum of $________ shall be provided and will apply over all liability policies, without exception, including but not limited to Commercial General Liability, Automobile Liability, Employers' Liability, Lessee's Pollution Liability and Marine Protection and Indemnity coverage.

## SUBCONTRACTORS:

Any subcontractors used to perform any work related to this Lease must be preapproved by State. The Lessee must provide a “statement of work” to State regarding the subcontracted work to be performed. The subcontractor will also have the same, indemnification and hold-harmless agreement requirements, “additional insured” and “waiver of subrogation” requirements that are outlined in this Lease. If approved, the insurance coverage types and limits will also be determined by State.

## ADDITIONAL INSURED:

The Commercial General Liability, Automobile liability, Lessee’s Pollution Liability and the Marine Protection and Indemnity insurance policies required under this Lease must include an additional insured endorsement specifying the State of Oregon, its officers, employees and agents as Additional Insureds, including additional insured status with respect to liability arising out of ongoing operations and completed operations, but only with respect to Lessee's activities to be performed under this Lease. Coverage shall be primary and non-contributory with any other insurance and self-insurance. The Additional Insured endorsement with respect to liability arising out of your ongoing operations must be on ISO Form CG 20 10 07 04 or equivalent and the Additional Insured endorsement with respect to completed operations must be on ISO form CG 20 37 04 13 or equivalent.

## WAIVER OF SUBROGATION (TRANSFER OF RIGHTS OF RECOVERY AGAINST OTHERS TO US):

Lessee agrees to waive rights of subrogation that may be required by the Lessee’s insurers, by virtue of the payment of any loss, regarding the workers’ compensation and any excess and/or umbrella insurance policies specific to this Lease. The Workers’ Compensation and Excess or Umbrella insurance policies required under this Lease shall be endorsed with a waiver of subrogation (transfer of rights of recovery against other to us) endorsement specifying the State of Oregon, its officers, employees and agents.

## TAIL COVERAGE:

If any of the required insurance is on a claims made basis and does not include an extended reporting period of at least 24 months, Lessee shall maintain either tail coverage or continuous claims made liability coverage, provided the effective date of the continuous claims made coverage is on or before the effective date of this Lease, for a minimum of 24 months following the later of (i) Lessee’s completion and State’s acceptance of all Services required under this Lease, or, (ii) State or Lessee termination of Lease, or, iii) The expiration of all warranty periods provided under this Lease.

## CERTIFICATE(S) AND PROOF OF INSURANCE:

Lessee shall provide to State Certificate(s) of Insurance for all required insurance before delivering any Goods and performing any Services required under this Lease. The Certificate(s) shall list the State of Oregon, its officers, employees and agents as a Certificate holder, as an endorsed Additional Insured and the Waiver of Subrogation endorsement as outlined in this document. As proof of insurance State has the right to request copies of insurance policies and endorsements relating to the insurance requirements in this Lease.

**NOTICE OF CHANGE OR CANCELLATION:**
The Lessee or its insurer must provide at least 30 days' written notice to State before cancellation of, material change to, potential exhaustion of aggregate limits of, or non-renewal of the required insurance coverage(s).

**INSURANCE REQUIREMENT REVIEW:**
Lessee agrees to periodic review of insurance requirements by State under this Lease and to provide updated requirements as mutually agreed upon by Lessee and State.

**STATE ACCEPTANCE:**
All insurance providers are subject to State acceptance. If requested by State, Lessee shall provide complete copies of insurance policies, endorsements, self-insurance documents and related insurance documents to State's representatives responsible for verification of the insurance coverages required under this Section.

# Appendix 6. Deed Restriction

# DECLARATION OF COVENANTS, CONDITIONS, AND RESTRICTIONS AND GRANT OF IRREVOCABLE LICENSE

**Property Address:** **10504 NW St. Helens Road**
**Multnomah County**
**Portland, OR 97231**

**Tax Parcel IDs:** **1N1W02C – 00100, 00200, 00800**

**Deed Reference(s):** **2015-113603: Multnomah County**

LINNTON WATER CREDITS, LLC (hereafter the "DECLARANT") is the fee simple owner of approximately 23 acres located in Multnomah County, Oregon, which are more particularly described in the attached **Exhibit A** (hereafter "Property"). Exhibit A is incorporated herein by reference.

The Property is located in the vicinity of the Portland Harbor Superfund Site. Declarant has developed a plan for the restoration, preservation and enhancement of native species and their habitats consistent with certain conservation purposes and performance standards which is more particularly described in the attached **Exhibit B, as it may thereafter be amended** (the "Linnton Restoration Plan" or "Plan"), which has been reviewed and recognized by the Portland Harbor Natural Resource Trustee Council ("Trustee Council").[1] The Plan is incorporated by reference and includes a a natural resource restoration project, known as the Linnton Mill Restoration Project (hereafter the "Project").

The Project is located on approximately 22 acres of the Property, (hereafter "Project Site"). The Project Site is more particularly depicted and described in the attached **Exhibit C**, which is incorporated herein by reference.

The Declarant and the Trustee Council agree that the Linnton Restoration Plan shall govern the use and occupancy of the Project Site during the term of this Declaration. As used herein, "parties" mean the Declarant and the Trustee Council and their respective successors and assigns.

NOW, THEREFORE, Declarant does hereby covenant, condition, restrict, and grant as follows:

## I. Project Site Use Restrictions.

The Declarant restricts, as set forth below, the uses to which the Project Site may be put. The Declarant declares that these restrictions shall constitute covenants that run with the land, as

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[1] The Trustee Council includes the National Oceanic and Atmospheric Administration on behalf of the Department of the Commerce, the United States Fish and Wildlife Service on behalf of the United States Department of Interior, the Oregon Department of Fish and Wildlife on behalf of the State of Oregon, the Confederated Tribes of the Grand Ronde Community of Oregon, the Confederated Tribes of Siletz Indians, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe.

provided by applicable law, and said restrictions shall continue in perpetuity or for the maximum period allowed by law, unless terminated as set forth herein. The restrictions on the Project Site's use under this Declaration shall be binding on the Declarant, its personal representatives, heirs, successors, assigns, employees, agents, lessees, licensees and invitees, and any subsequent person or entity claiming an interest in the Project Site.

1. The authorized use of the Project Site shall be restricted to the following:

   A. Uses by the Declarant and the Trustee Council furthering natural resource damage assessment restoration objectives consistent with the Linnton Restoration Plan are allowed. The term "natural resource" shall be defined pursuant to 42 U.S.C. § 9601 (16).

   B. Implementation of the Linnton Restoration Plan consistent with and pursuant to the terms of the Linnton Restoration Plan as agreed to by the Trustee Council and the Declarant is allowed.

   C. Purposes compatible with the preservation and enhancement of native species and their habitats in a manner consistent with the conservation purposes and performance standards set forth in the Linnton Restoration Plan are allowed.

   D. Any activity for which entry is authorized pursuant to "Grant of Entry" Section II, below.

2. The Project Site shall not be used for any purposes inconsistent with the Linnton Restoration Plan and the perpetual protection and conservation of the Project Site as provided in the Linnton Restoration Plan. All rights accruing from Declarant's ownership of the Project Site, including the right to engage in or permit or invite others to engage in all uses of the Project Site that are not prohibited herein and are not inconsistent with the purposes of this Declaration are reserved to Declarant and Declarant's personal representatives, heirs, successors, and assigns.

3. Prohibited uses of the Project Site, in so far as they are not actions identified, required or allowed by the Linnton Restoration Plan and its Exhibits, include, but are not limited to, the following:

   A. Construction, reconstruction or placement of any permanent building or structure.

   B. Unseasonable watering; use of fertilizers, biocides, or other agricultural chemicals; incompatible fire protection activities; and any and all other uses which may adversely affect the Linnton Restoration Plan conservation objectives and performance standards.

   C. Grazing or agricultural activity of any kind.

   D. Commercial or industrial uses.

   E. Depositing or accumulating soil, trash, ashes, refuse, waste, bio-solids or any other material.

F. Filling, dumping, excavating, draining, dredging, mining, drilling, removing, exploring for or extracting minerals, loam, gravel, soil, rock, sand or other material on or to a depth of 100 feet below the surface of the Project Site, or granting or authorizing surface entry for any of these purposes of the Project Site, or granting or authorizing surface entry for any of these purposes.

G. Altering the surface or general topography of the Project Site, including building roads, paving or otherwise covering the Project Site with concrete, asphalt, or any other impervious material.

H. Removing, destroying, or cutting trees, shrubs or other vegetation, except as required for implementation of the Linnton Restoration Plan.

I. Use of motor vehicles, except as required for implementation of the Linnton Restoration Plan.

J. Transferring any water, mineral, or air rights necessary to maintain or restore the biological resources of the Project Site.

K. Planting, introduction, or dispersal of invasive or exotic plant or animal species.

L. Manipulating, impounding or altering any natural watercourse, body of water or water circulation on the Project Site, other than those actions set forth under the Linnton Restoration Plan, and any activities or uses detrimental to water quality, including but not limited to degradation or pollution of any surface or sub-surface waters.

M. Permitting a general right of access to the Project Site.

N. Hunting.

O. Trapping of native species.

## II. GRANT OF IRREVOCABLE LICENSE

1. The Declarant hereby grants the each member of the Trustee Council and their authorized representatives an irrevocable license to enter the Project Site at reasonable times, subject to giving the Declarant 48-hours' notice (except in cases where the Trustee Council members or their designee(s) determine that immediate entry is required to preserve the conservation values of the Project Site as set forth in the Linnton Restoration Plan) to monitor the Declarant's compliance with the terms of this Declaration and for other purposes consistent with this Declaration; provided that the Trustee Council members or their designee(s) shall not unreasonably interfere with the Declarant's authorized use and quiet enjoyment of the Project Site.

2. The Declarant hereby grants an irrevocable license to the Project Site to the Oregon Department of Environmental Quality ("DEQ"), the United States, and any parties to an

agreement with the U.S. Environmental Protection Agency ("EPA") or order issued by EPA, and their representatives, contractors and subcontractors, to conduct any activity related to the cleanup of the Portland Harbor Superfund Site ("Site") at reasonable times and subject to Section 5, below. Such activities include, but are not limited to, the following activities:

a. Monitoring, investigation, removal, remedial or other activities at the Site;

b. Verifying any data or information submitted to the United States;

c. Conducting investigations relating to contamination at or near the Site;

d. Obtaining samples;

e. Assessing the need for, planning, or implementing additional response actions at or near the Site;

f. Inspecting and copying records, operating logs, contracts, or other documents;

g. Assessing compliance with any applicable EPA Consent Decree;

h. Determining whether the Project Site is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted, by or pursuant to any applicable EPA Consent Decree; and

i. Implementing, monitoring, maintaining, reporting on, or enforcing any institutional controls.

3. The Declarant will refrain from using the Project Site in any manner that would interfere with the completion of the Remedial Investigation and Feasibility Study, additional source control investigation and implementation, or adversely affect the implementation, integrity or protectiveness of the remedial measures to be performed at the Site.

4. The Declarant agrees to cooperate with DEQ, United States and any parties to an agreement or under an order issued by EPA upon their request in facilitating the performance of the remedy at the Site.

5. If EPA notifies Declarant or the Trustee Council or its designee that it has determined that access to the Project Site is necessary to perform or maintain the remedy at the Site, the party so notified shall notify the other party no less than 90 days prior to when access is needed, except for in an emergency response action situation, and the parties shall coordinate with EPA regarding the manner, duration, and details of the work required to be done on, at, or from the subject lands for the purpose of minimizing disruption to the owner's use of the subject lands and restoring any habitat impacted by the work.

6. If EPA, the United States, DEQ or any other party accesses the Project Site subject to Section II.2 of this Declaration and conducts activities inconsistent with the

conservation purposes and performance standards set forth in the Linnton Restoration Plan, Declarant shall notify the Trustee Council and/or its designees(s) when possible in advance of access, but no later than within 48 hours of access.

## III. ENFORCEMENT

The Declarant hereby reserves to itself, and grants to the Trustee Council and its designee(s) the right to enforce the terms of this instrument and prevent any activity or use of the Property that is inconsistent with the terms of this instrument or the Linnton Restoration Plan and, thus, detrimental to the interests of Linnton Water Credits, LLC, the Trustee Council and either of their designee(s). Further, consistent with the forgoing grant of a right of enforcement, the Declarant hereby expressly recognizes that the Trustee Council and its designee(s) are intended third-party beneficiaries and have standing to enforce the terms of this instrument and the Linnton Restoration Plan and require the restoration of such areas or features of the Property that may be damaged by any act, failure to act, or any use or activity that is inconsistent with the purposes of this instrument and the Linnton Restoration Plan. In the event that the Trustee Council disbands during the term of this instrument, the Trustee Council's appointed designee(s), if any, shall enforce the terms of this instrument pursuant to any agreement entered into by members of the Trustee Council which governs the Trustee Council members' process to exercise enforcement rights, including the third-party right of enforcement granted to the Trustee Council and its designee(s) pursuant to this instrument. In the event that the members of the Trustee Council do not enter into a separate agreement governing the Trustee Council's exercise of the third-party rights of enforcement granted herein prior to disbanding or otherwise ceasing to act as a group, each party that comprised the Trustee Council shall be deemed a third-party beneficiary to this instrument and may enforce the terms of this instrument as if such former member or member(s) are named parties to this instrument.

Declarant, at the written request of a member of the Trustee Council or its authorized representative, agrees to promptly to execute and deliver all such further documents or instruments, and promptly to take and forbear from all such actions, as may be reasonably necessary or appropriate in order more effectively confirm or carry out the provisions of this Declaration and the rights granted herein.

## IV. TERMINATION

This instrument shall automatically terminate upon conveyance by Declarant of a conservation easement to an authorized holder, which is appurtenant to the Project Site and that has previously been approved by Trustee Council. Notwithstanding the foregoing, Declarant and the Trustee Council shall prepare and record any instruments that are reasonably necessary to remove any cloud title to the Project Site

[The remainder of this page intentionally left blank.]

IN WITNESS WHEREOF, the undersigned being duly authorized by the Declarant herein, has unto set its hand this day of , 2018.

FOR THE DECLARANT,

By: ___________________________________

Its: ___________________________________

STATE OF
OREGON
COUNTY OF
MULTNOMAH

This instrument was acknowledged before me on___________________________(date) by _____________________________________________________ (name(s) of person(s)) as _________________________________________________ (type of authority, e.g., officer, trustee,) of LINNTON WATER CREDITS LLC, an Oregon limited liability company, on behalf of the company.

_______________________________
NOTARY PUBLIC

Print Name: __________________________

My Commission Expires: _______________

# Exhibit A
# [Property Legal Description]

A portion of the Solomon Richards DLC No. 47, located in the Southwest 1/4 and the Northwest 1/4 of Section 2, Township 1 North, Range 1 West, Willamette Meridian, City of Portland, Multnomah County, Oregon, being more particularly described as follows:
Commencing at a 4-1/4 inch aluminum disc at the Witness Corner 801.70 feet westerly of the Southeast Corner of the Solomon Richards D.L.C.; thence North 62º10’31” East 78.13 feet; thence South 26º38’14” East 395.96 feet; thence North 62º10’31” East 308.86 feet to the most southerly corner of the tract per Book 828 Page 214 (Recorded December 7, 1971) and the Point of Beginning; thence continuing along the southeast line of said tract North 62º10’31” East 558.01 feet to the Line of Ordinary Low Water of the Willamette River; thence along said Line of Ordinary Low Water North 35°51’32” West 57.90 feet; thence continuing along said line North 37°08’09” West 108.70 feet; thence continuing along said line North 33°48’34” West 63.12 feet; thence continuing along said line North 33°27’02” West 50.40 feet; thence continuing along said line North 18°40’18” West 93.36 feet; thence continuing along said line North 06°08’59” West 120.23 feet; thence continuing along said line North 62°53’37” West 126.83 feet; thence continuing along said line North 39°56’48” West 121.78 feet; thence continuing along said line North 19°24’56” West 65.97 feet; thence continuing along said line North 35°03’34” West 66.15 feet; thence continuing along said line South 85°47’44” West 9.27 feet; thence continuing along said line North 38°42’11” West 72.40 feet; thence continuing along said line North 70°15’33” West 29.28 feet; thence continuing along said line North 13°40’32” West 39.67 feet; thence continuing along said line North 05°17’02” East 157.78 feet; thence continuing along said line North 03°43’28” West 156.71 feet; thence continuing along said line North 26°09’09” West 275.82 feet; thence continuing along said line North 34°05’17” West 282.63 feet to the most northerly corner of the tract per Book 1029 Page 1716 (Recorded March 3, 1975); thence along the northwest line of said tract South 63°20’20” West 377.82 feet to the northeast right-of-way line of NW Front Street (30.00 feet wide); thence along said northeast right-of-way line South 26°37’00” East 100.00 feet to a 5/8 inch iron rod on the southeast right-of-way line of NW 107th Avenue (30 feet wide); thence along said southeast right-of-way line South 63°20’20” West 179.56 feet to the northeast line of the Portland and Western Railroad (50.00 feet from centerline); thence along said northeast line South 26°08’00” East 190.00 feet to the easterly projection of the north line of the southerly 15-feet of Lot 2, Block 65 of the plat “Town of Linnton”; thence along said line and the easterly projection thereof South 63°20’20” West 217.88 feet to a 5/8 inch iron rod on the northeast right-of-way line of the Columbia River Highway (44.00 feet from centerline); thence along said right-of-way line (44.00 feet from centerline) South 26°07’30” East 155.48 feet to a 5/8 inch iron rod; thence continuing along said right-of-way line South 23°52’45” East 102.08 feet; thence continuing along said right-of-way line (40.00 feet from centerline) South 26°07’30” East 68.00 feet; thence continuing along said right-of-way line South 63°52’30” West 3.00 feet; thence continuing along said right-of-way line (37.00 feet from centerline) South 26°07’30” East 76.63 feet to a 5/8 inch iron rod; thence along the westerly south line of the tract per Book 828 Page 214 (Recorded December 7, 1971) North 62°16’00” East 225.02 feet to said northeast line of the Portland and Western Railroad (50.00 feet from centerline); thence along said northeast line South 26°08’00” East 524.66 feet to a point of curvature; thence continuing along said northeast line along a curve to the left with a Radius of 5679.65 feet, a Delta of 06°04’12”, a Length of

601.70 feet, and a Chord of South 29°10’06” East 601.42 feet to the Point of Beginning.
Excepting therefrom: the right-of-way of the Portland and Western Railroad.

The above described tract contains 23.37 acres (excluding right-of-way), more or less.

# Exhibit B

## [Project Site Legal Description]

A portion of the Solomon Richards DLC No. 47, located in the Southwest 1/4 and the Northwest 1/4 of Section 2, Township 1 North, Range 1 West, Willamette Meridian, City of Portland, Multnomah County, Oregon, being more particularly described as follows: Commencing at a 4-1/4 inch aluminum disc at the Witness Corner 801.70 feet westerly of the Southeast Corner of the Solomon Richards D.L.C.; thence North 62º10’31” East 78.13 feet; thence South 26º38’14” East 395.96 feet; thence North 62º10’31” East 308.86 feet to the most southerly corner of the tract per Book 828 Page 214 (Recorded December 7, 1971) and the Point of Beginning; thence continuing along the southeast line of said tract North 62º10’31” East 558.01 feet to the Line of Ordinary Low Water of the Willamette River; thence along said Line of Ordinary Low Water North 35°51’32” West 57.90 feet; thence continuing along said line North 37°08’09” West 108.70 feet; thence continuing along said line North 33°48’34” West 63.12 feet; thence continuing along said line North 33°27’02” West 50.40 feet; thence continuing along said line North 18°40’18” West 93.36 feet; thence continuing along said line North 06°08’59” West 120.23 feet; thence continuing along said line North 62°53’37” West 126.83 feet; thence continuing along said line North 39°56’48” West 121.78 feet; thence continuing along said line North 19°24’56” West 65.97 feet; thence continuing along said line North 35°03’34” West 66.15 feet; thence continuing along said line South 85°47’44” West 9.27 feet; thence continuing along said line North 38°42’11” West 72.40 feet; thence continuing along said line North 70°15’33” West 29.28 feet; thence continuing along said line North 13°40’32” West 39.67 feet; thence continuing along said line North 05°17’02” East 157.78 feet; thence continuing along said line North 03°43’28” West 156.71 feet; thence continuing along said line North 26°09’09” West 275.82 feet; thence continuing along said line North 34°05’17” West 282.63 feet to the most northerly corner of the tract per Book 1029 Page 1716 (Recorded March 3, 1975); thence along the northwest line of said tract South 63°20’20” West 377.82 feet to the northeast right-of-way line of NW Front Street (30.00 feet wide); thence along said northeast right-of-way line South 26°37’00” East 100.00 feet to a 5/8 inch iron rod on the southeast right-of-way line of NW 107th Avenue (30 feet wide); thence along said southeast right-of-way line South 63°20’20” West 179.56 feet to the northeast line of the Portland and Western Railroad (50.00 feet from centerline); thence along said northeast line South 26°08’00” East 1112.50 feet to a point of curvature; thence continuing along said northeast line along a curve to the left with a Radius of 5679.65 feet, a Delta of 06°04’12”, a Length of 601.70 feet, and a Chord of South 29°10’06” East 601.42 feet to the Point of Beginning.

The above described tract contains 22.26 acres, more or less.

# Exhibit C
# Linnton Restoration Plan

[Linnton Mill Restoration Site Restoration Plan to be inserted into executed Deed Restriction]

# Appendix 7. Conservation Easement

NOTE: This conservation easement deed will likely be subject to change when a conservation easement holder is identified. This conservation easement deed is included in the "Linnton Restoration Project Restoration Plan" as an example.

## Conservation Easement Deed
## (Linnton Restoration Project)

THIS CONSERVATION EASEMENT DEED "Conservation Easement") is made this ____ day of ____ , 2018, by Linnton Water Credits, LLC ("Grantor"), in favor of [insert grantee name] ("Grantee").

## RECITALS

A. Grantor is the sole owner in fee simple of certain real property containing approximately 23 acres in the County of Multnomah, State of Oregon more particularly described in Exhibit A attached hereto and incorporated herein (the "Overall Property"). Grantor desires to grant the Conservation Easement over a 22-acre portion of the Overall Property (the "Property"). The Property is more particularly described in Exhibit B, which is attached hereto and incorporated herein.

B. Grantee is an organization qualified by ORS 271.715 (3) to hold conservation easements.

C. This agreement is a conservation easement as provided for by ORS 271.715 to 271.795 and will run with the land.

D. This Conservation Easement is being executed and delivered pursuant to the Linnton Mill Restoration Site Restoration Plan (the "Linnton Restoration Plan"), which includes the First Addendum to Memorandum of Agreement between the Portland Harbor Natural Resource Trustee Council and RestorCap Development, LLC Related to Habitat Restoration Projects Toward Future Settlement of Natural Resource Damage Claims at the Portland Harbor CERCLA Site (Linnton Restoration Site), dated _____, 2018 ("MOA Addendum"). The Linnton Restoration Plan also includes the Linnton Mill Restoration Site Long-Term Stewardship Plan (the "Long-Term Stewardship Plan"). Grantor and Grantee each have a copy of the Long-Term Stewardship Plan and the Linnton Restoration Plan, both incorporated herein by reference.

E. The Property provides or is capable of providing significant ecological habitat values that benefit endangered, threatened, and other animal species (collectively, "Conservation Values") as set forth in the Linnton Restoration Plan and summarized in Exhibit C.

F. The Portland Harbor Natural Resource Trustee Council ("Trustee Council") consists of the following members: the National Oceanic and Atmospheric Administration ("NOAA") on behalf of the United States Department of Commerce, the United States Fish and Wildlife Service ("USFWS") on behalf of the United States Department of the Interior, the Oregon Department of Fish and Wildlife ("ODFW") on behalf of the State of Oregon, the

Confederated Tribes of the Grand Ronde Community of Oregon, the Confederated Tribes of Siletz Indians, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe. As referenced to in this Easement Deed, "Trustee Council" means all of the above listed Trustee Council members. The Trustee Council is conducting a damage assessment for the Portland Harbor Superfund site ("Site"), and anticipates bringing claims for injuries to natural resources under the Comprehensive Environmental Response Compensation and Liability Act, 42 U.S.C. §§ 9601, *et seq.* ("CERCLA"), the Oil Pollution Act of 1990, 33 U.S.C. §§ 9601, *et seq*. and other applicable federal and state law.

G. Additionally, NOAA and USFWS exercise jurisdiction with respect to the conservation, protection, restoration, enhancement, and management of threatened and endangered species and habitat pursuant to various federal laws including the Endangered Species Act, 16 U.S.C. §§ 1531 et seq. ("ESA"), the Fish and Wildlife Coordination Act, 16 U.S.C. §§ 661-666c, the Magnuson-Stevens Act ("MSA") as amended (16 U.S.C. §§ 1801 *et seq*.) and the Fish and Wildlife Act of 1956 (16 U.S.C. §§742(f) *et seq*.).

H. Grantor intends to convey to Grantee the right to preserve, protect, sustain, and enhance and/or restore the Conservation Values of the Property in perpetuity.

## COVENANTS, TERMS, CONDITIONS AND RESTRICTIONS

NOW, THEREFORE, in consideration of the above recitals and the mutual covenants, terms, conditions, and restrictions contained herein, and pursuant to the laws of the United States and the State of Oregon, Grantor hereby voluntarily grants and conveys to Grantee a Conservation Easement in perpetuity over the Property of the nature and character consistent with the Linnton Restoration Plan to the extent hereinafter set forth.

1. Purpose. The purpose of this Conservation Easement is to ensure that the Property will be retained forever in a condition contemplated by the Linnton Restoration Plan and to prevent any use of the Property that will significantly impair or interfere with the Conservation Values of the Property. Grantor intends that this Conservation Easement will confine the use of the Property to such activities including, without limitation, those involving the preservation and enhancement of native species and their habitats in a manner consistent with the conservation purposes of this Conservation Easement and the Linnton Restoration Plan.

2. Rights of Grantee. To accomplish the purposes of this Conservation Easement, Grantor hereby grants and conveys the following rights to Grantee, along with the right of enforcement to the Trustee Council or their designee(s) as third party beneficiaries hereof, consistent with the Linnton Restoration Plan:

A. To preserve, protect, sustain, enhance, and/or restore the Conservation Values of the Property.

B. To enter upon the Property at reasonable times, subject to giving Grantor forty-eight (48) hours notice, except in cases where Grantee determines that immediate entry is required to prevent, terminate, or mitigate a violation of this Conservation Easement, to monitor Grantor's compliance with and to otherwise enforce the terms of this Conservation Easement; provided that Grantee shall not unreasonably interfere with Grantor's authorized use and quiet enjoyment of the Property.

C. To prevent any activity on or use of the Property that is inconsistent with the habitat conservation purposes of this Conservation Easement, including without limitation the Linnton Restoration Plan, and to require the restoration of such areas or features of the Property that may be damaged by any act, failure to act, or any use or activity that is inconsistent with the purposes of this Conservation Easement.

D. All mineral, air and water rights necessary to preserve, protect and sustain the biological resources and Conservation Values of the Property, unless specifically excluded from this Conservation Easement, including Grantor’s right, title and interest in and to any waters consisting of: (a) any riparian water rights appurtenant to the Property; (b) any appropriative water rights held by Grantor to the extent those rights are appurtenant to the Property; (c) any waters, the rights to which are secured under contract between the Grantor and any irrigation or water district, to the extent such waters are customarily applied to the Property; and (d) any water from wells that are in existence or may be constructed in the future on the Property or on those lands described as excepted from the Property in the legal description and that were historically used by the Grantor to maintain the Property in a flooded condition (collectively, "Easement Waters"). The Easement Waters, mineral, air and water rights are limited to the amount of Grantor's waters reasonably required to maintain the Conservation Values of the Property.

E. All present and future development rights.

3. Prohibited Uses. Any activity on or use of the Property inconsistent with the conservation purposes of this Conservation Easement and the Linnton Restoration Plan is prohibited. Without limiting the generality of the foregoing, Grantor, its personal representatives, heirs, successors, assigns, employees, agents, lessees, licensees and invitees are expressly prohibited from doing or permitting any of the following on the Property unless specifically authorized by the Grantee, the Linnton Restoration Plan or the Long-Term Stewardship Plan:

A. Construction, reconstruction or placement of any permanent building or structure.

B. Unseasonable watering; use of fertilizers, biocides, or other agricultural chemicals; incompatible fire protection activities; and any and all other uses which may adversely affect the conservation purposes of this Conservation Easement.

C. Grazing or agricultural activity of any kind.

D. Commercial or industrial uses.

E. Depositing or accumulating soil, trash, ashes, refuse, waste, bio-solids or any other material.

F. Filling, dumping, excavating, draining, dredging, mining, drilling, removing, exploring for or extracting minerals, loam, gravel, soil, rock, sand or other material on or to a depth of 100 feet below the surface of the Property, or granting or authorizing surface entry for any of these purposes of the Property, or granting or authorizing surface entry for any of these purposes.

G. Altering the surface or general topography of the Property, including building roads, paving or otherwise covering the Property with concrete, asphalt, or any other impervious material.

H. Removing, destroying, or cutting trees, shrubs or other vegetation, except as required for implementation of the Linnton Restoration Plan or the Long-Term Stewardship Plan.

I. Use of motor vehicles, except as required for implementation of the Linnton Restoration Plan.

J. Transferring any water, mineral, or air rights necessary to maintain or restore the biological resources of the Property.

K. Planting, introduction, or dispersal of invasive or exotic plant or animal species.

L. Manipulating, impounding or altering any natural watercourse, body of water or water circulation on the Property, other than those actions set forth under the Linnton Restoration Plan, and any activities or uses detrimental to water quality, including but not limited to degradation or pollution of any surface or sub-surface waters.

M. Permitting a general right of access to the Property.

N. Hunting.

O. Trapping of native species.

4. Grantor's Duties. Grantor shall undertake all reasonable actions to prevent the unlawful entry and trespass by persons whose activities may degrade or harm the Conservation Values of the Property and are inconsistent with the Linnton Restoration Plan.

5. Grantor's Reserved Rights. All rights accruing from Grantor's ownership of the Property, including the right to engage in or permit or invite others to engage in all uses of the Property that are not prohibited herein and are not inconsistent with the purposes of this Conservation Easement, are reserved to Grantor and Grantor's personal representatives, heirs, successors, and assigns.

6. Remedies for Violation and Corrective Action. If Grantee, Grantor, or the Trustee Council or the Trustee Council's designee(s) determines there is a violation of the terms of this Conservation Easement or that a violation is threatened, written notice of such violation and a demand for corrective action sufficient to cure the violation shall be given to Grantor or Grantee. Within ten (10) days of the receipt of written notice of such violation, the notice recipient shall provide a written response to each of the parties to this Conservation Easement, including the Trustee Council or the Trustee Council's designee(s), pursuant to section 12 of this Conservation Easement. In any instance, measures to cure the violation shall be reviewed and approved by the Trustee Council or the Trustee Council's designee(s). If a violation is not cured within thirty (30) days after receipt of written notice and demand, or if the cure reasonably requires more than thirty (30) days to complete and there is failure to begin the cure within the thirty-day period or failure to continue diligently to complete the cure, the Parties shall first engage in the following dispute resolution process to resolve any disputes arising related to the violation and cure. The Grantor, Grantee, or Trustee Council or the Trustee Council's designee(s), shall issue a written Notice of Deficiencies to all Parties, detailing the claimed deficiencies concerning the violation and cure. The Notice of Deficiencies shall identify a higher-level administrative officer within the issuing Party's organization who shall represent the Party in the dispute resolution process ("Dispute Resolution Representative"). The Notice of Deficiencies shall include the Dispute Resolution Representative's contact information. Within fourteen (14) days of the receipt of the Notice of Deficiencies, the remaining Parties shall identify corresponding Dispute Resolution

Representatives within their respective organizations and communicate to schedule a joint conference to be held at the earliest opportunity. The Dispute Resolution Representatives shall engage in a reasonable, good-faith effort to review the dispute and decide upon a mutually agreeable cure, which shall be diligently implemented. If, after a reasonable period of time, the Dispute Resolution Representatives are unable to reach agreement, the Grantor, Grantee, or the Trustee Council or the Trustee Council's designee(s) may bring an action at law or in equity in a court of competent jurisdiction to enforce compliance with the terms of this Conservation Easement, to recover any damages to which Grantee, Grantor, or the Trustee Council or the Trustee Council's designee(s) may be entitled for violation of the terms of this Conservation Easement or for any injury to the Conservation Values of the Property, or for other equitable relief, including, but not limited to, the restoration of the Property to the condition in which it existed prior to any violation or injury, consistent with the terms of the Linnton Restoration Plan. Without limiting violator's liability therefore, any damages recovered may be applied to the cost of undertaking any corrective action on the Property.

6.1 Injunctive Relief. If Grantee, Grantor, or the Trustee Council or the Trustee Council's designee(s), in each its sole discretion, determines that circumstances require immediate action to prevent or mitigate significant damage to the Conservation Values of the Property, Grantee, Grantor, or the Trustee Council or the Trustee Council's designee(s) may pursue its remedies under this Section without prior notice or without waiting for the period provided for cure to expire to enjoin the violation, *ex parte* as necessary, by temporary or permanent injunction without the necessity of proving either actual damages or the inadequacy of otherwise available legal remedies, and to require the restoration of the Property to the condition that existed prior to any such injury. The remedies described in this Section shall be cumulative and shall be in addition to all remedies now or hereafter existing at law or in equity. The failure of Grantee, Grantor, the Trustee Council or the Trustee Council's designee(s) to discover a violation or to take immediate legal action shall not bar taking such action at a later time.

6.2 Standing. If at any time Grantee, Grantor, or any successor in interest or subsequent transferee uses or threatens to use the Property for purposes not in conformance with the stated conservation purposes contained herein, or releases or threatens to abandon this Conservation Easement in whole or in part, then the Trustee Council or the Trustee Council's designee(s) shall have standing as an interested party in any proceeding affecting this Conservation Easement.

6.3 Costs of Enforcement. All reasonable costs incurred in enforcing the terms of this Conservation Easement including, but not limited to, costs of suit and attorneys' fees, and any costs of restoration necessitated by violation or negligence under the terms of this Conservation Easement shall be borne by the violator.

6.4 Enforcement Discretion. Enforcement of the terms of this Conservation Easement shall be at the discretion of Grantee, Grantor, or the Trustee Council or the Trustee Council's designee(s), and any forbearance to exercise rights of enforcement under this Conservation Easement in the event of any breach of any term of this Conservation Easement shall not be deemed or construed to be a waiver of such term or of any subsequent breach of the same or any other term of this Conservation Easement or of any rights under this Conservation

Easement. No delay or omission in the exercise of any right or remedy upon any breach shall impair such right or remedy or be construed as a waiver.

6.5 Catastrophic Acts Beyond Grantee's or Grantor's Control. Nothing contained in this Conservation Easement shall be construed to entitle Grantee, Grantor, or the Trustee Council or the Trustee Council's designee(s) to bring any action for any injury to or change in the Property resulting from causes beyond Grantee or Grantor's control, including, without limitation, fire, flood, storm, and earth movement, or from any prudent action taken by Grantee or Grantor under emergency conditions to prevent, abate, or mitigate significant injury to the Property resulting from such causes. The Grantor, Grantee, and Trustee Council or the Trustee Council's designee(s) shall be notified of the catastrophic event within forty-eight (48) hours of its discovery. The Grantor, Grantee, and the Trustee Council or the Trustee Council's designee(s) shall meet as soon as reasonably possible to determine a response to such catastrophic event. In the interim, the Grantor shall continue to the fullest extent possible to manage and maintain the Property consistent with the conservation purposes of the Conservation Easement, the Linnton Restoration Plan, and the Long-Term Stewardship Plan.

6.6 Third Party Beneficiary Right of Enforcement. All rights and remedies conveyed under this Conservation Easement shall extend to and are enforceable by the Trustee Council or its designee(s) as a third party beneficiary. These rights of enforcement are in addition to, and do not limit, the rights of enforcement under the Conservation Easement, the Linnton Restoration Plan, and the Long-Term Stewardship Plan.

7. Costs and Liabilities. Grantor retains all responsibilities and shall bear all costs and liabilities of any kind related to the ownership, operation, upkeep, and maintenance of the Property, including transfer costs, costs of title and documentation review, and maintenance of adequate liability insurance coverage. Grantor remains solely responsible for obtaining any applicable permits and approvals required for any activity or use permitted on the Property by this Conservation Easement, and any such activity or use shall be undertaken in accordance with all applicable federal, state, local and administrative agency laws, statutes, ordinances, rules, regulations, orders and requirements.

7.1 Taxes; No Liens. Grantor shall pay before delinquency all taxes, assessments, fees, and charges of whatever description levied on or assessed against the Property by competent authority (collectively, "taxes"), including any taxes imposed upon, or incurred as a result of, this Conservation Easement, and shall furnish Grantee with satisfactory evidence of payment upon request. Grantor shall keep Grantee's interest in the Property free from any liens, including those arising out of any obligations incurred by Grantor for any labor or materials furnished or alleged to have been furnished at or for use on the Property.

7.2 Hold Harmless. Grantor shall hold harmless, indemnify, and defend Grantee, Trustee Council or the Trustee Council's designee(s), and their respective members, directors, officers, employees, agents, and contractors and the heirs, personal representatives, successors, and assigns of each of them (collectively, "Indemnified Parties"), from and against all liabilities, penalties, costs, losses, damages, expenses, causes of action, claims, demands, orders, liens, or judgments, including, without limitation, reasonable attorneys' fees, arising from or in any way connected with (a) injury to or death of any person, or physical damage to any property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Property, unless due to the negligence of any of the Indemnified Parties, and (b) the obligations, covenants, representations, and warranties of this Conservation Easement relating to Costs and Liabilities of this Section 7.

7.3 No Hazardous Materials Liability. Other than as generally described in the Linnton Restoration Plan and more specifically described in references therein, Grantor represents and warrants that it has no knowledge of any release or threatened release of hazardous materials in, on, under, about, or affecting the Property. Without limiting the obligations of Grantor as otherwise provided in this instrument, Grantor agrees to indemnify, protect, and hold harmless the Indemnified Parties against any and all Claims arising from or connected with any hazardous materials present, released in, on from or about the Property, at any time, of any substance now or hereafter defined, listed, or otherwise classified pursuant to any federal state, or local law, regulation or requirement as hazardous, toxic, polluting or otherwise contaminating to the air, water, or soil, or in any way harmful or threatening to human health or the environment, unless caused solely by any of the Indemnified Parties.

8. Best and Most Necessary Use. The habitat conservation purposes of the Conservation Easement are presumed to be the best and most necessary public use.

9. Conservation Easement Assignment or Transfer. This Conservation Easement may be assigned or transferred by Grantee or any successor in interest upon written approval of the Trustee Council or its designee(s) and Grantor, which approval shall not be unreasonably withheld, but Grantee shall give Grantor and the Trustee Council or the Trustee Council's designees at least thirty (30) days prior written notice of the transfer. Grantee or any successor in interest may assign or transfer its rights and obligations under this Conservation Easement only to an entity or organization as approved by the Trustee Council or the Trustee Council's designee(s) and Grantor. As a condition of such assignment or transfer, Grantee shall require that the conservation purposes of this Conservation Easement and the Linnton Restoration Plan are carried out and notice of such restrictions, including the Linnton Restoration Plan, shall be recorded in the County where the Property is located. The failure of Grantee to perform any act required by this paragraph shall not impair the validity of this Conservation Easement or its enforcement in any way.

10. Subsequent Property Transfer. This Conservation Easement may be assigned or transferred by Grantor or any successor in interest upon written approval of the Trustee Council or its designee(s), which approval shall not be unreasonably withheld. Grantor agrees to give Grantee and the Trustee Council or the Trustee Council's designee(s) written notice of its intent to transfer any interest in this Conservation Easement at least thirty (30) days prior to the date of such transfer. Grantor or any successor in interest may assign or transfer its rights and obligations under this Conservation Easement only to an entity or organization as approved by the Trustee Council or its designee(s). Grantor further agrees to incorporate the terms of this Conservation Easement in any deed or other legal instrument by which Grantor divests itself of any interest in all or a portion of the Property, including, without limitation, a leasehold interest. Grantee or the Trustee Council or the Trustee Council's designee(s) shall have the right to prevent subsequent transfers in which prospective subsequent claimants or transferees are not given notice of the terms, covenants, conditions and restrictions of this Conservation Easement

or whenever a subsequent Property transfer will result in a merger of the Conservation Easement and the Property in a single Property owner (thereby extinguishing the Conservation Easement) if no method or mechanism deemed adequate to preserve, protect, and sustain the Property in perpetuity has been established. The failure of Grantor to perform any act required by this section shall not impair the validity of this Conservation Easement or limit its enforcement in any way.

11. Estoppel Certificates. Grantee shall, within thirty (30) business days after receiving Grantor's request therefor, execute and deliver to Grantor a document certifying, to the best knowledge of the person executing the document, that Grantor is in compliance with any obligation of Grantor contained in this Conservation Easement, or otherwise evidencing the status of such obligation to the extent of Grantee's knowledge thereof, as may be reasonably requested by Grantor.

12. Notices. Any notice, demand, request, consent, approval, or other communication that Grantor, Grantee, or the Trustee Council or the Trustee Council's designee(s) desires or isrequired to give to the others shall be in writing and either served personally or sent by first-class mail, postage prepaid or by recognized overnight courier that guarantees next-day delivery
addressed as follows:

To Grantor:
Linnton Water Credits, LLC
337 17th Street, Suite 200
Oakland, CA 94612

To Grantee:
[Insert Grantee information]

To Trustee Council:
NOAA
Restoration Center
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232

United States Fish and Wildlife Service
Pacific Region
Attn: Field Supervisor
911 NE 11th Ave. # 1
Portland, OR 97232

Oregon Department of Fish and Wildlife
3406 Cherry Avenue N.E.
Salem, OR 97303

Confederated Tribes of the Grand Ronde
Community of Oregon
9615 Grand Ronde Road
Grand Ronde, OR 97347-9712

Confederated Tribes of Siletz Indians
ATTN: Natural Resources Manager
P.O. Box 549
Siletz, OR 97380

Confederated Tribes of the Umatilla Indian Reservation
Nixyáawii Governance Center
46411 Timíne Way
Pendleton, OR 97801

Confederated Tribes of the Warm Springs Reservation of Oregon
1107 Wasco Street
Warm Springs, OR 97761

Nez Perce Tribe
P.O. Box 305
Lapwai, ID 83540

or to such other address as a party shall designate by written notice to the others. Notice shall be deemed effective upon delivery in the case of personal delivery or delivery by overnight courier or, in the case of delivery by first class mail, five (5) days after deposit into the United States mail.

13. Recordation. Grantor shall submit an original, signed and notarized Conservation Easement to Grantee and Grantee shall promptly record this instrument in the official records of the County in which the Property is located, and shall thereafter promptly provide a conformed copy of the recorded Conservation Easement to the Grantor and to the Trustee Council or the Trustee Council's designee(s). Grantee may re-record at any time as may be required to preserve its rights in this Conservation Easement.

14. Amendment. This Conservation Easement may be amended by Grantor and Grantee only by mutual written agreement and written approval by the Trustee Council or the Trustee Council's designee(s). Any such amendment shall be consistent with the purposes of this Conservation Easement and shall not affect its perpetual duration, and Grantee shall promptly record this amended instrument in the official records of the County in which the Property is located, and shall thereafter promptly provide a conformed copy of the recorded amended Conservation Easement to the Grantor and to the Trustee Council or its designee(s).

15. No Warranty; AS IS. Grantee agrees, for itself, successors, and assigns, that it is accepting this grant on an AS IS basis, without reliance upon any representation or warranty of Grantor, and is relying solely upon Grantee's own expertise, experience and investigation of the Property and Grantee expressly disclaims, waives and releases any warranty or representation, express or implied, by Grantor or any representative of Grantor, including as to title, condition, or suitability for any particular purpose.

16. Additional Interests. Except for another conservation easement established in

accordance with the Linnton Restoration Plan and which is not adverse to the Conservation Easement established herein, Grantor shall not grant any additional interest in the Property that is not subordinate to this Conservation Easement, nor shall Grantor grant, transfer, abandon, or relinquish any water or water right associated with the Property, including without limitation any Easement Waters, without the prior written authorization of Grantee and the Trustee Council or the Trustee Council's designee(s). Such consent may be withheld if the proposed interest or transfer is inconsistent with the purposes of this Conservation Easement and the Linnton Restoration Plan or will impair or interfere with the Conservation Values of the Property. This Section shall not prohibit the transfer of a fee title or leasehold interest in the Property that is otherwise subject to and complies with the terms of this Conservation Easement.

17. Third-Party Beneficiaries and Access. Grantor and Grantee acknowledge that the Trustee Council and its designee(s) are third-party beneficiaries of this Conservation Easement with rights of access to the Property for monitoring or conservation activities contemplated by this Conservation Easement,the Restoration Plan, or the Long-Term Stewardship Plan, except in cases where the Trustee Council or its designee(s) determine that immediate entry is required to prevent, terminate, or mitigate a violation of the Agreement, such access is subject to providing the Grantor with forty- eight (48) hours notice, and with rights to enforce all of the provisions of this ConservationEasement.

18. Condemnation. If all or any part of the Property is the subject of an eminent domain proceeding, Grantor will take reasonable actions to defend the Property and the Conservation Values associated with it. In the event that said efforts are unsuccessful, Grantor shall take all appropriate actions to recover the full value of the taking and all incidental or direct damages resulting from the taking (the "Proceeds"). Grantee shall receive the portion of the Proceeds equal to the value of the conservation easement. Disagreements regarding the appropriate response under this Section shall be resolved in accordance with the Dispute Resolution provision in this Conservation Easement.

19. Other Agency Access. Grantor hereby grants access to the Property to the Oregon Department of Environmental Quality ("DEQ"), the United States, and any parties to an agreement with the U.S. Environmental Protection Agency ("EPA") or order issued by EPA, and their representatives, contractors and subcontractors, to conduct any activity related to the cleanup of the Portland Harbor Superfund Site ("Site") at reasonable times and subject to this Section 19. Such activities include, but are not limited to, the following activities:

a. Monitoring, investigation, removal, remedial or other activities at the Site;

b. Verifying any data or information submitted to the United States;

c. Conducting investigations relating to contamination at or near the Site;

d. Obtaining samples;

e. Assessing the need for, planning, or implementing additional response actions at or near the Site;

f. Inspecting and copying records, operating logs, contracts, or other documents;

g. Assessing compliance with any applicable EPA Consent Decree;

h. Determining whether the Property is being used in a manner that is prohibited or restricted, or that may need to be prohibited or restricted, by or pursuant to any applicable EPA Consent Decree; and

i. Implementing, monitoring, maintaining, reporting on, or enforcing any institutional controls.

19.1 Grantor and Grantee will refrain from using the Property in any manner that would interfere with the completion of the Portland Harbor Remedial Investigation and Feasibility Study, additional source control investigation and implementation, or adversely affect the implementation, integrity or protectiveness of the remedial measures to be performed at the Site.

19.2 Grantor and Grantee agree to cooperate with DEQ, United States and any parties to an agreement or under an order issued by EPA upon their request in facilitating the performance of the remedy at the Site.

19.3 If EPA notifies the Grantor that it has determined that access to the Property is necessary to perform or maintain the remedy at the Site, the Grantor shall notify the Grantee and the Trustee Council except for in an emergency response action situation, and the parties shall coordinate with EPA regarding the manner, duration, and details of the work required to be done on, at, or from the subject lands for the purpose of minimizing disruption to the Grantor's use of the subject lands and restoring any habitat impacted by the work.

19.4 If EPA, the United States, DEQ or any other party accesses the Property subject to Section 19 of this Conservation Easement and conducts activities inconsistent with the conservation purposes and performance standards set forth in the Linnton Restoration Plan, Grantor shall notify the Grantee and the Trustee Council and/or its designees(s) when possible in advance of access, but no later than within forty-eight (48) hours of access.

20. General Provisions.

20.1 Controlling Law. The interpretation and performance of this Conservation Easement shall be governed by the laws of the State of Oregon and applicable Federal law including the ESA.

20.2 Liberal Construction. Any general rule of construction to the contrary notwithstanding, this Conservation Easement shall be liberally construed in favor of the deed to affect the purposes of this Conservation Easement. If any provision in this instrument is found to be ambiguous, an interpretation consistent with the purposes of this Conservation Easement that would render the provision valid shall be favored over any interpretation that would render it invalid.

20.3 Severability. If any provision of this Conservation Easement or the application thereof is found to be invalid the remaining provisions of this Conservation Easement or the application of such provisions other than that found to be invalid shall not be affected thereby.

20.4 Entire Agreement. This Conservation Easement and the Linnton Restoration Plan incorporated by reference herein, including all of the exhibits thereto, together set forth the entire agreement of the parties and supersede all prior discussions, negotiations, understandings, or agreements relating to the Conservation Easement, all of which are merged herein. No alteration or variation of this instrument shall be valid or binding unless contained in an amendment in accordance with the provisions herein.

20.5 No Forfeiture. Nothing contained herein will result in a forfeiture or reversion of Grantor's title in any respect.

20.6 Successors. The covenants, terms, conditions, and restrictions of this Conservation Easement shall be binding upon, and inure to the benefit of, the parties hereto and their respective personal representatives, heirs, successors, and assigns and shall constitute a servitude running in perpetuity with the Property. This Conservation Easement shall remain valid consistent with the terms of ORS 271-745.

20.7 Termination of Rights and Obligations. A party's rights and obligations under this Conservation Easement terminate upon transfer of the party's interest in the Conservation Easement or Property in accordance with the applicable terms of this Conservation Easement, except that liability for acts, omissions or breaches occurring prior to transfer shall survive transfer.

20.8 Captions. The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon its construction or interpretation.

20.9 Counterparts. The parties may execute this instrument in two or more counterparts, which shall, in the aggregate, be signed by both parties; each counterpart shall be deemed an original instrument as against any party who has signed it. In the event of any disparity between the counterparts produced, the recorded counterpart shall be controlling.

21. No Merger. This Conservation Easement shall be of perpetual duration, it being the express intent of the Parties that this Easement not be extinguished by, or merged into, any other interest or estate in the Property now or hereafter held by Grantee or any other Party.

IN WITNESS WHEREOF, Grantor has executed and delivered this Conservation Easement Deed as of the day and year first above written

GRANTOR (Linnton Water Credits, LLC):

By: ______________________________

Title: ______________________________

Date: ______________________________

GRANTEE:

By: ______________________________

Title: ______________________________

Date: ______________________________

# Exhibit A
# Overall Property

**[legal description of overall property]**

A portion of the Solomon Richards DLC No. 47, located in the Southwest 1/4 and the Northwest 1/4 of Section 2, Township 1 North, Range 1 West, Willamette Meridian, City of Portland, Multnomah County, Oregon, being more particularly described as follows:
Commencing at a 4-1/4 inch alumnum disc at the Witness Corner 801.70 feet westerly of the Southeast Corner of the Solomon Richards D.L.C.; thence North 62º10’31” East 78.13 feet; thence South 26º38’14” East 395.96 feet; thence North 62º10’31” East 308.86 feet to the most southerly corner of the tract per Book 828 Page 214 (Recorded December 7, 1971) and the Point of Beginning; thence continuing along the southeast line of said tract North 62º10’31” East 558.01 feet to the Line of Ordinary Low Water of the Willamette River; thence along said Line of Ordinary Low Water North 35°51’32” West 57.90 feet; thence continuing along said line North 37°08’09” West 108.70 feet; thence continuing along said line North 33°48’34” West 63.12 feet; thence continuing along said line North 33°27’02” West 50.40 feet; thence continuing along said line North 18°40’18” West 93.36 feet; thence continuing along said line North 06°08’59” West 120.23 feet; thence continuing along said line North 62°53’37” West 126.83 feet; thence continuing along said line North 39°56’48” West 121.78 feet; thence continuing along said line North 19°24’56” West 65.97 feet; thence continuing along said line North 35°03’34” West 66.15 feet; thence continuing along said line South 85°47’44” West 9.27 feet; thence continuing along said line North 38°42’11” West 72.40 feet; thence continuing along said line North 70°15’33” West 29.28 feet; thence continuing along said line North 13°40’32” West 39.67 feet; thence continuing along said line North 05°17’02” East 157.78 feet; thence continuing along said line North 03°43’28” West 156.71 feet; thence continuing along said line North 26°09’09” West 275.82 feet; thence continuing along said line North 34°05’17” West 282.63 feet to the most northerly corner of the tract per Book 1029 Page 1716 (Recorded March 3, 1975); thence along the northwest line of said tract South 63°20’20” West 377.82 feet to the northeast right-of-way line of NW Front Street (30.00 feet wide); thence along said northeast right-of-way line South 26°37’00” East 100.00 feet to a 5/8 inch iron rod on the southeast right-of-way line of NW 107th Avenue (30 feet wide); thence along said southeast right-of-way line South 63°20’20” West 179.56 feet to the northeast line of the Portland and Western Railroad (50.00 feet from centerline); thence along said northeast line South 26°08’00” East 190.00 feet to the easterly projection of the north line of the southerly 15-feet of Lot 2, Block 65 of the plat “Town of Linnton”; thence along said line and the easterly projection thereof South 63°20’20” West 217.88 feet to a 5/8 inch iron rod on the northeast right-of-way line of the Columbia River Highway (44.00 feet from centerline); thence along said right-of-way line (44.00 feet from centerline) South 26°07’30” East 155.48 feet to a 5/8 inch iron rod; thence continuing along said right-of-way line South 23°52’45” East 102.08 feet; thence continuing along said right-of-way line (40.00 feet from centerline) South 26°07’30” East 68.00 feet; thence continuing along said right-of-way line South 63°52’30” West 3.00 feet; thence continuing along said right-of-way line (37.00 feet from centerline) South 26°07’30”

East 76.63 feet to a 5/8 inch iron rod; thence along the westerly south line of the tract per Book 828 Page 214 (Recorded December 7, 1971) North 62°16’00” East 225.02 feet to said northeast line of the Portland and Western Railroad (50.00 feet from centerline); thence along said northeast line South 26°08’00” East 524.66 feet to a point of curvature; thence continuing along said northeast line along a curve to the left with a Radius of 5679.65 feet, a Delta of 06°04’12”, a Length of 601.70 feet, and a Chord of South 29°10’06” East 601.42 feet to the Point of Beginning.
Excepting therefrom: the right-of-way of the Portland and Western Railroad.

The above described tract contains 23.37 acres (excluding right-of-way), more or less.

## Exhibit B
## Property

**[legal description of property]**

A portion of the Solomon Richards DLC No. 47, located in the Southwest 1/4 and the Northwest 1/4 of Section 2, Township 1 North, Range 1 West, Willamette Meridian, City of Portland, Multnomah County, Oregon, being more particularly described as follows: Commencing at a 4-1/4 inch aluminum disc at the Witness Corner 801.70 feet westerly of the Southeast Corner of the Solomon Richards D.L.C.; thence North 62º10’31” East 78.13 feet; thence South 26º38’14” East 395.96 feet; thence North 62º10’31” East 308.86 feet to the most southerly corner of the tract per Book 828 Page 214 (Recorded December 7, 1971) and the Point of Beginning; thence continuing along the southeast line of said tract North 62º10’31” East 558.01 feet to the Line of Ordinary Low Water of the Willamette River; thence along said Line of Ordinary Low Water North 35°51’32” West 57.90 feet; thence continuing along said line North 37°08’09” West 108.70 feet; thence continuing along said line North 33°48’34” West 63.12 feet; thence continuing along said line North 33°27’02” West 50.40 feet; thence continuing along said line North 18°40’18” West 93.36 feet; thence continuing along said line North 06°08’59” West 120.23 feet; thence continuing along said line North 62°53’37” West 126.83 feet; thence continuing along said line North 39°56’48” West 121.78 feet; thence continuing along said line North 19°24’56” West 65.97 feet; thence continuing along said line North 35°03’34” West 66.15 feet; thence continuing along said line South 85°47’44” West 9.27 feet; thence continuing along said line North 38°42’11” West 72.40 feet; thence continuing along said line North 70°15’33” West 29.28 feet; thence continuing along said line North 13°40’32” West 39.67 feet; thence continuing along said line North 05°17’02” East 157.78 feet; thence continuing along said line North 03°43’28” West 156.71 feet; thence continuing along said line North 26°09’09” West 275.82 feet; thence continuing along said line North 34°05’17” West 282.63 feet to the most northerly corner of the tract per Book 1029 Page 1716 (Recorded March 3, 1975); thence along the northwest line of said tract South 63°20’20” West 377.82 feet to the northeast right-of-way line of NW Front Street (30.00 feet wide); thence along said northeast right-of-way line South 26°37’00” East 100.00 feet to a 5/8 inch iron rod on the southeast right-of-way line of NW 107th Avenue (30 feet wide); thence along said southeast right-of-way line South 63°20’20” West 179.56 feet to the northeast line of the Portland and Western Railroad (50.00 feet from centerline); thence along said northeast line South 26°08’00” East 1112.50 feet to a point of curvature; thence continuing along said northeast line along a curve to the left with a Radius of 5679.65 feet, a Delta of 06°04’12”, a Length of 601.70 feet, and a Chord of South 29°10’06” East 601.42 feet to the Point of Beginning.

The above described tract contains 22.26 acres, more or less.

SUBJECT TO CHANGE – DOCUMENT WILL BE REVIEWED DURING PROJECT PERFORMANCE PERIOD FOR ACCURACY.

# Exhibit C
# Conservation Values

## PROPERTY CONSERVATION VALUES

The goals and objectives (collectively, "Conservation Values") of the Linnton Mill Restoration Site Property (hereinafter "Property" or "Project") are as follows.

- **Goal 1: Restore 26.67 acres of industrial land by removing existing abandoned infrastructure.**
  - Objective 1a: Remove existing docks and all piles in the ACM and Shallow Water habitat zones.
  - Objective 1b: Remove all buildings on site.
  - Objective 1c: Remove concrete and asphalt, with the exception of the concrete foundation under the building.

- **Goal 2: Restore 26.67 acres of industrial land into a complex of fully functioning habitats to benefit fish and wildlife species in Portland Harbor.**
  - Objective 2a: Through grading and excavation, create 5.48 acres of new aquatic habitat, including 4.34 acres of off-channel habitat and 1.14 acres of new ACM habitat.
  - Objective 2b: Conduct habitat restoration on 1.76 acres of active channel margin habitat to the Willamette River through re-grading, riprap removal, and revegetation.
  - Objective 2c: Improve the quality of 4.93 acres of shallow water habitat through piling removal and improvements to adjacent ACM habitat.
  - Objective 2d: Through grading and excavation, create 9.60 acres of fully-functioning forested riparian habitat and 4.90 acres of fully-functioning forested upland habitat.
  - Objective 2e: Remove approximately 700 piles and pile stubs, inclusing many creosote-treated piles, within 0.77 acres of aquatic habitat.
  - Objective 2f: Plant and manage appropriate native vegetation throughout the different habitat types to facilitate the establishment of vegetative cover and minimize non-native plant establishment.
  - Objective 2g: Install 3 to 4 structural habitat features per acre of ACM, Off-Channel, Riparian and Upland habitat to provide complexity for fish and wildlife.

- **Goal 3: Ensure the long-term success of the restored habitat through monitoring, maintenance and stewardship.**
  - Objective 3a: Conduct select pre-construction baseline lamprey and wildlife monitoring.
  - Objective 3b: Implement a site-specific performance plan with performance standards to track the development of the site.
  - Objective 3c: Minimize colonization of the site by noxious species, as defined in the performance standards.
  - Objective 3d: Maintain fish access to the Off-Channel habitat.

  - Objective 3e: Identify and rectify obstacles to habitat development or use, as defined in the performance standards.
  - Objective 3f: After the Performance Period, implement a long-term stewardship program.

- **Goal 4: Support human enjoyment of the site.**
  - Objective 4a: Construct a view platform and path, which connects to the City of Portland Greenway Trail that is mapped as passing by the site.
  - Objective 4b: Discourage human use of the habitat site through fences and signage.
  - Objective 4c. Place educational signage on site that informs the public about the habitat site, as well as the history of the site as a lumber and plywood mill.

## DESCRIPTION OF CONSERVATION ACTIONS

The Property created and restored the types of habitat that have been most affected by development, and are most critical to fish and wildlife species using the lower Willamette River: new Off-Channel habitat, enhanced Shallow Water and ACM habitats, and new/restored Riparian and Upland forested habitat[1]. The majority of the work has and will continue to occur in areas that were formerly uplands, above the OHW and the 100-year flood elevation.

Conservation values were implemented through clearing/grubbing existing vegetation, removing existing overwater structures and piles, excavating upland soils to form the off-channel habitat, placing the excavated soils on the fringes of the Property, removing shoreline armoring and anthropogenic material, re-grading the shoreline, then replanting the disturbed soils with native vegetation. Some key elements of the Property are listed below. The specific quantities of habitat or infrastructure listed below are based on the project design and may have changed as a result of project construction. Final acres, linear feet, number of pilings, etc. should be verified using the as-built report and other documentation after construction.

- 5.48 acres of new aquatic habitat, 4.34 acres of which are new off-channel habitat within the Off-Channel Zone;
- 4.93 acres of restored shallow water habitat within the Shallow Water Zone, including removal of approximately 0.36 acres of overwater coverage and associated piles;
- 1.76 acres of restored ACM habitat, including removal of 0.49 acres/1,050 linear feet of shoreline armoring within the ACM, and 1.14 acres of new ACM habitat;
- 9.60 acres of restored riparian habitat and 4.90 acres of restored upland habitat, including conversion of invasive vegetation, buildings, and concrete pads to native forested habitat;
- Removal of approximately 700 piles and pile stubs within approximately 0.77 acre of aquatic habitat, including many creosote-treated piles.
- Disconnection of on-site stormwater discharge pipes from the North Tributary in the downstream portion of the site and replacing the failing culvert/outfall.

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[1] Habitat types as defined by the Portland Harbor NRD Trustee Council's Habitat Equivalency Analysis (HEA) table of values.

- In terms of Cowardin Classification habitats, the Property generated 7.76 acres of new/restored Riverine habitat, and 4.40 acres of new/restored Palustrine habitat.

**Table 1. Acres of each Habitat Type, Pre- and Post-Conservation Implementation.**

| Habitat Type | Pre-Project acres | Post-Project acres |
|---|---|---|
| Upland | 11.45 | 4.90 |
| Riparian | 8.80 | 9.60 |
| ACM | 1.76 | 2.90 |
| Shallow Water | 4.93 | 4.93 |
| Off-Channel | 0 | 4.34 |
| Total | 26.94 | 26.67[*] |

[*] Total of 26.94 acres, minus 0.27 acre of easements that are not counted toward the total.

The Property represents a unique and important opportunity to provide diverse nearshore and off-channel habitat, well-developed riparian forested habitat, and surrounding forested upland. The Property generates the valuable, river-associated habitats that were once common to the lower Willamette River. This represents a unique opportunity, as property within the lower Willamette River that is both available for habitat site development and of a large enough size to generate significant habitat while remaining economically viable is exceedingly rare.

# Appendix 8. Construction Bid Summaries

# LINNTON MITIGATION SITE
# PHASE 2 - HABITAT RESTORATION

Job No: 13-044

10/14/2016

## AVERAGE BID RESULTS FROM PRELIMINARY COST ESTIMATES

| ITEM NO. | SPECIFICATION SECTION | ITEM | QUANTITY | UNIT | AVG. UNIT COST | AVG. TOTAL COST |
|---|---|---|---|---|---|---|
| **1** | **015000** | **MOBILIZATION** | 1 | LS | $ 241,666.67 | $ 241,666.67 |
| **2** | **015713** | **ESCP IMPLEMENTATION** | 1 | LS | $ 22,666.67 | $ 22,666.67 |
| **3** | **015713.01** | **FIBER ROLLS** | 16294 | LF | $ 3.25 | $ 52,955.50 |
| **4** | **024100** | **GENERAL DEMOLITION** | 1 | LS | $ 138,333.33 | $ 138,333.33 |
| **5** | **024100** | **PILING DEMOLITION** | 700 | EA | $ 541.67 | $ 379,166.67 |
| **6** | **311100** | **CLEARING AND GRUBBING** | 1 | LS | $ 21,666.67 | $ 21,666.67 |
| **7** | **312319** | **DEWATERING** | 1 | LS | $ 133,333.33 | $ 133,333.33 |
| **8** | **312316** | **UNCLASSIFIED EXCAVATION** | 329,466 | CY | $ 9.50 | $ 3,129,927.00 |
| **9** | **312316** | **CONTAMINATED MEDIA EXCAVATION** | 926 | CY | $ 26.67 | $ 24,693.33 |
| **10** | **329200** | **SEEDING** | 19.2 | AC | $ 8,333.33 | $ 160,000.00 |
| **11** | **329300** | **PLANTING** | 102000 | EA | $ 3.83 | $ 391,000.00 |
| **12** | **330533** | **24” HDPE PIPE** | 553 | LF | $ 153.33 | $ 84,793.33 |
| **13** | **330561** | **48" DIAMETER MANHOLES** | 2 | EA | $ 7,800.00 | $ 15,600.00 |
| **14** | **354200** | **LOG STRUCTURES** | 5 | EA | $ 7,166.67 | $ 35,833.33 |
| **15** | **354200** | **SNAG LOGS** | 15 | EA | $ 1,033.33 | $ 15,500.00 |
| **16** | **354200** | **DEBRIS PILES** | 10 | EA | $ 1,633.33 | $ 16,333.33 |
| **17** | **354200** | **HABITAT LOGS BELOW OHW** | 10 | EA | $ 1,233.33 | $ 12,333.33 |
| **18** | **354200** | **HABITAT LOGS ABOVE OHW** | 10 | EA | $ 966.67 | $ 9,666.67 |
| **19** | **354257** | **ENGINEERED STREAMBED MATERIAL** | 467 | TON | $ 90.00 | $ 41,988.38 |
| **20** | **354257** | **BOULDER PLUNGE POOLS** | 2 | EA | $ 5,666.67 | $ 11,333.33 |
| **21** | **354257** | **BOULDER CLUSTERS** | 15 | EA | $ 791.67 | $ 11,875.00 |
| | | | | **TOTAL PROJECT COST (NUMBERS)** | | $ 4,950,665.88 |

*In the event that the product of a unit price and an estimated quantity does not equal the extended amount stated, the unit price will govern and the correct product of the unit price and the estimated quantity shall be deemed to be the bid amount.

# Appendix 9. Performance Bond Interim Management and Contingency Security and Lamprey Monitoring

# PERFORMANCE BOND
# INTERIM MANAGEMENT AND CONTINGENCY SECURITY AND LAMPREY MONITORING

Bond No. _____ — _____

KNOW ALL BY THESE PRESENTS:

That we, Linnton Water Credits LLC, as Principal, hereinafter called Principal, and _________________________, a _________ corporation, as Surety, hereinafter called Surety, are held and firmly bound unto the National Oceanic and Atmospheric Administration (NOAA), on behalf of the United States Department of Commerce, the United States Fish and Wildlife Service, on behalf of the United States Department of the Interior, the Oregon Department of Fish and Wildlife, the Confederated Tribes of the Grand Ronde Community of Oregon, the Confederated Tribes of Siletz Indians, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe (collectively, the "Obligee"), in the amount of **$993,024.00** ("Total Dollar Amount") for the payment of which sum, well and truly to be made, the said Principal and Surety bind themselves, and their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal and the Obligee have developed a document titled "Memorandum of Agreement Between the Natural Resources Trustees and RestorCap for Providing Technical Assistance Related to Habitat Restoration Projects Toward Future Settlement of Natural Resource Damage Claims at the Portland Harbor CERCLA Site" dated May 16, 2013, as assigned to RestorCap Development LLC on December 8, 2015, hereinafter called the "MOA."

WHEREAS, Principal and Obligee have developed a document titled "Linnton Mill Restoration Site, Restoration Plan" dated [x], and hereinafter called the "Restoration Plan". The Restoration Plan sets forth requirements regarding the implementation, monitoring, operation and management, and stewardship of a natural resource restoration project for the site located at 10504 NW St. Helens Road in Portland, Oregon (the "Restoration Project").

WHEREAS, under the Restoration Plan, the Principal must provide financial assurance in the amount of **$656,776.00** to guarantee full funding for the implementation of vegetation and biological monitoring, monitoring reports, invasive plant management, trash removal, insurance, maintenance of the constructed Restoration Project, conservation easement holder fee, and other interim contingency and maintenance tasks as outlined in the Restoration Plan (collectively, "Interim Management Activities") in accordance with the Restoration Plan.

WHEREAS, under the Restoration Plan, the Principal must provide financial assurance to guarantee Principal's full funding of lamprey monitoring for Years 1-10 in the amount of **$240,929.00** ("Lamprey Years 1-10 Monitoring Funding").

WHEREAS, under the Restoration Plan, the Principal must provide financial assurance to guarantee Principal's funding of lamprey monitoring for Years 15 and 20 in the amount of **$95,319.00** in accordance with the Restoration Plan ("Lamprey Years 15-20 Monitoring Funding").

WHEREAS, compliance by Principal regarding Lamprey Years 1-10 Monitoring Funding, Lamphrey Years 15-20 Monitoring Funding, and Interim Management Activities are hereinafter collectively referred to as the "Guaranteed Work."

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if Principal shall promptly, faithfully, fully and finally complete the Guaranteed Work, the Surety's obligation shall be null and void, otherwise to remain in full force and effect.

PROVIDED, HOWEVER, That:

1. The Surety shall become liable on the obligation evidenced hereby only upon receipt of a written notice from the Obligee that the Obligee has determined that the Principal has failed to perform the Guaranteed Work. Such notice shall include a description of the Principal's failure to perform and shall be forwarded to the Principal, with a copy to the Surety, within thirty (30) days after the Obligee has finally determined the Principal is in default under the terms of the Restoration Plan. The notice to the Surety shall be delivered to Surety at its Home Office in accordance with the notice requirements of paragraph 8 below.

   In the event of default, the Surety shall tender to the Obligee funds sufficient (as determined by the Obligee) to pay the cost, or remaining costs, of the Guaranteed Work, up to an amount not to exceed the penal sum of this Performance Bond. In no event shall the Surety be liable for fines, penalties, or forfeitures assessed against the Principal.

2. Any action, lawsuit or proceeding that may arise pursuant to this Performance Bond must be instituted in the US District Court for the District of Oregon. No action, lawsuit or proceeding under the Performance Bond shall be had or maintained against the Surety

unless the same be filed and properly served upon the Surety within one year from the effective date of the cancellation of the Performance Bond

3. That no right of action shall accrue under this Performance Bond to or for the use of a person or entity other than the Obligee, and its successors and assigns.

4. The aggregate liability of the Surety is limited to the penal sum (as reduced under paragraph 2 if applicable) stated herein regardless of the number or amount of claims brought against this Performance Bond and regardless of the number of years this Performance Bond remains in force. The liability of the Surety shall not be discharged by any payment or succession of payments hereunder, unless and until such payment or payments shall amount in the aggregate to the Total Dollar Amount of this Performance Bond. The Surety's aggregate liability hereunder shall in no event exceed the amount set forth above.

5. Any modification, revision, or amendment which may be made in the terms of the Guaranteed Work or in the work to be done there under, or any extension of the Guaranteed Work, or other forbearance on the part of either the Principal or Obligee to the other, shall not in any way release the Principal and the Surety, or either of them, or their heirs, executors, administrators, successors or assigns from liability hereunder. The Surety hereby expressly waives notice of any change, revision, or amendment to the Guaranteed Work or to any related obligations between the Principal and Obligee.

6. The Surety hereby agrees that the obligations of the Surety under this Performance Bond shall be in no way impaired or affected by any winding up, insolvency, bankruptcy or reorganization of the Principal or by any other arrangement or rearrangement of the Principal for the benefit of creditors.

7. The Surety will notify the Obligee in writing of any of the following events: (a) the filing by the Surety of a petition seeking to take advantage of any laws relating to bankruptcy, insolvency, reorganization, winding up or composition or adjustment of debts; (b) the Surety's consent to (or failure to contest in a timely manner) any petition filed against it in an involuntary case under such bankruptcy or other laws; (c) the Surety's application for (or consent to or failure to contest in a timely manner) the appointment of, or the taking of possession by, a receiver, custodian, trustee, liquidator, or the like of itself or of all or a substantial part of its assets; (d) the Surety's making a general assignment for the benefit of creditors; or (e) the Surety's taking any corporate action for the purpose of effecting any of the foregoing. Such notice shall be provided to the Obligee within five (5) days of the occurance of any of the above events so as to provide the Obligee time to respond to any of the noted events.

8. All notices, consents, approvals and requests required or permitted hereunder shall be given in writing and shall be effective for all purposes if hand delivered or sent by (a) certified or registered United States mail, postage prepaid, return receipt requested or (b) expedited prepaid delivery service, either commercial or United States Postal Service, with proof of attempted delivery, to the address shown in this Performance Bond. Notice to Obligee shall not be effective unless notice is sent to Restoration Center, National Marine Fisheries Service, Oregon Field Office NOAA, 1201 NE Lloyd Blvd., Portland, OR 97232-2182, Attn: Megan Callahan-Grant. Any Notice to the Surety shall not be effective unless sent by the National Marine Fisheries Service, Oregon Field Office NOAA, 1201 NE Lloyd Blvd., Portland, OR 97232-2182 or an authorized NOAA representative. All notices, elections, requests and demands under this Performance Bond shall be effective and deemed received upon the earliest of (a) the actual receipt of the same by personal delivery or otherwise, (b) one business day after being deposited with a nationally recognized overnight courier service as required above, or (c) three business days after being deposited in the United States mail as required above. Rejection or other refusal to accept or the inability to deliver because of changed address of which no notice was given as herein required shall be deemed to be receipt of the notice, election, request, or demand sent.

9. Any provision in this Performance Bond that conflicts with any applicable statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or legal requirement shall be deemed incorporated herein.

10. The Principal may terminate this Performance Bond only by sending written notice of termination to the Surety and to the Obligee; provided, however, that no such termination shall become effective unless and until the Surety receives written authorization for termination of this Performance Bond by the Obligee.

11. Obligee will authorize termination of this Performance Bond if a) Obligee certifies the completion of the Guarantee Work, and establishment and full funding of an Adaptive Management Set-Aside Escrow Accrount; or b) the Surety and/or Principal establishes a replacement financial assurance mechanism satisfactory to the Obligee.

IN WITNESS WHEREOF The said Principal and Surety have signed and sealed this instrument on this ____ day of _______________

Linnton Water Credits, LLC
Principal

_____________________________________________
By Name/Title

______________________
Surety

_____________________________________________
By Name/Title

## *BOND RELEASE- Bond Number _______________*

***Effective the date shown below, the Obligee confirms that the required work has been completed and accepted. We hereby fully release and exonerate this bond.***

*Date*______________________________________

*Signature*___________________________________

*Name / Title*________________________________

# Appendix 10. Ecological Monitoring Cost Estimate

# Appendix 10: Grette Associates Cost Estimate for Ecological Monitoring
## Years 1-10

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Physical/topo (assuming sub-contractor) | $10,000 | $10,300 | | $10,927 | | $11,593 | | $12,299 | | | $13,439 |
| Fish access (combined with other work; 2 hrs) | $200 | $206 | $212 | $219 | $225 | $232 | $239 | $246 | $253 | $261 | $269 |
| Vegetation (assuming 2 days, 2 people) | $1,000 | $3,296 | | $3,497 | | $3,710 | | $3,936 | | | $4,301 |
| Water level (can collect data once or twice a year during other monitoring; assuming 2 hrs each) | | -- | $1,697 | -- | $1,801 | -- | $1,910 | -- | $2,027 | $2,088 | -- |
| Inundation analysis (process data from topo; 8 hrs) | $800 | $824 | $849 | $874 | $900 | $927 | $955 | $984 | $1,013 | $1,044 | $1,075 |
| Water quality (assuming no additional field effort above water level data collection) | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Fish (assuming two days, 8x each appropriate year) | | $13,184 | | $13,987 | | $14,839 | | $15,742 | | | $17,202 |
| Bald eagle (assuming 3 hr day one person, 37x/appropriate year) | | | | $12,129 | | $12,868 | | $13,652 | | | $14,917 |
| Bird (assuming one day) | | $2,472 | | $2,623 | | $2,782 | | $2,952 | | | $3,225 |
| Mink study (assuming can be combined with bald eagle; 3 add'l hours times 6) | | | | $1,967 | | $2,087 | | $2,214 | | | $2,419 |
| Photo points (2 hrs combined with other visits) | $200 | $206 | $212 | $219 | $225 | $232 | $239 | $246 | $253 | $261 | $269 |
| Habitat feature monitoring (1 day) | $800 | $824 | $849 | $874 | $900 | $927 | $955 | $984 | $1,013 | $1,044 | $1,075 |
| Reporting | $7,500 | $12,500 | $5,000 | $12,500 | | $12,500 | | $12,500 | | | $20,000 |
| Invasive plant management (4x ann., 2 days each) | | $8,240 | $8,487 | $8,742 | $9,004 | $9,274 | $9,552 | $9,839 | $10,134 | $10,438 | $10,751 |
| Trash removal (4x ann., 1 day each) | $4,800 | $4,944 | $5,092 | $5,245 | $5,402 | $5,565 | $5,731 | $5,903 | $6,080 | $6,263 | $6,451 |
| Maintenance (4x ann., 1 day each) | $6,400 | $6,592 | $6,790 | $6,993 | $7,203 | $3,710 | $3,821 | $3,936 | $4,054 | $4,175 | $4,301 |
| Totals | $31,700 | $63,588 | $29,189 | $80,795 | $25,662 | $81,245 | $23,403 | $85,432 | $24,829 | $25,574 | $99,694 |

*Biologist rate of $100/hr, increasing 3%/year

| | |
|---|---|
| 10-Year Total | $571,110 |
| Contingency (15%) | $85,666 |
| **Total** | **$656,776** |

# Appendix 11. Lamprey Monitoring Budget and Site-Specific Monitoring Plan

## Linnton Restoration Project Site
## Revised Final Budget for Lamprey Monitoring Efforts - Linnton Mill Restoration Site (7/31/17)

| | **MONITORING YEAR** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Pre-implementation** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **10** | **15** | **20** | |
| **Cost Elements** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** | **2024** | **2025** | **2027** | **2032** | **2037** | ***TOTAL:*** |
| **Inflation Factor (no investment return)** | **1.00** | **1.03** | **1.06** | **1.09** | **1.13** | **1.16** | **1.19** | **1.23** | **1.27** | **1.34** | **1.56** | **1.81** | |
| **RESTORATION PROJECT MONITORING** | | | | | | | | | | | | | |
| Personnel | $ 1,966 | $ 3,431 | $ 3,534 | $ 3,640 | $ 3,749 | $ 3,861 | $ 6,484 | $ 6,678 | $ 6,879 | $ 4,476 | $ 5,189 | $ 6,016 | $ 55,902 |
| Non-personnel | $ 274 | $ 563 | $ 580 | $ 597 | $ 615 | $ 634 | $ 923 | $ 951 | $ 979 | $ 735 | $ 852 | $ 987 | $ 8,689 |
| Overhead | $ 1,012 | $ 1,820 | $ 1,874 | $ 1,930 | $ 1,988 | $ 2,048 | $ 3,352 | $ 3,452 | $ 3,556 | $ 2,374 | $ 2,752 | $ 3,191 | $ 29,350 |
| Organic content & Total Solids ($50/sample) | $ 1,000 | $ 1,391 | $ 1,432 | $ 1,475 | $ 1,519 | $ 1,565 | $ - | $ - | $ - | $ 1,814 | $ 2,103 | $ 2,438 | $ 14,738 |
| Grain size ($125/sample) | $ 2,500 | $ 3,476 | $ 3,581 | $ 3,688 | $ 3,799 | $ 3,913 | $ - | $ - | $ - | $ 4,536 | $ 5,258 | $ 6,096 | $ 36,845 |
| Lab-associated admin costs | $ 525 | $ 730 | $ 752 | $ 774 | $ 798 | $ 822 | $ - | $ - | $ - | $ 953 | $ 1,104 | $ 1,280 | $ 7,738 |
| Plan development/ implementation | $ 3,316 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3,316 |
| Annual Data Compilation | $ 8,005 | $ 8,245 | $ 8,493 | $ 8,747 | $ 9,010 | $ 9,280 | $ - | $ - | $ - | $ 10,758 | $ 12,472 | $ 14,458 | $ 89,467 |
| Equipment Replacement Cost | $ - | $ - | $ - | $ - | $ - | $ 13,509 | $ - | $ - | $ - | $ - | $ - | $ - | $ 13,509 |
| Contingency | $ 110 | $ 226 | $ 233 | $ 240 | $ 247 | $ 255 | $ 370 | $ 381 | $ 393 | $ 295 | $ 342 | $ 397 | $ 3,489 |
| Contingency (20% of total analytical cost) | $ 700 | $ 973 | $ 1,003 | $ 1,033 | $ 1,064 | $ 1,096 | $ - | $ - | $ - | $ 1,270 | $ 1,472 | $ 1,707 | $ 10,317 |
| ***TOTAL*** | ***$ 19,408*** | ***$ 20,855*** | ***$ 21,480*** | ***$ 22,125*** | ***$ 22,789*** | ***$ 36,981*** | ***$ 11,129*** | ***$ 11,462*** | ***$ 11,806*** | ***$ 27,211*** | ***$ 31,545*** | ***$ 36,569*** | ***$ 273,360*** |
| **REFERENCE SITE MONITORING** | | | | | | | | | | | | | |
| Personnel | $ 1,966 | $ 2,025 | $ 2,086 | $ 2,148 | $ 2,213 | $ 2,279 | $ - | $ - | $ - | $ 2,642 | $ 3,063 | $ 3,551 | $ 21,973 |
| Non-personnel | $ 274 | $ 282 | $ 291 | $ 299 | $ 308 | $ 318 | $ - | $ - | $ - | $ 368 | $ 427 | $ 495 | $ 3,062 |
| Overhead | $ 1,012 | $ 1,042 | $ 1,074 | $ 1,106 | $ 1,139 | $ 1,173 | $ - | $ - | $ - | $ 1,360 | $ 1,577 | $ 1,828 | $ 11,311 |
| Organic content & Total Solids ($50/sample) | $ 1,000 | $ 1,030 | $ 1,061 | $ 1,093 | $ 1,126 | $ 1,159 | $ - | $ - | $ - | $ 1,344 | $ 1,558 | $ 1,806 | $ 11,176 |
| Grain size ($125/sample) | $ 2,500 | $ 2,575 | $ 2,652 | $ 2,732 | $ 2,814 | $ 2,898 | $ - | $ - | $ - | $ 3,360 | $ 3,895 | $ 4,515 | $ 27,941 |
| Lab-associated admin costs | $ 525 | $ 541 | $ 557 | $ 574 | $ 591 | $ 609 | $ - | $ - | $ - | $ 706 | $ 818 | $ 948 | $ 5,868 |
| Contingency | $ 110 | $ 113 | $ 117 | $ 120 | $ 124 | $ 128 | $ - | $ - | $ - | $ 148 | $ 171 | $ 199 | $ 1,229 |
| Contingency (20% of total analytical cost) | $ 700 | $ 721 | $ 743 | $ 765 | $ 788 | $ 811 | $ - | $ - | $ - | $ 941 | $ 1,091 | $ 1,264 | $ 7,823 |
| ***TOTAL*** | ***$ 8,087*** | ***$ 8,330*** | ***$ 8,579*** | ***$ 8,837*** | ***$ 9,102*** | ***$ 9,375*** | ***$ -*** | ***$ -*** | ***$ -*** | ***$ 10,868*** | ***$ 12,599*** | ***$ 14,606*** | ***$ 90,384*** |
| **TOTAL PROJECT SITE PLUS REFERENCE SITE** | ***$ 27,495*** | ***$ 29,184*** | ***$ 30,060*** | ***$ 30,962*** | ***$ 31,891*** | ***$ 46,356*** | ***$ 11,129*** | ***$ 11,462*** | ***$ 11,806*** | ***$ 38,079*** | ***$ 44,144*** | ***$ 51,175*** | ***$ 363,743*** |
| **Pay to US FWS** | ***$ 18,045*** | ***$ 17,748*** | ***$ 18,280*** | ***$ 18,828*** | ***$ 19,393*** | ***$ 33,484*** | ***$ 11,129*** | ***$ 11,462*** | ***$ 11,806*** | ***$ 23,157*** | ***$ 26,845*** | ***$ 31,120*** | ***$ 241,297*** |
| **Pay to Designated Trustee** | ***$ 9,450*** | ***$ 11,437*** | ***$ 11,780*** | ***$ 12,133*** | ***$ 12,497*** | ***$ 12,872*** | ***$ -*** | ***$ -*** | ***$ -*** | ***$ 14,923*** | ***$ 17,299*** | ***$ 20,055*** | ***$ 122,446*** |

*Notes:*

1. This budget is based on the project design as described in "Basis of Design Memorandum - 100%" dated December 20, 2016. Changes to the project design may result in changes in to this budget.

2. The cost estimates provided in this budget reflect our best estimates of the costs of lamprey monitoring over the life of the plan (20 years). While the budget does account for inflation in estimating costs beyond year 0, it is not possible to predict with certainty whether and to what extent certain costs may change over time.

3. The cost estimates for the portion of each annual budget associated with US FWS may differ slightly from the values presented in the US FWS site-specific monitoring plan due to rounding. Please refer to the US FWS Funding Agreement for the official payment amount to be remitted.

4. Costs included in the category “Equipment Replacement Costs” reflect the cost of major equipment required for carrying out lamprey monitoring activities that FWS is initially providing at no cost. Should any or all of the equipment require replacement during the term of lamprey monitoring on NRDA restoration sites, some or all of the replacement costs may be divided among all active restoration sites. The Trustees will make every attempt to identify options for sharing costs with other on-going, non-NRDA research activities. Project developers will not be charged for the costs of equipment replacement unless and until those costs are necessarily incurred.

# Evaluation of Portland Harbor Superfund Area Restoration: Larval Pacific Lamprey
## Linnton Restoration Site

Investigators

U.S. Fish and Wildlife Service
Columbia River Fish & Wildlife Conservation Office
1211 SE Cardinal Court, Suite 100
Vancouver, Washington 98683
(360) 604-2500

For the period 1 April 2017 to 30 June 2038

Submitted January
2017

# Project Summary

## A. Goal

The goal of this investigation is to evaluate how individual restoration projects affect larval Pacific lampreys, specifically their colonization or occupancy of restored habitat.

## B. Objectives

1. Determine whether larval lampreys occupy restoration and reference sites.
2. Determine the types of habitat available and in which types larvae are detected.
3. Characterize species and life history stage that occupy a site.
4. Evaluate the health of larval lamprey detected at each site.

## C. Methodology

We propose to determine whether larval lamprey occupy various sites in the Superfund reach of the Willamette River. In general, tributary/slough, confluence (tributary or slough mouths within the mainstem) and shoreline habitat types will be sampled in both restoration and reference sites. Sites will be sampled pre-implementation as well as years 1-5, 10, 15 and 20 post-implementation. In wadeable habitats, we will use backpack electrofishing to sample for larval lamprey. In non-wadeable habitats we will use deep-water electrofishing technology to sample for larval lamprey. Using a similar approach as that in Jolley et al. (2012a), previously applied to a study of larval lamprey use of the Lower Willamette River, we will determine occupancy within several explicit scales. Generally, slough or tributary areas of interest will be divided into 25-50 m reaches for subsampling. If a slough or tributary is sufficiently short, the entire length will be sampled. Mainstem river areas of interest (e.g., shoreline or confluence habitats) will be divided into 30 m x 30 m quadrats for subsampling. A generalized random tessellation-stratified (GRTS) technique will be used to select sample reaches or quadrats in a random, spatially-balanced order. This approach generates an unbiased sample design that allows the probability of presence to be quantified when lamprey are not captured, detection probabilities to be calculated when lamprey occupy an site, and allows statistical evaluation of temporal changes.

*For this proposal, locations include the Linnton restoration site and McCarthy Creek reference site.*

## D. Relevance

Pacific lamprey numbers have declined to a remnant of those for historical populations. As a result, Pacific lamprey has become a species of concern for federal and state agencies, Native American tribes, and the local public (Close et al. 2002; Luzier et al. 2011). In 2003, Pacific lamprey was petitioned for listing under the Endangered Species Act, and Oregon and Idaho currently list Pacific lamprey as a species of concern. Water and sediment quality was identified as a major threat for Pacific lamprey in the Pacific Lamprey Assessment and Template for Conservation Measures (Luzier et al. 2011). A Conservation Agreement was signed in 2012 by tribal, state, federal, and local agencies as a cooperative effort to reduce threats to Pacific lamprey and improve their habitats and population status (USFWS 2012). Monitoring the effectiveness of research and conservation actions is a primary objective of the Conservation Agreement.

The Portland Harbor Natural Resource Trustee Council Tribal Working Group (TWG) has found sufficient evidence that lamprey have been injured due to the release of hazardous substances in Portland Harbor and require compensation for these injuries. While restoration of habitat will most likely benefit lamprey as well as other species, additional compensation is appropriate to offset the lost services provided by lamprey due to their unique importance to tribes. Injury to larval lamprey due to contamination was identified through preliminary toxicity testing performed by the Trustee Council. The lost use of lamprey due to contamination was identified through interviews with Tribal members. During two workshops with Tribal and Trustee lamprey experts, the TWG learned that not enough is known about the types of habitat that lamprey prefer in large river systems or what habitat features would be most effective in the design of restoration projects targeted at benefiting lamprey. The TWG, with the help of the lamprey experts, decided that the best use of resources at this time is to incorporate a comprehensive lamprey monitoring program into the harbor-wide restoration monitoring plan, rather than design restoration projects specifically for lamprey. The purposes are to evaluate whether the restoration projects designed to benefit salmon and other species also benefit lamprey, and to gather data about habitat use by larval lamprey that may be used by the Tribal Trustees and others in the future to improve the design of restoration projects for lamprey.

Patterns of occupancy, abundance, and habitat use by larval Pacific lamprey in restored sites that are in or adjacent to relatively large rivers has been largely unexplored. Recent findings indicate potentially widespread occupancy of larval lamprey in a variety of mainstem (large river) habitats (Jolley et al. 2010, 2011, 2012a; 2012b). Information from the proposed study can be used to help inform whether restoration of the Superfund Area is beneficial to lamprey. Learning if and how lampreys recolonize and use restored sites in or near mainstem habitats is essential for understanding of the effects of Superfund Area restoration on larval lamrpey.

# Project Description

## A. Background

Pacific lamprey *Entosphenus tridentatus* in the Columbia River Basin (CRB) and other areas have experienced a great decline in abundance (Close et al. 2002) and have been given protected status within Oregon (Kostow 2002). Lamprey are culturally important to Native American tribes, are ecologically important within the food web, and are an indicator species whose decline provides further insight into the impacts of human actions on ecological function (Close et al. 2002). Much information is lacking on the basic biology, ecology, and population dynamics that is required for effective conservation and management.

Pacific lampreys have a complex life history that includes a multiple year larval (ammocoete), migratory juvenile (macrophthalmia), and adult marine phase (Scott and Crossman 1973). Larvae and juveniles are strongly associated with stream and river sediments. Larvae live burrowed in stream and river sediments for multiple years after hatching, where they filter feed detritus and organic material (Sutton and Bowen 1994). Larvae metamorphose into juveniles from July to December (McGree et al. 2008) and major migrations are made downstream to the Pacific Ocean in the spring and fall (Beamish and Levings 1991). The sympatric western brook lamprey *Lampetra richardsoni* does not have a major migratory or marine life stage although adults may locally migrate upstream before spawning (Renaud 1997). For both species, the majority of the information on habitat preference of larvae comes from CRB tributary systems (Moser and Close 2003; Torgersen and Close 2004; Stone and Barndt 2005; Stone 2006) and coastal systems (Farlinger and Beamish 1984; Russell et al. 1987; Gunckel et al. 2009).

Larval lamprey are known to occur in sediments of low-gradient streams (<5th order [1:100,000 scale]; Torgersen and Close 2004) but their use of larger river habitats in relatively deeper areas is less known. Downstream movement of larvae, whether passive or active, occurs year-round (Nursall and Buchwald 1972; Gadomski and Barfoot 1998; White and Harvey 2003). Sea lamprey *Petromyzon marinus* ammocoetes have been documented in deepwater habitats in tributaries of the Great Lakes, in proximity to river mouths (Hansen and Hayne 1962; Wagner and Stauffer 1962; Lee and Weise 1989; Bergstedt and Genovese 1994; Fodale et al. 2003a), and in the large, connecting St. Marys River (Young et al. 1996). References to other species occurring in deepwater or lacustrine habitats are scarce (American brook lamprey *Lampetra appendix*; Hansen and Hayne 1962). In the Pacific Northwest, anecdotal observations exist regarding larval lamprey occurrence in large river habitats, mainly at Columbia River hydropower facilities (Moursund et al. 2003; CRITFC 2008), impinged on screens associated with juvenile bypass facilities, or through observation during dewatering events. These occurrences are thought to be associated with downstream migration and specific collections of apparently migrating ammocoetes have been made in large river habitats (Beamish and Youson 1987; Beamish and Levings 1991). More recently, evaluations of larval Pacific lamprey occupancy and distribution in mainstem river habitats have suggested widespread occurrence in certain areas of the Columbia River and Willamette River mainstem (Jolley et al. 2011; Jolley et al. 2012b).

A portion of the mainstem of the lower Willamette River that is known to be occupied by larval Pacific and western brook lamprey (Jolley et al. 2012) was declared a Superfund Site in 2000 by the U.S. Environmental Protection Agency. The Superfund study reach extends from river kilometer 3.2 to river kilometer 18.9 and has a broader focus area extending from the Columbia River to Willamette Falls (Figure 1). To mitigate for past environmental damage being identified through the Natural Resource Damage Assessment (NRDA) process, these areas are subject to various restoration activities as well as assessments of the effectiveness of any restoration. It is unclear whether any of the proposed aquatic restoration activities, which are primarily focused on salmonids, will improve conditions for Pacific lamprey. As such, there is interest in monitoring the effectiveness of the restoration, in part, relative to larval Pacific lamprey.

A lamprey monitoring plan (LMP) was developed based on a set of monitoring goals and objectives that were identified by Trustee Council lamprey biologists over two workshops held in the fall of 2011. This LMP was developed to simultaneously monitor the impact of restoration actions on lamprey populations and health in Portland Harbor by gathering information about larval lamprey life history, biology, and habitat use. This information may be used by the Trustee Council in the future to design and evaluate lamprey-specific restoration projects. Since lamprey biology and life history are very different from other biota, the overlap between the LMP and the general restoration monitoring and stewardship plan is not extensive. The LMP differs from the general restoration monitoring and stewardship plan, in part, because the lamprey monitoring is proposed to continue for a period of 20 years. In most cases, the metrics proposed for collection as part of the lamprey monitoring effort need to be co-located with lamprey sampling. To maximize efficiencies, the Trustee Council will use the data collected as part of the lamprey monitoring plan for the general restoration monitoring and stewardship effort as much as possible. Biologists recommended monitoring lamprey for 20 years, with the goal of capturing data for 1 to 2 complete generations. Pre-implementation monitoring will be conducted at each restoration site. Lampreys may colonize habitats rapidly. Therefore, monitoring will be conducted on a yearly basis for the first five years, and every five years thereafter.

Here we propose to investigate and document patterns of larval lamprey occupancy and habitat use in or near a restoration site. Understanding larval lamprey usage of habitats in and adjacent to restoration sites is critical to understanding the effectiveness of restoration actions. At present, little specific information is available on whether larvae colonize restored habitats, which life stages may use these habitats, or how quickly and for how long they use these sites. In general, the proposed work is guided by the LMP. However, due to site specific conditions and constraints, the specific metrics and timing of monitoring proposed for any given site may differ slightly from those outlined in the LMP. Our specific objectives for this phase of NRDA restoration monitoring are as follows:

## B. Objectives

1. Determine whether lampreys occupy restoration and reference sites.
2. Determine the types of habitat available at each site and in which types lamprey are detected.
3. Characterize lamprey species and life history stage that occupy each site.
4. Evaluate the health of lamprey detected at each site.

## C. Study Area

### Restoration Site

*There is a proposed action to improve habitat at the Linnton site (Multnomah County, OR). The Linnton site is located on the west side of the Willamette River,just upstream from Sauvie Island. Currently the site has slough or tributary habitat as well as a confluence area and associated shoreline (Linnton Creek, Figure 2). However, pre-restoration monitoring is not required to understand the effectiveness of the tributary improvement. The slough or tributary habitat runs through a pipe, underground and is not accessible to fish. Lampreys are not believed to occupy or have access to the underground tributary area being proposed for restoration. Pre-restoration monitoring is required to understand the effects of restoration on the shoreline and confluence areas. Larval lamprey are known to occur in nearby areas of the mainstem Willamette River (Jolley et al. 2012b), and have access to and the potential to occur in or occupy the confluence and shoreline habitats of the proposed restoration site. Post-restoration monitoring is required to understand the effects of the restoration. In the case of the Linnton site, this proposal includes monitoring newly exposed tributary/slough habitat (since this habitat is currently believed to be inaccessible to fish, monitoring would be post restoration only) (Figure 3) as well as the confluence and shoreline habitat (pre and post restoration).*

### Reference Sites

*McCarthy Creek and adjacent shoreline (Figure 4) is proposed as a specific reference site to complement the Linnton restoration. Since the Linnton restoration site currently has confluence and shoreline habitat, to assess the restoration, the inclusion of a reference site with confluence and shoreline habitat is appropriate for a before-after-control-impact (BACI) approach. A BACI approach to monitoring would provide some ability to make inferences about the effect of the restoration activity.*

*In total, six reference sites have been identified within the broader Superfund Area. These include the McCarthy Creek as well as habitat associated with Ross Island, Cemetery Creek, Oswego Creek,* *Columbia Slough and Multnomah Channel. The combination of these reference sites contains representative tributary/slough, confluence, and shoreline habitats. Combined information from all reference sites will allow for a relatively rigorous and thorough BACI evaluation. Monitoring at the Ross Island and Cemetery Creek sites began in 2014 and 2015, respectively. Starting in 2016, the USFWS began to monitor all habitat areas of all six reference sites. For monitoring at reference sites and/or habitat areas that are not being funded as part of a particular restoration activity, the USFWS will provide a cost share match to ensure that all reference sites and habitat areas are monitored. As long as budgets permit, the USFWS will incur the expense of the reference site monitoring that is not covered by a restoration sponsor. If, at some point in the future, the USFWS is unable to fund the monitoring of the reference sites, the associated cost will be distributed as directed by the Trustee Council.*

## D. Methods

### Sample framework

To make inferences about whether changes observed at the restoration site are the result of the restoration action, we propose to use a BACI approach. Thus, we propose to determine whether larval Pacific lamprey occupy the restoration and reference sites both prior to and after restoration actions. In general, restoration and reference sites are likely to have one or more of three distinct habitat types, 1) tributary or slough, 2) confluence and 3) shoreline areas. Tributaries or sloughs would typically be (braided networks of) wadeable water. Confluence areas are being defined as 100 m radius arcs of mainstem habitat (in the Willamette River or Multnomah Channel), with the arc center originating near the midpoint of the tributary or slough mouth intersection with the mainstem. Shorelines are being defined as 100 m wide bands in the mainstem (Willamette River or Multnomah Channel) that are adjacent and parallel to the shoreline. Where possible and appropriate, each of these areas will be sampled to determine occupancy.

For each tributary or slough area longer than 400 m, we will develop a layer of 50 m reaches. For the two types of mainstem areas (shoreline and confluence), we will develop a layer of 30 m x 30 m quadrats using ArcMap 10.3 (ESRI [Environmental Systems Research Institute], Redlands, California) which will be overlaid on these areas. We will use a generalized random-tessellation stratified (GRTS) approach scripted in Program R (R Core Team 2013) to select sample reaches or quadrats in a random, spatially-balanced order (Stevens and Olsen 2004). The GRTS approach produces an unbiased sample design that allows for quantifying detection probabilities and determining the likelihood that an area is occupied if larvae are not observed. As they are selected in the GRTS approach, the reaches or quadrats are ordered sequentially and the lower numbered reaches or quadrats are given highest priority for sampling. Unfeasible reaches or quadrats (e.g., dewatered, inaccessible, physical impediment, excessive depth for our configuration, unsuitable hydraulics) will be eliminated from the sample through reconnaissance surveys and all subsequent reaches or quadrats will be increased in priority. Generally, reaches or quadrats in which the UTM center point is wetted will be considered feasible.

We propose to use a sampling effort (number of sample reaches or quadrats) that, in the case they are not detected, we estimate would allow us to be at least 80% certain that larval lamprey do not occupy a sample area (20% occurrence) (see Bayley and Peterson 2001, Peterson and Dunham 2003). The amount of effort is based, in part, on estimates from reach-specific (see Silver et al. 2010) and quadrat-specific (see Jolley et al. 2012b) probabilities of detection generated from previous work. Sample effort was also dependent, in part, on total area. For tributaries or sloughs, if the area of interest is less than 400 m in length, we propose to sample all reaches (contiguous 50 m reaches). If the area of interest is 400 m or longer, we propose to sample seven reaches. For mainstem areas (shorelines and confluence), if the area is such that fewer than 10 quadrats exist, we propose to sample all quadrats. If the area is such that 10 or more quadrats exist, we propose to sample 10 quadrats.

*At the Linnton restoration site, we anticipate the sample effort will correspond to 6-8, 50 m tributary reaches (post restoration only), 10 confluence quadrats and 10 shoreline quadrats (pre and post restoration)*

*(Figure 5). In the McCarthy Creek reference site, we anticipate the sample effort will correspond to 10 confluence quadrats and 10 shoreline quadrats (pre and post restoration) (Figure 4)*

Sample technique - fish

For tributary or slough (wadeable) areas, a sampling event will consist of using an AbP-2 backpack electrofisher (ETS Electrofishing, Madison, WI; Silver et al. 2010) in a 50 m reach. Initially, the electrofisher delivers three DC pulses per second at 25% duty cycle, 125 V, with a 3:1 burst pulse train (i.e., three pulses on, one pulse off). This current is designed to stimulate burrowed ammocoetes to enter the water column. Once a larva is observed in the water column, 30 pulses/second are applied to temporarily immobilize the larva for capture in a net.

For confluence and shoreline areas, sampling will be conducted using a boat-mounted deep-water electrofisher (Bergstedt and Genovese 1994, Jolley et al. 2012a; Figure 6) in a 30 m x 30 m quadrat. This quadrat size was selected based on the previous experience of sea lamprey researchers in the Great Lakes (M. Fodale, USFWS, personal communication) as their sampling evolved from a systematic to adaptive approach (Fodale et al. 2003b). Each sampling event consists of a single drop of the deepwater electrofisher within a quadrat (Bergstedt and Genovese 1994; Jolley et al. 2012). The deepwater electrofisher is comprised of a pyramid-shaped fiberglass bell (or hood; 0.61 $m^2$ in area) with stainless steel plate electrodes on its bottom surface. The electrodes are wired to a modified AbP-2 electrofisher which delivers three pulses DC per second at 10% duty cycle, with a 2:2 pulse train (i.e., two pulses on, two pulses off). Output voltage will be adjusted at each quadrat to maintain a peak voltage gradient between 0.6 and 0.8 V/cm across the electrodes. The bell is lowered to the river bottom where it sits flat, allowing electrical stimulus to be delivered from the electrofisher into the substrate to induce larval lamprey emergence. The bell is coupled (by 7.6 cm vinyl water hose) to a gasoline-powered hydraulic pump which brings emergent larvae to the surface for collection. Pumping is started approximately 5 seconds prior to shocking to purge air from the suction hose. Suction from the bell is produced by directing flow from the pump through a hydraulic eductor, which allows larvae to be collected in a mesh basket (27 x 62 x 25 cm; 2 mm wire mesh) while preventing them from passing through the pump. A 60 second pulse delivery is followed by an additional 60 seconds of pumping to help ensure displaced larvae cycle through the hose and into the collection basket. The sampling techniques are described in detail by Bergstedt and Genovese (1994) and were similar to those used in the Great Lakes region (Fodale et al. 2003) and the Willamette River (Jolley et al. 2012).

Collected lampreys will be anesthetized in a solution of buffered tricaine methanesulfonate (MS-222), identified to genus (*Entosphenus*, i.e., Pacific lamprey or *Lampetra* spp. i.e., western brook/river lamprey) according to caudal pigmentation (if greater than 60 mm TL; Figure 7; Goodman et al. 2009), classified according to developmental stage (i.e., ammocoete, macrophthalmia, or adult), and measured for total length (TL in mm).Caudal fin tissue will be collected and preserved in 100% ethanol for potential, subsequent genetic analysis to confirm identification. Any physical anomalies (lesions, suspected bird strikes, etc.) will be recorded for all larvae. If larvae with tumors are collected, they will be euthanized and preserved for potential evaluation at a later date. In addition, any observations of juveniles, adults, or suspected Pacific lamprey nests will also be recorded. Lampreys will be placed in a recovery bucket of fresh river water and released after they can maintain an upright position and resume swimming behavior. Previous use of these methodologies (for example, see Jolley et al. 2010) suggests that captured larval lamprey experience little or no injury and mortality.

Sample technique - habitat

Concurrent to each sampling event a sediment sample will be taken (if possible) from each reach or quadrat by using a Ponar bottom sampler (16.5 cm x 16.5 cm). Each sample will be mixed thoroughly and approximately two, 250-500 ml subsamples will be transferred to containers provided by a contracted (non-USFWS) laboratory. Each sample will be labeled with the sample site number, replicate number and date, placed on ice, returned to the USFWS station and subsequently handled per the instructions provided from the contracted laboratory. All sediment samples will be made available to the contracted laboratory for subsequent analysis.

Water temperature (°C), conductivity (µS/cm) and water depth will be measured (tributaries or sloughs in cm, mainstem areas in m) in each sample reach or quadrat. In general, larval lamprey habitats have been classified as Type I, II, or III, and it is widely accepted that larvae appear to most prefer Type I and least prefer Type III (see Slade et al. 2003). As such, we will estimate the proportion of Type I, II, and III habitat in each of the wadeable sample reaches.

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## Analysis

*Occupancy*: The probabilistic sampling approach will provide a basis for using a BACI approach to make inferences about the utility of the restoration. If Pacific lamprey larvae are detected, the area of interest will be defined as occupied. Using detection probabilities estimated from previous work (Silver et al. 2010; Jolley et al. 2012a), if larvae are not detected we would estimate at least an 80% level of certainty that they do not occupy at least 20% of the area. Occupancy will be summarized and compared between the restoration and reference sites.

*Relative Abundance*: When possible, detection probabilities will be calculated. While absolute abundance may be difficult or impossible to calculate, detection probability may be useful as an index of relative abundance. When possible, detection probabilities will be summarized and compared between the restoration and reference sites. In addition, when possible, sample effort in wadeable areas will be tracked and CPUE will be calculated. When possible, CPUE will be summarized and compared between the restoration and reference sites.

*Grain size, grain type, sediment contaminant concentrations, organic content*: Sediment samples and associated data will be provided to a contracted laboratory for analysis of these variables. If the laboratory provides results to the FWS, they will be included in the final report.

*Water temperature, conductivity, and depth*: Water temperature, conductivity, and depth characteristics will be summarized and compared between the restoration and reference sites.

*Total Length*: The size-structure of captured lamprey will be described (i.e., mean TL, length-frequency histograms) and be related to published studies of size and age (e.g., Meeuwig and Bayer 2005). Size structure will also be compared between the restoration and reference sites.

*Species composition*: Population composition will be described (i.e., proportion *Entosphenus tridentatus*, and *Lampetra* spp.) and be related to published studies of population composition in mainstem areas of the Willamette River (e.g., Jolley et al. 2012b). Population composition will also be compared between the restoration and reference sites.

*Qualitative health assessment*: Physical anomalies will be described (i.e., proportion of larvae with lesions) and compared between the restoration and reference sites.

*Habitat*: For slough/tributary habitat, the proportion of each habitat type (I, II, III) in a reach as well as at the site will be summarized. The relationship between the proportion of each habitat type in a reach or site and whether or not larvae were detected in that reach or site will be characterized.

*Life history stage*: The presence of various life stages will be described (i.e., number of Pacific lamprey nests observed) and compared between the restoration and reference sites.

## Inference and Expectations

The ability to make a specific inference about the effect of a given restoration activity will be influenced, in part, by sample design, variability in the metrics as well as whether or not lamprey are detected. For many of the metrics listed above, what variability will be encountered and whether lamprey will be detected is unknown and difficult to predict. There is a finite set of likely occupancy outcomes (Table 1). One anticipated outcome (for example) is that prior to restoration, larvae will not occupy project areas but will occupy reference sites whereas sometime after restoration, larvae will occupy both project and reference sites. This outcome would support an inference that restoration, at least in part, allowed lamprey to colonize or occupy the restored site. An alternative outcome (for example) is that prior to and after restoration, larvae will not occupy project or reference sites. This outcome would not allow for any (or very limited) inference to be made about the utility of the restoration for larval lamprey. For additional discussion concerning inference, see Section C (above), Study Area.

Work locations and schedule *

*Restoration site: Linnton.*
*Reference site: McCarthy Creek.*
*Estimated sample period: April-October, 2017 (pre-restoration).*
*Outyears: 2018-2022, 2027, 2032, 2037 (post-restoration).*
*Final report: 2038.*
*Schedule may be adapted as necessary

## E. Facilities and Equipment

The field sampling will be carried out by staff of the Columbia River Fish & Wildlife Conservation Office (CRFWCO). Currently, the CRFWCO has vehicles, a backpack electrofisher, a deep-water electrofishing configuration, boat, and boat trailer as well as office resources necessary to conduct this study. The boat is equipped with appropriate safety equipment.

## F. Biological Impacts

The proposed project should not have any significant impact on the population health or status of Pacific lamprey. All collected lamprey will be released. The collection methods should not affect any other listed species (i.e. no take of other native species).

## G. Key Personnel

**Brook Silver**, (B.Sc.) is a Fishery Biologist with the U.S. Fish and Wildlife Service, Columbia River Fish & Wildlife Conservation Office.

**Joe Skalicky**, (B.Sc.) is a Fishery Biologist with the U.S. Fish and Wildlife Service, Columbia River Fish & Wildlife Conservation Office.

**Christina Wang**, (M.Sc.) is a Fishery Biologist with the U.S. Fish and Wildlife Service, Columbia River Fish & Wildlife Conservation Office.

**Timothy A. Whitesel** (Ph.D.), is a Supervisory Biometrician with the U.S. Fish and Wildlife Service, Columbia River Fish & Wildlife Conservation Office.

Project planning, administration, and reporting: C. Wang, T. Whitesel

Work plan preparation, protocols, permits: B. Silver, T. Whitesel

Field sampling of larval lamprey: J. Skalicky

Analysis of data and preparation of report segments: J. Skalicky, T. Whitesel

## H. Technology Transfer

Information and analyses from this study will be transferred in the form of written and/or oral reports. Appropriate findings may be published in technical journals and presented at regional or national professional society symposia. Special efforts will be made to provide information to managers as needed.

*Products timeline*

March 31, 2018 – draft final report

June 30, 2018 – final report

## I. Estimated Budget[1]

### 2017: Estimated budget for pre-restoration sampling (one event)

<u>Pre-monitoring planning (*first year only*):</u>
Personnel – 2,318
Non-personnel – 0
Contingency – 0
O/H – 998
Total – 3,316

<u>Linnton restoration site sampling:</u>

*Shoreline Areas*
Personnel – 983
Non-personnel – 137
Contingency – 55
O/H – 506
Total – 1,681

*Confluence Areas*
Personnel – 983
Non-personnel – 137
Contingency – 55
O/H – 506
Total – 1,681

*Slough and Tributary Areas*
Personnel – 0
Non-personnel – 0
Contingency – 0
O/H – 0
Total – 0

<u>McCarthy Creek reference site sampling:</u>

*Shoreline Areas*
Personnel – 983
Non-personnel – 137
Contingency – 55
O/H – 506
Total – 1,681

*Confluence Areas*
Personnel – 983
Non-personnel – 137
Contingency – 55
O/H – 506
Total – 1,681

*Slough and Tributary Areas*
Personnel – 0
Non-personnel – 0
Contingency – 0
O/H – 0
Total – 0

<u>Analysis and information exchange:</u>
Personnel – 5,515
Non-personnel – 115
Contingency – 0
O/H – 2,375
Total – 8,005

<u>GRAND TOTAL:</u> 18,045

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[1] This budget reflects costs to FWS for one sampling event, but is not reflective of all costs related to lamprey monitoring. For example, it does not include the costs of sediment analyses or related contingency, or costs related to potential equipment replacement.

## Outyears: Estimated budget for post-restoration sampling (one event, each year) (based on expanded sampling in tributaries as well as an annual inflation rate of 3%)

2018: 17,747
2019: 18,279
2020: 18,828
2021: 19,393
2022: 19,974
2027: 23,156
2032: 26,844
2037: 31,119
2038: 14,892 (overall data summary and analysis, completion report)

## 2018: OUTYEAR EXAMPLE of estimated budget for post-restoration sampling (one event)

Linnton restoration site sampling:

*Shoreline Areas*
Personnel – 1,013
Non-personnel – 141
Contingency – 56
O/H – 521
Total – 1,731

*Confluence Areas*
Personnel – 1,013
Non-personnel – 141
Contingency – 56
O/H – 521
Total – 1,731

*Slough and Tributary Areas*
Personnel – 1,407
Non-personnel – 281
Contingency – 113
O/H – 778
Total – 2,578

McCarthy Creek reference site sampling:

*Shoreline Areas*
Personnel – 1,013
Non-personnel – 141
Contingency – 56
O/H – 521
Total – 1,731

*Confluence Areas*
Personnel – 1,013
Non-personnel – 141
Contingency – 56
O/H – 521
Total – 1,731

*Slough and Tributary Areas*
Personnel – 0
Non-personnel – 0
Contingency – 0
O/H – 0
Total – 0

Analysis and information exchange:
Personnel – 5,681
Non-personnel – 112
Contingency – 0
O/H – 2,447
Total – 8,245

GRAND TOTAL: 17,747

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Figure 1. Harborwide restoration focus area, outlined in red and yellow.

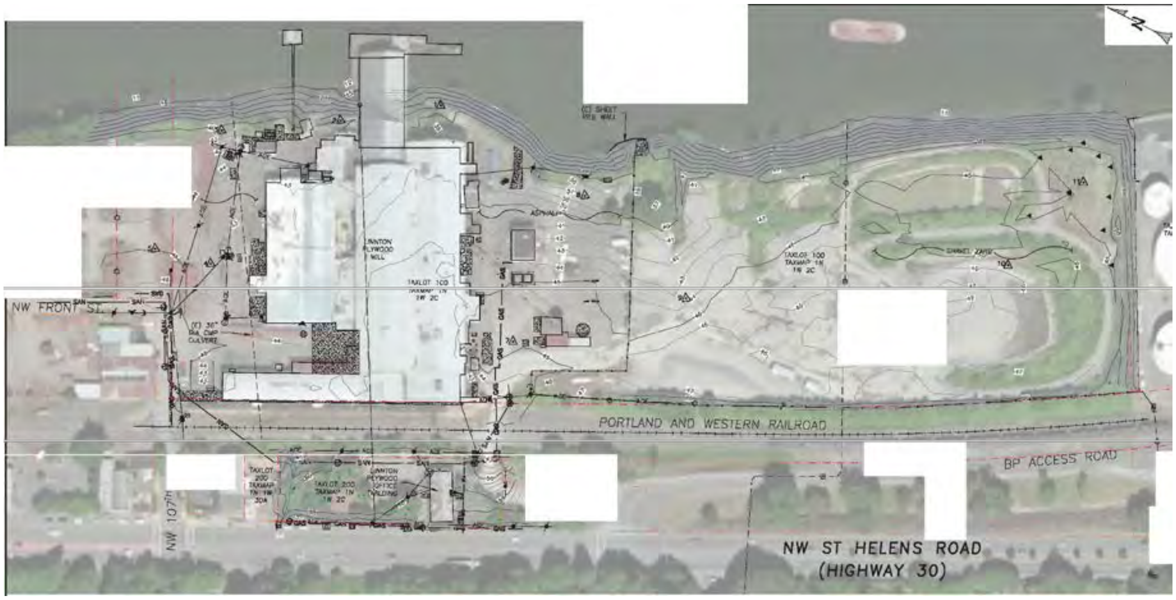


Figure 2. Proposed Linnton restoration project area.

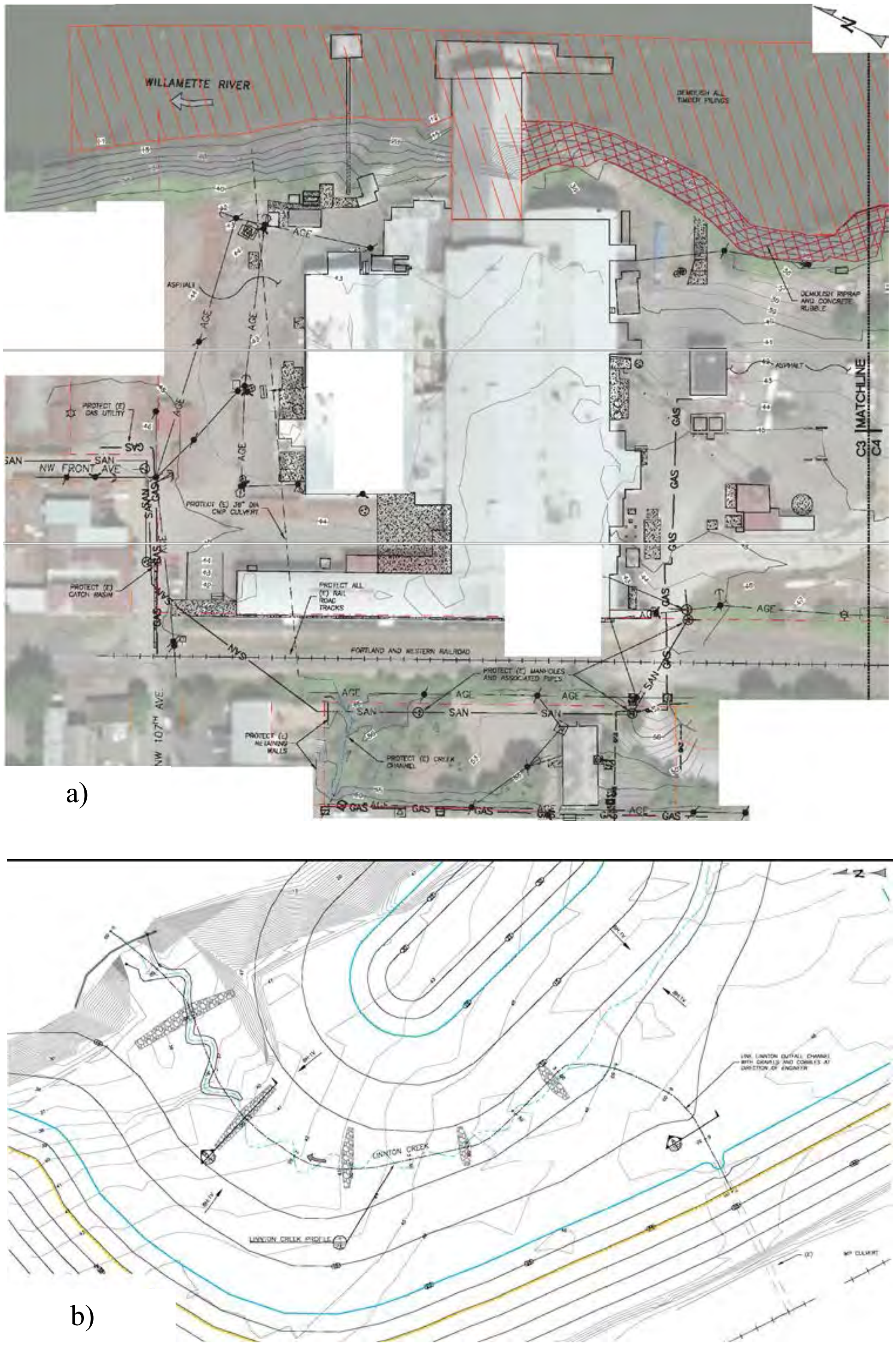


Figure 3. Proposed restoration at Linnton includes improved a) shoreline and b) tributary habitat.

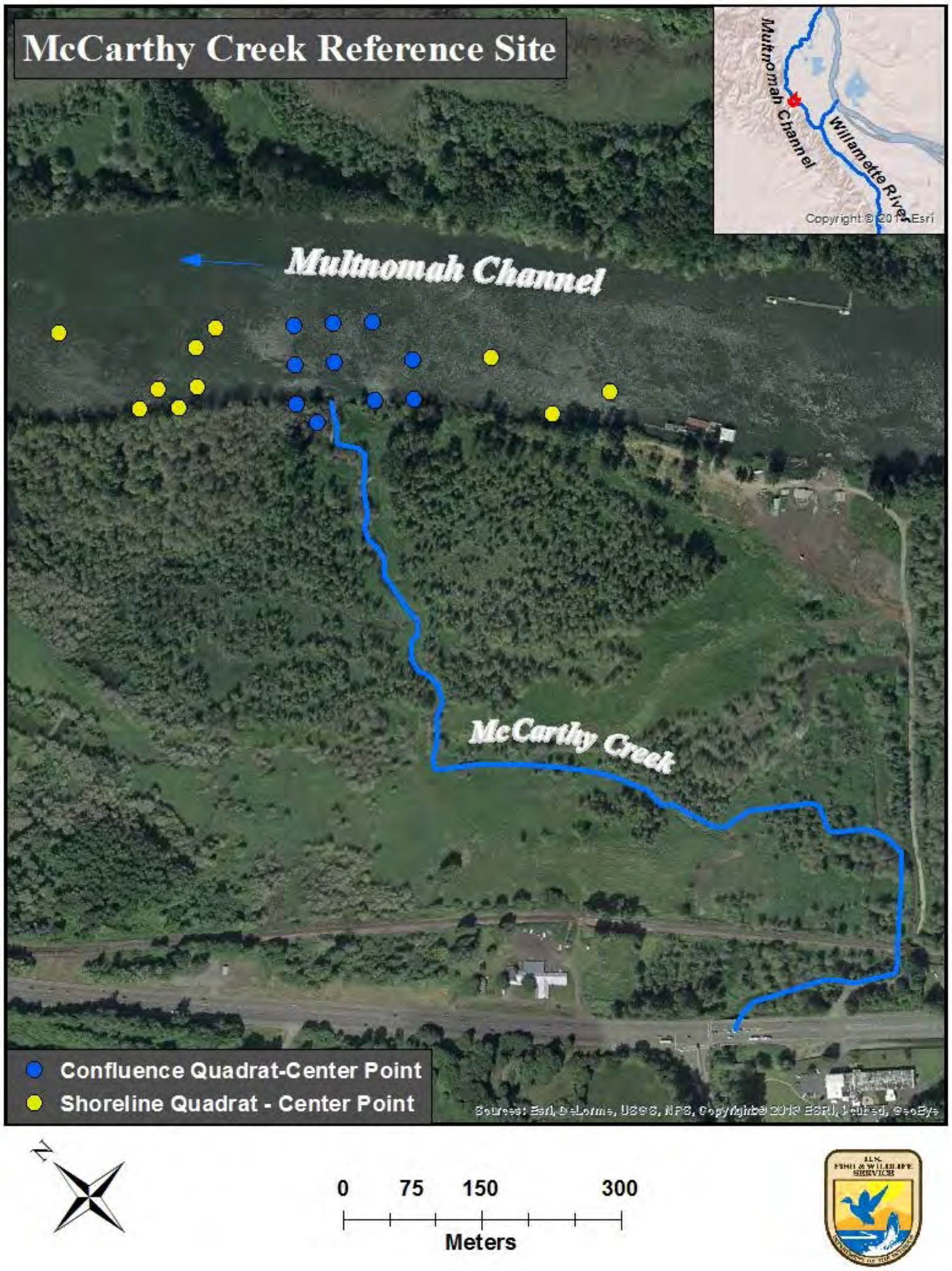


Figure 4. Proposed sample design for the McCarthy Creek reference site. Potential shoreline (100 m band) sample quadrats (yellow points) and confluence sample quadrats (100 m arc, blue points) will be sampled as part of this investigation. Tributary reaches will not be sampled as part of this investigation.

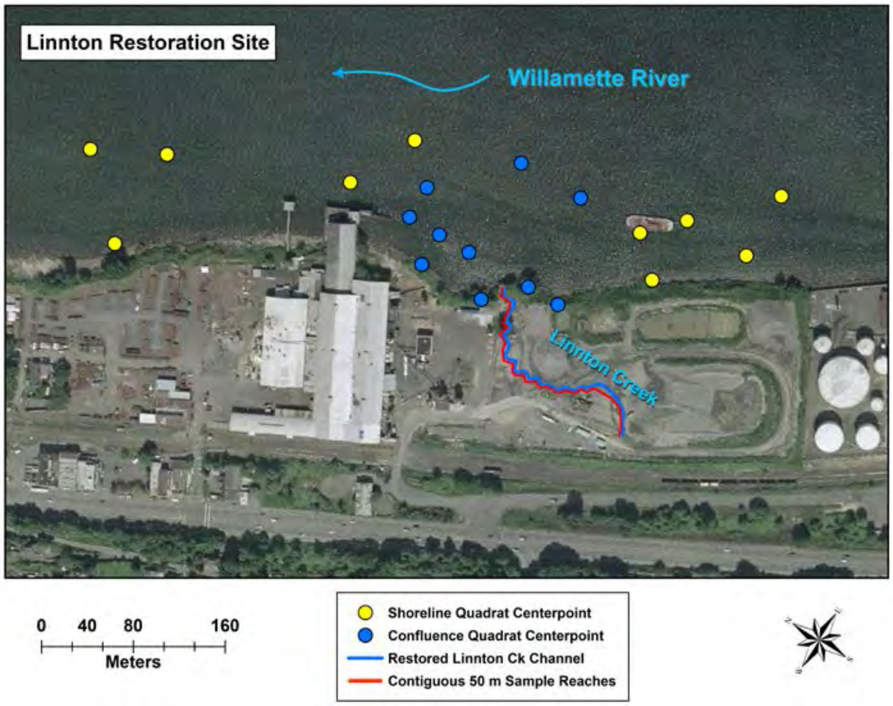


Figure 5. Proposed sample design for the restoration site, potential shoreline (100 m wide band) sample quadrats (yellow points), confluence sample quadrats (blue points) and tributary sample area (red line).

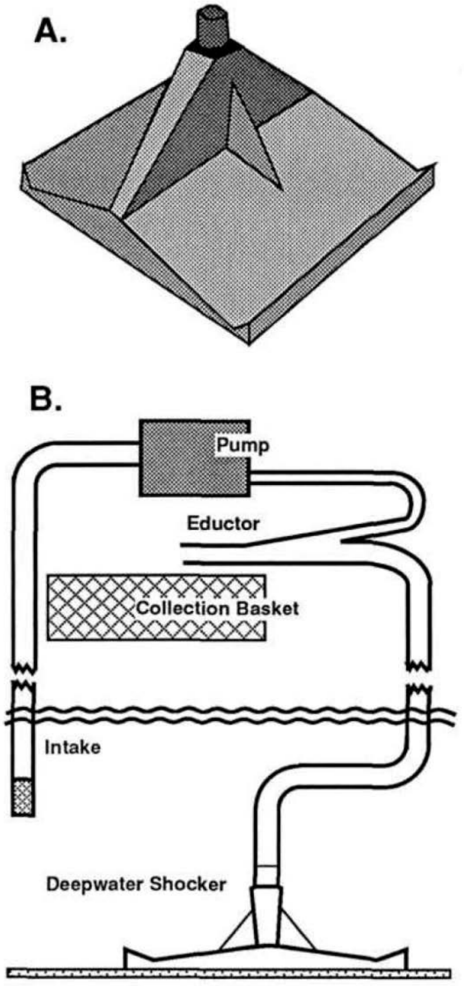


Figure 6. (A) Deepwater electrofishing device for driving lamprey larvae from the bottom and (B) the pumping system used to move them to the surface for collection. Figure taken from Bergstedt and Genovese (1994).

## Lamprey Ammocoete I.D. Guide

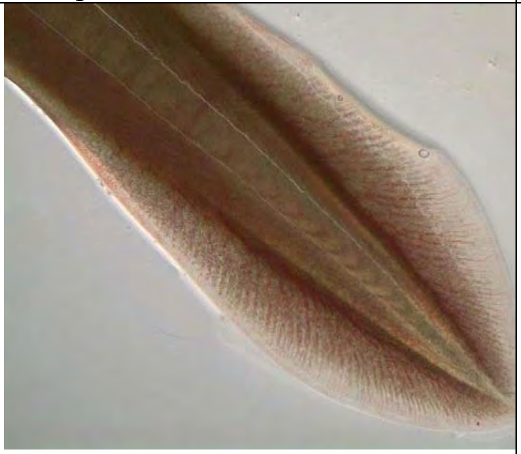
| **Species** | Pacific Lamprey<br>Entosphenus tridentata | Western Brook Lamprey (River Lamprey)<br>Lampetra Richardsoni (Lampetra ayresi) |
|---|---|---|
| **Picture** |  |  |
| **Caudal Ridge** | Light pigmentation | Dark, even pigmentation |
| **Caudal Fin** | Darker pigmentation (hard to see w/ bare eyes) | Translucent or peppered pigmentation |
| **Ventral (Belly)** | Light pigmentation | Dark, even pigmentation |
| **Myomere Counts** | Higher counts | Lower counts |

Figure 7. Larval lamprey identification guide.

Table 1. Description of possible occupancy scenarios, by site (Reference or Restoration) and time period (Before or After restoration); O = occupied; U = Unoccupied. Using the BACI approach, to attribute a response to a restoration action, it will be necessary to see a change at the restoration site and for that change to be different than any change seen at the reference site.

| | **Before Restoration** | **After Restoration** |
|---|---|---|
| **Restoration Site** | O or U | O or U |
| **Reference Site** | O or U | O or U |

# Addendum A

## B. Objectives

5. Determine whether larval lampreys are stranded in ephemeral tributaries

Stranding in the Tributary Area of the Restoration Site

*There is a proposed action to improve habitat at the Linnton site (Multnomah County, OR). A schematic of the proposed restoration can be seen in Figures 2 & 3. Once the restoration is complete, the tributary will flow through the restoration area and confluence with the Willamette River. This tributary is expected to be ephemeral, drying up in the summer months. As such, if lamprey occupy this tributary, the potential exists for these fish to be stranded in the new habitats as the tributary drys up. Thus, if and when larval lamprey are detected occupying (have colonized) the tributary area of the restoration site, we will evaluate the fate of these larvae.*

*It is unclear whether the tributary will dry up in a manner such that a) it become disconnected from the Willamette River before going completely dry or b) it drys homogeneously and maintains continuous connection to the Willamette River. If larvae are detected in the tributary, we will continue to sample that tributary for occupancy by backpack electrofishing. Sampling will occur approximately once every two weeks from June 15 through August 15 (as drying occurs). During sampling, we will determine whether larvae continue to occupy the tributary and we will evaluate the manner in which the tributary is drying.*

*If the tributary loses connection with the mainstem before the tributary is completely dry (a), one (1) possible outcome is that larvae occupy the remaining water and become stranded in the tributary. Another possible outcome (2) is that larvae do not occupy the remaining water and are not stranded in the tributary. If the tributary does not lose connection with the mainstem before the tributary is completely dry (b), one possible outcome (3) is that, prior to it completely drying up, larvae are not detected in the tributary (they have moved out). If larvae are not detected in two consecutive sampling events, we will use that as evidence that they left the tributary prior to getting stranded. It is also possible that, prior to it completely drying up, larvae continue to be detected in the tributary. In this case, we will evaluate the movement of larvae out of the tributary. Approximately two weeks before the tributary will be completely dry, a larval electrofishing survey will be conducted. Larvae that are captured will be marked with an elastomer tag. A fine-mesh (designed to retain larval lamprey) fyke net will be installed near the mouth of the tributary. This trap will be monitored daily, until the tributary is dry. One possible outcome (4) is that larval lamprey are captured leaving the tributary. This would provide evidence that some lamprey leave the tributary and are not stranded. Another possible outcome (5) is that larval lamprey are not captured leaving the tributary. This would provide evidence that some lamprey do not leave the tributary and are stranded. Tagged larvae will allow us to estimate the proportion that leave the tributary. For example, if all tagged lamprey are captured in the fyke net, that would provide some evidence that larvae were not stranded in the tributary.*

*Evaluation of the fate of potentially stranded fish would only occur the first three years that larvae are detected occupying a tributary.*

## Estimated Budget[2]

Occupied tributary area sampling:

Personnel – 5,430
Non-personnel – 773
Contingency – 310
O/H – 2,807
Total – 9,320

GRAND TOTAL: 9,320

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[2] Based on 2017 rates, this budget reflects costs to FWS for one sampling event, if necessary and appropriate, to evaluate the fate of larvae which occupy ephemeral habitat. This budget does not include the costs of year 2 or year 3 (if necessary and appropriate) or costs related to potential equipment replacement.

# EVALUATION OF PORTLAND HARBOR SUPERFUND AREA RESTORATION: LINNTON MILL RESTORATION SITE LAMPREY MONITORING PLAN - ADDENDUM 1

## SEDIMENT SAMPLING AND ANALYSIS PLAN

FINAL | 02 March 2017

## A. Goal

Describe habitat conditions at specific locations within the Linnton Mill restoration site and associated McCarthy Creek reference site to supplement information collected by FWS under the central monitoring plan for this site, “Evaluation of Portland Harbor Superfund Area Restoration: Larval Pacific Lamprey Linnton Natural Area Restoration Site.”

## B. Methodology

Concurrent with the lamprey sampling event described in the central monitoring plan entitled “Evaluation of Portland Harbor Superfund Area Restoration: Larval Pacific Lamprey – Linnton Restoration Site,” sediment samples will be collected and analyzed for grain size, total solids, and organic content from each lamprey sampling location. Where possible, sediment will be collected using a Ponar bottom sampler. After the sampler is deployed and retrieved, the Ponar will be emptied into a stainless steel bucket or pan and thoroughly mixed with a stainless steel spoon. Debris such as rocks and sticks or wood chunks will be removed from the sample material before filling sample containers. From the collected sample, 1-8 oz. sample container and 1-4 oz sample container (provided by the contracted laboratory) will be filled with sediment, minimizing the amount of free-standing water in the jar to the extent practical. Sample jars will be labeled with the sample site number, date and time, type of analysis, and then placed on ice and transferred to an on- or off-site, access- controlled building. Chain of custody forms provided by the contracted lab will be completed for all samples. Samples will then be refrigerated at 4 +/- 2°C until transfer to the contracted laboratory. Equipment contacting sediment (Ponar, spoon, and bucket or pan) will be rinsed with water between samples.

At both the restoration site (Linnton Mill) and the reference site (McCarthy Creek), up to three habitat types will be sampled for lamprey as described in the “Evaluation of Portland Harbor Superfund Area Restoration: Larval Pacific Lamprey Linnton Restoration Site.” At both the Linnton Mill restoration site and McCarthy Creek reference site, sampling will occur in the shoreline and confluence habitats in all years. Additionally, at the Linnton Mill restoration site, sampling will occur in the new tributary habitat in all years following baseline (i.e., Year 0) sampling. Table 1 identifies the habitat types to be sampled at each site respectively, as well as the number of reaches or quadrats (i.e., sample locations) that will be sampled for lamprey and sediment within each habitat type.

Table 1. Sediment Sampling Plan by Site and Habitat Type.

| HABITAT TYPE | YEARS SAMPLED | TOTAL LAMPREY SAMPLE LOCATIONS | TOTAL SEDIMENT SAMPLES TO BE COLLECTED |
|---|---|---|---|
| **LINNTON MILL RESTORATION SITE** | | | |
| Shoreline | 0-5, 10, 15, 20 | 10 | 10 |
| Slough/Tributary | 1-5, 10, 15, 20 | 6-8 | 6-8 |
| Confluence | 0-5, 10, 15, 20 | 10 | 10 |
| **MCCARTHY CREEK REFERENCE SITE** | | | |
| Shoreline | 0-5, 10, 15, 20 | 10 | 10 |
| Slough/Tributary | Not applicable | Not applicable | Not applicable |
| Confluence | 0-5, 10, 15, 20 | 10 | 10 |

## C. Analysis and Data Reporting

All samples collected by FWS will be picked up by the contracted laboratory for analysis. As noted above, the contracted laboratory will analyze all samples for grain size, total solids, and total organic carbon. Results of these analyses will be provided to the entity designated by the Trustee Council. Then the designated entity will transmit results to FWS for inclusion in the annual monitoring report.

## D. Process for Modification

This sampling and analysis plan applies to years 0 and 1 of the 20-year monitoring period. Following the baseline and year one data collection and analysis events and interpretation of results, the Trustees and FWS will determine whether the sediment sample collection and analysis plan described above warrants modification. Revised plans, if warranted, will be included as an addendum to this plan.

# Appendix 12. Long Term Stewardship Funding Plan

# LINNTON MILL RESTORATION SITE (NWP-2014-477)

## APPENDIX 12: LONG-TERM STEWARDSHIP FUNDING PLAN

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DECEMBER 4, 2018

Grette Associates LLC
ENVIRONMENTAL CONSULTANTS

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Attachment 1: Long Term Stewardship Budget

# 1 INTRODUCTION

This Plan describes the long-term stewardship plan and funding strategies for the Linnton Mill Restoration Site (the "Site"). The long-term steward will be responsible for the following tasks at the Site after the performance period ends or the performance standards are met, into perpetuity. Long-term stewardship will involve tasks such as:

- Regularly scheduled site visits to observe and document site conditions.
- Managing invasive vegetation.
- Maintaining fences and gates.
- Ensuring any public uses are appropriate and any illegal or incompatible uses are addressed.
- Long-term monitoring of parameters such as vegetation survival.
- Clean-up and debris removal.
- Maintaining positive relationships with adjacent landowners and interested community members.
- Any other tasks required to maintain project effectiveness and full functionality of a given NRDA restoration project.

The goal of long-term stewardship is to ensure that the Project continues to meet the goals and objectives outlined in this Plan in perpetuity. In addition to active stewardship of the site through the types of activities listed above, the Trustee Council expects that the Project's conservation features be permanently, legally protected prior to the end of the performance period.

The budget for the long-term stewardship program is detailed in Section 5 and Appendix 1 of this Plan and includes funding for the following tasks.

- Monitoring
- Maintenance
- Program Management
- Community Relations and Enforcement, and
- Reporting, Documentation, and Data Management

Each of these responsibilities and their associated sub-tasks are detailed in Section 4 of this Plan. Each of the responsible Parties and their roles are described in Section 3.1.

## 1.1 NEED FOR LONG-TERM STEWARDSHIP

The Habitat Equivalency Analysis (HEA) model used to calculate ecological credit for a NRDA restoration project assumes that a given site will continue to provide ecological benefit to injured resources at least 300 years into the future. In practice, a variety of natural and anthropogenic phenomena threaten the ecological value of a project throughout its existence. Newly disturbed soils may activate a fallow seed bank that includes invasive species. Major flood events may occur 5, 15, or 50 years after a project is installed and severely alter habitat element locations, elevations, or features. Decades in the future, project ownership or land ownership may be questioned or challenged by new land uses, new community members, or shifting management priorities. A long-term stewardship plan, a stewardship fund, and permanent legal protection of the property are needed to ensure that a restoration project's ecological integrity is maintained in perpetuity.

### 1.2 FINANCIAL ASSURANCES

Long-term stewardship will be financed by a portion of the sale of each of the first 50% of credits sold at the site, to be measured in "Discounted Service Acre Years" or "DSAYs." Based on this plan, long-term stewardship shall be fully funded by year 8. This strategy will ensure that the stewardship fund has time to accrue interest before annual drawdowns occur, beginning after the Performance Period.

As detailed herein, cost estimate of $28,936.88 per year has been established for Long-Term Stewardship budget in accordance with the Portland Harbor Natural Resource Trustee Council Long-Term Stewardship Funding Standards. To calculate the stewardship funding the following assumptions were made. The annual cost estimate (above) includes a 10% contingency for all tasks and a 25% administrative cost. Assuming a 4% per annum drawdown rate for the Long-Term Stewardship Fund, a total of $723,422.00 must be deposited there by the end of Year 8 to yield the $28,936.88 per year necessary (starting in Year 11) to fully fund the annual Long-Term Stewardship budget, in perpetuity. For the first 50% of credits sold, $2,832.51 per credit will be deposited in the approved account (Table 1). LWC will ensure it has $723,422 on deposit by the end of Year 8.

Funds collected will be in the form of a long-term stewardship fund. LWC will deposit stewardship funds into the Department of Interior Natural Resource Damage Assessment and Restoration Fund (DOI NRDAR Fund) following the procedures outlined in the Department of the Interior Natural Resource Damage Assessment and Restoration Fund Assessment and Settlement Deposit Remittance Procedures. LWC will deposit funds within 60 days of credits being sold, and LWC will notify FWS once deposited. The Long-Term Stewardship Funding Agreement, which must be approved by the Trustee Council prior to implementation, will include provisions for the potential transfer of the oversight of the long-term stewardship fund to the Long-Term Steward and/or Stewardship Fund Manager.

## 2 PROPERTY DESCRIPTION

### 2.1 EXISTING CONDITIONS

The Linnton Mill Site encompasses approximately 27.83 acres over approximately 1,800 linear ft of the western bank of the Lower Willamette River. The Linnton Mill Site has been used as an industrial property since the late 1800s (CH2M Hill 2007). The site was initially developed as a sawmill which operated on the entirety of property from 1894 to 1947. Following a fire that destroyed the sawmill, the northern portion of the property was redeveloped as a plywood mill that operated from 1951 to 2001. The southern portion of the property was used for dewatering and stockpiling Columbia River sand from 1997 until recent years (CH2M Hill 2007). Although most of the plywood mill buildings and infrastructure remain, the property is currently vacant and in a state of disrepair. Neighboring properties are zoned and used for industrial and commercial purposes.

## 2.2 RESTORATION ACTION

Restoration activities involve contouring and vegetating the property to provide habitat types recognized as being most critical to fish and wildlife species using the lower Willamette River and that have been most affected by development. Target species include native fish such as salmonids and lamprey, birds, mink and bald eagle. The Site will provide new Off-Channel habitat, enhanced Shallow Water and Active Channel Margin (ACM) habitats, and new/restored Riparian and Upland forested habitat (see Table 1 and Figure 1 for definitions of these habitats). Key features of the project include:

- 5.48 acres of new aquatic habitat, 4.34 acres of which would be new off-channel habitat within the Off-Channel Zone;
- 4.93 acres of restored shallow water habitat within the Shallow Water Zone, including removal of approximately 0.36 acres of overwater coverage and associated piles;
- 1.76 acres of restored ACM habitat, including removal of 0.49 acres/1,050 linear feet of shoreline armoring within the ACM, and 1.14 acres of new ACM habitat;
- 9.60 acres of restored riparian habitat and 4.90 acres of restored upland habitat, including conversion of invasive vegetation, buildings, and concrete pads to native forested habitat;
- Removal of approximately 700 piles and pile stubs within approximately 0.77 acre of aquatic habitat, including many creosote-treated piles.
- Disconnection of on-site stormwater discharge pipes from the North Tributary in the downstream portion of the site and replacing the failing culvert/outfall.

**Table 1. Habitat Zones at the Site relative to ordinary high water (OHW).**

| Zone | Elevation/Distance Range | Above/Below OHW |
|---|---|---|
| Upland | >200’ landward of OHW | Above |
| Riparian | OHW to 200’ landward of OHW (+20.1’) | Above |
| Off-Channel | Below OHW | Below |
| Active Channel Margin | OHW (+20.1’) to OLW (+8.0’) | Below |
| Shallow Water | OLW (+8.0’) to -15 OLW (-7.0’) | Below |

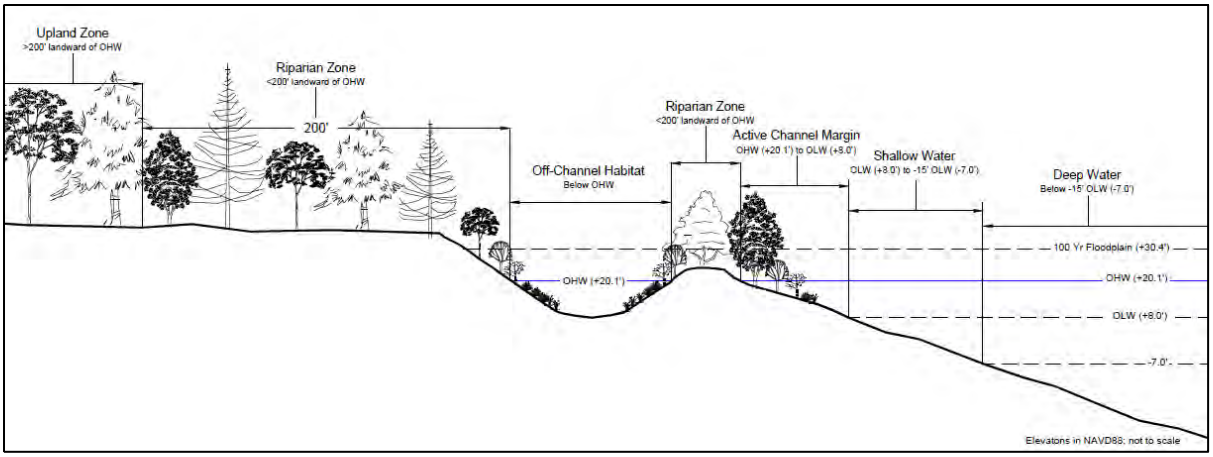

**Figure 1. Elevation zones of habitats relative to OHW**

# 3 ASSUMPTIONS

## 3.1 ROLES AND RESPONSIBILITIES

The Trustee Council has identified up to six roles that may be involved in long-term stewardship at a given Portland Harbor NRDA restoration project:

- Long-term steward
- Conservation easement holder
- Stewardship fund manager
- Landowner
- Project implementer
- Trustee Council

Some of these roles overlap in the case of the Linnton Plywood restoration project. For example, Linnton Water Credits LLC is both the landowner and the Project Implementer at this site. A single entity may serve certain roles for multiple Portland Harbor NRDA restoration projects. For example, the Trustee Council has expressed a preference towards having a single entity serve as the long-term steward or stewardship fund manager for all Portland Harbor NRDA restoration projects.

### 3.1.1 Long-Term Steward

The long-term steward is the entity responsible for monitoring and maintaining the restoration site after the performance period ends or the performance standards are met, into perpetuity. The steward will conduct ongoing on-the-ground monitoring and maintenance activities such as regular site visits, invasive species management, fence maintenance, and trash clean up. The steward will also be responsible for administrative activities such as development of the long-term stewardship plan (prior to beginning on-the-ground stewardship activities), development of annual maintenance plans, and reporting to the Trustee Council. The steward will also be expected to coordinate with the easement holder, landowner, stewardship fund manager, and others as needed. In the event that further response action is required at the BP/Arco site, the Long Term Steward will coordinate with the Trustee Council or its designee on any possible impacts to the Project including but not limited to required site access or land disturbance.

Adequate funding to cover the steward's responsibilities will be provided by the stewardship fund described in Appendix 1.

### Steward Selection

The steward will be determined by the Trustee Council in cooperation with the landowner and conservation easement holder. This decision will be made before the long-term stewardship phase begins. Likely candidates for the role of steward may be the landowner or a third-party group, such as a non-profit organization with a natural resource conservation-oriented mission and restoration project management expertise. Although there may be significant temptation to allow various project implementers, landowners, or potentially responsible parties to provide long-term stewardship at individual restoration projects, the Trustee Council has a strong preference towards employing a single, outside entity to provide long-term stewardship services at all Portland Harbor NRDA restoration projects to ensure objectivity, maximum efficiency, and consistency among the projects. The initial agreement between the Trustee Council and the steward may be termed in order to allow for a trial period to make sure that the steward is a proper fit for the needs of the restoration project. The steward may choose to subcontract with other organizations for work crews, specialized technical assistance, or other activities as needed.

### 3.1.2 Conservation Easement Holder

The conservation easement holder (easement holder) shall be an organization qualified under ORS 271.715 (3) to hold a conservation easement. The easement holder's duties may include, but are not limited to the following tasks: Receive conveyance of a permanent conservation easement; Perform annual conservation easement monitoring to ensure that the terms of the easement are not violated; Coordinate with the Trustee Council, landowner, project implementer, long-term steward, and stewardship fund manager; Conduct enforcement or legal defense of the easement as required by circumstances at the restoration project; Report to the Trustee Council and partners on compliance with terms of the conservation easement and use of stewardship funds. Adequate funding to cover the cost of holding a conservation easement for the Linnton Plywood restoration project will be provided by the stewardship fund. To minimize risk, the Trustee Council recommends that easement holders investigate the possibility of getting insurance to support easement enforcement. Terrafirma is an example of an insurance program available to Land Trust Alliance members.

### Conservation Easement Holder Selection

Prior to the end of the performance period, the Linnton Mill Restoration Site will be permanently protected with a conservation easement. A permanent easement holder shall be approved by the Trustee Council, in cooperation with Linnton Water Credits LLC, prior to the close of the performance period or before the performance standards are met, whichever occurs first. Once the permanent easement holder is approved, a conservation easement deed running with the land and restricting the uses of the restoration project consistent with the restoration plan, performance standards, and conservation values expressed therein will be recorded to ensure the protection of a restoration project in perpetuity.

In limited cases, a deed restriction may be used in lieu of a conservation easement to protect the conservation value of a restoration project. Such instances may include projects where the property is publically owned, owned by a conservation-missioned organization, or other instances where the conservation values of the property are already otherwise reasonably protected in perpetuity. A deed restriction may also be required during the performance period as an interim method of land protection until a conservation easement can be secured for the property.

### 3.1.3 Stewardship Fund Manager

The Stewardship Fund Manager (fund manager) manages the long-term stewardship fund. This entity will be responsible for managing the stewardship fund as a non-wasting fund that accrues sufficient interest to finance annual stewardship activities in perpetuity. The fund manager will be responsible for providing financial documentation and reporting to the Trustee Council on a regular basis. The fund manager will be expected to coordinate with the steward and easement holder for each restoration project. If the steward and easement holder for a given project are different entities, the fund manager may need to track and disperse funds to these entities separately. Given the Trustee Council's preference to pool stewardship funds from all Portland Harbor NRDA restoration sites into a single fund, the fund manager may also need to track expenses and income across multiple projects.

#### Stewardship Fund Manager Selection

The Trustee Council will seek a Stewardship Fund Manager (fund manager) that has an established relationship with the Long-Term Steward (LTS). Likely candidates for the role may be a non-profit organization with a natural resource conservation-oriented mission and stewardship fund management expertise or a third-party investment management and advisory firm. The Trustee Council has a strong preference towards employing a single, outside entity to provide stewardship fund management services for all Portland Harbor NRDA restoration projects consistent with its preference for a single LTS entity. The Trustee Council's objective is to ensure objectivity, maximum efficiency, and consistency among the projects and a strong, single LTS and fund manager team is likely to further that objective.

### 3.1.4 Landowner

The entity or entities that hold fee title to the land where the restoration project is occurring (in the case of the Linnton Plywood restoration project, Linnton Water Credits LLC and DSL are the landowners). Linnton Water Credits LLC will need to work closely with the easement holder and steward to clarify roles and responsibilities, allow access, and coordinate activities during the long- term stewardship phase of the project. The Trustee Council requires that sufficient legal protections be put in place prior to restoration project implementation or during the project performance period to ensure that the conservation values of the property will be sustained if land ownership changes in the future. It is LWC's intent to transfer its fee interest in the Project at some point following Project implementation; exact timing to be determined. This will be done in coordination with the Long-Term Stewardship process and in consultation with the Trustee Council.

### 3.1.5 Project Implementer

The Project Implementer is the entity implementing the restoration project to compensate for natural resources damages from the Portland Harbor Superfund site (in this case, Linnton Water Credits LLC is the Project Implementer). The Project Implementer is responsible for the project during the performance period and will be an essential contributor during the transition phase when an easement holder, steward, and stewardship fund manager are selected. Unless the Project Implementer also serves in one of the other roles outlined here, the project implementer's role will be limited during the long-term stewardship phase of the project.

### 3.1.6 Trustee Council

The Portland Harbor Natural Resource Trustee Council (or its designee) will provide oversight of Portland Harbor NRDA restoration projects during the long-term stewardship phase. The Trustee Council or its designee(s) may review and oversee regular reporting of effectiveness monitoring results, site visits, maintenance activities, qualitative monitoring results (observational and photographic), enforcement issues, financial management, adaptive management activities, and descriptions of community involvement that will be provided to the Trustee Council or its designee by the steward.

## 3.2 SITE CONDITION ASSUMPTIONS

The following is a list of conditions at the site that may potentially affect long-term property maintenance.

### 3.2.1 Public Access

The Site will not be open for direct public use of the habitat area. However, the City of Portland, as part of its Greenway Trail Network, maps the Greenway Trail as passing by the Site and includes an overlook on the Linnton Restoration Site. The overlook has been designed into the Site plan, locating it in the northern/downstream end of the Site. Thus, the public will use a portion of the Site to a limited degree, which will likely result in maintenance needs. Linnton Water Credits has engaged the City regarding maintenance and liability of the trail in the future pursuant to City of Portland Municipal Code 33.272.070 and 343.440.250. While a formal agreement with the City has not yet been finalized, based upon discussions with the City it is anticipated that the City will agree to accept responsibility for all trail-related maintenance, including, but not limited to, security, responses to vandalism, litter removal, and security. In the unlikely event that such an agreement is not reached, LWC will retain the Steward to perform such responsibilities. If the Steward takes on this responsibility, additional funding will be added to the budget as described in Section 5.2.

### 3.2.2 Urban Setting

It is assumed that the location of the Site within urban Portland will result in frequent unauthorized human traffic on the Site, particularly at the shoreline. This will likely result in maintenance needs and, potentially, a need for law enforcement actions (e.g. trespass, occupation, etc.).

### 3.2.3 Vegetation and Invasive Plant Species

At the start of the long-term maintenance period, the Site will have passed its final performance standards and should be relatively self-sustaining. Any major failures of vegetation to meet performance standards should have been manifested by this time, and if necessary addressed through the adaptive management and contingency planning process outlined in the Site-Specific Performance Plan (Grette Associates 2017). Thus, the site should be relatively self-sustaining and the role of the Steward would be to ensure the site maintains this trajectory.

Assuming the vegetation performance standards have been met at the end of the monitoring period, the Site should have high percent cover of native plants and a relatively low percent cover of invasive species. The off-channel habitat will also have equilibrated to find the lowest elevation at which emergent vegetation will establish. This will limit the opportunity for invasive plant colonization. However, it is also assumed that invasive species colonization is a constant threat. Thus, it is assumed that vegetation stewardship would consist of identifying new colonizations of invasive species, eradicating them, and replanting native species in their place.

### 3.3 DEVIATIONS FROM GUIDANCE

This Plan is based on guidance provided by the Trustee Council for Natural Resource Damage Assessment ("NRDA") Restoration Projects. This Plan does not deviate from Trustee Council stewardship guidance.

## 4 PROPOSED MANAGEMENT

The Long-Term Steward will be responsible for maintenance and adaptive management of the Site at the end of the Performance Period, into perpetuity. The major role of the Steward will be to identify and address any conditions that threaten the Site's long-term success. Threats to the success of the Site include changes in water regime, colonization by invasive species, anthropogenic misuse of the Site, or changes in adjacent land use. Therefore, the Steward will be responsible for assessing the Site's long-term maintenance needs, developing a site-specific plan to carry out those maintenance needs, ensuring the maintenance is carried out, and ensuring that the maintenance carried out is effective. Some key stewardship tasks specific to the project are outlined below.

### 4.1 INITIAL SITE ASSESSMENT

Long-term stewardship begins after the end of the Performance Period. For the Linnton Site, this includes the establishment or restoration of the attributes described in Section 2.2 above within the project area.

The initial site assessment will document each attribute identified above through site visit observations, notes, photo documentation, and mapping as needed to establish baseline conditions. These baseline conditions will establish what has been agreed to and what should be maintained or adaptively managed through time.

### 4.2 ANNUAL SITE STEWARDSHIP PLAN (ACTIVITIES)

The Long-Term Steward (to be determined) will complete or manage the inspection and maintenance of the Site. Several tasks are described below. The focus and detail of some tasks are presently unknown but will be clarified as post-Performance Period conditions become established and finalized when the Initial Site Assessment is completed. Before the conclusion of the performance period, the Long-Term Steward will work with project stakeholders to develop a site-specific Long-Term Stewardship Plan detailing specific tasks in light of anticipated post-performance period project conditions.

Annual site visits will document changes considered to be a reduction in the structure and function of the created habitat. Recommendations for management actions required to bring deficiencies back to acceptable standards will then be completed and implemented. The following are inspection/monitoring and maintenance duties the Steward may undertake or contract once the long-term stewardship program begins. Some of the inspections will require knowledge of plant ecology, fish and wildlife biology, hydrology, geomorphology and engineering, to understand the original intent of the work, identify future changes in habitat condition and function, and recommend maintenance actions.

### 4.2.1 Vegetation Management

A major component of the Project is the removal of invasive plant species and the replanting of native plants throughout the Site. Native plantings and invasive plant control will include upland, shoreline, riparian, and wetland zones throughout the Site. Controlling invasive plants will be a continual process on the site and will likely require annual maintenance into the future. Invasive plant control may include mechanical or chemical treatments as needed to control invasive species.

Vegetation management also includes vegetation growth (native or invasive) which may reduce safety and access. Overgrown areas that prevent access to easements will need to be cut back to maintain access.

### 4.2.2 General Habitat Inspection and Maintenance Need

Habitat degradation or uplift could occur slowly over time or rapidly during a flood event. In the coming decades, comparison to the Initial Site Assessment will provide guidance as to when intervention is required to maintain habitat, or when natural processes that slowly change habitat should be allowed to continue.

### 4.2.3 Infrastructure Maintenance, Inspection, and Clean-Up

Access to the Site brings with it the need to control public use and movement. Fences, gates, access roads and trails, will all require inspection and maintenance when or where they exist. Trespassing, dumping, or other illegal activities may occur at the site, and will require time and labor to manage. The land steward, easement holder, or its designee(s) will assume the responsibility of taking legal actions on enforcement issues at the Linnton Plywood restoration project site, unless other arrangements are made with the landowner, steward, and Trustee Council. The steward will document and be responsible for repair or cleanup resulting from public use.

### 4.2.4 Neighborhood Communication and Enforcement

Long-term project success will depend on local community support of restoration actions. Local interest in and access to the Site could aid the Steward by providing accounts of illegal activity or physical problems at the site in-between steward site visits. Problems identified by the local community could be addressed quickly and more efficiently, potentially reducing environmental loss and repair costs. Building and maintaining this type of community relationship will require reaching out to local interest groups through email, meeting attendance and/or personnel communications.

## 4.3 DOCUMENTATION AND ANNUAL REPORTING

All entities involved with long-term stewardship of the Site will provide documentation of monitoring, adaptive management, and stewardship tasks to the Trustee Council or its designee(s) and other interested parties on a regular basis. At a minimum, the documents outlined in Table 2 will be provided to the Trustee Council or its designee(s) as they are developed or on an annual basis, depending on their frequency.

**Table 2. Documentation and Annual Reporting during the Long-Term Stewardship Phase of the Project**

| Product | Purpose | Frequency |
|---|---|---|
| Initial Site Assessment | Describe baseline condition of site when long-term stewardship begins. | One time |
| Long-term Stewardship Plan | Outlines roles and responsibilities for entities involved with long-term stewardship at the site. Provides methodology and actions to maintain ecological values and benefits during the lifetime of the project. | Once at the beginning and then update periodically as needed. |
| Maintenance Plan | Describes each year's activities based on priority actions. | Annually |
| Monitoring Report | Provides current condition information and management and maintenance recommendations for the following year. | Annually |
| Fiscal Report | Document interest accrual, spending, and overall standing of long- term stewardship fund. | Annually |
| Notification of Enforcement Issue | Notify the Trustee Council or its designee of enforcement issue and whether assistance is needed to resolve the problem. | As needed |

In addition, restoration site information and data should be made available to the general public in the form of a website, online database, and/or online mapping feature so that the general public can access information about the site and stay involved in events such as work parties and community discussions.

# 5 COST ESTIMATE

This section presents a narrative of the tasks and sub-tasks presented in the budget (see Appendix 1). All annual costs include a 10% contingency, and the final total includes a 25% administrative rate. In total, the estimated annualized stewardship cost is $28,936.88.

## 5.1 ANNUAL MONITORING SITE VISITS

The yearly monitoring budget allows for up to four monitoring site visits. This includes site visits by the Conservation Easement Holder, a plant ecologist and engineer as described in Section 4 - Management of this Plan.

The budget assumes that each site visit will reimburse travel expenses for approximately 50 miles round-trip (200 miles total annually) at a typical travel reimbursement rate of $0.55 per mile. The budget also includes some reimbursement for equipment that will be necessary for monitoring activities. Based on these assumptions, the average annual cost for monitoring site visits is budgeted at approximately $4,686. Additional funding for annual reporting and documentation associated with each of the site visits is described in Section 5.5 below.

### 5.2 MAINTENANCE ACTIVITIES

The budget assumes multiple days of field work removing trash and invasive plant species, planting new vegetation as needed, limbing large trees as needed, and addressing potential erosion. This also includes costs for mileage, as well as field supplies such as trash bags and dumpsters. A one-time cost of $5,000 is included in this total for clean-up of a major flood. Maintenance of the trail is not accounted for in the budget because it is assumed the City will take over maintenance by the beginning to the Stewardship phase. If the City does not take on responsibility for the trail, money will be added to the budget to cover associated costs. Maintenance activities are budgeted at approximately $6,507 annually.

### 5.3 PROGRAM MANAGEMENT

The Program Management budget includes office-based organization and cataloguing as described in Section 4 above. This also includes budget approximately two hours of legal assistance annually. The Program Management is budgeted at approximately $2,332 annually.

### 5.4 COMMUNITY RELATIONS AND ENFORCEMENT

The community relations and enforcement budget allows for ongoing public outreach by the Steward and brief site visits to follow up on any notifications from the public related to problems observed at the site. Regular patrolling and coordination with local law enforcement are also allotted for. Additionally, one community meeting per year is budgeted. Approximately $3,245 is allotted annually for community relations. Any needed maintenance activity resulting from the community relations shall be funded through Maintenance Activities budget described above.

### 5.5 REPORTING, DOCUMENTATION, AND DATA MANAGEMENT

Work associated with the Site-Specific Long-Term Stewardship Plan will involve an in-depth review of the existing data, and one or more site visits. The Stewardship Plan will involve synthesizing the monitoring data from years 1-10 as well as the results of the initial site visit(s). This is budgeted as a one-time cost of $6,000.

The annual reporting budget assumes relatively brief reports that are responsive to the requirements outlined in this Plan. The annual reporting budget is $6,050. This includes preparation of annual Stewardship Plan updates, maintenance plans, monitoring reports and fiscal reports. Database management and annually website management costs are also included. In total, the annualized cost of these tasks, including initial Stewardship Plan preparation, is $6,380.

## 6 DOCUMENTS INVENTORIED

Grette Associates. 2017. Linnton Mill Restoration Site Site-Specific Performance Plan. Prepared for Linnton Water Credits. LLC. Grette Associates$^{LLC}$, Wenatchee, WA. April 7, 2017.

Portland Harbor Natural Resources Trustee Council (Trustee Council). 2015. Entities Eligible to Hold Easements on Portland Harbor NRDA Restoration Projects. Available at URL https://www.fws.gov/oregonfwo/Contaminants/PortlandHarbor/Documents/NoticeReEligibleEasementHolders_final93015.pdf. Public Notice dated September 30, 2015. Accessed March 23, 2017.

Portland Harbor Natural Resources Trustee Council (Trustee Council). 2016a. Portland Harbor Natural Resource Trustee Council Long-term Stewardship Funding Standards. March 24, 2016.

Portland Harbor Natural Resources Trustee Council (Trustee Council). 2016b. Portland Harbor NRDA Monitoring and Stewardship Framework. October 1, 2016.

Portland Harbor Natural Resources Trustee Council (Trustee Council). Long-Term Stewardship Budget Template. Excel spreadsheet. Date unknown.

# LINNTON MILL RESTORATION SITE (NWP-2014-477)

## APPENDIX 12: LONG-TERM STEWARDSHIP FUNDING PLAN

## ATTACHMENT 1: LONG TERM STEWARDSHIP BUDGET

# Attachment 3.c.i. Linnton Water Credits Long Term Stewardship Budget October 2017

| Stewardship Task | Relevant PAR Task | SubTask | Specific Description | Unit | Number of Units | Cost/ Unit | Annual Cost | Frequency | Cont % | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|
| Corresponding task in stewardship framework | Corresponding task in PAR software | Specific task | provide detailed info | hrs, #, etc. | number of hours or items | cost per hour or number | # of units * cost/unit | Example: # of years until a GPS needs to be replaced or # of years between easement monitoring visits, i.e. 1 | Contingency percentage | annual cost * years * contingency |
| **Monitoring** | | | | | | | | | | |
| | Biotic Surveys | | | | | | | | | |
| | | Plant Ecologist | Inspect for invasive plants | hrs | 4 | $100 | **$ 400.00** | **0.5** | 10% | $ 880.00 |
| | | Wildlife Biologist | | hrs | 0 | | **$ -** | **1** | 10% | $ - |
| | | Biologist (Other) | | hrs | 0 | | **$ -** | **1** | 10% | $ - |
| | | Hydrologist | | hrs | 0 | | **$ -** | **1** | 10% | $ - |
| | | Conservation Easement Monitorin | Inspect for illicit uses | hrs | 4 | $100 | **$ 400.00** | **0.25** | 10% | $ 1,760.00 |
| | | Engineer | Inspect elevations, contours, hydrology | hrs | 8 | $200 | **$ 1,600.00** | **1** | 10% | $ 1,760.00 |
| | Monitoring Equipment | | | | | | | | | |
| | | Camera (35mm lens) | Camera billing rate | Day | 4 | $25 | **$ 100.00** | **1** | 10% | $ 110.00 |
| | | Vehicle | Assuming 50 mi/visit, reimbursed at typical mileage rate | miles | 200 | $1 | **$ 110.00** | **1** | 10% | $ 121.00 |
| | | Boat | No boat; assuming low tide site visits if needed | | | | **$ -** | **1** | 10% | $ - |
| | | GPS | | | | | **$ -** | **1** | 10% | $ - |
| | | Sampling Equipment | No equipment anticipated to be used up by monitoring | # | | | **$ -** | **1** | 10% | $ - |
| | | Shovels & other tools | Maintenance reimbursement | $ | | | **$ 50.00** | **1** | 10% | $ 55.00 |
| **Maintenance** | | | | | | | | | | |
| | General Maintenance | | | | | | | | | |
| | | Trash container | | | | | **$ -** | **1** | 10% | $ - |
| | | Trash Bags | Cost to purchase trash bags | # | 50 | $1 | **$ 25.00** | **1** | 10% | $ 27.50 |
| | | Dumpster | 3-day rental rate, incl dropoff and pickup ($200 refundable deposit not incl.) | # | 1 | $375 | **$ 375.00** | **1** | 10% | $ 412.50 |
| | | Fence Maintenance | Limited to repairing fence along public access trail | hrs | 5 | $100 | **$ 500.00** | **1** | 10% | $ 550.00 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Trail Maintenance | Assuming City will maintain | | | | $ - | 1 | 10% | $ - |
| | | Maintain Signage | Assuming periodic replacement of display portion | # | 1 | $100 | $ **100.00** | 1 | 10% | $ 110.00 |
| | | Travel | Assuming 50 mi/visit (X4), reimbursed at typical mileage rate | Miles | 200 | $1 | $ **110.00** | 1 | 10% | $ 121.00 |
| | Habitat Maintenance | | | | | | | | | |
| | | Exotic Plant Control | 1 field crew of 4 to treat/remove what was identified in Monitoring; 8 hrs/person/visit; 2x/year | hrs | 32 | $25 | $ **800.00** | **0.5** | 10% | $ 1,760.00 |
| | | Seed Collection | | | | | $ - | 1 | 10% | $ - |
| | | Trapping permit | | | | | $ - | 1 | 10% | $ - |
| | | Brush Management | | | | | $ - | 1 | 10% | $ - |
| | | Erosion Control | | | | | $ - | 1 | 10% | $ - |
| | | Exotic Animal Control | | | | | $ - | 1 | 10% | $ - |
| | | Maintain Safe Trees | Arborist to limb trees; assumed to be needed only after Year 20 | hrs | 8 | $50 | $ **400.00** | **2** | 10% | $ 220.00 |
| | | Major Flood Clean-up | Lump sum, assuming one large flood over 20 yrs needing cleanup | # | 1 | $5,000 | $ **5,000.00** | **20** | 10% | $ 275.00 |
| | | Plant Procurement | Assumes up to 100 plants/yr @ $5/ea | # | 100 | $5 | $ **500.00** | 1 | 10% | $ 550.00 |
| | | Remove Trash | 10 man-hours trash removal/yr | hrs | 10 | $50 | $ **500.00** | 1 | 10% | $ 550.00 |
| | | Revegetation | 16 man-hours planting/yr | hrs | 16 | $25 | $ **400.00** | 1 | 10% | $ 440.00 |
| | | Geomorphic Inspection | Inspection by professional | hrs | 3 | $150 | $ **450.00** | 1 | 10% | $ 495.00 |
| | | Stormwater Inspection | Inspection by professional | hrs | 1 | $150 | $ **150.00** | 1 | 10% | $ 165.00 |
| | | Travel | Assuming 50 mi/visit, reimbursed at typical mileage rate | Miles | 100 | $1 | $ **55.00** | 1 | 10% | $ 60.50 |
| | Maintenance Equipment | | | | | | | | | |
| | | Wood for Fence or trail Maintenan | Assuming minor repair annually (links, wood) | # | 1 | $500 | $ **500.00** | 1 | 10% | $ 550.00 |
| | | Tools for maintenance | Replacement of tools | # | 1 | $100 | $ **100.00** | 1 | 10% | $ 110.00 |
| | | Erosion control materials | Silt fence | # | 1 | $100 | $ **100.00** | 1 | 10% | $ 110.00 |
| **Program Management** | | | | | | | | | | |
| | Office Maintenance | | | | | | | | | |
| | | Computer (based on % used for this project) | | # | 0.2 | $1,000 | $ **200.00** | 1 | 10% | $ 220.00 |
| | | Internet | | # | 0.2 | $100 | $ **20.00** | 1 | 10% | $ 22.00 |
| | | Office supplies | | # | 1 | $100 | $ **100.00** | 1 | 10% | $ 110.00 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Meeting rooms | | | | | **$ -** | **1** | 10% | $ - |
| | Operations | | | | | | | | | |
| | | Insurance | | | | | **$ 500.00** | **1** | 10% | $ 550.00 |
| | | Legal & Emergency fund | | | 2 | $400 | **$ 800.00** | **1** | 10% | $ 880.00 |
| | | Research | | | | | **$ 100.00** | **1** | 10% | $ 110.00 |
| | | Communications/Meeting | | | | | **$ 200.00** | **1** | 10% | $ 220.00 |
| | | Supervisor Site Visit | | | | | **$ -** | **1** | 10% | $ - |
| | | Travel | | | | | **$ -** | **1** | 10% | $ - |
| | | Accounting Services | | | | | **$ 200.00** | **1** | 10% | $ 220.00 |
| | | Contracting Services | | | | | **$ -** | **1** | 10% | $ - |
| | | Succession Planning | | | | | **$ -** | **1** | 10% | $ - |
| **Community Relations and Enforcement** | | | | | | | | | | |
| | Public Services | | | | | | | | | |
| | | Patrolling | | hrs | 1 | $25 | **$ 25.00** | **0.02** | 10% | $ 1,375.00 |
| | | Working with Volunteers | | | | | **$ -** | **1** | 10% | $ - |
| | | Community Meetings | | | 1 | $100 | **$ 100.00** | **1** | 10% | $ 110.00 |
| | Enforcement | | | | | | | | | |
| | | Working with Law enforcement | | | 1 | $100 | **$ 100.00** | **0.25** | 10% | $ 440.00 |
| | | Addressing illegal operations | | | 1 | $100 | **$ 100.00** | **0.25** | 10% | $ 440.00 |
| | | Cleaning up illegal operations | | | 1 | $100 | **$ 100.00** | **0.25** | 10% | $ 440.00 |
| | | Addressing Encampments | | | 1 | $100 | **$ 100.00** | **0.25** | 10% | $ 440.00 |
| | | Travel | | | | | **$ -** | **1** | 10% | $ - |
| **Reporting, Documentation, and Data Management** | | | | | | | | | | |
| | Reporting | | | | | | | | | |
| | | Stewardship Plan (Development) | Prepared once | hrs | 60 | $100 | **$ 6,000.00** | **20** | 10% | $ 330.00 |
| | | Stewardship Plan (Update) | Updated annually | hrs | 8 | $100 | **$ 800.00** | **1** | 10% | $ 880.00 |
| | | Annual Maintenance Plan | | hrs | 15 | $100 | **$ 1,500.00** | **1** | 10% | $ 1,650.00 |
| | | Annual Monitoring Report | | hrs | 15 | $100 | **$ 1,500.00** | **1** | 10% | $ 1,650.00 |
| | | Annual Fiscal Report | | hrs | 8 | $100 | **$ 800.00** | **1** | 10% | $ 880.00 |
| | | Database/Geodatabase Management | | hrs | 5 | $100 | **$ 500.00** | **1** | 10% | $ 550.00 |
| | | GIS mapping | | | | | **$ -** | **1** | 10% | $ - |
| | | GPS mapping | | | | | **$ -** | **1** | 10% | $ - |
| | | Website Management | | hrs | 4 | $100 | **$ 400.00** | **1** | 10% | $ 440.00 |
| **Subtotal** | | | | | | | | | | $ 23,149.50 |
| **Administration (25%)** | | | | | | | | | | $ 5,787.38 |
| **Total** | | | | | | | | | | $ 28,936.88 |

# Appendix 13. Adaptive Management Set-Aside Cost Calculations

# LINNTON MITIGATION SITE
# PHASE 2 - HABITAT RESTORATION

Job No: 13-044

8/7/2017

## ATTACHMENT 3.D.I - PROPOSED ADAPTIVE MANAGEMENT AMOUNT

| ITEM NO. | ITEM | QUANTITY | UNIT | AVG. UNIT COSTS FROM PRELIMINARY PHASE 2 BIDS | AVG. TOTAL COST FROM PRELIMINARY PHASE 2 BIDS | Percentage Applicable to Adaptive Management Calculation | Comment | Dollar Amount Applicable to Adapative Management Calculation | ADAPTIVE MANAGEMENT COSTS |
|---|---|---|---|---|---|---|---|---|---|
| 1A | MOBILIZATION (HABITAT RESTORATION) | 1 | LS | $ 181,250.00 | $ 181,250.00 | 100% | The portion of mobilization costs associated with pile/general demolition is approximately 25% of the total mobilization costs according to discussions with the bidders. | $ 181,250.00 | $ 45,312.50 |
| 1B | MOBILIZATION (DEMOLITION) | 1 | LS | $ 60,416.67 | $ 60,416.67 | 0% | The portion of mobilization costs associated with pile/general demolition is 25% of the total mobilization costs according to discussions with the bidders. | $ - | $ - |
| 2 | ESCP IMPLEMENTATION | 1 | LS | $ 22,666.67 | $ 22,666.67 | 100% | | $ 22,666.67 | $ 5,666.67 |
| 3 | FIBER ROLLS | 16294 | LF | $ 3.25 | $ 52,955.50 | 100% | | $ 52,955.50 | $ 13,238.88 |
| 4 | GENERAL DEMOLITION | 1 | LS | $ 138,333.33 | $ 138,333.33 | 0% | One-time Cost | $ - | $ - |
| 5 | PILING DEMOLITION | 700 | EA | $ 541.67 | $ 379,166.67 | 0% | One-time Cost | $ - | $ - |
| 6 | CLEARING AND GRUBBING | 1 | LS | $ 21,666.67 | $ 21,666.67 | 0% | One-time Cost | $ - | $ - |
| 7 | DEWATERING | 1 | LS | $ 106,666.67 | $ 106,666.67 | 100% | Change in dewatering approach resulted in a 20% reduction in dewatering costs according to discussions with bidders. | $ 106,666.67 | $ 26,666.67 |
| 8A | UNCLASSIFIED EXCAVATION (FOR PERMANENT UPLAND STORAGE) | 194,591 | CY | $ 9.50 | $ 1,848,617.67 | 0% | Assumes that any excavation would be limited to the top 4 feet of the area across the entire site grading area of 20.9 acres which yeilds a volume of 134,900 cubic yards (41% of the total amount of excavation) | $ - | $ - |
| 8B | UNCLASSIFIED EXCAVATION (FOR HABITAT CREATION) | 134,875 | CY | $ 9.50 | $ 1,281,309.33 | 100% | | $ 1,281,309.33 | $ 320,327.33 |
| 9 | CONTAMINATED MEDIA EXCAVATION | 926 | CY | $ 26.67 | $ 24,693.33 | 100% | | $ 24,693.33 | $ 6,173.33 |
| 10 | SEEDING | 19.2 | AC | $ 8,333.33 | $ 160,000.00 | 100% | | $ 160,000.00 | $ 40,000.00 |
| 11 | PLANTING | 102000 | EA | $ 3.83 | $ 391,000.00 | 100% | | $ 391,000.00 | $ 97,750.00 |
| 12 | 24” HDPE PIPE | 553 | LF | $ 153.33 | $ 84,793.33 | 0% | One-time Cost | $ - | $ - |
| 13 | 48" DIAMETER MANHOLES | 2 | EA | $ 7,800.00 | $ 15,600.00 | 0% | One-time Cost | $ - | $ - |
| 14 | LOG STRUCTURES | 5 | EA | $ 7,166.67 | $ 35,833.33 | 100% | | $ 35,833.33 | $ 8,958.33 |
| 15 | SNAG LOGS | 15 | EA | $ 1,033.33 | $ 15,500.00 | 100% | | $ 15,500.00 | $ 3,875.00 |
| 16 | DEBRIS PILES | 10 | EA | $ 1,633.33 | $ 16,333.33 | 100% | | $ 16,333.33 | $ 4,083.33 |
| 17 | HABITAT LOGS BELOW OHW | 10 | EA | $ 1,233.33 | $ 12,333.33 | 100% | | $ 12,333.33 | $ 3,083.33 |
| 18 | HABITAT LOGS ABOVE OHW | 10 | EA | $ 966.67 | $ 9,666.67 | 100% | | $ 9,666.67 | $ 2,416.67 |
| 19 | ENGINEERED STREAMBED MATERIAL | 467 | TON | $ 90.00 | $ 41,988.38 | 100% | | $ 41,988.38 | $ 10,497.09 |
| 20 | BOULDER PLUNGE POOLS | 2 | EA | $ 5,666.67 | $ 11,333.33 | 100% | | $ 11,333.33 | $ 2,833.33 |
| 21 | BOULDER CLUSTERS | 15 | EA | $ 791.67 | $ 11,875.00 | 100% | | $ 11,875.00 | $ 2,968.75 |
| | | | | AVERAGE TOTAL PROJECT COST | $ 4,923,999.21 | TOTAL ADAPTIVE MANAGEMENT COST | | **$ 2,375,404.88** | **$ 593,851.22** |

# Appendix 14. Trustee Council Oversight Budget

## Portland Harbor NRDA Restoration

## RestorCap Linnton - Monitoring and Stewardship Trustee Council Oversight Budget

| Year | Task | NOAA | State of Oregon | USFWS/DOI | Nez Perce | Umatilla | Siletz | Warmsprings | Grand Ronde | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| **Pre-Implementation** | | **$0.00** | **$0.00** | **$0.00** | **$1,070.99** | **$894.18** | **$1,026.49** | **$751.17** | **$2,433.61** | **$6,176.44** |
| | Lamprey: Cost Documentation/Data Review/Meeting/Site Visit | | | | | | | | | $6,176.44 |
| **0** | | **$1,134.20** | **$630.16** | **$432.70** | **$306.00** | **$153.00** | **$430.24** | **$25.50** | **$493.68** | **$3,605.48** |
| | Credit release process and tracking | | | | | | | | | $3,605.48 |
| **1** | | **$5,126.56** | **$1,966.11** | **$3,542.87** | **$2,611.59** | **$2,111.65** | **$2,628.41** | **$913.41** | **$5,147.85** | **$24,048.45** |
| | Participate in community outreach activities | | | | | | | | | $980.19 |
| | Review annual monitoring reports | | | | | | | | | $4,280.78 |
| | Site visits: 5 over 10 years | | | | | | | | | $2,047.76 |
| | Recommend and approve adaptive management actions as needed | | | | | | | | | $5,373.16 |
| | Revisit HEA using As-Builts | | | | | | | | | $2,280.80 |
| | Credit release process and tracking | | | | | | | | | $1,933.94 |
| | Lamprey: Coordination/Cost Documentation/Data review/Meeting/Site Visit | | | | | | | | | $7,151.82 |
| **2** | | **$3,417.75** | **$1,561.61** | **$2,555.92** | **$1,234.64** | **$1,211.18** | **$1,527.29** | **$365.87** | **$4,558.34** | **$16,432.59** |
| | Participate in community outreach activities | | | | | | | | | $513.28 |
| | Review annual monitoring reports | | | | | | | | | $4,371.04 |
| | Site visits: 5 over 10 years | | | | | | | | | $1,639.31 |
| | Recommend and approve adaptive management actions as needed | | | | | | | | | $5,486.45 |
| | Lamprey: Coordination/Cost Documentation/Data review/Technical conference call | | | | | | | | | $4,422.51 |
| **3** | | **$4,094.19** | **$1,930.32** | **$2,840.39** | **$1,561.03** | **$1,529.99** | **$1,926.75** | **$506.86** | **$5,098.47** | **$19,487.99** |
| | Participate in community outreach activities | | | | | | | | | $524.10 |
| | Review annual monitoring reports | | | | | | | | | $4,463.21 |
| | Site visits: 5 over 10 years | | | | | | | | | $1,673.88 |
| | Recommend and approve adaptive management actions as needed | | | | | | | | | $5,602.14 |
| | Credit release process and tracking | | | | | | | | | $2,016.35 |
| | Lamprey: Coordination/Cost Documentation/Data review/Technical conference call | | | | | | | | | $5,208.32 |
| **4** | | **$2,818.96** | **$1,383.96** | **$1,944.30** | **$2,680.06** | **$2,383.99** | **$2,245.67** | **$1,301.03** | **$5,237.80** | **$19,995.77** |
| | Participate in community outreach activities | | | | | | | | | $535.15 |
| | Review annual monitoring reports | | | | | | | | | $4,557.32 |
| | Recommend and approve adaptive management actions as needed | | | | | | | | | $5,720.26 |
| | Lamprey: Coordination/Cost Documentation/Data review/Meeting/Site Visit | | | | | | | | | $9,183.04 |
| **5** | | **$6,015.39** | **$2,712.78** | **$3,699.48** | **$2,717.33** | **$1,993.60** | **$3,472.60** | **$709.37** | **$6,036.06** | **$27,356.62** |
| | Participate in community outreach activities | | | | | | | | | $546.43 |
| | Review annual monitoring reports | | | | | | | | | $4,653.41 |
| | Site visits: 5 over 10 years | | | | | | | | | $1,745.21 |
| | Recommend and approve adaptive management actions as needed | | | | | | | | | $5,840.88 |
| | Review and development of conservation easements | | | | | | | | | $4,500.02 |
| | Confirm IMCS can be released | | | | | | | | | $3,391.16 |
| | Lamprey: Coordination/Cost Documentation/Data review/Technical conference call | | | | | | | | | $6,679.51 |
| **6** | | **$3,582.51** | **$484.78** | **$488.01** | **$433.98** | **$347.18** | **$546.00** | **$57.86** | **$472.17** | **$6,412.49** |
| | Participate in community outreach activities | | | | | | | | | $373.03 |
| | Review annual monitoring reports | | | | | | | | | $1,668.11 |
| | Recommend and approve adaptive management actions as needed | | | | | | | | | $2,224.73 |
| | Credit release process and tracking | | | | | | | | | $2,146.61 |
| **7** | | **$3,001.06** | **$584.93** | **$1,114.45** | **$265.88** | **$177.25** | **$308.30** | **$29.54** | **$196.16** | **$5,677.56** |
| | Participate in community outreach activities | | | | | | | | | $569.72 |
| | Review annual monitoring reports | | | | | | | | | $2,269.74 |
| | Recommend and approve adaptive management actions as needed | | | | | | | | | $2,838.10 |

| Year | Task | NOAA | State of Oregon | USFWS/DOI | Nez Perce | Umatilla | Siletz | Warmsprings | Grand Ronde | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|
| **8** | | **$5,222.52** | **$199.09** | **$379.31** | **$452.47** | **$361.98** | **$629.60** | **$60.33** | **$400.59** | **$7,705.88** |
| | Participate in community outreach activities | | | | | | | | | $388.93 |
| | Review annual monitoring reports | | | | | | | | | $1,739.20 |
| | Review and approve Initial Long Term Stewardship Framework | | | | | | | | | $3,258.21 |
| | Recommend and approve adaptive management actions as needed | | | | | | | | | $2,319.54 |
| **9** | | **$3,128.96** | **$135.52** | **$258.21** | **$277.21** | **$184.80** | **$321.44** | **$30.80** | **$204.52** | **$4,541.45** |
| | Participate in community outreach activities | | | | | | | | | $397.13 |
| | Review annual monitoring reports | | | | | | | | | $1,775.87 |
| | Recommend and approve adaptive management actions as needed | | | | | | | | | $2,368.45 |
| **10** | | **$4,501.14** | **$1,288.07** | **$2,269.92** | **$4,211.71** | **$3,464.94** | **$2,682.74** | **$2,573.65** | **$5,912.14** | **$26,904.32** |
| | Participate in community outreach activities | | | | | | | | | $606.52 |
| | Review annual monitoring reports | | | | | | | | | $2,416.36 |
| | Site visits: 5 over 10 years | | | | | | | | | $1,937.13 |
| | Recommend and approve adaptive management actions as needed | | | | | | | | | $3,021.44 |
| | Confirm IMCS can be released | | | | | | | | | $1,992.11 |
| | Lamprey: Coordination/Cost Documentation/Data review/Meeting/Site Visit | | | | | | | | | $16,930.75 |
| **11** | | **$4,156.72** | **$396.79** | **$272.46** | **$192.68** | **$192.68** | **$270.91** | **$32.11** | **$310.86** | **$5,825.21** |
| | Credit release process and tracking | | | | | | | | | $2,382.67 |
| | Stewardship Oversight | | | | | | | | | $3,442.55 |
| **12** | | **$3,339.38** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$3,339.38** |
| | Stewardship Oversight | | | | | | | | | $3,339.38 |
| **13** | | **$3,230.35** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$3,230.35** |
| | Stewardship Oversight | | | | | | | | | $3,230.35 |
| **14** | | **$3,115.25** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$3,115.25** |
| | Stewardship Oversight | | | | | | | | | $3,115.25 |
| **15** | | **$2,993.88** | **$0.00** | **$0.00** | **$2,421.83** | **$1,946.05** | **$1,128.56** | **$1,297.37** | **$6,070.15** | **$15,857.83** |
| | Stewardship Oversight | | | | | | | | | $2,993.88 |
| | Lamprey: Coordination/Cost Documentation/Data review/Technical conference call | | | | | | | | | $12,863.96 |
| **16** | | **$2,866.03** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$2,866.03** |
| | Stewardship Oversight | | | | | | | | | $2,866.03 |
| **17** | | **$2,731.48** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$2,731.48** |
| | Stewardship Oversight | | | | | | | | | $2,731.48 |
| **18** | | **$2,590.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$2,590.00** |
| | Stewardship Oversight | | | | | | | | | $2,590.00 |
| **19** | | **$2,441.37** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$0.00** | **$2,441.37** |
| | Stewardship Oversight | | | | | | | | | $2,441.37 |
| **20** | | **$2,077.59** | **$0.00** | **$0.00** | **$4,730.32** | **$3,905.14** | **$2,642.45** | **$3,175.61** | **$6,687.67** | **$23,218.78** |
| | Stewardship Oversight | | | | | | | | | $2,077.59 |
| | Lamprey: Coordination/Cost Documentation/Data review/Meeting/Site Visit | | | | | | | | | $21,141.19 |
| **TOTALS** | | **$71,585.29** | **$13,274.12** | **$19,798.02** | **$25,167.70** | **$20,857.61** | **$21,787.43** | **$11,830.49** | **$49,260.05** | **$233,560.72** |

**Notes:**

1. This budget is based on the project design as described in Attachment A of the Trustees' Forecase Settlement Credits Value letter to RestorCap. Changes to the project design, level of effort required for oversight, etc., identified during the development of the restoration plan for the site, may result in changes in to this budget.

2. The costs associated with lamprey monitoring oversight assume that the Covered Project is the third of three restoration projects that will be implemented for Portland Harbor NRDA credit. For years in which multiple projects are conducting lamprey monitoring, costs savings associated with efficiencies gained from tasks being conducted for multiple projects simultaneously are factored into the presented values.

# Appendix 15. Memorandum of Agreement

# MEMORANDUM OF AGREEMENT BETWEEN THE NATURAL RESOURCE TRUSTEES AND RESTORCAP FOR PROVIDING TECHNICAL ASSISTANCE RELATED TO HABITAT RESTORATION PROJECTS TOWARD FUTURE SETTLEMENT OF NATURAL RESOURCE DAMAGE CLAIMS AT THE PORTLAND HARBOR CERCLA SITE

THIS MEMORANDUM OF AGREEMENT ("MOA") is made and entered into by and among the National Oceanic and Atmospheric Administration ("NOAA") on behalf of the Department of Commerce, the United States Fish and Wildlife Service ("USFWS") on behalf of the Department of the Interior, the Oregon Department of Fish and Wildlife, the Confederated Tribes of the Grand Ronde Community of Oregon, the Confederated Tribes of Siletz Indians, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Nez Perce Tribe (collectively, "the Trustees") and Montclair Environmental Management, Inc. dba Restorcap ("Developer") (together, "the Parties"). The effective date of this MOA is the date of the signature of Developer and one Trustee.

## RECITALS

WHEREAS, the Trustees are carrying out a damage assessment for the Portland Harbor Superfund site ("Site"), and anticipate bringing claims for injuries to natural resources under the Comprehensive Environmental Response Compensation and Liability Act, 42 USC § 9601, *et seq.* ("CERCLA"), the Oil Pollution Act, 33 U.S.C. § 3701 *et seq.* and other applicable laws and regulations; and

WHEREAS, the Parties desire to facilitate the creation of habitat in the Restoration Focus Area in advance of the Trustees' completion of a damage assessment or the filing of actions against liable parties; and

WHEREAS, the Parties recognize that the terms of any natural resource damages ("NRD") settlement, including any restoration project the Trustees propose as part of the settlement, must be subject to public review and comment and court approval, and therefore the Trustees can make no final determination to accept a restoration project prior to entering into a settlement agreement; and

WHEREAS, the Parties agree that, if a habitat restoration project developed pursuant to this MOA is included in an NRD settlement agreement, it is appropriate to credit the ecological value produced by the project prior to entering into the settlement agreement against the liability of the settling party or parties who were responsible for developing and/or funding the development of the project; and

WHEREAS, Developer is willing to develop one or more habitat restoration projects in the Restoration Focus Area with the intention of marketing the ecological value credits produced by such project(s) to one or more parties liable for NRD claims at the Site to be potentially used by such party or parties to offset some or all of their liability in settlements with the Trustees; and

WHEREAS, the Parties desire to work collaboratively to design and assess the value of one or more habitat restoration projects in the Restoration Focus Area;

NOW, THEREFORE, in consideration of the foregoing recitals the Parties mutually agree as follows:

## AGREEMENT

### 1. Definitions

1.1 Project Baseline Condition. Solely for the purposes of this MOA, the "Project Baseline Condition" shall be the habitat conditions at the location of a habitat restoration project taking into account remedial measures that are, or are reasonably anticipated to be, required by the U.S. Environmental Protection Agency under CERCLA.

1.2 Covered Projects. "Covered Projects" shall refer to those habitat restoration projects as to which the Parties collaborate on project design and establishment of Forecast Settlement Credit Value pursuant to the terms of this MOA.

1.3 Forecast Settlement Credits Value. "Forecast Settlement Credits Value" shall be a determination of the value a habitat restoration project subject to this MOA is expected to generate taking into account the project's anticipated habitat benefits beyond the Project Baseline Condition. Forecast Settlement Credits Value will be estimated based on discounted service acre years ("DSAYs"), or such other measurement of value that the Trustees employ for determining NRD for the Site and pursuing claims against liable parties for such damages.

1.4 Technical Assistance. "Technical Assistance" shall mean the provision by the Trustees of assistance to Developer in the evaluation, design and planning of Site area habitat restoration projects and the determination of Forecast Settlement Credits Value for such restoration projects. Technical Assistance shall include review and evaluation of proposed projects by Trustee technical and legal representatives as needed.

1.5 Final Settlement Credits Value. "Final Settlement Credits Value" shall be the value of a habitat restoration project that will be recognized as offsetting some or all of a party's NRD liability in a formal settlement agreement.

1.6 Potentially Liable Party. "Potentially Liable Party" shall mean any party identified by the Trustees as having potential NRD legal liability arising from releases of hazardous substances at or to the Site.

1.7 Restoration Focus Area. "Restoration Focus Area" includes the Portland Harbor Superfund study area and the Willamette River from its confluence with the Columbia River to Willamette Falls, inclusive of the immediate confluences of major tributaries (Johnson Creek, Tryon Creek, Clackamas River, and Kellogg Creek), and the lower Columbia River on the Oregon side from the Sandy River confluence to the Multnomah Channel outlet (including a portion of the western end of West Hayden Island), all of Multnomah Channel, and portions of Scappoose Bay.

## 2. Collaboration on Habitat Project Design and Settlement Credits Value Assessment

2.1 Site Habitat Project Evaluations. The Trustees will collaborate with Developer in evaluating options for potential habitat restoration projects located in the Restoration Focus Area. Technical Assistance will be provided in an effort to maximize the ecological services of habitat restoration projects and the consistency of such projects with Trustee goals and responsibilities.

2.2 Payment of Trustee Technical Assistance Costs. Developer will reimburse the Trustees for the cost of Technical Assistance provided by the Trustees at Developer's request. In any future actions for or settlements of NRD claims with respect to the Site, the Trustees will not seek to recover any Technical Assistance costs paid by Developer pursuant to this MOA.

2.3 Billing Payment Procedures for Trustee Technical Assistance. Developer shall pay the cost of Technical Assistance annually on a projected basis. Developer shall make an initial payment of $ 26,905.45 to the Trustees within 30 days of the signing of this MOA by Developer and one Trustee, which is the projected cost of providing one year of Technical Assistance. The Trustees shall have no obligation to begin providing Technical Assistance prior to receiving the initial payment. However, if the Trustees elect to provide Technical Assistance prior to the effective date of this MOA, Developer will reimburse those costs as part of the initial payment. On an annual basis beginning one year after the effective date of this MOA, the Trustees will provide Developer with an invoice detailing the Technical Assistance work performed prior to that date (or, for subsequent invoices, since the date of the prior invoice) and the charges for such work, and detailing the Technical Assistance work the Trustees project performing during the succeeding year and the projected charges for such work. Within 30 days after the date of each such invoice, Developer shall pay the Trustees' projected costs, less any amounts paid previously that have not been expended by the Trustees. Payment instructions for each Trustee are included in Appendix A.

## 3. Establishment and Use of Settlement Credits Value

3.1 Identification of Covered Projects and Establishment of Forecast Settlement Credits Values. The Parties shall jointly identify one or more proposed habitat restoration projects as Covered Projects under the terms of this MOA. The Parties shall jointly agree on a proposed design for each Covered Project, and shall in good faith meet and discuss the Forecast Settlement Credits Value for each Covered Project. If and when the Parties agree on the Forecast Settlement Credits Value of a Covered Project, that value shall be documented in written form by the Trustees and conveyed to Developer.

3.2 Future Adjustments to Credit Amounts. Prior to entering into any future NRD settlement in which the Trustees would propose to apply credits from a Covered Project, the Trustees and Developer shall in good faith meet and review the results of performance monitoring for each Covered Project and determine a Final Settlement Credits Value for each. The Trustees will allow for an upward adjustment from the Forecast Settlement Credits Value that has previously been established under paragraph 3.1 of this MOA, in the following circumstances: 1) The results of performance monitoring for the affected Covered Project demonstrate the project has produced or is expected to produce greater ecological benefits than were estimated in developing the Forecast Settlement Credits Value; 2) the Trustees' protocols for the evaluation of habitat restoration projects change such that a greater Final Settlement Credits Value would be available under the new protocols; 3) additional habitat is planned or developed by Developer or others in the vicinity of a Covered Project such that a greater Final Settlement Credits Value should be available under the Trustees' protocols; or 4) any other circumstances under which Developer would have obtained a greater Final Settlement Credits Value for a Covered Project had Developer delayed working with the Trustees on the establishment of a Forecast Settlement Credit Value for that project. The Trustees will recognize a Final Settlement Credits Value that is lower than the Forecast Settlement Credits Value in the following circumstances: 1) The results of performance monitoring for the Covered Project demonstrate that the project has produced or is expected to produce lower ecological benefits than were estimated in developing the Forecast Settlement Credits Value; 2) remedial actions, development actions or other activities are planned or have occurred in the vicinity of a Covered Project such that a lower Final Settlement Credits Value should be available under the Trustees' protocols; or 3) a party has previously received credit for all or a portion of a Covered Project against environmental or habitat mitigation requirements under federal, state or local laws or ordinances or against NRD liability in another settlement agreement.

3.3 Further Collaboration. The Parties recognize that additional collaboration will be necessary to develop entitlement conditions for Covered Projects, including, but not limited to, real estate assurances (*e.g.,* conservation easement, deed restrictions), financial assurances (*e.g.,* performance bonds), a monitoring and stewardship protocol, and the applicability, sale and transfer of credits to Potentially Liable Parties. Some or all of such additional collaboration would require an addendum to this MOA or a separate MOA.

3.4 Effect of MOA on Natural Resource Damage Assessment Process. This MOA and the Parties' actions or determinations pursuant to this MOA are not intended to prejudice or affect the course of or obviate the need for the Trustees' natural resource damage assessment process for the Site.

## 4. Miscellaneous

4.1 Modifications. The Parties may modify the terms of this MOA by mutual written agreement signed by authorized representatives of the Parties.

4.2 No Admission of Liability; No Release of Non-Parties; and No Third Party Beneficiaries. This MOA shall not constitute nor shall it be used as evidence of any admission of law or fact, or a waiver of any right or defense by any Party, except as expressly set forth in this MOA. The Parties do not admit to any fact or to any liability under federal, state, or local law or regulation, and no part of this MOA shall constitute such an admission. This MOA is not intended to, nor shall it, release, discharge or affect any rights or causes of action that any of the Parties may have against any other person or entity, and each of the Parties reserves all such rights. This MOA is neither expressly nor impliedly intended for the benefit of any third party, and is neither expressly nor impliedly enforceable by any third party, including, but not limited to, local, state and federal governments and/or agencies. Nothing in this MOA is or shall be construed to be a waiver of sovereign immunity by any of the Trustees.

4.3 Limitation. Nothing in this MOA shall be construed as obligating the Trustees, their officers, agents or employees, to expend any funds in excess of appropriations authorized by law.

4.4 Counterparts. This MOA may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

4.5 Assignment of Rights. Developer may, upon written notice to the Trustees, assign its rights and obligations under this MOA to any person or business entity which is an affiliate of Developer, or similar entity that performs Developer's obligations under this MOA.

*(Signatures on the following page)*

## SIGNATURES

**FOR DEVELOPER**

By:

Printed Name: ANDREW GREGG

Date: 5/16/13

## FOR THE PORTLAND HARBOR NATURAL RESOURCE TRUSTEE COUNCIL

**Confederated Tribes of the Grand Ronde Community of Oregon**

By:

Date:

**Confederated Tribes of Siletz Indians**

By:

Date:

**Nez Perce Tribe**

By:

Date:

**Confederated Tribes of the Umatilla Indian Reservation**

By:

Date:

**Confederated Tribes of the Warm Springs Indian Reservation of Oregon**

By:

Date:

**Oregon Department of Fish and Wildlife**

By: ________________________________________

Date: ______________________________________

**U.S. Department of the Interior**

By: ________________________________________

Date: ______________________________________

**National Oceanic and Atmospheric Administration**

By: ________________________________________

Date: ______________________________________

# Appendix 16. Memorandum of Agreement Addendum

# FIRST ADDENDUM TO MEMORANDUM OF AGREEMENT BETWEEN THE PORTLAND HARBOR NATURAL RESOURCE TRUSTEE COUNCIL AND RESTORCAP DEVELOPMENT, LLC RELATED TO HABITAT RESTORATION PROJECTS TOWARD FUTURE SETTLEMENT OF NATURAL RESOURCE DAMAGE CLAIMS AT THE PORTLAND HARBOR CERCLA SITE

## (Linnton Restoration Site)

This First Addendum to Memorandum of Agreement ( this **"First Addendum"**), dated as of _______, 2018, is entered into by and among Linnton Water Credits, LLC, a Delaware limited liability company (**"Restoration Implementer"**), RestorCap Development, LLC, a Delaware limited liability company ("**RestorCap**"), and the NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION ("**NOAA**"), on behalf of the United States Department of the Commerce, the UNITED STATES FISH AND WILDLIFE SERVICE ("**USFWS**"), on behalf of the United States Department of the Interior, the OREGON DEPARTMENT OF FISH AND WILDLIFE ("**ODFW**"), the CONFEDERATED TRIBES OF THE GRAND RONDE COMMUNITY OF OREGON, the CONFEDERATED TRIBES OF SILETZ INDIANS, the CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION, the CONFEDERATED TRIBES OF THE WARM SPRINGS RESERVATION OF OREGON, and the NEZ PERCE TRIBE (collectively the **"Trustee Council"**). The Restoration Implementer and the Trustee Council are collectively referred to herein as the **"Parties."** This First Addendum sets forth the agreement of the Parties regarding the establishment, use, operation and maintenance of the Linnton Restoration Site located at 10504 NW St. Helen's Road, Portland, Oregon (the **"Restoration Site"**). The effective date of this First Addendum is the date of the signature of the Restoration Implementer, RestorCap and one member of the Trustee Council.

## Recitals

A. The Trustee Council is carrying out a damage assessment for the Portland Harbor Superfund Site and anticipates bringing claims for injuries to natural resources under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), 42 U.S.C. §§ 9601, *et seq*.

B. Trustee Council and RestorCap are parties to that certain Memorandum of Agreement between the Trustee Council and RestorCap for Providing Technical Assistance Related to Habitat Restoration Projects toward Future Settlement of Natural Resource Damage Claims at the Portland Harbor CERCLA Site dated May 16, 2013 (the **"Original Memorandum"**), wherein they agreed to use their collaborative efforts to identify, design and assess the value of one or more habitat restoration projects in or near the Portland Harbor Superfund Site. The Original Memorandum set forth a process to develop a forecast settlement credits value and final settlement credit value for a habitat restoration project.

C. Restoration Implementer is a wholly-owned subsidiary of RestorCap.

D. Pursuant to the terms of the Original Memorandum, RestorCap assigns all of its rights and obligations under the Original Memorandum to Restoration Implementer.

E. Restoration Implementer is the owner of certain real property, consisting of approximately 23 acres (the **"Overall Property"**), located in Multnomah County, Oregon.

F. Pursuant to the terms of the Original Memorandum, Restoration Implementer and Trustee Council have determined that a portion of the Overall Property, and adjacent Department of State Lands property, consisting of approximately 27 acres (the "**Restoration Site**"), is a suitable habitat restoration project. Based upon such determination, Restoration Implementer desires to develop a habitat restoration project as more fully described herein (the "**Restoration Project**") on the Restoration Site.

G. Consistent with the terms of the Original Memorandum, Restoration Implementer intends to develop the Restoration Site for the purpose of creating credits ("**Credits**" or "**DSAY Credits**") for sale to one or more potentially responsible parties seeking to offset its/their liability for damages resulting from injury to natural resources in the Portland Harbor Superfund Site.

H. In collaboration with the Trustee Council, Restoration Implementer has developed the Linnton Mill Restoration Site Restoration Plan (the "**Linnton Restoration Plan**,") and will perform the obligations described therein.[1]

I. The Trustee Council agrees that the Restoration Project fits within the parameters set forth in the draft Portland Harbor Programmatic EIS and Restoration Plan and that the Restoration Project, if implemented pursuant to the Linnton Restoration Plan, will provide Credits that may be proposed as part of a natural resource damages (**"NRD"**) settlement, subject to approval by all appropriate officials, public review and comment, and court approval.

NOW, THEREFORE, in consideration of the foregoing recitals, and the mutual covenants contained herein, the Parties agree as follows:

## **Agreement**

1. Approval of the Linnton Restoration Plan. The Trustee Council hereby approves the Linnton Restoration Plan.

2. Restoration Project Implementation. The Restoration Project shall be implemented in accordance with the Restoration Plan. Such implementation shall include, without limitation, recording a deed restriction, obtaining all necessary permits for the Restoration Project, constructing the Restoration Project, recording a Conservation Easement an to provide permanent protection of the

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[1] A Project-specific Long-Term Stewardship Plan will be developed and approved after the Project is constructed and prior to the end of the Performance Period.

ecological values of the Restoration Site, providing all real estate assurances and financial assurances required under the Linnton Restoration Plan, and maintaining and monitoring the Restoration Project in accordance with the Linnton Restoration Plan.

3. DSAY Credits. The number of DSAY Credits forecasted for the Restoration Project (**"forecast settlement credits value"**) shall be provided in the Credit Evaluation attached as Exhibit I to the Linnton Restoration Plan. Subject to the Original Memorandum of Agreement, the Trustee Council may adjust the forecast settlement Credits value upward or downward based on a number of factors.

4. Settlement Agreements. The Parties recognize that the terms of any NRD settlement may include additional terms or assurances that are not part of this First Addendum. The Parties agree that if requested by the Trustee Council, the Restoration Implementer will be a party to any NRD settlement, memorialized in a consent decree entered in Federal District Court for the District of Oregon, accepting the Credits purchased by a potentially responsible party ("Consent Decree"), with the understanding that the Restoration Implementer will have the right to review and approve those portions of any Consent Decree related to the Restoration Implementer.

5. Limitations. Nothing in this First Addendum shall be construed as obligating the Trustee Council, their officers, agents or employees, to expend any funds in excess of appropriations authorized by law. Use of DSAY Credits to offset or resolve a Potentially Responsible Party's (PRP's) liability for damages resulting from injury to natural resources in the Portland Harbor Superfund Site can only occur via the entry of a Consent Decree. The decision to enter into a Consent Decree with any given PRP involves enforcement discretion on the part of the Trustees and the United States Department of Justice, and any Consent Decree also is predicated upon successful settlement discussions involving the Trustees, the United States Department of Justice and the PRP. Nothing in the Original Memorandum or this First Addendum limits the enforcement discretion of the Trustees or the United States Department of Justice, nor do those documents require that a Consent Decree with any particular PRP use DSAY Credits rather than other types of consideration (such as cash or a restoration project constructed by the PRP) that are used to resolve the NRD liabilities of PRPs.

6. Representations and Warranties. Each of the Parties hereby represents and warrants as follows as of the date hereof:

(a) It has all requisite power and authority to execute, deliver and perform this First Addendum and to consummate the transactions contemplated hereby.

(b) The execution, delivery and performance of this First Addendum and the consummation of the transactions contemplated hereby have been duly and validly authorized.

7. Ratification. The Parties agree that, except as provided in this First Addendum, the Original Memorandum is ratified, affirmed and remains in full force and effect and is incorporated herein by this reference.

8. Counterparts. This First Addendum may be executed in multiple counterparts, each of which shall be deemed an original, but all of which, together, shall constitute one and the same instrument.

9. Notices. Any notices under this First Addendum shall be in writing and shall be effective and deemed received upon the earliest of (a) the actual receipt of the same by personal delivery or otherwise, (b) one business day after being deposited with a nationally recognized overnight courier service addressed as specified below, or (c) three business days after being deposited in the United States mail addressed as specified below. Rejection or other refusal to accept or the inability to deliver because of changed address of which no notice was given as herein required shall be deemed to be receipt of the notice sent. Either Party may change its address by providing written notice to the other Party.

To Trustee Council:

Restoration Center
National Marine Fisheries Service
Oregon Field Office NOAA
1201 NE Lloyd Blvd.
Portland, OR 97232-2182
Attn: Megan Callahan-Grant

To Restoration Implementer:

Linnton Water Credits, LLC
337 17th Street #200
Oakland, CA 94612
Attention: Robert Marinai
Telephone: 510-326-7131
Facsimile No.: 562-427-331
Email: robm@restorcap.net

With a copy to:

Linnton Water Credits, LLC
2726 Walnut Avenue
Signal Hill, CA 90755
Attention: Andrew Gregg
Telephone: 714-580-2004
Facsimile No.: 562-427-3314
Email: andyg@restorcap.net

10. Electronic Transmittals. The Parties agree that if this First Addendum is transmitted electronically, the electronic transmittal of the original execution signatures shall be treated as original signatures and given the same legal effect as an original signature.

11. Entire Agreement. This First Addendum, together with the Linnton Restoration Plan and its incorporated exhibits, as applicable, constitute the entire agreement and understanding of the

Parties with respect to the subject matter hereof, and supersede all other prior and contemporaneous agreements, whether written or oral, between the Parties.

12. Dispute Resolution. Any dispute, controversy or claim arising out of or relating to this First Addendum, the Original Memorandum, or the Linnton Restoration Plan or its incorporated exhibits, including any dispute relating to interpretation of or performance thereunder ("**Dispute**"), shall be resolved in the manner set forth below (the "**Dispute Resolution Procedures**"):

If a violation is not cured within thirty (30) days after receipt of written notice and demand, or if the cure reasonably requires more than thirty (30) days to complete and there is failure to begin the cure within the thirty-day period or failure to continue diligently to complete the cure, the Parties shall first engage in the following dispute resolution process to resolve any disputes arising related to the violation and cure. The Restoration Implementer, the Trustee Council or the Trustee Councils' designee(s), shall issue a written Notice of Deficiencies to all Parties, detailing the claimed deficiencies concerning the violation and cure. The Notice of Deficiencies shall identify a higher-level administrative officer within the issuing Party's organization who shall represent the Party in the dispute resolution process ("**Dispute Resolution Representative**"). The Notice of Deficiencies shall include the Dispute Resolution Representative's contact information. Within fourteen (14) days of the receipt of the Notice of Deficiencies, the remaining Parties shall identify corresponding Dispute Resolution Representatives within their respective organizations and communicate to schedule a joint conference to be held at the earliest opportunity. The Dispute Resolution Representatives shall engage in a reasonable, good-faith effort to review the dispute and decide upon a mutually agreeable cure, which shall be diligently implemented.

***[The remainder of this page has been intentionally left blank.]***

IN WITNESS WHEREOF, the Parties hereto have executed this First Addendum as of the dates set forth above.

**RESTORATION IMPLEMENTER:**

LINNTON WATER CREDITS, LLC

By:
Name: Andrew Gregg
Title: Member

**RESTORCAP:**

RESTORCAP DEVELOPMENT, LLC

By:
Name: Andrew Gregg
Title: Member

**TRUSTEE COUNCIL:**

CONFEDERATED TRIBES OF THE GRAND
RONDE COMMUNITY OF OREGON

By:________________________
Name:
Title:

CONFEDERATED TRIBES OF
SILETZ INDIANS

By:________________________
Name:
Title:

NEZ PERCE TRIBE

By:________________________
Name:
Title:

CONFEDERATED TRIBES OF THE UMATILLA
INDIAN RESERVATION

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**RESTORATION IMPLEMENTER:**

LINNTON WATER CREDITS, LLC

By:
Name: Andrew Gregg
Title: Member

**RESTORCAP:**

RESTORCAP DEVELOPMENT, LLC

By:
Name: Andrew Gregg
Title: Member

**TRUSTEE COUNCIL:**

CONFEDERATED TRIBES OF THE GRAND RONDE COMMUNITY OF OREGON

By: Cheryle A. Kennedy
Name:
Title: Chairwoman

CONFEDERATED TRIBES OF SILETZ INDIANS

By:____________________
Name:
Title:

NEZ PERCE TRIBE

By: ____________________
Name:
Title:

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION

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**RESTORATION IMPLEMENTER:**

LINNTON WATER CREDITS, LLC

By:__________________________
Name:
Title:

**RESTORCAP:**

RESTORCAP DEVELOPMENT, LLC

By:__________________________
Name:
Title:

**TRUSTEE COUNCIL:**

CONFEDERATED TRIBES OF THE GRAND
RONDE COMMUNITY OF OREGON

By:__________________________
Name:
Title:

CONFEDERATED TRIBES OF
SILETZ INDIANS

By: Delores Pigsley
Name: Delores Pigsley
Title: Tribal Chairman

NEZ PERCE TRIBE

By:__________________________
Name:
Title:

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**RESTORATION IMPLEMENTER:**

LINNTON WATER CREDITS, LLC

By:__________________________
Name:
Title:

**RESTORCAP:**

RESTORCAP DEVELOPMENT, LLC

By:__________________________
Name:
Title:

**TRUSTEE COUNCIL:**

CONFEDERATED TRIBES OF THE GRAND
RONDE COMMUNITY OF OREGON

By:__________________________
Name:
Title:

CONFEDERATED TRIBES OF
SILETZ INDIANS

By:__________________________
Name:
Title:

NEZ PERCE TRIBE

By:__________________________
Name: Shannon F. Wheeler
Title: Chairman

CONFEDERATED TRIBES OF THE UMATILLA
INDIAN RESERVATION

By:________________________
Name: Jeremy R. Wolf
Title: BOT Vice-Chair

CONFEDERATED TRIBES OF THE WARM SPRINGS
INDIAN RESERVATION OF OREGON

By:________________________
Name:
Title:

OREGON DEPARTMENT OF THE INTERIOR

By:________________________
Name:
Title:

U.S. DEPARTMENT OF THE INTERIOR

By:________________________
Name:
Title:

NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION

By:________________________
Name:
Title:

CONFEDERATED TRIBES OF THE UMATILLA
INDIAN RESERVATION

By:__________________________
Name:
Title:

CONFEDERATED TRIBES OF THE WARM SPRINGS
INDIAN RESERVATION OF OREGON

By: Robert A Brunoe
Name: Robert A. Brunoe
Title: General Manager Branch of Natural Resources

OREGON DEPARTMENT OF THE INTERIOR

By:__________________________
Name:
Title:

U.S. DEPARTMENT OF THE INTERIOR

By:__________________________
Name:
Title:

NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION

By:__________________________
Name:
Title:

CONFEDERATED TRIBES OF THE UMATILLA
INDIAN RESERVATION

By:________________________
Name:
Title:

CONFEDERATED TRIBES OF THE WARM SPRINGS
INDIAN RESERVATION OF OREGON

By:________________________
Name:
Title:

OREGON DEPARTMENT OF
FISH AND WILDLIFE

By: 01-03-19
Name: Cameron Smith
Title: Deputy Director of Administration

U.S. DEPARTMENT OF THE INTERIOR

By:________________________
Name:
Title:

NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION

By:________________________
Name:
Title:

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION

By:__________________________
Name:
Title:

CONFEDERATED TRIBES OF THE WARM SPRINGS INDIAN RESERVATION OF OREGON

By:__________________________
Name:
Title:

OREGON DEPARTMENT OF THE INTERIOR

By:__________________________
Name:
Title:

U.S. DEPARTMENT OF THE INTERIOR

By: Mary M Abrams
Name: Mary H Abrams
Title: Acting Regional Director

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

By:__________________________
Name:
Title:

CONFEDERATED TRIBES OF THE UMATILLA
INDIAN RESERVATION

By:__________________________
Name:
Title:

CONFEDERATED TRIBES OF THE WARM SPRINGS
INDIAN RESERVATION OF OREGON

By:__________________________
Name:
Title:

OREGON DEPARTMENT OF THE INTERIOR

By:__________________________
Name:
Title:

U.S. DEPARTMENT OF THE INTERIOR

By:__________________________
Name:
Title:

NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION

By: KELLY.CHAUNCEY.THOMAS.1404285188 Digitally signed by KELLY.CHAUNCEY.THOMAS.1404285188 Date: 2018.12.19 14:47:40 -05'00'
Name: Chauncey Kelly
Title: Section Chief, Natural Resources Section