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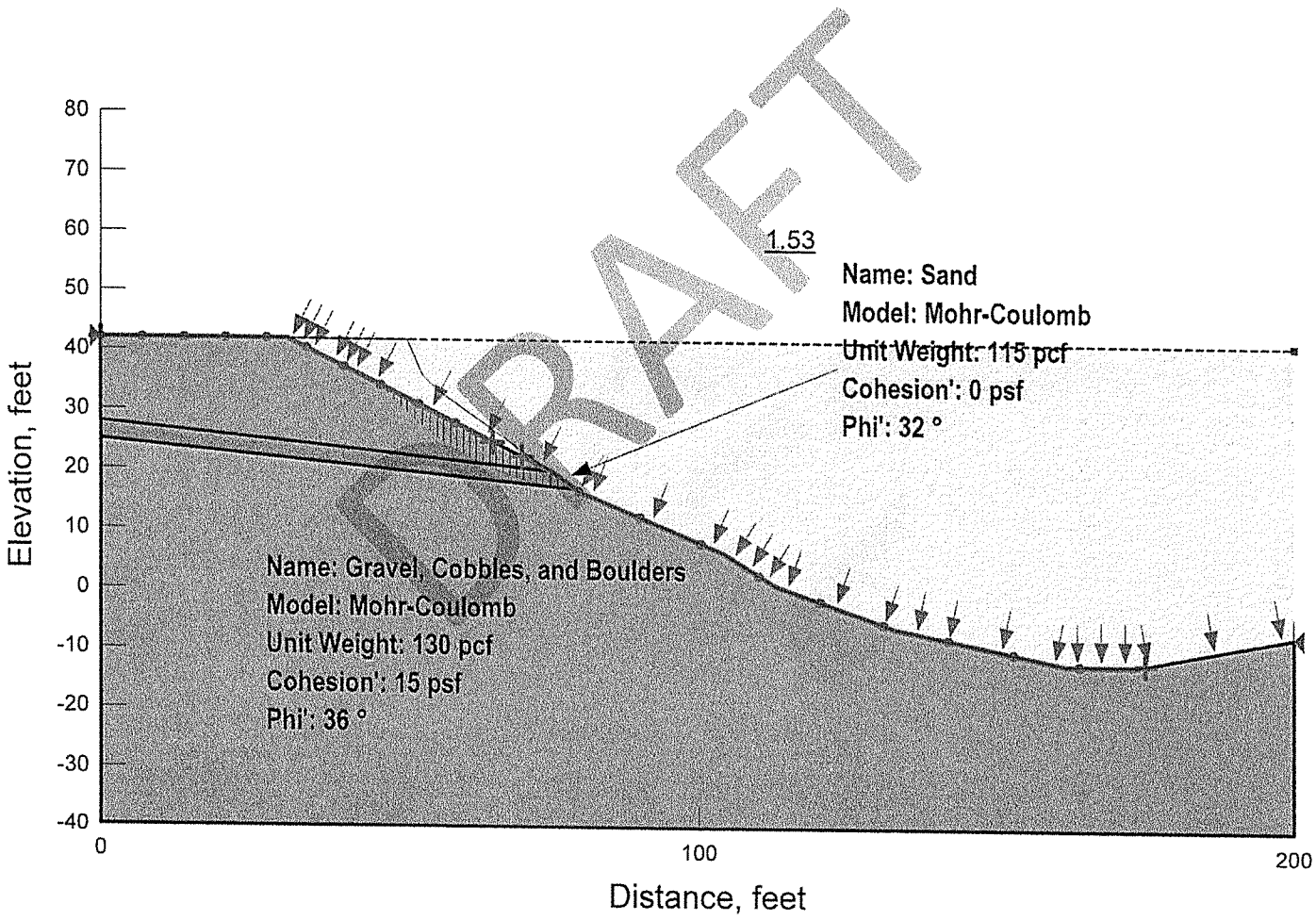
Created By: Jim Alders
Date: 10/8/2015
Case 2: High Water Regraded
Method: Spencer



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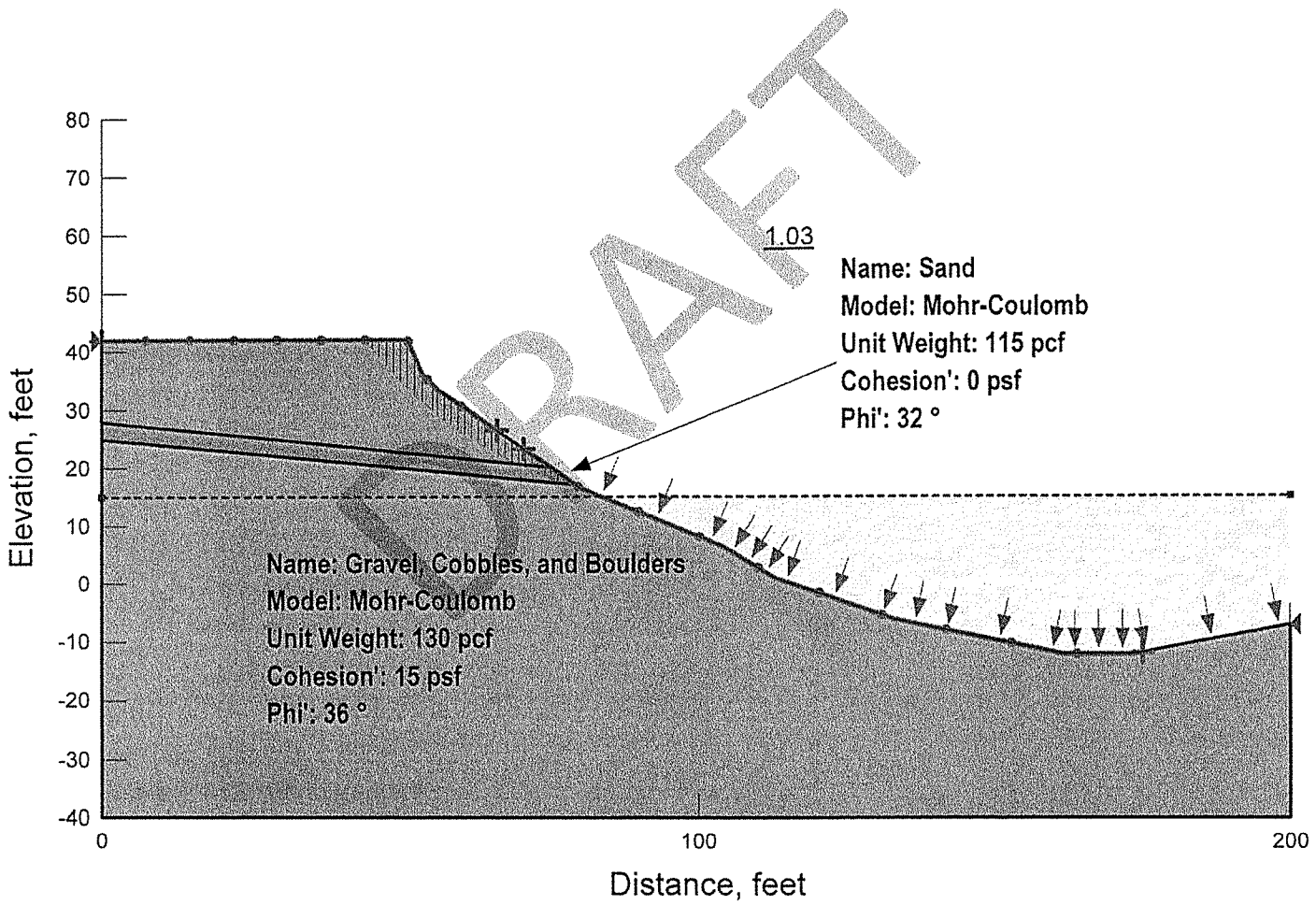
Created By: Jim Alders
Date: 10/8/2015
Case 3: Low Water Existing
Method: Spencer



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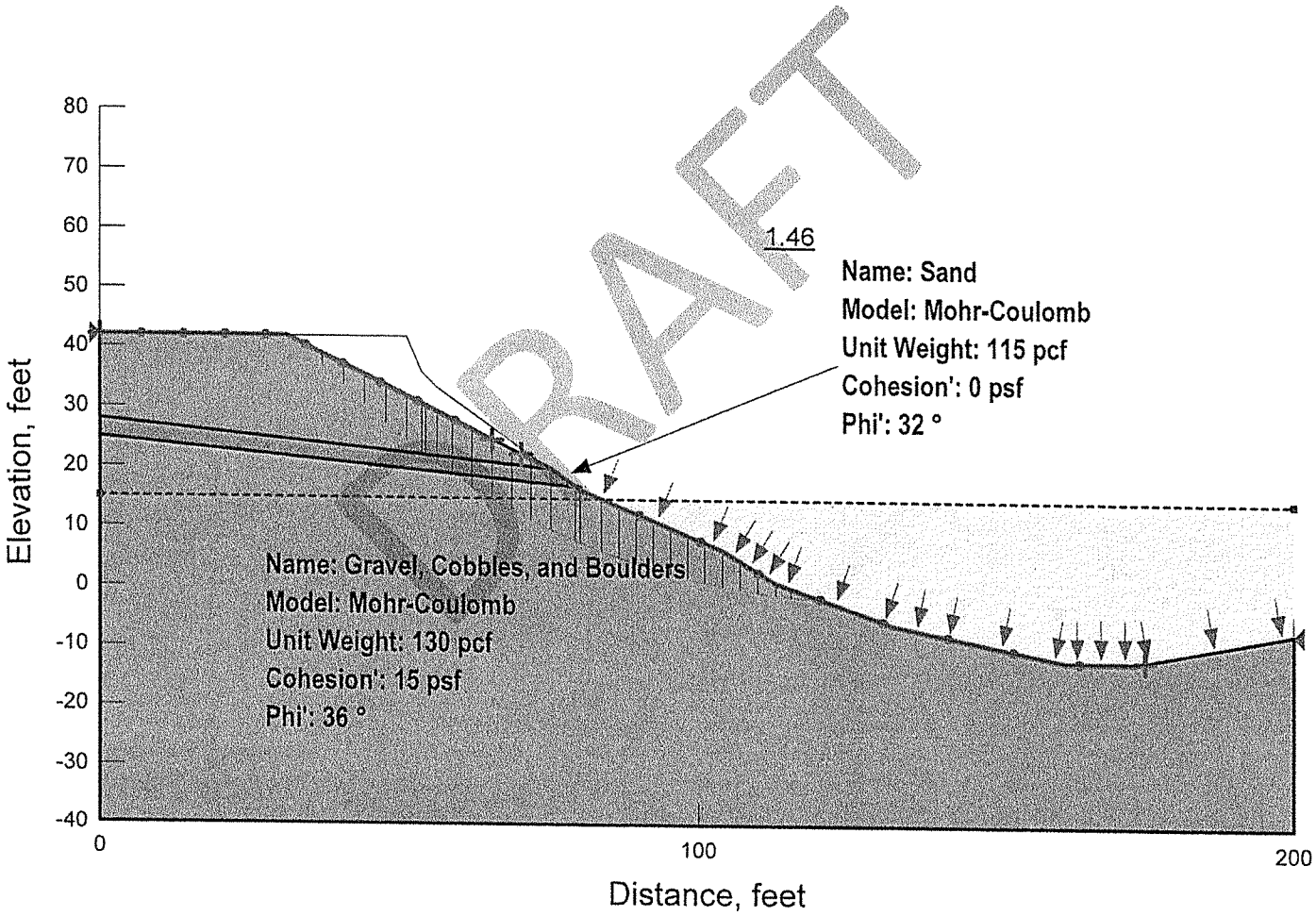
Title: Dahl Beach Stability Analysis
Created By: Jim Alders
Date: 10/8/2015
Case 4: Low Water Regraded
Method: Spencer



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Title: Dahl Beach Stability Analysis
Created By: Jim Alders
Date: 10/8/2015
Case 5: Ordinary High Water Existing
Method: Spencer

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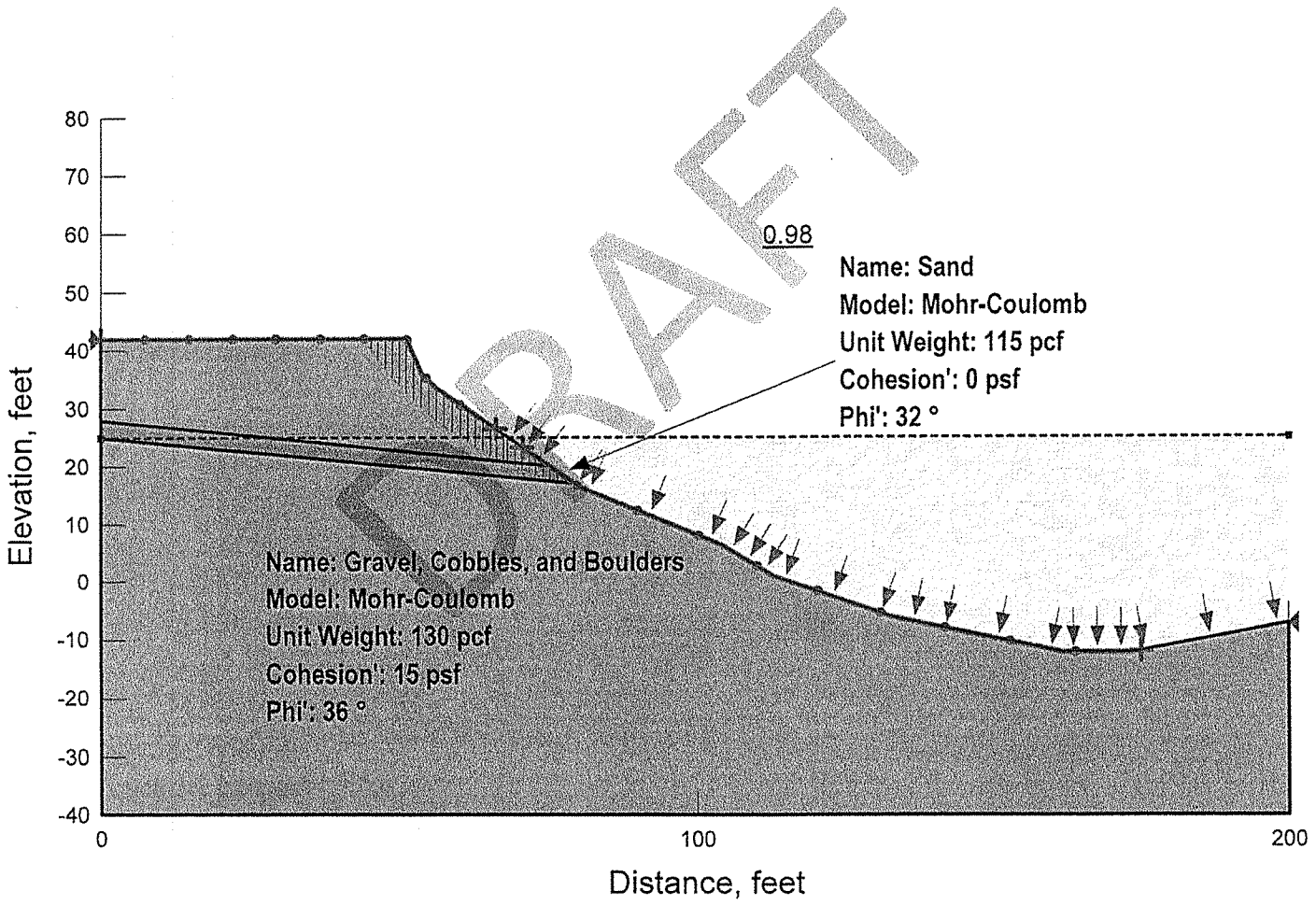
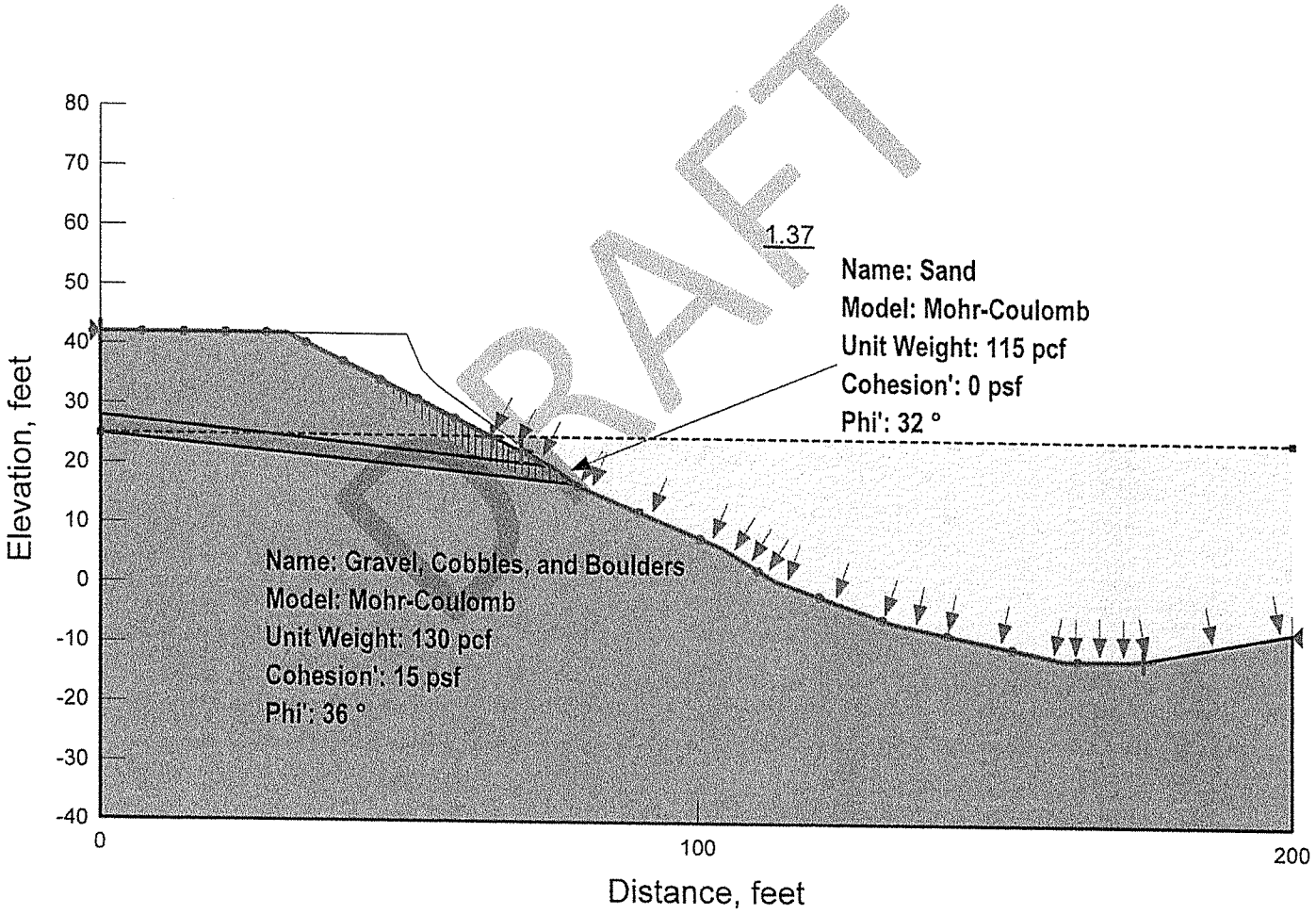


Title: Dahl Beach Stability Analysis
Created By: Jim Alders
Date: 10/8/2015
Case 6: Ordinary High Water Regraded
Method: Spencer



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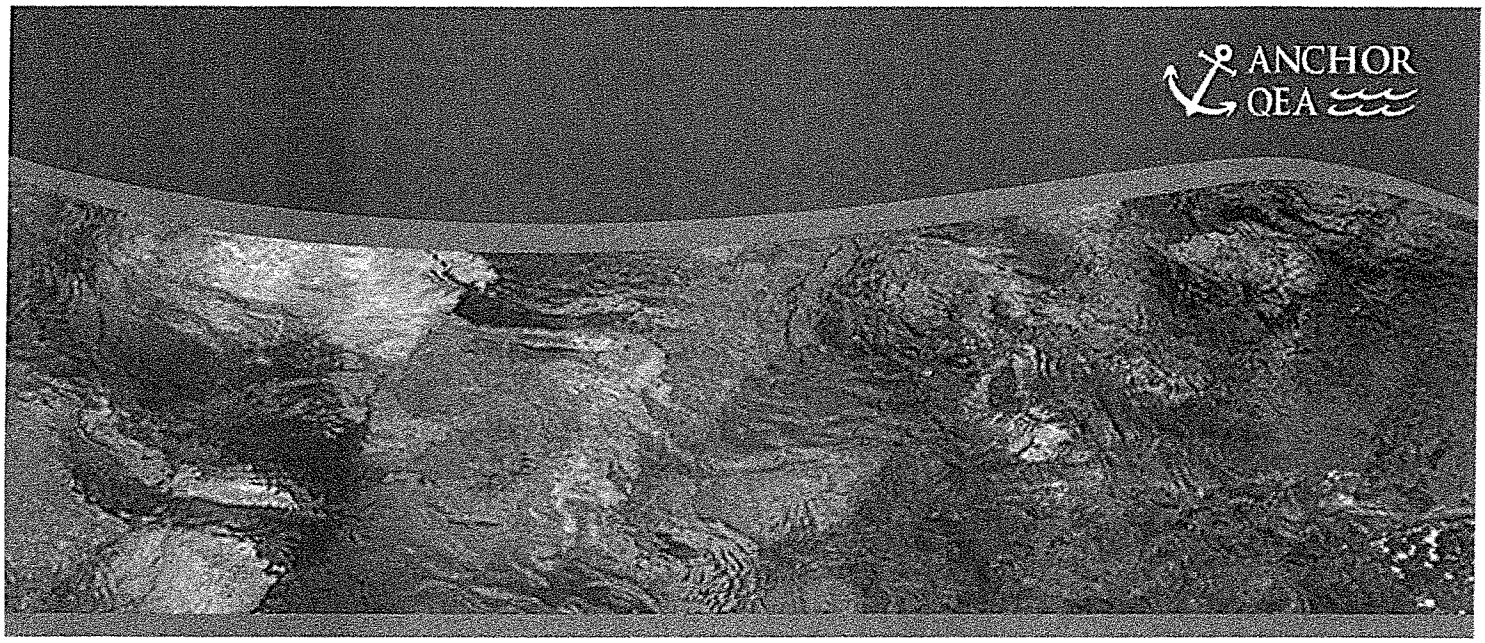
APPENDIX C
DAHL BEACH LEVEL 1 ASSESSMENT



DAHL BEACH MITIGATION SITE LEVEL I SEDIMENT EVALUATION TERMINAL 4 PHASE I REMOVAL ACTION PORTLAND, OREGON

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LIST OF ACRONYMS AND ABBREVIATIONS

BMP	best management practice
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
DEQ	Oregon Department of Environmental Quality
ECSI	Environmental Cleanup Site Information
I-205	Interstate 205
LWD	large woody debris
NFA	No Further Action
ng/kg	nanogram per kilogram
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
ODFW	Oregon Department of Fish and Wildlife
OHWM	ordinary high water mark
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
Port	Port of Portland
RM	river mile
SCO	Sediment Cleanup Objectives
SEF	Sediment Evaluation Framework
Site Inspection	Blue Heron Paper Mill Site Inspection
T4	Terminal 4 (Port of Portland)
TEQ	toxic equivalent
TOC	total organic carbon
UPL	Upper Prediction Limit
WOTUS	Waters of the United States
WPCP	Water Pollution Control Plant
WQSIS	Water Quality Source Information System

1 SUMMARY

The Port of Portland (Port) is proposing to restore two areas within Dahl Beach Park to mitigate unavoidable impacts to Waters of the United States (WOTUS) and to offset impacts to federally listed species incurred at the Port's Terminal 4 (T4) facility. Both areas are owned by the City of Gladstone and are managed as park lands. This report provides a Level 1 sediment evaluation that can be used to determine if there is a need for further sediment evaluation prior to initiating the mitigation work.

Dahl Beach Park is located on the northeast side of the confluence of the Clackamas and Willamette rivers in Gladstone, Oregon, between river miles (RMs) 24.5 and 24.7 on the Willamette River. The proposed mitigation project is composed of the following two components:

- Removal of a portion of an asphalt concrete lower parking area and associated riprap, and restoration of the shoreline in the southwest portion of the park
- Removal of a failed sheetpile bulkhead and associated riprap and restoration of the shoreline near the northwest end of the park, approximately 700 feet downstream from the lower parking lot

Figure 1 provides an aerial overview of Dahl Beach Park, including the lower parking area and failed bulkhead restoration areas. Figure 2 provides ground-level photographs of existing sediment conditions at the proposed restoration sites. Anthropogenic materials, including sheetpiling, riprap, asphalt concrete, and underlying fill material, are proposed to be removed as part of the restoration action. The riprap armoring associated with the parking area will be recycled or repurposed outside of WOTUS. Native sediments will be removed and re-used either on site and re-contoured to form a more natural shoreline or at an appropriate location in the project vicinity. Native trees and shrubs will be established and wood structures will be incorporated into the restoration as possible and appropriate to stabilize the shoreline and provide habitat improvements.

Multiple lines of evidence demonstrate that sediments at the project site should qualify for beneficial use as habitat material based on a "very low" ranking (formerly exclusionary

status), according to the guidelines provided in the Sediment Evaluation Framework (SEF; USACE et al. 2009). These lines of evidence include the following:

- **Lack of Fines and Organic Carbon.** Fine-grained sediments and total organic carbon (TOC) are scarce at the site due to the high-energy environment surrounding the confluence of the Clackamas and Willamette rivers. The fines content of river sediments in the vicinity of Dahl Beach Park is between 2.6% and 6.2%, and the TOC content is between 0.2% and 0.4% (Ecology and Environment 2008). According to the SEF Ranking Definitions (Table 4-2 of USACE et al. 2009), sediment containing less than 20% fines and less than 0.5% TOC, and which is removed from known or historical sources of contamination, is generally consistent with a "very low" ranking.
- **Lack of Potential Sources and Exposure Pathways.** There are no stormwater conveyances in Dahl Beach Park and in most of the contiguous Meldrum Bar Park to the north (Brown and Caldwell 2014). Stormwater runoff is evidently managed on site through natural processes such as infiltration, evapotranspiration, and diffuse overland flow. Historical photographs indicate the site has been used for open space, parkland, and agriculture for many decades, and has evaded commercial and industrial development. Although a number of potentially contaminated sites were identified in state and federal databases in upland and inland locations in Gladstone and Oregon City, potential releases from these sites, if any, would be routed to discharge points that are substantially removed from the Dahl Beach area.
- **No Exceedances of SEF Screening Levels.** Five surface sediment samples collected in the site vicinity as part of the Blue Heron Paper Mill Site Inspection (Site Inspection; Ecology and Environment 2008) provide quantitative data on sediment quality near the site and meet SEF recency criteria for "very low" ranked sites. There were no exceedances of SEF screening levels in any of the existing sediment samples. Metals were two to ten times lower than their corresponding SEF screening levels. Polycyclic aromatic hydrocarbons (PAHs) were occasionally detected at concentrations two orders of magnitude lower than SEF screening levels. There were no detections of volatile organic compounds, chlorinated pesticides, or polychlorinated biphenyl (PCB) Aroclors, and dioxin/furan concentrations were within the range of background levels for the Willamette River.

In summary, this Level 1 evaluation provides several corroborating lines of evidence to support a determination that sediments in the Dahl Beach mitigation site are commensurate with a "very low" site ranking. There is no reason to believe contamination is present and no additional sediment testing is warranted. Site sediments are therefore suitable for use as habitat material during regrading of the restoration areas to form a more natural shoreline or to be placed on the beach in surrounding areas to keep the material within the system. Controlling sediment erosion and turbidity will be the primary environmental concerns during construction, and these can be controlled through project permits using standard upland and in-water best management practices (BMPs).

2 PROJECT DESCRIPTION

2.1 Project Location

Dahl Beach Park is located on the northeast side of the confluence of the Clackamas and Willamette rivers in Gladstone, Oregon. It is located between RMs 24.5 and 24.7 on the east bank of the Willamette River (Figure 1) in Section 19, Township 2S, Range 2E, and in the Tanner Creek-Willamette River and Rock Creek-Clackamas River watersheds. Two proposed mitigation sites are described in this report with coordinates as follows:

Site	Latitude	Longitude	Comment
Parking Lot Site	45.373189	-122.607108	See Section 2.3.1
Bulkhead Site	45.374406	-122.610036	See Section 2.3.2

2.2 Project Purpose

The purpose of the project is to restore two portions of Dahl Beach Park to offset impacts to WOTUS and impacts to federally listed species incurred by remedial actions at the Port's T4 facility. The two restoration areas at Dahl Beach Park total 0.52 acres and are owned by the City of Gladstone and managed as park lands.

The Dahl Beach mitigation areas would provide the following environmental benefits to offset impacts at T4:

- T4 mitigation actions at Dahl Beach will remain within the tidally influenced lower Willamette River, providing improved habitat in an important location for aquatic organisms, including salmonids listed under the Endangered Species Act (ESA)
- Mitigation actions will mainly be conducted between elevations +14 and +22 feet National Geodetic Vertical Datum (NGVD), below the ordinary high water mark (OHWM) at +25.4 NGVD; these elevations overlap with the elevations of impact at T4
- The proposed projects complement nearby restoration efforts including the Rinearson Natural Area restoration and the Dahl Beach off-channel habitat improvement projects funded by the Oregon Watershed Enhancement Board

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2.3 Project Design Concept

The proposed mitigation includes restoration of the lower parking area in Dahl Beach Park at the mouth of the Clackamas River, and restoration of a failed bulkhead approximately 700 feet downstream. The restoration actions include removal of typical anthropogenic materials (surficial asphalt concrete, parking lot ballast, riprap, and decrepit sheetpiling), restoration of shoreline contours, and establishment of native trees and shrubs. Large woody debris (LWD) will be incorporated into the shoreline as possible during restoration of the parking area to provide improved habitat. Anthropogenic materials removed from the restoration area will be recycled or repurposed, further reducing the impacts of the proposed work.

Figure 2 shows the general shoreline conditions at the two proposed restoration sites during a site walk conducted on August 25, 2015. Both sites are characterized by coarse-grained, steeply sloping beaches of gravel, cobble, and riprap. Note that the sheetpile bulkhead has completely failed and serves no function.

2.3.1 Dahl Beach Parking Area

The first area identified for mitigation is the lower Dahl Beach Park parking area (Figure 1). This area includes 0.26 acres of asphalt concrete and riprap at the confluence of the Clackamas and Willamette rivers at the south end of Dahl Beach Park. The lower parking area is used primarily for seasonal fishing access, and is frequently submerged by high flows in the winter and spring.

The restoration of the lower parking area will include the following components:

- Removing the asphalt concrete surface, riprap, and gravel ballast
- Contouring the bank to a more natural profile
- Planting native species
- Placing LWD

All components of the restoration will improve habitat quality and ecosystem function in the area. Because the lower parking area is below the OHWM, restoration activities will be subject to Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

Figure 3 provides the conceptual design for the restoration of the lower Dahl Beach Park parking area, and Figure 4 provides longitudinal and transverse cross sections of the lower parking lot mitigation area.

2.3.2 Bulkhead Area

The 0.26-acre bulkhead area at the north end of Dahl Beach Park, consisting of decrepit sheetpile, riprap, and cobbles, is the second proposed mitigation area (Figure 1). The bulkhead spans both low and high flow elevations and is the cause of localized erosion and degraded habitat conditions. Figure 2 shows a portion of the failed bulkhead and riprap proposed for removal. An over-steepened alluvial cut bank above the bulkhead evidently provides a local source of gravel and cobble to the shoreline in this area.

The restoration of the failed bulkhead will include the following components:

- Removing all artificial structures including sheetpiling and riprap
- Contouring the river bank to a natural profile
- Planting native vegetation

All components of the mitigation will improve habitat quality and ecosystem function in the area. Due to the location of the failed bulkhead below the OHWM, mitigation activities will be subject to Section 10 of the River and Harbors Act and Section 404 of the Clean Water Act.

2.3.3 Project Quantities

The estimated removal quantities for the two combined mitigation projects are as follows:

- 150 cubic yards (cy) of asphalt
- 200 cy of non-native fill material, including riprap
- 190 linear feet (lf) of sheet piling
- 400 lf of metal cable

In addition, it is estimated that approximately 3,100 cy of native sediment will be regraded on site. Excess native sediment from regrading activities (approximately 2,000 cy of rock and sand) will be placed on beach areas within and adjacent to the sites. These estimated quantities are preliminary and may be revised as the details of the design are developed.

3 PRELIMINARY CONSTRUCTION METHODS

It is anticipated that the proposed restoration activities will be performed in the dry during low river levels, to the extent practicable, using conventional earthmoving equipment such as excavators and bulldozers. Anthropogenic materials (asphalt concrete in the lower parking lot, parking lot base fill material, decrepit sheetpiling, and riprap) will be removed from the mitigation areas. These anthropogenic materials will be recycled or repurposed outside WOTUS.

The proposed work is not a sediment removal action. The shoreline will be re-contoured to a natural profile such that native soils and sediments will be re-used on site or on nearby beaches for habitat material to the extent practicable. There will be no open-water disposal of site sediments in either the Clackamas or Willamette rivers.

3.1 Schedule

Site construction is anticipated to occur in summer 2016 during the in-water work window established by the Oregon Department of Fish and Wildlife (ODFW) for the Lower Willamette River, which occurs from July 1 through October 31. However, the project schedule is dependent on regulatory approvals.

3.2 Environmental Conservation Measures

All or a majority of the mitigation work is expected to be conducted in the dry during the ODFW in-water work window, which coincides with seasonal low water conditions. Therefore, the proposed work is expected to have a low risk for impacting aquatic environments in the Clackamas and Willamette rivers. Because the project sediments are uncontaminated based on the evidence presented in Section 4, BMPs will be focused primarily on erosion and sediment control and minimizing river turbidity impacts.

It is anticipated that detailed BMPs for minimizing turbidity will be developed as part of the Section 401 Water Quality Certification process when construction methods are more fully defined. The following BMPs, or similar, will likely be considered for erosion and sediment control during implementation of the mitigation project:

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- Use of downslope perimeter controls, such as silt fences or straw wattles
- Stock pile management
- Slope stabilization measures, such as erosion control fabric or mulching
- Visual and, if necessary, instrumented turbidity monitoring
- Contractor Spill Prevention, Control, and Countermeasure Plan

4 REVIEW OF EXISTING INFORMATION

4.1 Site Use and History

Dahl Beach Park comprises two tax lots totaling 18.99 acres within the city limits of Gladstone, Oregon, and the Metro Urban Growth Boundary. The Clackamas River forms the approximate boundary between the cities of Gladstone to the north and Oregon City to the south. The City of West Linn is located to the west across the Willamette River.

The project site is surrounded on all sides by park lands, undeveloped open space, or submerged aquatic lands. To the north and east of the site is Dahl Beach Park and the contiguous Meldrum Bar Park, which includes a small golf course and a complex of sport fields. To the west is the Willamette River and undeveloped Goat Island, and to the south is the Clackamas River and Clackamette Park in Oregon City.

4.1.1 Site Zoning

The shoreline adjacent to the proposed restoration areas is zoned as open space. Areas to the north of Dahl Beach Park are zoned as multifamily residential and open space. At the east end of Dahl Beach Park, approximately one-quarter mile upstream from the project site, the business district along Mcloughlin Boulevard (Highway 99E) is zoned for general commercial use. Across the Clackamas River from Dahl Beach Park is Clackamette Park; east of Clackamette Park is a large area zoned for mixed use in downtown Oregon City. The nearest land zoned for industrial use is located nearly a mile upstream of the site along the Interstate 205 (I-205) corridor in Oregon City. In summary, the project site is surrounded by relatively low-impact land uses (predominantly open space and some multi-family residential) and substantial buffer zones separating the site from commercial uses along Highway 99E and industrial uses near I-205.

4.1.2 Current Site Use

Currently, Dahl Beach Park is used primarily for recreation and river access. The park includes three parking lots (including the lower parking lot, a portion of which is proposed for removal and restoration), forested areas, and a mixed beach and cobble shoreline. The park shoreline borders both the Clackamas and Willamette rivers at their confluence. The

ease of access to these waters has made Dahl Beach Park popular with fishers and other water enthusiasts. The closest boat launch for recreational boaters is in Clackamette Park; however, this launch was recently closed for safety concerns because the strong and erosive river currents along this cut bank have undermined and destabilized the launch.

4.1.3 Storm Sewer Outfalls

The storm sewer system for the City of Gladstone is described in Brown and Caldwell (2014). There are no storm sewers in Dahl Beach Park and a majority of the contiguous Meldrum Bar Park to the northwest. Stormwater is evidently managed on site in the parklands through infiltration, evapotranspiration, and diffuse overland flow.

The nearest major storm sewer outfall from the City of Gladstone discharges to the Clackamas River on the upstream side of the Highway 99E bridge, approximately 2,000 feet upstream from the site. Other municipal outfalls, including one that appears to capture stormwater runoff from the residential areas east of the park lands, discharge to Rinearson Creek, which is confluent with the Willamette River approximately 4,000 feet downstream from the site. Because of the significant separation distances, these stormwater outfalls are not expected to have any discernible impact on sediment quality at the project site.

4.1.4 Historical Aerial Photographs

Historical photographs dating to 1936 provide insight into land use activity in and around Dahl Beach Park. Representative historical photographs from 1936, 1948, 1964, and 1973 are shown in Figure 5.

In the 1936 photograph, there are linear features cross-cutting the sediment shoals in the mouth of the Clackamas River. These features may be indicative of earth moving equipment, possibly for the purpose of aggregate mining. This is the only photograph that shows evidence of direct anthropogenic disturbance of the river sediments.

The shoreline in the area of Dahl Beach Park appears to be relatively dynamic over time with shifting bedforms in the mouth of the Clackamas River, although some of these changes may be exaggerated by differing river levels at the time the photographs were taken. By 1973, the

shoreline appears to have become more stabilized and resembles its current form (compare with Figure 1).

The prevailing land use in the vicinity of the site during much of this photographic history is devoted to open space and agriculture, with some commercial activity beginning to appear along Highway 99E by 1948. The golf course was first evident in 1964, built on former agricultural land. Clackamette Cove was excavated between 1956 (image not shown) and 1964, but the outlet to the Clackamas River was not dredged until sometime between 1964 and 1973. The development of paved roads and structures in the park, as well as the multifamily residential development to the east of the park, evidently occurred post-1980.

In summary, the historical site photographs show no evidence of high-impact industrial or commercial activity in Dahl Beach Park where the mitigation project is proposed, with the possible exception of some aggregate mining in the Clackamas River mouth in 1936.

4.2 Potential Sources in the Site Vicinity

A search of the Oregon Department of Environmental Quality (DEQ) Environmental Cleanup Site Information (ECSI) and Water Quality Source Information System (WQSIS) databases was completed for the area within approximately 1 mile of Dahl Beach Park. Results from these queries identify possible sources of contamination that could impact sediments in the proposed restoration areas. A search of the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database for federal Superfund sites was also conducted for the cities of Gladstone, Oregon City, and West Linn.

4.2.1 ECSI Database Search Results

A search of the ECSI database returned 24 results within the 1-mile search area, as summarized in Figure 6. A description of these sites is included for completeness; however, none of the sites has a direct pathway for impacting Dahl Beach sediments because any potential contaminant releases would be routed well upstream or well downstream of the project area based on the configuration of the natural drainages and the municipal stormwater conveyance system (see Section 4.1.3).

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Auto Dealers and Repair Facilities. Approximately one-half to three-quarters of a mile north of Dahl Beach Park along Highway 99E are nine auto dealers and repair facilities that were included in a cleanup program at one point in time. Eight of the nine sites have been issued No Further Action (NFA) determinations. Thomason Subaru is considered a suspect site. Further site screening was recommended by the DEQ in 1997, but no other information is available.

Walgreens-Gladstone Development Site. Approximately one-quarter mile east of the site, on the southeast corner of W. Arlington Street and Highway 99, is the Walgreens-Gladstone Development site. This site has been shown to have elevated metals in groundwater associated with the placement of non-native fill materials. The Walgreens-Gladstone Development site is considered a suspect site and was added to the ECSI database in 2010. Additional site screening was recommended by the DEQ.

Clackamette Cove Area. The Clackamette Cove area was used for agriculture until the mid-1950s, when sand and gravel mining commenced along with asphalt and concrete production. The mining initially created a lake, which then became a cove in the 1960s when an outlet to the Clackamas River was dredged. Sand and gravel operations were continued by various entities until they were shut down in 1986, and the area has largely been vacant since that time. Historical site operations and proximity to the Old Rossman Landfill (see next site description) resulted in moderate levels of contamination in soil and groundwater in the uplands near the cove. However, contaminants of concern have not been detected in water samples collected from the shoreline of the cove. In recent years, Oregon City has been working with developers to plan a multi-use community development on the cove consisting of apartments, offices, restaurants, and other public amenities.

Old Rossman Landfill. To the northeast of Clackamette Cove, an unlined municipal waste landfill (Old Rossman Landfill) was operated between 1960 and 1969 on previous agricultural land. In 1970, a sand and gravel mining company built an asphalt plant, cement plant, and rock crusher near or on top of the landfill. Low levels of metals, volatiles, semivolatiles, pesticides, and PCBs have been detected sporadically in groundwater throughout the footprint of the landfill, but contaminants diminish rapidly in the downgradient direction toward Clackamette Cove. East of this site, the newer and larger Rossman Landfill operated

under a permit from the DEQ Solid Waste Program from 1969 to 1983. A gasoline release occurred on the north end of the property in 1986 from an above-ground storage tank or its associated piping. Local ordinances have been put in place to protect the public from contaminated groundwater. The Rossman Landfill is currently under post-closure monitoring and no unacceptable impacts to Clackamette Cove have been detected.

Abernethy Creek Drainage Basin. Several sites were identified on the south side of I-205. These sites are within the Abernethy Creek drainage basin, which discharges to the Willamette River approximately one-half mile upstream from the project site (URS 2008). These sites are sufficiently separated that they pose no significant concern for site sediment quality. Several sites in this area have received NFA determinations, including the former Al's Machine Shop, Bud's Radiator, and Landeen Welding. The Old Standard Oil Bulk Plant, Old Shell Bulk Plant, Old Rossman Landfill (see previous site description), and Stimson Lumber sites are listed as active sites in the cleanup database. The Old Standard Oil and Old Shell Bulk Plants are both associated with soil contamination found during road construction. The Old Standard Oil site has been cleaned up and reduced to a low priority site. No actions are planned for the contamination at the Old Shell Bulk Plant. The DEQ recommended that the site undergo a preliminary assessment in 1993, but no other information is available. The Stimson Lumber site is associated with pentachlorophenol contamination in soil and groundwater. A remedy was completed under Stimson oversight in 2005, and a final closure report has been submitted. Prior to issuing an NFA determination, a formal ICP agreement is needed between the current property owner, Oregon City, and the DEQ.

West Linn. Across the Willamette River in West Linn are two sites identified in the ECSI database. These sites are the Gross Property Disposal Site and the Thrifty Cleaners. Both of these sites have been issued NFA determinations.

4.2.2 WQSIS Database Search Results

The search of the WQSIS database returned nine results within the search area, as shown in Figure 7. Eight of these sites are operating under active permits. One site north of Dahl Beach Park is not active. To the east of Dahl Beach Park on the north side of the Clackamas

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River are the Parker Fill and Gladstone/Clackamas River Tigard Pipeline sites, which both hold stormwater National Pollutant Discharge Elimination System (NPDES) permits. To the south across the Clackamas River are The Cove, Tri-City Service District, Heritage Rock, Metro South Station, Park Place Development, and Miles Fiberglass and Plastics. All of these sites hold stormwater NPDES permits except Tri-City Service District, which holds an individual permit as a Water Pollution Control Plant (WPCP). The Tri-City WPCP discharges treated wastewater to the Willamette River near RM 25.5, approximately three-quarters of a mile upstream from Dahl Beach Park. Discharge from the Tri-City WPCP is not expected to impact sediments near the proposed restoration areas since it has been treated to meet water quality criteria at the edge of a permitted 300-foot mixing zone, whereas the mitigation areas are several thousand feet downstream.

4.2.3 CERCLIS Database Search Results

A search of the CERCLIS database was performed for the cities of Gladstone, Oregon City, and West Linn. This search returned only one result: the Oregon City Mercury Site. This site is unique in that small amounts of elemental mercury were discovered at a private residence south of I-205. The site was removed from the National Priorities List in 2011 after completion of a cleanup action led by the U.S. Environmental Protection Agency.

4.3 Summary of Existing Sediment Quality Data

The physical and chemical characteristics of sediments near Dahl Beach Park are evaluated in this section. Laboratory testing results from five surface sediment samples collected in 2007 are available for site characterization, as shown in Figure 8. These samples are within the 10-year recency requirement set forth in the SEF for "very low" ranked sediments (USACE et al. 2009).

The surface sediment samples were collected by Ecology and Environment as part of a Site Inspection for the Blue Heron Paper Company in Oregon City (Ecology and Environment 2008). The Blue Heron Paper Company is located at RM 26.5 on the Willamette River, immediately downstream of Willamette Falls and approximately 2 miles upstream from Dahl Beach Park. During the Site Inspection, several downstream surface sediment samples were collected from 0 to 10 centimeters to assess contaminant migration

off site. Samples were analyzed for grain size, TOC, metals, volatile organic compounds, semivolatile organic compounds, PAHs, pesticides, PCBs, and dioxins/furans. The samples used in this Level 1 evaluation include four samples between RM 24.1 and 25.4 on the Willamette River (WR03SD, WR04SD, WR06SD, and WR07SD), and one sample in the mouth of the Clackamas River (CR01SD). Physical and chemical testing results are summarized in Table 1 and in the following sections.

4.3.1 Sediment Physical Properties

The sediment deposits at Dahl Beach Park were assessed by an Oregon Registered Geologist on August 25, 2015. Sediments in the project areas are mainly composed of sand, gravel, cobble, and riprap with very low fines content (Figure 2), estimated at a few percent fines. The sediments are indicative of a high-energy environment situated on the outside bend of the Willamette River and subject to vigorous currents at the confluence of the Clackamas and Willamette rivers. There is an eroded cut bank at the bulkhead removal area where alluvial gravels are exposed in a 5- to 10-foot-high escarpment; these alluvial gravel deposits are contributing material to the local beaches. Sandy beaches are found in some of the more protected shoreline areas, again with very low fines content.

Physical testing of sediments from the Blue Heron Site Inspection confirm that sediments in the site vicinity are described as clean sand and gravelly sand with low fines content and low organic carbon (Table 1). The fines content of nearby sediments ranged from 2.6% to 6.2%. The TOC content ranged from 0.16% to 0.37%. The SEF suggests that a "very low" ranking may be associated with clean sediments containing less than 20% fines and less than 0.5% TOC. The fines and TOC content of sediments in the site vicinity are well below these SEF guidelines, providing physical evidence that site sediments are unlikely to be contaminated.

4.3.2 Sediment Chemical Analyses

Sediment analytical results from the Blue Heron Site Inspection were compared to SEF screening levels to help determine whether a Level 2 evaluation is warranted for the Dahl Beach Park mitigation areas. The SEF 2006 Interim Freshwater screening levels posted on the Portland District website provided the primary line of evidence for this analysis. The SEF screening levels were supplemented with the Sediment Cleanup Objectives (SCO) of the

Washington State Sediment Management Standards (Ecology 2013) because the SCO include criteria for some additional chemicals that do not have SEF screening levels. A compilation of sediment analytical results and SEF/SCO screening level comparisons is provided in Table 1.

As summarized below, all chemicals were below their respective SEF (or SCO) screening levels—in many instances one or more orders of magnitude below the screening levels. These results demonstrate a consistent lack of contamination and are commensurate with a "very low" site ranking.

The results of the screening level evaluation are as follows:

- **Metals.** All metals results were well below their respective SEF screening levels. Zinc and nickel concentrations were less than 50% of the screening level. Arsenic, chromium, and copper concentrations were less than 20% of the screening level. Cadmium, lead, and mercury were less than 10% of the screening level. Silver was not detected.
- **Volatile Organics.** There were no volatile organics detected in any sediment samples in the site vicinity.
- **Semivolatile Organics.** Semivolatile organics were rarely detected (approximately 1% detection frequency) in sediment samples from the site vicinity. The rare detections were one to two orders of magnitude lower than the corresponding SEF or SCO screening levels.
- **PAHs.** Several PAHs were detected at estimated concentrations in the Clackamas River sample. PAHs were detected less frequently in Willamette River samples. PAH detections were typically two orders of magnitude lower than corresponding SEF or SCO screening levels.
- **Chlorinated Pesticides.** No chlorinated pesticides were detected in any sediment samples from the site vicinity.
- **PCBs.** No PCBs (reported as Aroclors) were detected in any sediment samples from the site vicinity.
- **Dioxins/Furans.** There are no SEF or SCO screening levels for dioxins and furans. Sediment concentrations in the site vicinity were compared to background concentrations developed for the Portland Harbor Superfund Site based on Upper Prediction Limit (UPL) statistics for upriver samples (Integral et al. 2011). The

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calculated UPL for the toxic equivalent (TEQ) of 2,3,7,8-tetrachlorodibenzo-p-dioxin, based on mammalian toxicity, ranged from 2.2 to 5.7 nanograms per kilogram (ng/kg). The TEQ concentrations in the site vicinity ranged from less than 0.1 to 3.0 ng/kg, averaging 0.7 ng/kg. These dioxin/furan concentrations are therefore consistent with Willamette River background levels.

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5 CONCEPTUAL SITE MODEL

This section describes the potential contaminant sources and exposure pathways for human and ecological receptors at the proposed restoration site. A diagram of the conceptual site model is provided in Table 2. Based on a lack of contamination in nearby surface sediments and a lack of complete exposure pathways to upland and inland sources, the environmental risk associated with mitigation actions (removal of structures, rock, and underlying fill material, and re-contouring of native sediment) is expected to be negligible, provided that standard sediment and erosion control BMPs are implemented.

5.1 Receptors of Interest

The Clackamas and Willamette rivers provide habitat for a diverse community of resident and migratory aquatic life and water-dependent wildlife. In addition, the project area may be used by several salmonid species listed as endangered or threatened under the federal ESA, including the following (USFWS 2015):

- Lower Columbia River (LCR) Evolutionarily Significant Unit (ESU) of Coho salmon (*Oncorhynchus kisutch*)
- LCR ESU of Chinook salmon (*O. tshawytscha*)
- Upper Willamette River (UWR) ESU of Chinook salmon (*O. tshawytscha*)
- LCR Distinct Population Segment (DPS) of steelhead (*O. mykiss*)
- UWR DPS of steelhead (*O. mykiss*)

UWR and LCR ESUs of Chinook salmon (*O. tschawytscha*), and UWR DPS) of steelhead (*O. mykiss*) are likely to occur in the project vicinity, and all have designated critical habitat up to at least Willamette Falls. LCR coho salmon (*O. kisutch*) includes a Clackamas River population that spawns in tributaries of the Willamette River below Willamette Falls but critical habitat is currently only proposed for this species. There is an experimental re-introduced population of LCR DPS of Bull trout (*Salvelinus confluentus*) within the Clackamas River that do not warrant protection under ESA.

The primary human activities at Dahl Beach Park are associated with water-dependent recreation, including sunbathing, fishing, wading, and swimming. The nearest boat launch is

at the end of Meldrum Bar Park Road, approximately 2,000 feet downstream from the restoration site.

5.2 Potential Contaminant Sources

There are no complete pathways linking known contaminant sources with sediments in the Dahl Beach mitigation area. The site has been devoted to low-impact land use including parkland and sport fields in recent years, and open space and agriculture historically (Section 4.1.4).

There are no stormwater conveyance structures in Dahl Beach Park and a majority of the contiguous Meldrum Bar Park. Stormwater is evidently managed on site through natural processes such as infiltration, evapotranspiration, and diffuse overland flow (Section 4.1.3). Runoff from adjacent urban areas in the City of Gladstone is shunted to the Clackamas River approximately 2,000 feet upstream of the site, or to Rinearson Creek approximately 4,000 feet downstream of the site.

There were 24 sites identified in the ECSI database (Section 4.2.1) and 9 sites in the WQSIS database (Section 4.2.2) within 1 mile of the restoration site. Many of these sites have been issued NFA determinations. Runoff from the remaining active sites is discharged at significant distances from the Dahl Beach mitigation area and is not expected to impact sediment or water quality in the restoration area. There was one small residential mercury site identified in Oregon City in the federal CERCLIS database that was cleaned up and removed from the National Priorities List in 2011 (Section 4.2.3).

5.3 Contaminants of Concern

Surface sediment quality in the vicinity of the proposed restoration area is uniformly free of contamination, which is consistent with the lack of connection to upland and inland sources, as described in the preceding section.

Dahl Beach Park resides along a high-energy environment at the confluence of the Clackamas and Willamette rivers and on the outside bend of a Willamette River meander (Section 4.3.1). Bed sediments at the restoration site primarily comprise clean sand, gravel,

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cobble, and riprap, with limited fines and organic carbon, and thus very low potential for contaminant accumulation. Sediments in the site vicinity contain, on average, 4% fines and 0.22% TOC, consistent with SEF guidelines for a "very low" site ranking (i.e., less than 20% fines and less than 0.5% TOC per SEF Table 4-2; USACE et al. 2009).

There are no contaminants of concern identified in sediments in the vicinity of the Dahl Beach mitigation site (Section 4.3.2; Table 1). Metals concentrations in surface sediments are 2 to 10 times lower than their respective screening levels, PAHs and semivolatile organics are 10 to 100 times lower than their respective screening levels, and dioxin/furan concentrations are consistent with Willamette River background levels. No volatile organics, chlorinated pesticides, or PCBs were detected in existing surface sediments in vicinity of the site.

5.4 Potential Short-term Exposures

Based on the nature of the project activities and the lack of contamination in site sediment, the primary pathway of concern during construction is the potential for short-term impacts to the water column caused by sediment erosion and/or resuspension during removal of the sheetpiling, riprap, pavement, and underlying fill materials, and recontouring of native sediments. Aquatic organisms are the primary receptors of concern for this exposure pathway. While turbidity may present an aesthetic nuisance for humans, it is not a toxicity concern.

Sediment and turbidity impacts are expected to be mitigated through the use of appropriate nearshore and in-water sediment control BMPs, site monitoring, and by conducting the work in the dry to the extent practicable. In addition, any sediment that is disturbed during site mitigation activities is expected to settle and dissipate quickly due to the predominance of sand and gravel and the paucity of fines. Sediment and erosion control requirements are expected to be specified in project permitting documents, in particular, the Section 401 Water Quality Certification which will be issued by DEQ.

5.5 Potential Long-term Exposures

Existing surface sediment chemical concentrations in the site vicinity are all well below SEF screening levels, as shown in Table 1. Potentially bioaccumulative contaminants such as mercury, chlorinated pesticides, and PCBs were not detected, and dioxin/furan concentrations were consistent with Willamette River background levels. Therefore, site sediments are suitable for reuse on site and nearby as habitat material. Because site sediments are uncontaminated, there is no potential for long-term exposures associated with generated or undisturbed construction residuals.

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6 CONCLUSIONS

Sediments within the proposed Dahl Beach mitigation site should be ranked "very low" according to SEF guidelines. An analysis of existing site conditions, site history, potential sources and discharge locations, and physical and chemical testing results of surface sediments in the site vicinity demonstrate a consistent lack of contamination and absence of exposure pathways. Neither a Level 2 analysis nor further analytical testing is warranted for the Dahl Beach mitigation site.

This conclusion is supported by the following lines of evidence:

- **Existing Site Conditions.** The Dahl Beach mitigation areas are characterized by relatively dynamic shorelines comprising sand, gravel, cobble, and riprap, indicative of a high-energy sedimentary regime. The site is subject to erosion from being on an outside meander (i.e., cut bank) of the Willamette River, as well as turbulence generated by the confluence of the Clackamas and Willamette rivers.
- **Historical Land Use.** The Dahl Beach Park area has been used for agriculture, open space, or parkland for its entire history. Aside from possible aggregate mining of the river bed in the 1930s, there is no evidence of commercial or industrial operations near the restoration site, other than minor paving and infrastructure to support park facilities.
- **Stormwater Runoff.** There are no storm sewers in Dahl Beach Park and a majority of the contiguous Meldrum Bar Park to the northwest. Stormwater is evidently managed on site in the parklands through natural processes such as infiltration, evapotranspiration, and diffuse overland flow. The nearest municipal stormwater outfalls from the City of Gladstone discharge approximately 2,000 feet upstream on the Clackamas River and 4,000 feet downstream on the Willamette River via Rinearson Creek. These stormwater outfalls are sufficiently removed as to pose no significant risk to site sediments.
- **Potential Contaminant Sources.** State and federal databases were consulted to identify environmental cleanup sites and discharges within 1 mile of the Dahl Beach mitigation site. No complete exposure pathways were identified, and there is no reason to believe that any upland sources have the potential to adversely impact sediment quality at the restoration site.

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- **Sediment Physical Properties.** The sediments in the vicinity of Dahl Beach Park have very low fines and TOC content, and thus very limited potential for contaminant accumulation. Fines content ranges between 2.6% and 6.2%. TOC content ranges between 0.16% and 0.37%. SEF guidelines indicate sediments with less than 20% fines and less than 0.5% TOC may be appropriate for a "very low" site ranking, provided there are no significant contaminant sources in the site vicinity, and there are none (see previous bullet).
- **Sediment Chemical Analyses.** Chemical analyses were performed on five surface sediment samples collected near Dahl Beach Park in 2007 as part of the Blue Heron Paper Mill Site Investigation (Ecology and Environment 2008). Results of these analyses confirm the appropriateness of a "very low" ranking for this site and meet the SEF recency requirements for this type of ranking (i.e., 10 years). Metals were two to ten times lower than their corresponding SEF screening levels. PAHs were occasionally detected at concentrations two orders of magnitude lower than SEF or SCO screening levels. Other semivolatile compounds were rarely detected, and those rare detections were at least an order of magnitude lower than SEF or SCO screening levels. There were no detections of volatile organic compounds, chlorinated pesticides, or PCB Aroclors. Dioxin/furan TEQs were within the range of background concentrations for the Willamette River.

In summary, this Level 1 evaluation provides several corroborating lines of evidence to support a determination that sediments in the Dahl Beach mitigation areas are commensurate with a "very low" ranking. There is no reason to believe contamination is present and no additional sediment testing is warranted. Available data confirm that site sediments meet the criteria for unconfined aquatic disposal and pose no significant risk to aquatic life or human health. The sediments are therefore suitable for use as habitat material during regrading of the restoration areas to form a more natural shoreline. Controlling sediment erosion and turbidity generation will be the primary environmental concerns during construction, and these can be controlled through project permits using standard upland and in-water BMPs.

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7 REFERENCES

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TABLES

l Parameters (pct)							
ganic carbon			0.37	0.153	0.169	0.16	
ct)							
			0.3	0.0001 U	9.2	1.8	
ery coarse			1.6	0.0001 U	7.8	5.2	
oarse			27	1	14.7	21.8	
iedium			39.8	46.3	44.6	46.3	
ne			17.9	46.9	19.7	18.3	
ery fine			7.1	3.1	1.4	4.1	
rse			2.5	--	--	--	
dium			1.2	--	--	--	
			0.9	--	--	--	
/ fine			0.7	--	--	--	
) Phi			0.2	--	--	--	
arse			0.4	--	--	--	
edium			0.3	--	--	--	
es			6.2	2.7	2.7	2.6	
g)							
m			9750 J	9660	8430	8100	
y			1.5 UJ	1.5 UJ	0.12 UJ	0.1 UJ	
	20	14	2.3 J	2.1 J	2.3 J	3.7 J	
			76.5 J	85.4 J	82.1 J	96.5 J	
n			0.38 J	0.31 J	0.27 J	0.47 J	
n	1.1	2.1	0.06 J	0.05 UJ	0.04 UJ	0.04 UJ	
			--	0.0001 U	--	--	
m	95	72	12.9 J	14.8 J	11.9 J	18.6 J	
			8.6 J	11.3 J	10.3 J	13.8 J	
	80	400	15.5 J	13.4 J	13.6 J	10.5 J	
	340	360	4.4 J	4.9 J	9.7 J	10.5 J	
ese			288 J	318	279	332	
	0.28	0.66	-- R	0.02 UJ	0.02 UJ	0.02 UJ	
	60	26	13.3 J	17.9 J	14.5 J	12.3 J	
n			--	--	--	--	
		11	0.14 J	2.9 U	2.8 U	2.8 U	
	2	0.57	0.76 U	0.74 U	0.69 U	0.69 U	
			1.5 U	0.02 UJ	1.4 U	1.4 U	
n			50.9 J	57.5 J	46.9 J	39.7 J	
	130	3200	40.4 J	48.4 J	44 J	41.1 J	
ics (µg/kg)							
hloroethane			9.8 U	8 U	6.6 U	7.4 U	
etrachloroethane			9.8 U	8 U	6.6 U	7.4 U	
hloro-1,2,2-trifluoroethane			9.8 U	8 U	6.6 U	7.4 U	
hloroethane			9.8 U	8 U	6.6 U	7.4 U	
oroethane			9.8 U	8 U	6.6 U	7.4 U	
oroethene			9.8 U	--	6.6 U	7.4 U	
hlorobenzene			9.8 U	8 U	6.6 U	7.4 U	
mo-3-chloropropane			9.8 U	8 U	6.6 U	7.4 U	
oroethane			9.8 U	8 U	6.6 U	7.4 U	
oroethene, cis-			9.8 U	8 U	6.6 U	7.4 U	
oroethene, trans-			9.8 U	8 U	6.6 U	7.4 U	
oropropane			9.8 U	8 U	6.6 U	7.4 U	
oropropene, cis-			9.8 U	8 U	6.6 U	7.4 U	
oropropene, trans-			9.8 U	8 U	6.6 U	7.4 U	
ne			-- R	-- R	-- R	-- R	
ne (MEK)			20 U	16 U	13 U	15 U	
ne (Methyl butyl ketone)			20 U	16 U	13 U	15 U	
			20 U	16 U	13 U	15 U	
			9.8 U	8 U	6.6 U	7.4 U	
romethane			9.8 U	8 U	6.6 U	7.4 U	

odifluoromethane			9.8 U	8 U	6.6 U	7.4 U	
omethane (Methylene chloride)			12 U	13 U	12 U	11 UJ	
nzene			9.8 U	8 U	6.6 U	7.4 U	
e dibromide			9.8 U	8 U	6.6 U	7.4 U	
lorobutadiene			0.09 U	0.09 UJ	0.08 UJ	0.09 UJ	
ylbenzene (Cumene)			9.8 U	8 U	6.6 U	7.4 U	
ene			9.8 U	8 U	6.6 U	7.4 U	
acetate			9.8 U	8 U	6.6 U	7.4 U	
isobutyl ketone (MIBK)			20 U	16 U	13 U	15 U	
tert-butyl ether (MTBE)			9.8 U	8 U	6.6 U	7.4 U	
cyclohexane			9.8 U	8 U	6.6 U	7.4 U	
e			9.8 U	8 U	6.6 U	7.4 U	
			9.8 U	8 U	6.6 U	7.4 U	
loroethene (PCE)			9.8 U	8 U	6.6 U	7.4 U	
e			9.8 U	8 U	6.6 U	7.4 U	
oethene (TCE)			9.8 U	8 U	6.6 U	7.4 U	
ofluoromethane			9.8 U	8 U	6.6 U	7.4 U	
loride			9.8 U	8 U	6.6 U	7.4 U	
Organics (µg/kg)							
ichlorobenzene			9.8 U	8 U	6.6 U	7.4 U	
lorobenzene			9.8 U	8 U	6.6 U	7.4 U	
henylhydrazine			24 UJ	24 U	22 U	23 U	
lorobenzene			9.8 U	8 U	6.6 U	7.4 U	
lorobenzene			9.8 U	8 U	6.6 U	7.4 U	
/bis (1-chloropropane)			24 UJ	24 U	22 U	23 U	
Tetrachlorophenol			24 UJ	24 U	22 U	23 U	
Tetrachlorophenol			24 UJ	24 U	22 U	23 U	
ichlorophenol			24 UJ	24 U	22 U	23 U	
ichlorophenol			24 UJ	24 U	22 U	23 U	
lorophenol			24 UJ	24 U	22 U	23 U	
ethylphenol			24 UJ	24 U	22 U	23 U	
itrophenol			120 UJ	120 UJ	110 UJ	120 UJ	
itrotoluene			24 UJ	24 U	22 U	23 U	
itrotoluene			24 UJ	24 U	22 U	23 U	
onaphthalene			24 UJ	24 U	22 U	23 U	
ophenol			24 UJ	24 U	22 U	23 U	
ylphenol (o-Cresol)			24 UJ	24 U	22 U	23 U	
aniline			120 UJ	120 U	110 U	120 U	
ohenol			24 UJ	24 U	22 U	23 U	
hlorobenzidine			24 UJ	24 U	22 U	23 U	
aniline			120 UJ	120 U	110 U	120 U	
ophenyl-phenyl ether			24 UJ	24 U	22 U	23 U	
o-3-methylphenol			24 UJ	24 U	22 U	23 U	
oaniline			24 UJ	24 U	22 U	23 U	
ophenyl phenyl ether			24 UJ	24 U	22 U	23 U	
ylphenol (p-Cresol)		260	24 UJ	24 U	22 U	23 U	
aniline			120 UJ	120 U	110 U	120 U	
ohenol			120 UJ	120 U	110 U	120 U	
			24 UJ	24 U	22 U	23 U	
: acid		2900	**27 J**	24 UJ	22 UJ	23 UJ	
alcohol			24 UJ	24 U	22 U	23 U	
loroethoxy)methane			24 UJ	24 U	22 U	23 U	
loroethyl)ether			24 UJ	24 U	22 U	23 U	
hylhexyl)phthalate	220	500	**16 J**	24 U	22 U	23 U	
nzyl phthalate	260		24 UJ	24 U	22 U	23 U	
phthalate			24 UJ	24 U	22 U	23 U	
yl phthalate	46		24 UJ	24 U	22 U	23 U	
tyl phthalate		380	**3.2 J**	24 U	22 U	23 U	
o-cresol			120 UJ	120 U	110 U	120 U	

omatic Hydrocarbons (µg/kg)							
ylnaphthalene	470		2.4 U	2.4 U	2.2 U	2.3 U	
nthene	1100		2.6 J	2.4 UJ	2.2 UJ	2.3 UJ	
nthylene	470		2.4 U	2.4 U	2.2 U	2.3 U	
ene	1200		2.3 J	2.4 UJ	2.2 UJ	2.3 UJ	
)anthracene	4300		13 J	2.4 UJ	2.2 UJ	4.4 J	
)pyrene	3300		19 J	2.4 UJ	2.2 UJ	2.3 UJ	
)fluoranthene			19 J	2.4 UJ	2.2 UJ	7.4 J	
,h,i)perylene	4000		2.4 U	2.4 U	2.2 U	7.3	
)fluoranthene			17 J	2.4 UJ	2.2 UJ	5.8 J	
le		900	2.6 J	24 U	22 U	23 U	
e	5900		14 J	2.4 UJ	2.2 UJ	6.7 J	
(a,h)anthracene	800		4.2 J	2.4 UJ	2.1 UJ	2.3 UJ	
furan	400	200	2.4 UJ	2.4 UJ	2.2 UJ	2.3 UJ	
hene	11000		21 J	2.4 UJ	2.2 UJ	16 J	
e	1000		2.4 UJ	2.4 UJ	2.2 UJ	2.3 UJ	
,2,3-c,d)pyrene	4100		11 J	2.4 UJ	2.2 UJ	9 J	
lene	500		2.4 UJ	2.4 UJ	2.2 UJ	2.3 UJ	
hrene	6100		2.4 J	2.4 U	2.2 U	2.3 U	
	8800		17 J	2.4 UJ	2.2 UJ	18 J	
nzofluoranthenes (U = 1/2)	600		36 J	2.4 UJ	2.2 UJ	13.2 J	
H (U = 0)		17000	143 J	2.4 UJ	2.2 UJ	74.6 J	
/kg)							
(o,p'-DDD)			0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
(o,p'-DDE)			0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
(o,p'-DDT)			0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
(p,p'-DDD)			0.92 UJ	0.93 UJ	0.86 UJ	0.9 UJ	
(p,p'-DDE)			0.92 UJ	0.93 UJ	0.86 UJ	0.9 UJ	
(p,p'-DDT)			0.92 UJ	0.93 UJ	0.86 UJ	0.9 UJ	
			0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
e, alpha- (Chlordane, cis-)			0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
e, beta- (Chlordane, trans-)			0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
		4.9	0.92 UJ	0.93 UJ	0.86 UJ	0.9 UJ	
an sulfate			0.92 UJ	0.93 UJ	0.86 UJ	0.9 UJ	
an, alpha- (I)			0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
an, beta (II)			0.92 UJ	0.93 UJ	0.86 UJ	0.9 UJ	
			0.92 UJ	0.93 UJ	0.86 UJ	0.9 UJ	
dehyde			0.92 UJ	0.93 UJ	0.86 UJ	0.9 UJ	
tone		8.5	0.92 UJ	0.93 UJ	0.86 UJ	0.9 UJ	
or			0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
or epoxide			-- R	-- R	-- R	-- R	
a			0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
		7.2	0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
a			0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
ma (Lindane)			0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
hlor			4.7 UJ	4.8 UJ	4.4 UJ	4.6 UJ	
			-- R	-- R	-- R	-- R	
r, cis-			0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
r, trans-			0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
lane			0.47 UJ	0.48 UJ	0.44 UJ	0.46 UJ	
e			47 UJ	48 UJ	44 UJ	46 UJ	
ng/kg)							
trachlorodibenzo-p-dioxin (TCDD)			0.22 U	0.22 U	0.2 U	0.22 U	
entachlorodibenzo-p-dioxin			1.14 U	1.18 U	1.05 U	1.04 U	
-Hexachlorodibenzo-p-dioxin			1.19 U	1.24 U	1.1 U	1.23 U	
-Hexachlorodibenzo-p-dioxin			1.05 U	1.08 U	0.96 U	1.08 U	
-Hexachlorodibenzo-p-dioxin			1.14 U	1.18 U	1.05 U	1.17 U	
,8-Heptachlorodibenzo-p-dioxin			5.24	9.49	4.75	3.61	
8,9-Octachlorodibenzo-p-dioxin			39.3	69.1	37.4	28	

; (µg/kg)							
1016			9.2 U	9.3 U	8.6 U	9 U	
1221			9.2 U	9.3 U	8.6 U	9 U	
1232			9.2 U	9.3 U	8.6 U	9 U	
1242			9.2 U	9.3 U	8.6 U	9 U	
1248			9.2 U	9.3 U	8.6 U	9 U	
1254			9.2 U	9.3 U	8.6 U	9 U	
1260			9.2 U	9.3 U	8.6 U	9 U	
1262			9.2 U	9.3 U	8.6 U	9 U	
1268			9.2 U	9.3 U	8.6 U	9 U	
CB Aroclors (U = 0)	60	110	9.2 U	9.3 U	8.6 U	9 U	

ted result
d concentration is greater than SEF screening level (No Exceedances)
e River "upriver" surface sediment background values range from 2.2 to 5.7 ng/kg based on upper prediction limits (LWG 2011)
value
ıd analyzed, but not detected above detection limit
nd analyzed, but not detected above estimated detection limit

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nt
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Table 2
Conceptual Site Model for Dahl Beach Park Restoration

POTENTIAL SEDIMENT RELEASE FROM SHORELINE REGRADING AND ANTHROPOGENIC MATERIAL REMOVAL (if applicable)

Media of Concern (where chemicals of concern may be present)	Release[1] Mechanism (process that liberates or reveals chemicals of concern from media)	Secondary Media (other media impacted)	Primary Pathway (route from media to receptor)	Potential Receptors: Benthic Inverts	Fish	ESA Species	Critical Habitat	Birds/Mammals	Humans
SEDIMENT →	Resuspension[2] (during restoration or anthropogenic material removal) →	Water column →	Direct Contact →	[A]	[A]	[A]	[A]		
	Generated Residuals[3] (redeposited from sloughing, dislodging, slope failure, or resettling during dredging or disposal) →	Settled sediment →	Direct Contact →	Not Applicable					
			Dietary → Tertiary Media, Tissue →	Not Applicable					
	Undisturbed Residuals[4] (as uncovered during dredging- measured as the new surface material) →	Newly exposed sediment surface →	Direct Contact →	Not Applicable					
			Dietary → Tertiary Media, Tissue →	Not Applicable					

Receptor Pathway Abbreviations: **C** = Pathway complete; **P** = Potentially complete pathway; I = Incomplete or insignificant pathway; NA = not applicable (e.g., NSM is bedrock or concrete)

[1] Release: the process by which the operations result in the transfer of contaminants from sediment pore water and sediment particles into the water column or air (i.e., repartitioning). Contaminants in near-surface sediments (e.g., transport from redeposited sediment or residuals) may be released into the water column by densification, diffusion, and bioturbation (Bridges et. al., 2008).

[2] Resuspension: The process by which attended operations dislodge bedded sediment particles and disperse them into the water column. Resuspension rates range from <0.1% to over 5% (Bridges et. al., 2008).

[3] Redeposition: The process by which suspended particles resettle on the surface of the sediment after disturbance. Redeposition can occur in the near field (the plume area dominated by rapid settling velocities, changes in sediment total suspended concentration, and load with distance from the dredging operation) or the far field (the area where the total load in the plume is slowly varying and where advection, diffusion and settling are of the same order of magnitude).

[4] Residuals: Contaminated sediment found at the post-dredging surface of sediment profile, either within or adjacent to the dredging footprint (Bridges et. al., 2008). Examples include contaminated surface sediments uncovered by dredging, but not fully removed (e.g., newly exposed surface) or contaminated sediment dislodged from nearby slopes during dredging or slope failures. Although in-water disposal does not create undisturbed residuals, resuspended sediment particles settling at a site become part of the generated dredging residuals.

SEDIMENT RELEASE FROM OTHER TYPES OF DISPOSAL (not considered in the SEF) [B] Not Applicable

	Disposal Method	Disposal Location	Transport Processes (Examples)
SEDIMENT →	Upland Disposal →	Upland Confined Aquatic Disposal (CDF)	The following upland processes are outside of the purview of SEF review: 1. Leaching 2. Surface runoff 3. Volatilization 4. Bioaccumulation Additional information on the evaluation of these disposal options can be found the following manuals: 1. Corps. 2003. Upland Testing Manual, ERD/EL TR-03-1. 2. EPA. 1998. Guidance for In Situ Subaqueous Capping of Contaminated Sediment, EPA 905-B96-004.
	Nearshore Disposal →	Nearshore CDF	
	Subaqueous Capping →	Engineered Cap	

[A] – Possible effects from increased turbidity only. There is no reason to believe contaminants are present (i.e., "very low" ranking proposed).

[B] – All native soil and sediment will be left onsite. Only rock, structural debris, and non-native ballast material will be removed and repurposed.

6-136

FIGURES

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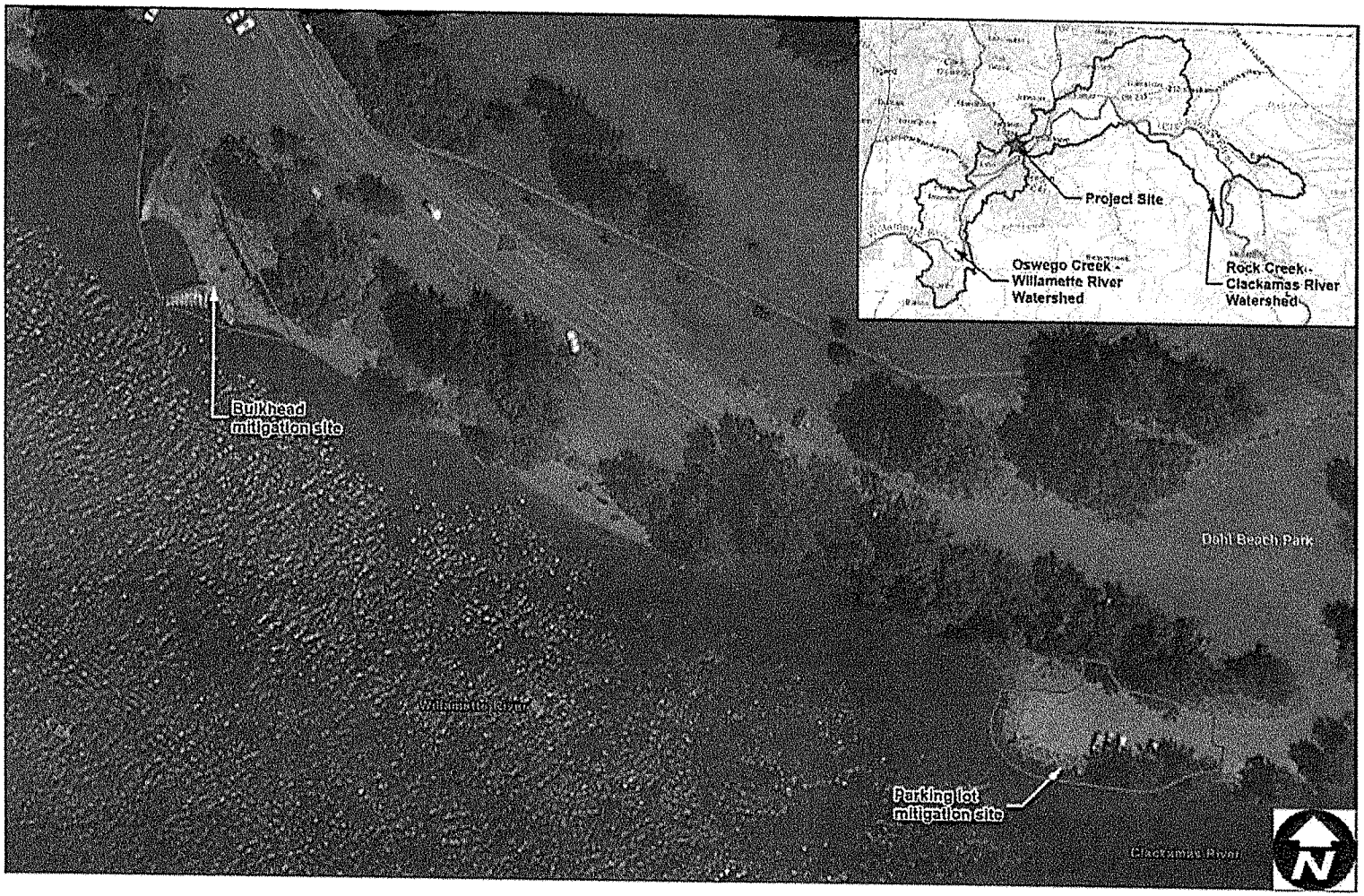
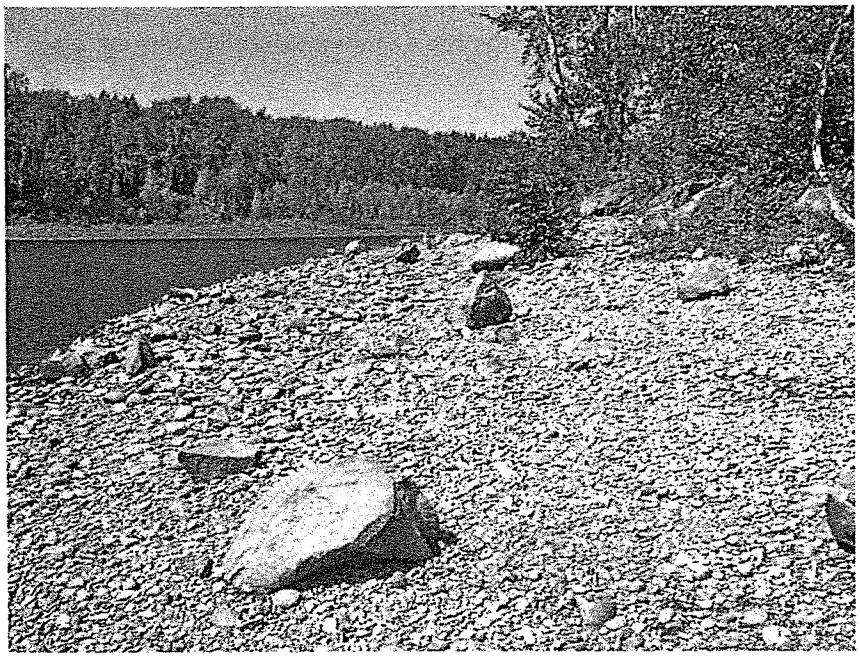


Source: Cascade Environmental Group (8/25/2015)

ANCHOR QEA

Figure 1
Site Map
Dahl Beach Mitigation Site Level 1 Sediment Evaluation
Port of Portland Terminal 4 Mitigation Project



Looking downriver below parking area showing typical gravel, cobble, and riprap beach.

Looking downriver along failed sheet pile bulkhead showing typical gravel and cobble beach in foreground and background.

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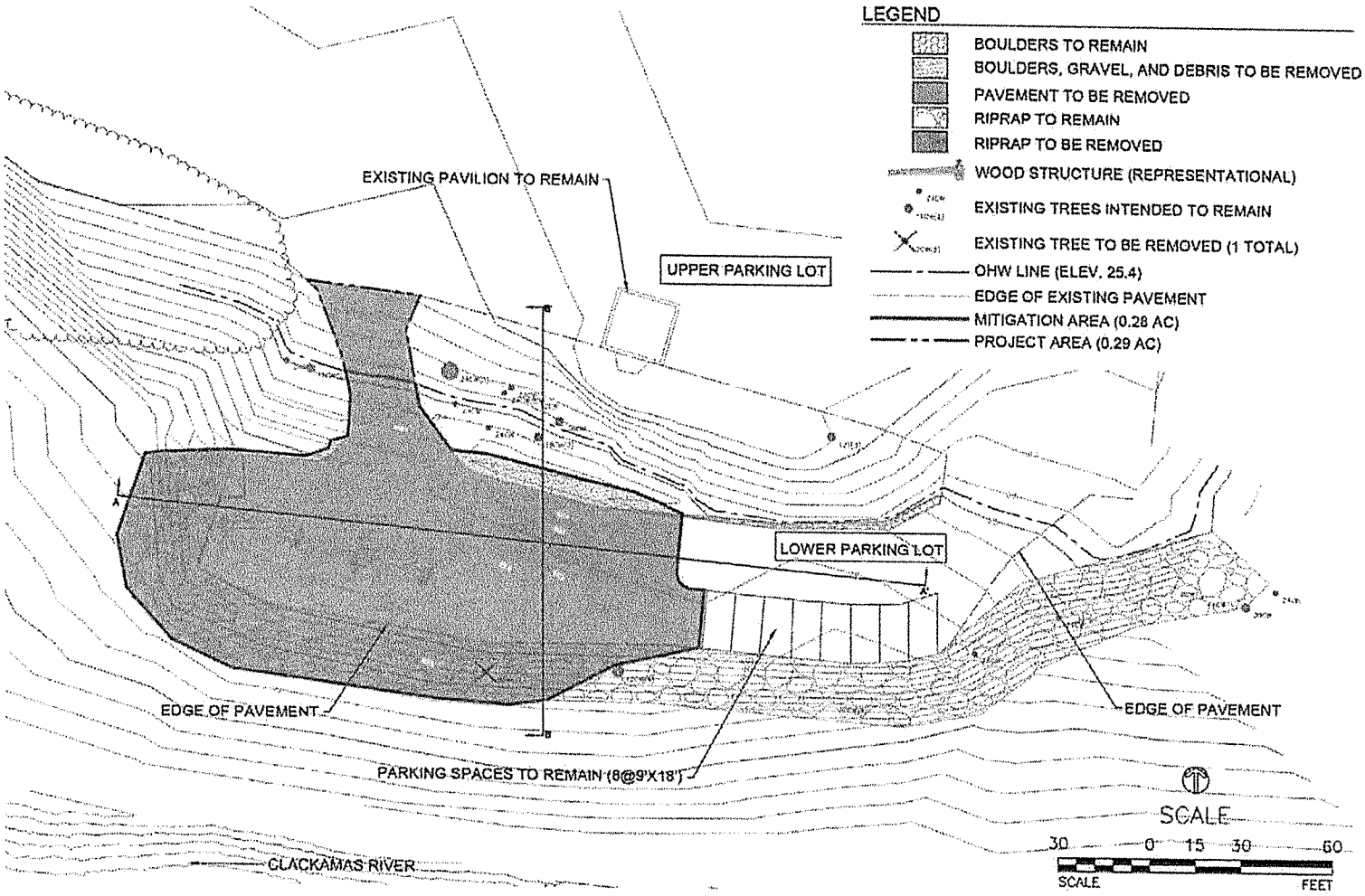
Figure 2
Representative Photographs of Site Sediment Characteristics
Dahl Beach Mitigation Site Level 1 Sediment Evaluation
Port of Portland Terminal 4 Mitigation Project



Source: Cascade Environmental Group (8/2015)

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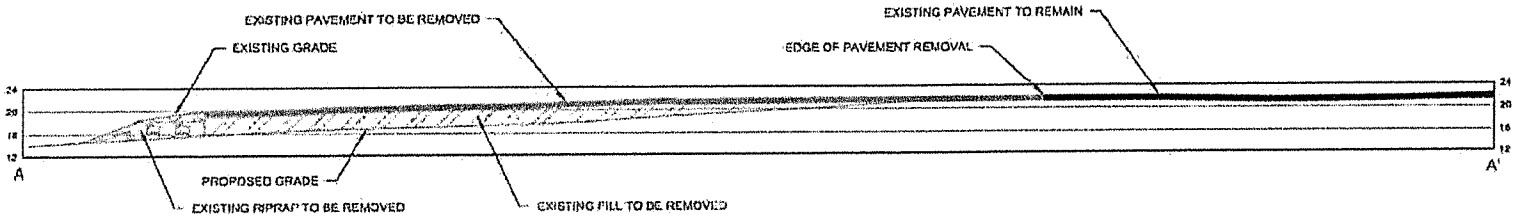
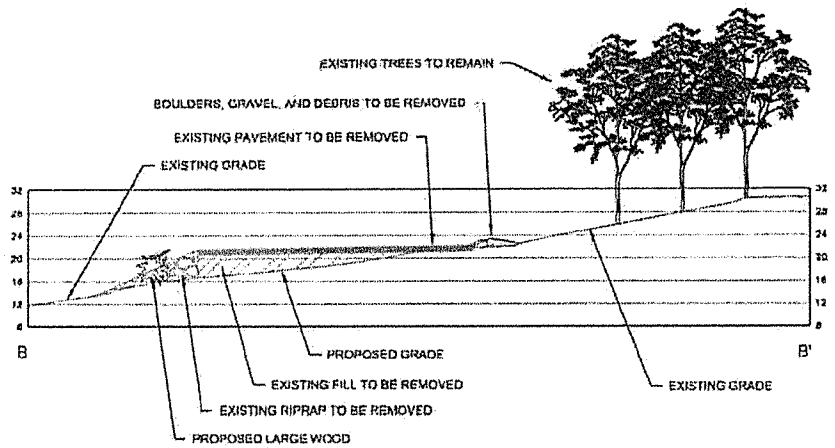
Figure 3
Lower Parking Lot Area Project Design Concept
Dahl Beach Mitigation Site Level 1 Sediment Evaluation
Port of Portland Terminal 4 Mitigation Project



SECTION A-A' THROUGH RESTORATION AREA

SCALE: VERT. 1"=20' HORIZ. 1"=20'



SECTION B-B' THROUGH RESTORATION AREA

SCALE: VERT. 1"=20' HORIZ. 1"=20'

Source: Cascade Environmental Group (8/2015)

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Figure 4
Lower Parking Lot Area Project Design Cross Sections
Dahl Beach Mitigation Site Level 1 Sediment Evaluation
Port of Portland Terminal 4 Mitigation Project

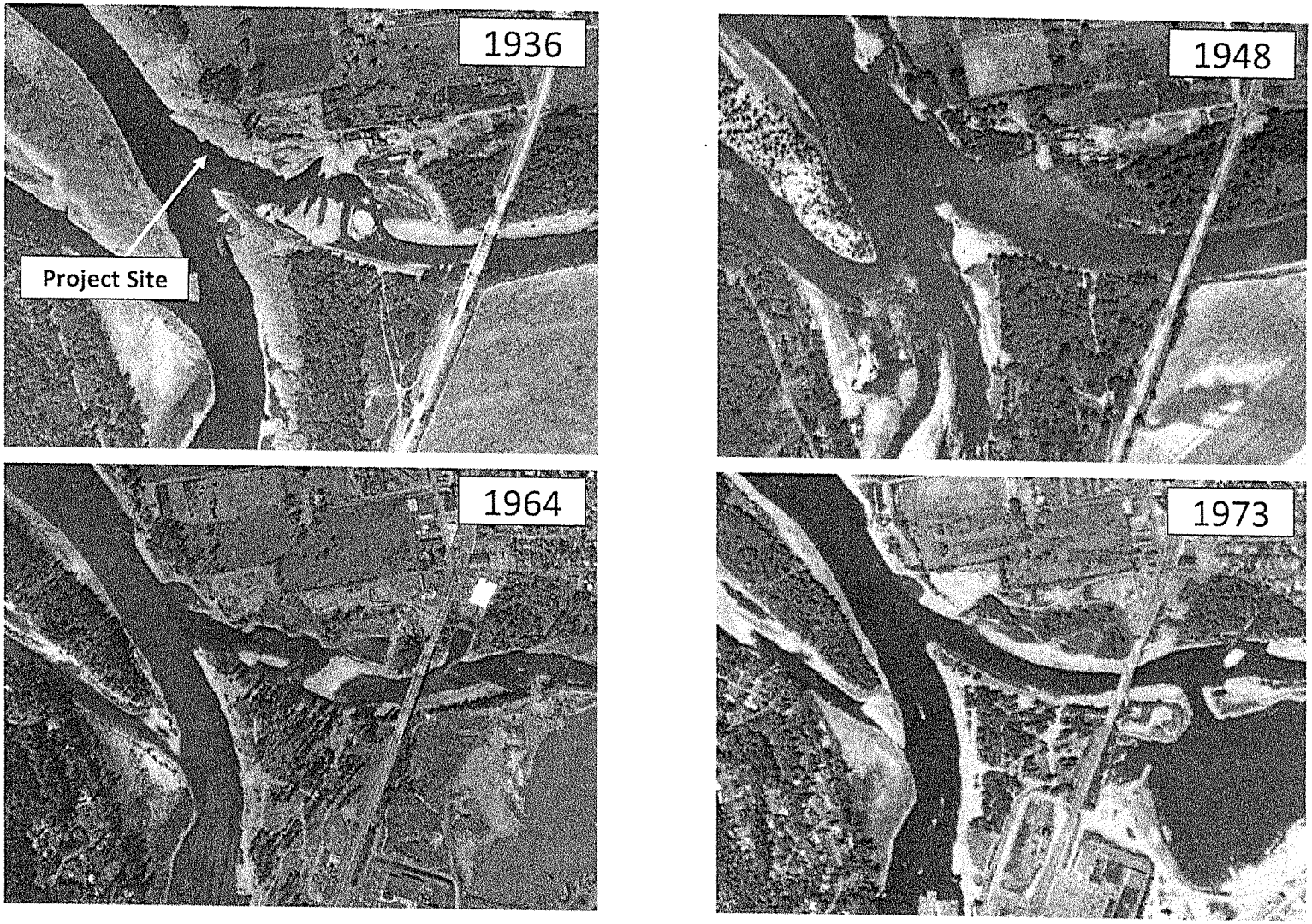

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Figure 5
Representative Historical Photos
Dahl Beach Mitigation Site Level 1 Sediment Evaluation
Port of Portland Terminal 4 Mitigation Project

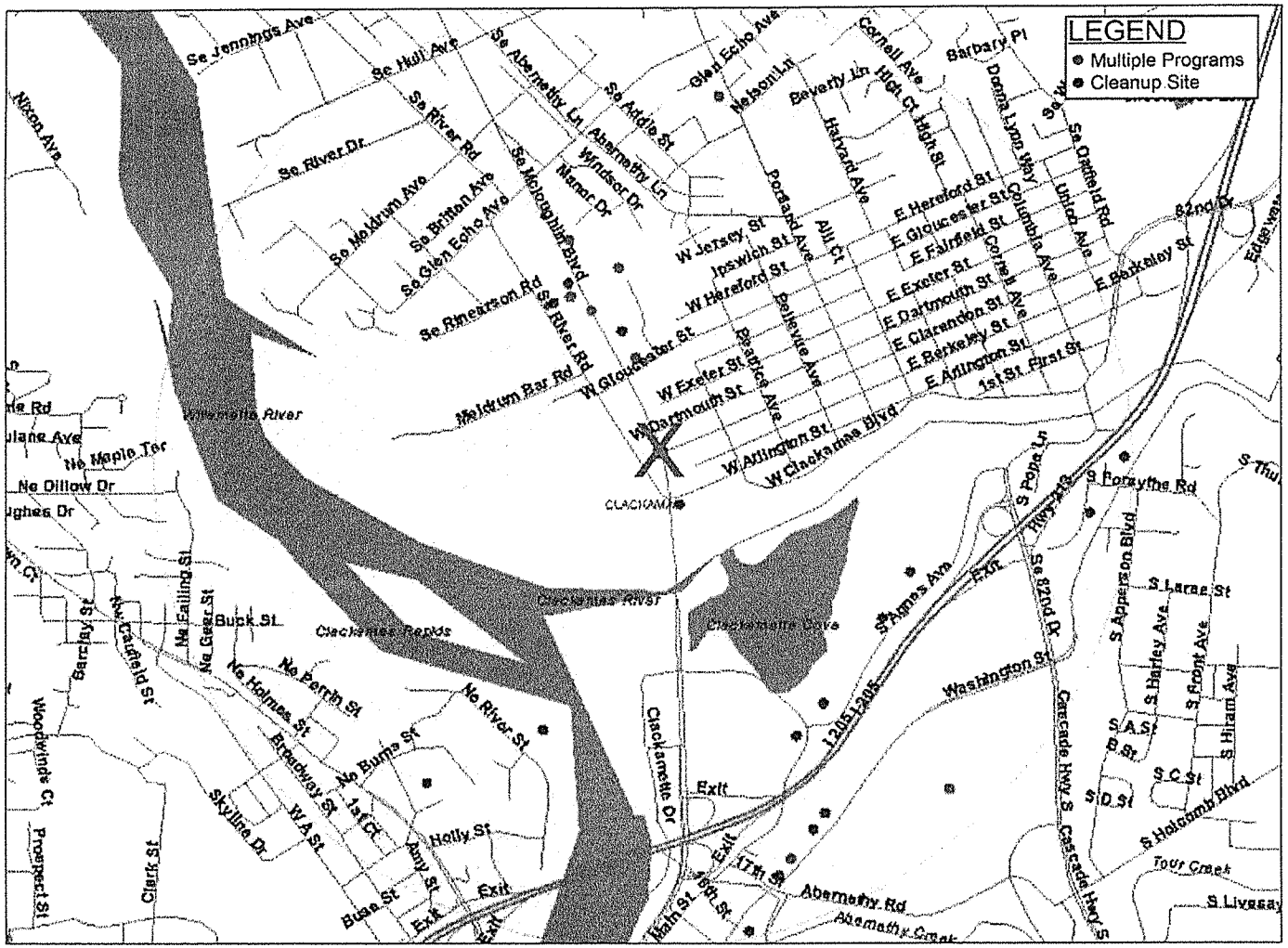

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Figure 6
State Environmental Site Cleanup Inventory (ESCI) Database Search Results
Dahl Beach Mitigation Site Level 1 Sediment Evaluation
Port of Portland Terminal 4 Mitigation Project

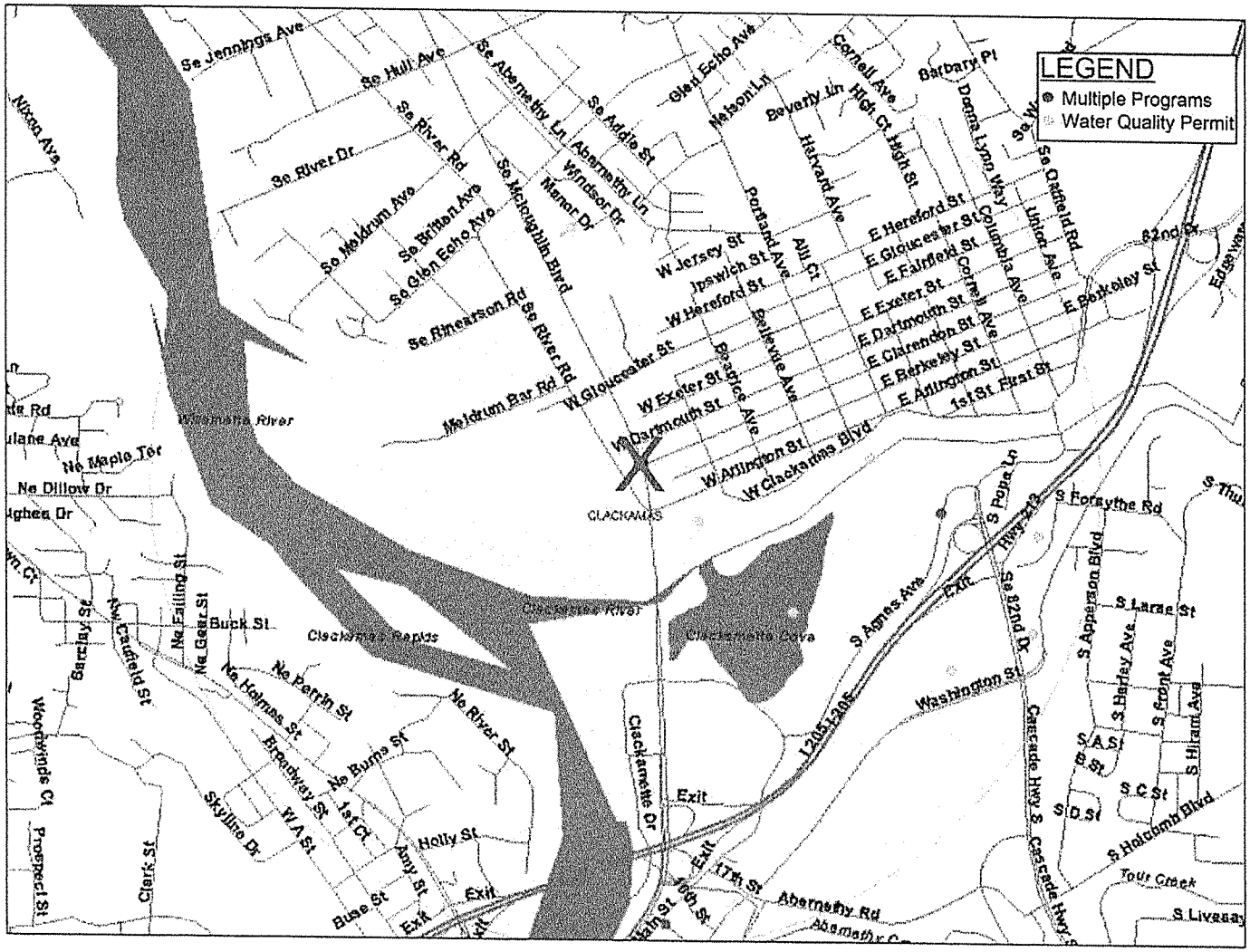

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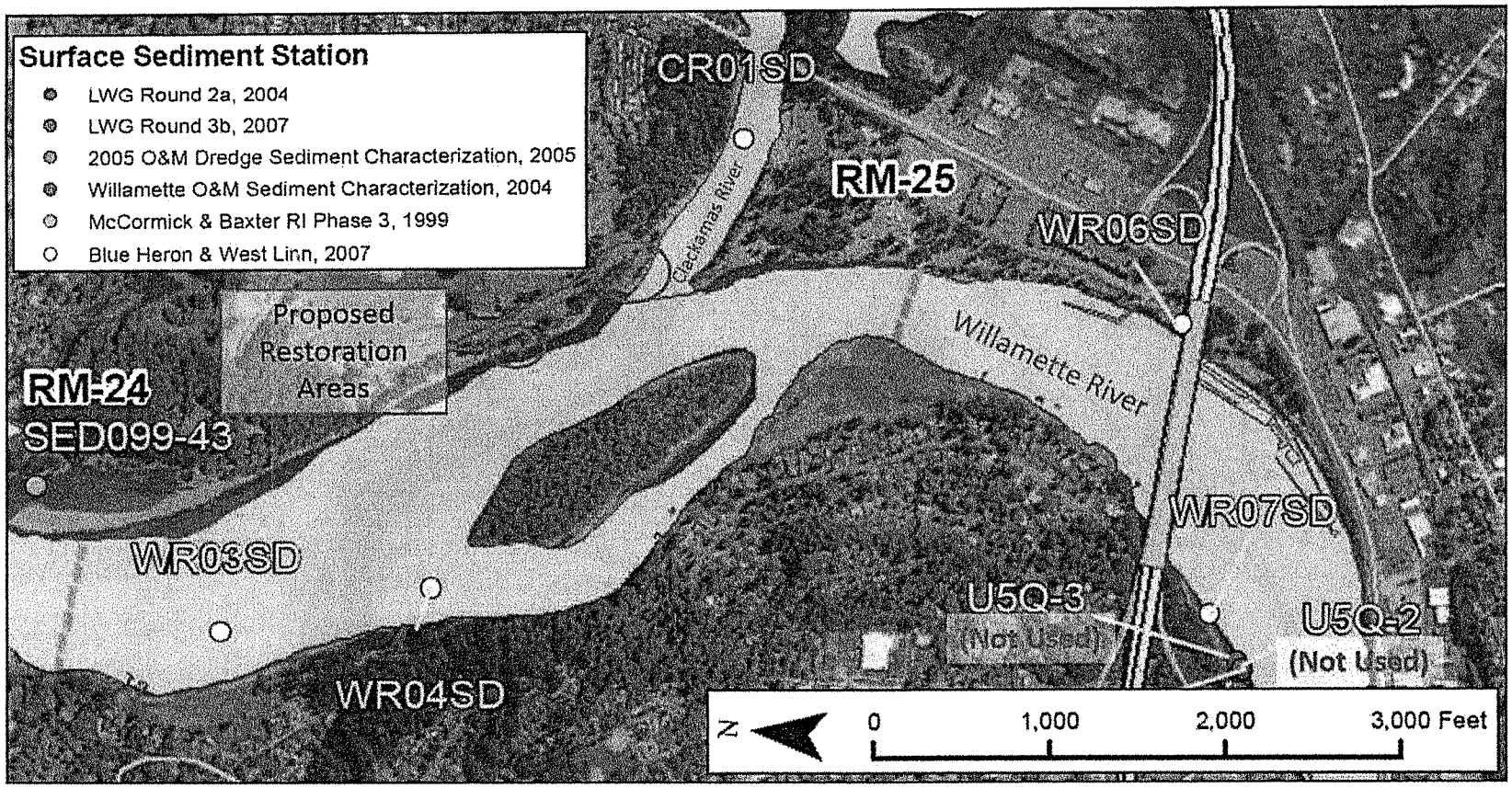
Figure 7
State Water Quality Source Information System (WQSIS) Database Search Results
Dahl Beach Mitigation Site Level 1 Sediment Evaluation
Port of Portland Terminal 4 Mitigation Project



ANCHOR QEA

Figure 8
Existing Surface Sediment Sampling Locations
Dahl Beach Mitigation Site Level 1 Sediment Evaluation
Port of Portland Terminal 4 Mitigation Project

APPENDIX D
REFERENCE SITE MEMORANDUM

CASCADE
ENVIRONMENTAL GROUP

Date: October 14, 2015

To: Kelly Madalinski, Port of Portland

From: Cascade Environmental Group, LLC

Re: Dahl Beach Reference Sites

This memo presents four sites selected to serve as restoration design reference for the Dahl Beach Mitigation Project. Sites were selected based on their proximal location to the Mitigation Project site and shared hydrogeomorphic and topographical characteristics. Slope, elevation, substrate type, and vegetation community were assessed at each site; the information was used to inform planting plan species selection and installation elevations on the Project site, as well as weed management planning. Reference site vegetation communities vary in composition and elevation ranges, but several trends were observed and contributed to the development of planting recommendations for the Project site. The observations and related recommendations are presented at the end of this memo. The reference sites are described in detail in the next section, including photographs, and summarized in a table following the descriptions. The location of the reference sites relative to the Project site is depicted in the attached map.

Reference Site Descriptions

1. Maddax Woods – Burnside Park

The Maddax Woods – Burnside Park reference site is located along the Willamette River, on the opposite bank and just downstream of the Mitigation Project. The site is owned and managed by the City of West Linn as a public park. It is characterized by a moderately-to-steeply sloped (10-30%) sand-cobble beach grading to a short vertical bank and a forested river terrace bordered by a steep upland escarpment. Vegetation occurring on the beach (below 14 ft. NAVD88) is very sparse and dominated by weedy, herbaceous species such as prostrate knotweed (*Polygonum aviculare*), tansy ragwort (*Senecio jacobea*), and bird's foot trefoil (*Lotus corniculatus*). Vegetation occurring on the terrace (above 14 ft. NAVD88) consists of black cottonwood (*Populus balsamifera*) forest with emerging Oregon ash (*Fraxinus latifolia*) and an understory dominated by non-native species including Himalayan blackberry (*Rubus armeniacus*), English ivy (*Hedera helix*), wild Clematis (*Clematis vitalba*), and reed canarygrass (*Phalaris arundinacea*); redosier dogwood (*Cornus sericea*) occurs occasionally. Above the floodplain elevation (48 ft. NAVD88), vegetation consists of Douglas fir (*Pseudotsuga menziesii*)/bigleaf maple (*Acer macrophyllum*) forest with an understory dominated by snowberry (*Symphoricarpos albus*) and English ivy.

Photo 1. Maddax Woods–Burnside Park: looking upstream

Photo 2. Maddax Woods–Burnside Park: looking downstream

2. Lonesome Bottom

This reference site consists of accreted land on an inside bend of the Willamette River, just upstream of the Mitigation Project; ownership is unknown. It features a gently-to-moderately sloped (5-15%) sand-gravel-cobble beach grading to a broad, flat terrace. Vegetation consists of three distinct communities forming bands stratified by elevation. The lowest elevations (10-11 ft. NAVD88) are colonized by Indian hemp (*Apocynum cannabinum*) along with prostrate knotweed and bird's foot trefoil. At elevations of 11-15 ft. NAVD88, a sandbar willow (*Salix fluviatilis*) dominated community occurs and includes pennyroyal (*Mentha pelugium*), St. John's wort (*Hypericum perforatum*), smartweed (*Persicaria* spp.) and beggars tick (*Bidens cernua*). Above 15 ft. NAVD88, young black cottonwood and Oregon ash have established along with St. John's wort.

Photo 3. Lonesome Bottom: looking downstream

Photo 4. Lonesome Bottom: looking upstream

3. **Goat Island**

Goat Island is a large, undeveloped, low-lying island located in the Willamette River, directly across from the Mitigation Project; it is owned and managed by the Oregon Department of State Lands as a public park. The site consists of a gently-to-moderately sloped cobble-gravel beach (5-20%) grading to a level forested floodplain. Similar to Lonesome Bottom, Goat Island features vegetation communities that are distinctly stratified by elevation. At 10-11 ft. NAVD88, the community is composed of Indian hemp along with *Aster* spp., prostrate knotweed, smartweed, and bird's foot trefoil along with sandbar willow shoots. The sandbar willow community colonizes the elevations between 11-14 ft. NAVD88 and includes an understory of beggar's tick, St. John's wort, tansy ragwort, common plantain (*Plantago lanceolata*), and common evening-primrose (*Oenothera biennis*). Above 14 ft. NAVD88, black cottonwood/Oregon ash forest occurs and includes an understory of Himalayan blackberry, English ivy, and, occasionally, redosier dogwood and Pacific ninebark (*Physocarpus capitata*). Scotch broom (*Cytisus scoparius*) also occurs within this elevation range. At elevations above 30 ft. NAVD88, small groves of bigleaf maple are found along with some snowberry.

Photo 5. Goat Island: looking downstream

Photo 6. Goat Island: looking upstream

4. **Meldrum Bar Park Beach**

This site consists of a stretch of beach upstream of the Mitigation Project in the adjacent Meldrum Bar Park, owned and managed by the City of Gladstone. It is characterized by a moderately to very steeply sloped (15-50%) cobble-gravel beach grading to a high vertical bank and broad river terrace; a distinctive scour line is present at around 13.5 ft. NAVD88. Above the scour line, the beach is sparsely vegetated by weedy species to 20 ft. NAVD88 including Scotch broom (occurring around the 20 ft. mark), prostrate knotweed, evening primrose, and mullein (*Verbascum thapsus*). Above 20 ft. NAVD88, black cottonwood/bigleaf maple forest is present which features occasional Oregon ash, Oregon oak (*Quercus garryana*), and honey locust (*Gleditsia triacanthos*) trees and a non-native dominated understory of Himalayan blackberry, English ivy and false brome (*Brachypodium sylvaticum*); redosier dogwood and hazelnut (*Corylus cornuta*) also occur occasionally.

Photo 7. Meldrum Bar Park Beach: looking upstream

Photo 8. Meldrum Bar Park Beach: looking downstream

Reference Site Summary Table

Reference Site	ACM Slope Range (%)	Vegetation Community	Elevation Range (ft. NAVD88)
Maddax Woods - Burnside Park	10-30	weedy forbs	<14
		Black cottonwood- Oregon ash/Himalayan blackberry/English ivy	14-48
		Doug fir-bigleaf maple	>48
Lonesome Bottom	5-15	Indian hemp-weedy forbs	10-11
		Sandbar willow/ smartweed	11-15
		Black cottonwood- Oregon ash/St John's wort	15-25
Goat Island	5-20	Indian hemp-weedy forbs	10-11
		Sandbar willow/weedy forbs	11-15
		Black cottonwood- Oregon ash/Himalayan blackberry/English ivy	15-30
		Bigleaf maple/ snowberry	>30
Meldrum Bar Park Beach	15-50	Scotch broom-weedy forbs	14-20
		Black cottonwood/ bigleaf maple-Himalayan blackberry-English ivy	>20

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ENVIRONMENTAL GROUP

Key Observations and Applicability to Dahl Beach Mitigation Project Plant Selection

1. **Observation:** Black cottonwood is the dominant tree species in forested areas on the reference sites, extending from near the scour line to the upper limits of riparian areas. Black cottonwood is known as an aggressive colonizer and will likely spread readily once established.

   Recommendation: Plant black cottonwood at the Project site in elevation ranges where there are no existing dominant tree species and allow to spread to other elevations; allow additional native species to establish in other elevation ranges to promote site diversity long term.

2. **Observation:** Vegetation establishment on the reference sites appears to be related to a combination of beach slope and assumed exposure to higher flow velocities: sites with flatter slopes featured intact sandbar willow communities and vegetation present at lower elevations than sites with steeper slopes.

   Recommendation: The Bulkhead Removal Area appears too steep to support favorable conditions for sandbar willow based on the proposed finished gradient and the absence of sandbar willow at the Meldrum Bar Park Reference site (adjacent to the Bulkhead Removal Area). Install sandbar willow only at Parking Lot Area where proposed finished gradients are more gradual and employ adaptive management to inform maintenance of plantings.

3. **Observation:** Himalayan blackberry, English ivy, wild Clematis, and Scotch broom are prevalent on all reference sites and will likely present ongoing management challenges. Non-persistent ruderal forbs are also widespread in areas subject to regular scour.

   Recommendation: Develop specific strategies for control of Himalayan blackberry and English Ivy; control of non-persistent ruderal forbs, however, will provide little benefit.

Date: 10/16/2015
Scale: 1 inch = 500 feet
Data Source: ESRI, 2015; Metro, 2012.

Reference Site Locations

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CASCADE ENVIRONMENTAL GROUP

0 500 1,000 Feet

Dahl Beach Park Mitgation Site

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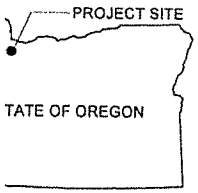
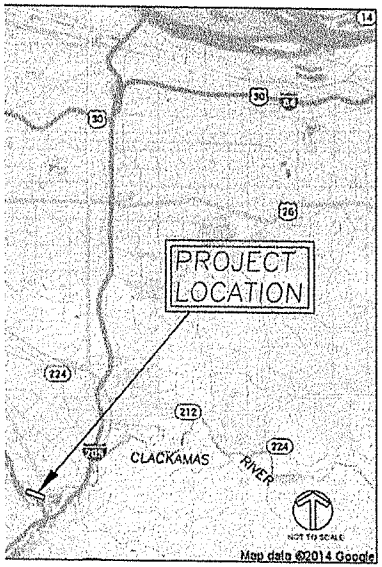
APPENDIX E
30% DESIGN PLANS

CITY OF GLADSTONE, OREGON

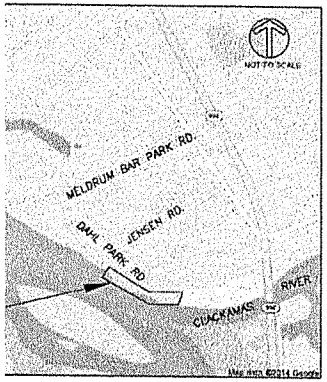
30% DESIGN DRAWINGS
OCTOBER 2015



CATION MAP



INITY MAP



SITE MAP

SHEET INDEX

SHEET NUMBER	SHEET NAME	SHEET DESCRIPTION
1	G1	COVER
2	G2	NOTES, GENERAL INFORMATION, AND ABBREVIATIONS
3	G3	PROPOSED SITE OVERVIEW
4	C1	GRADING PLAN: PARKING LOT AREA
5	C2	GRADING PLAN: BULKHEAD REMOVAL AREA
6	C3	CROSS SECTION: PARKING LOT AREA
7	C4	CROSS SECTION: BULKHEAD REMOVAL AREA
8	P1	PLANTING PLAN: PARKING LOT AREA
9	P2	PLANTING PLAN: BULKHEAD REMOVAL AREA

PROJECT TEAI

LANDOWNER
CITY OF GLADSTONE
CONTACT: SCOTT TABOR
525 PORTLAND AVE.
GLADSTONE, OR 97027
PH: 503-656-7957

ENVIRONMENTAL CONSULTANT / CIVIL ENGINEER
CASCADE ENVIRONMENTAL GROUP
CONTACT: BRENT HADDAWAY
222 NW DAVIS ST., SUITE 317
PORTLAND, OR 97209
PH: 503-894-8585

SURVEYO
WATERW
CONTACT:
1020 SW T
PORTLANI
PH: 503-2

SURVEYO:
HYDRO SC
6635 N. BA
PORTLANI
PH: 206-2(

GEOTECH
HARTCRO
CONTACT:
300 W. 15T
VANCOUV
PH: 206-8

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6-155

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(NOTE: THE TELEPHONE NUMBER
THE OREGON UTILITY NOTIFICATIO
CENTER IS 503-232-1987).

POTENTIAL UNDERGROUND FACILIT

Dig Safely.

Call the Oregon One-Call Cen
DIAL 811 or 1-800-332-

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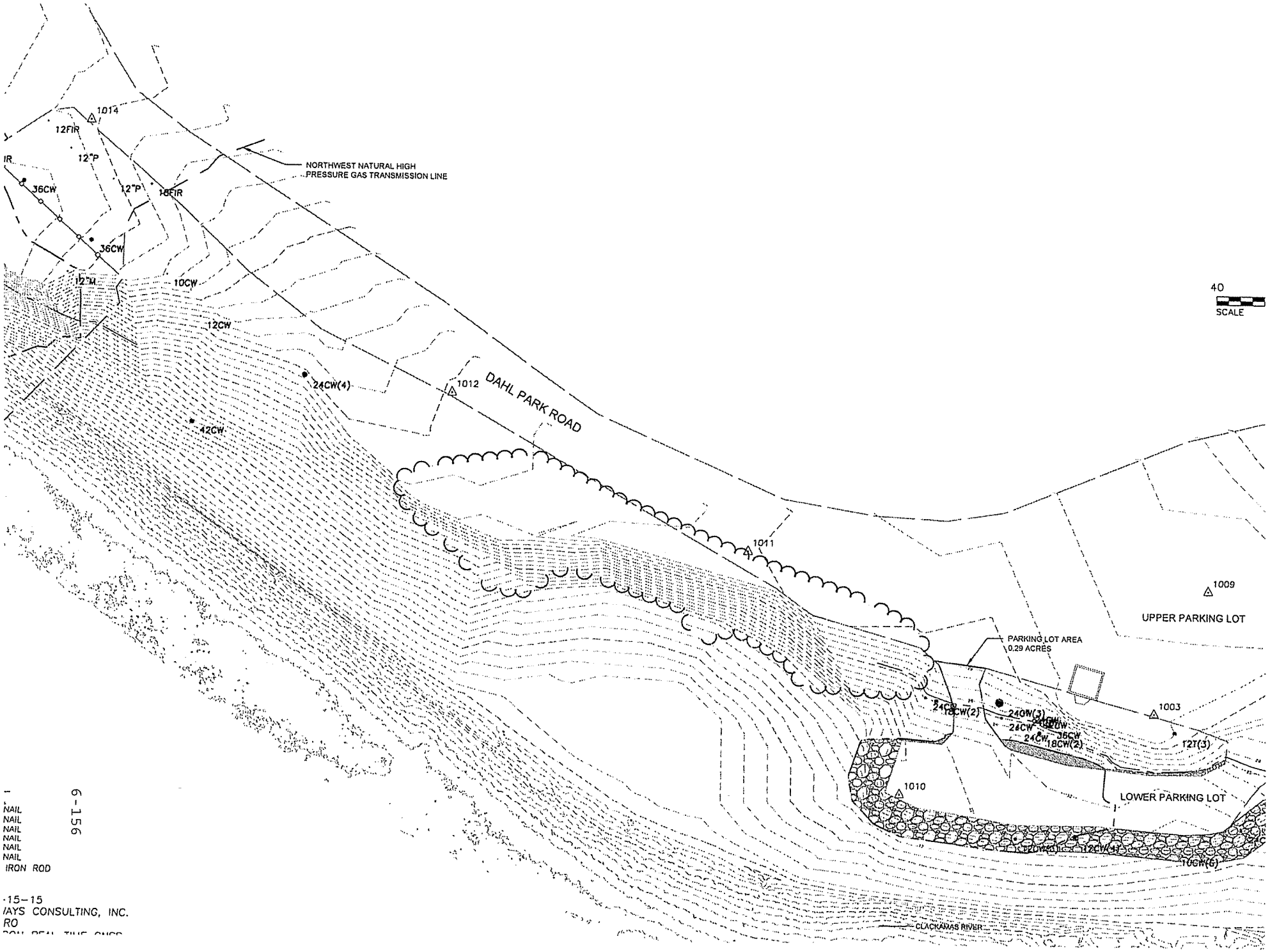

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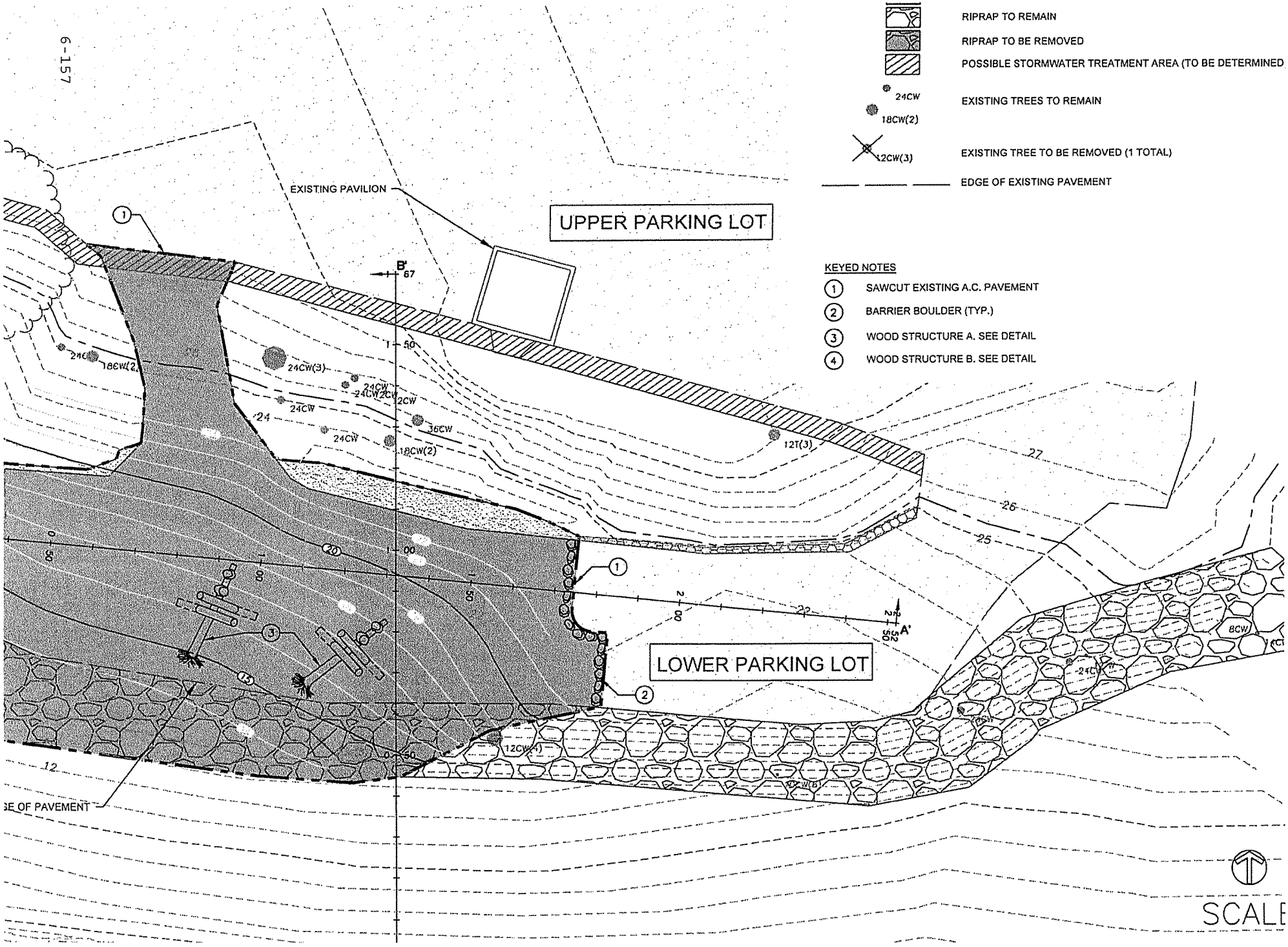
RIPRAP TO REMAIN
RIPRAP TO BE REMOVED
POSSIBLE STORMWATER TREATMENT AREA (TO BE DETERMINED
24CW
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KEYED NOTES
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2 BARRIER BOULDER (TYP.)
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4 WOOD STRUCTURE B. SEE DETAIL
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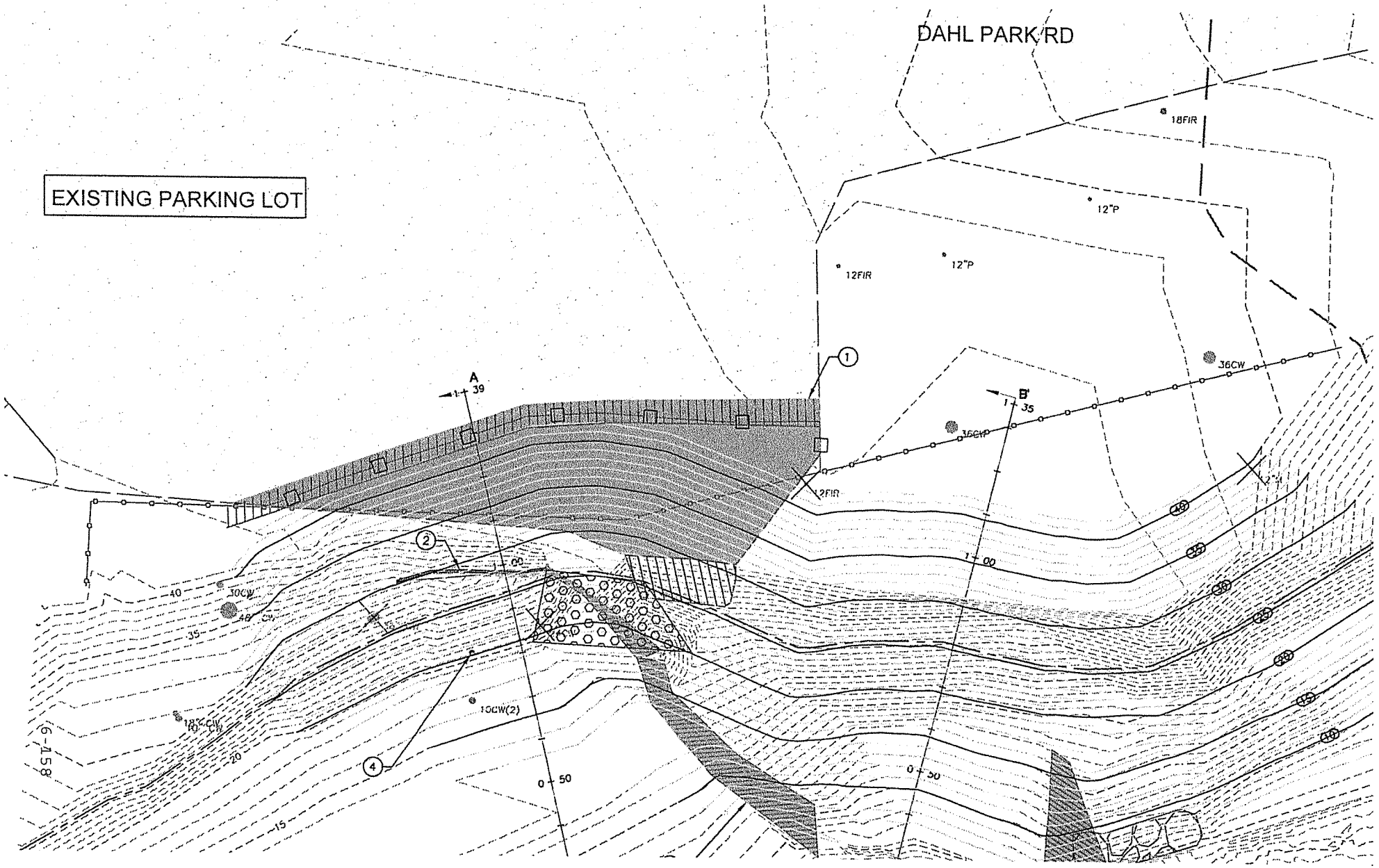
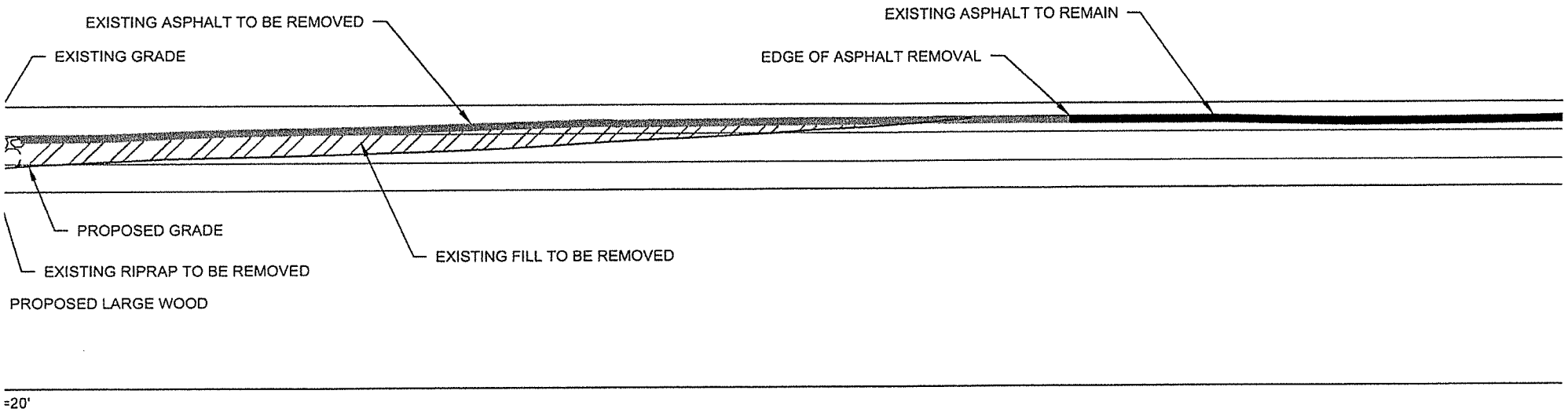
SHEETPILE SEGMENTS THAT ARE UNABLI
WITHOUT EXTRAORDINARY EFFORT WILL
BELOW GRADE AND BURIED WITH NATIVE

(4) PROTECT EXISTING PIPE TO REMAIN




EXISTING ASPHALT TO BE REMOVED
EXISTING GRADE
EXISTING ASPHALT TO REMAIN
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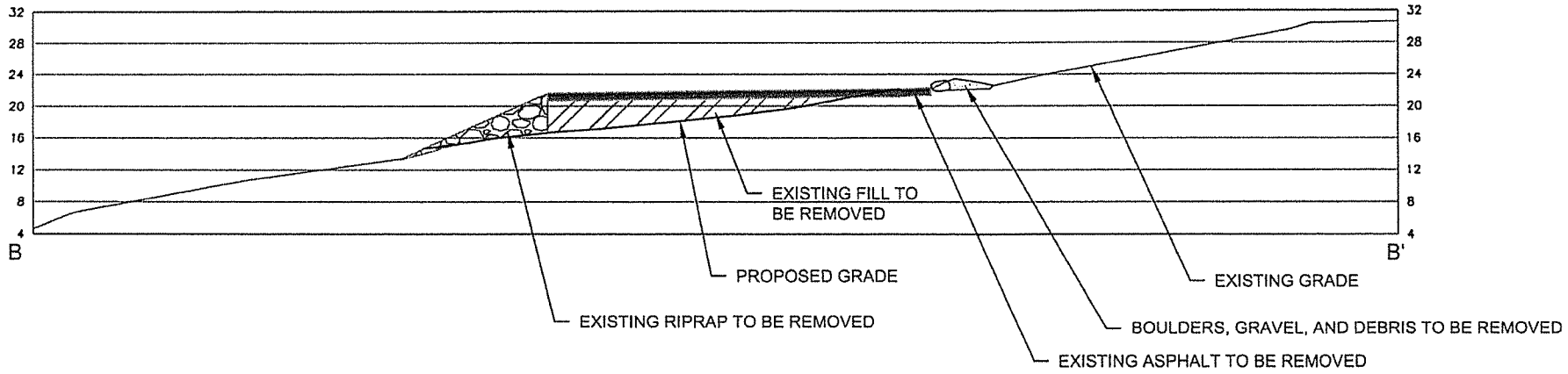
EXISTING RIPRAP TO BE REMOVED
PROPOSED LARGE WOOD
=20'


32
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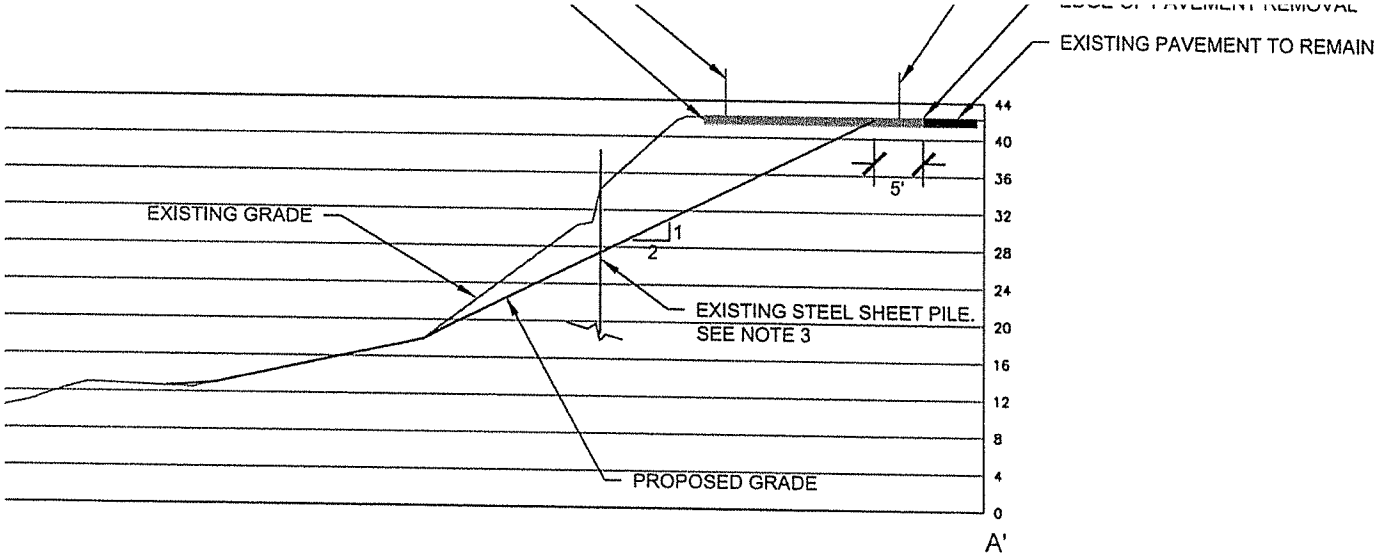
EXISTING FILL TO BE REMOVED
PROPOSED GRADE
EXISTING GRADE
EXISTING RIPRAP TO BE REMOVED
BOULDERS, GRAVEL, AND DEBRIS TO BE REMOVED
EXISTING ASPHALT TO BE REMOVED



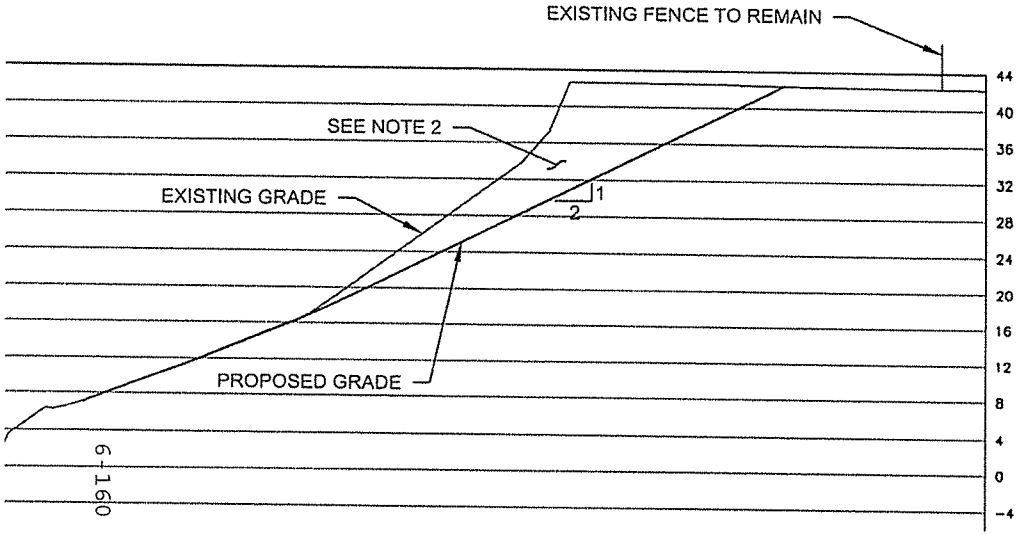
1"=10'

NOTES

1. REMOVE EXISTING CABLES, HARDWARE, AND OTHER APPU
IF FEATURE EXTENDS BELOW FINISH GRADE, CUT OFF 2-3 F

2. MASS EXCAVATION MATERIAL EXPECTED TO BE SPREAD O
WASHED OF FINES.

3. CUT EXISTING STEEL SHEET PILE 2 FEET BELOW FINISH GR
STRUCTURAL FILL.



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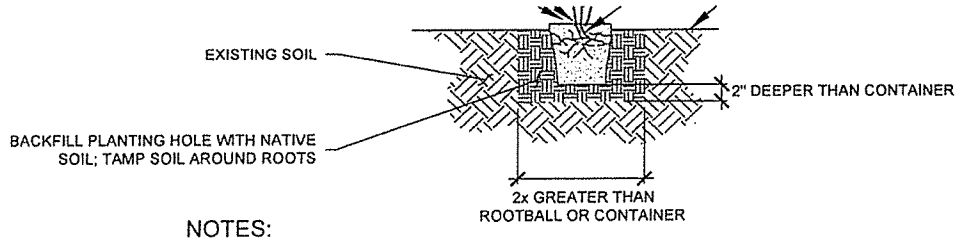


NOTES:

1. SEE SPECIFICATIONS FOR BACKFILL REQUIREMENTS

1 GALLON TREE & SHRUB PLANTING

Not to Scale

24CW — EXISTING TREES TO REMAIN

18CW(2)

12CW(3) — EXISTING TREE TO BE REMOVED (1 TOTAL)

EDGE OF PAVEMENT

25 — EXISTING CONTOURS

10 — PROPOSED CONTOURS

BOULDER BARRIER; SEE GRADING PLANS

PROPOSED HABITAT AREA SIGNAGE (3 TOTAL)

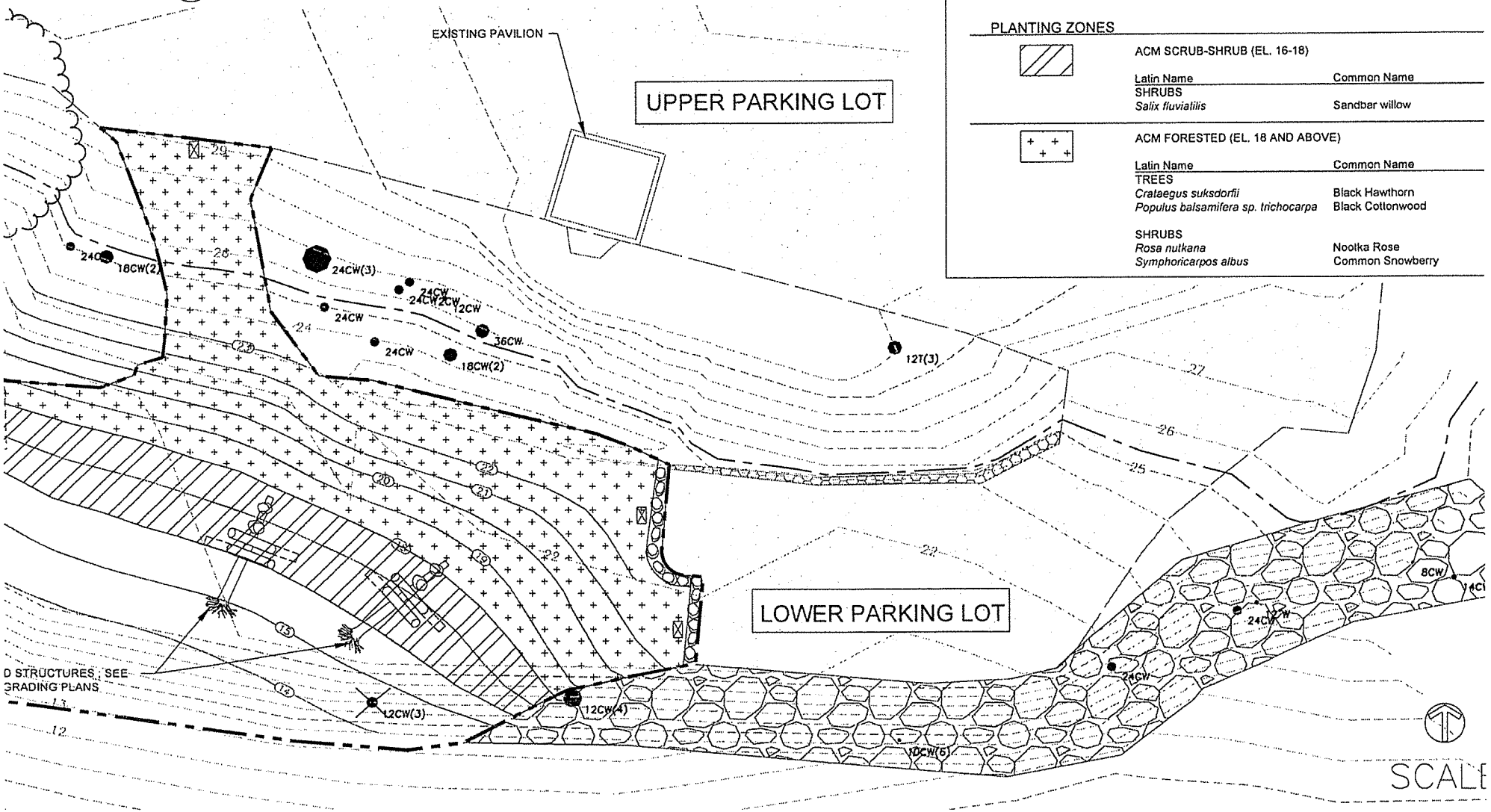
PLANTING ZONES

ACM SCRUB-SHRUB (EL. 16-18)

Latin Name	Common Name
SHRUBS	
Salix fluviatilis	Sandbar willow

ACM FORESTED (EL. 18 AND ABOVE)

Latin Name	Common Name
TREES	
Crataegus suksdorfii	Black Hawthorn
Populus balsamifera sp. trichocarpa	Black Cottonwood
SHRUBS	
Rosa nutkana	Nootka Rose
Symphoricarpos albus	Common Snowberry



ED (3 TOTAL)

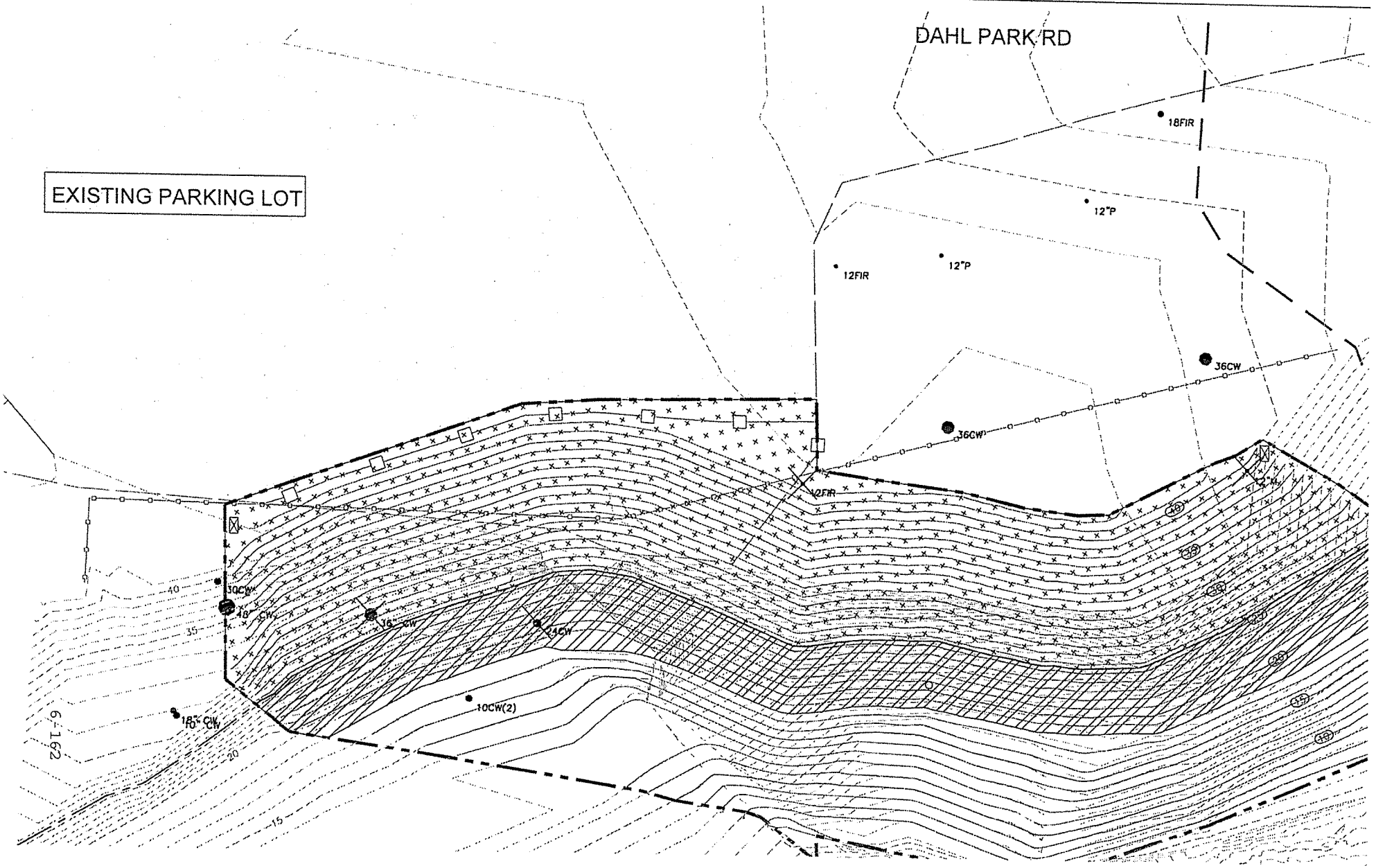
NEW FENCE

PROPOSED HABITAT AREA SIGNAGE (2 TOTAL)

Symphoricarpos albus	Common Snowberry	230

ACM FORESTED (EL. 18-25.4)

Latin Name	Common Name	Quantity
TREES		
Crataegus douglasii	Black Hawthorn	20
Populus balsamifera sp. trichocarpa	Black Cottonwood	20
SHRUBS		
Rosa nutkana	Nootka Rose	115
Symphoricarpos albus	Common Snowberry	115



APPENDIX F
GEOMORPHOLOGY REPORT

This page is a placeholder. The report will be available the first week of November 2015.

PORT OF PORTLAND

MEMORANDUM

To: Ross Schultz, City of Gladstone
Scott Tabor, City of Gladstone

From: Port of Portland

Date: October 30, 2015

Re: Dahl Beach – Bulkhead Mitigation Project: Technical Information and Basis for the Preliminary Design

1. INTRODUCTION

This memorandum summarizes the preliminary (30%) design for the Port of Portland's Dahl Beach – Bulkhead Mitigation Project (henceforth the Dahl Beach Mitigation Project) and the technical considerations that informed the development of the design. The purpose is to provide the City of Gladstone with details on the technical studies, surveys, engineering factors, restoration goals, and other information that supported the preliminary design process. In addition to the technical studies, the design also considered input from the City and public safety factors.

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7. REFERENCES.....14

APPENDICIES

The 30% design level represents a refined concept based on the technical studies with suitable detail for review and permitting. The project team gathered Project area-specific data and information from various sources for the project design process. The background information and technical studies are included in the appendices as follows:

- Historical aerial photography – Cascade Environmental Group, LLC (Appendix A)
- Geotechnical report – Hart Crowser, Inc. (Appendix B)
- Level 1 sediment evaluation – Anchor QEA, LLC (Appendix C)
- Reference site memorandum – Cascade Environmental Group, LLC (Appendix D)
- Geomorphic report – Waterways Consulting, Inc. (Appendix F)

In addition to these studies, topographic and bathymetric surveys were conducted to provide current land and river channel elevations within the Project area.

A geomorphic study report, which includes a qualitative assessment of sediment transport and the potential impact of the parking lot and bulkhead removal on upstream and downstream riverbanks, is

being finalized by Waterways Consulting, Inc. The geomorphic assessment informed the design process, but the consultant is currently incorporating the draft details of the 30% design into the report. The geomorphic report is anticipated to be delivered in the first week of November and will be forwarded to the City at that time.

2. THE MITIGATION PROJECT SITE

The Project includes restoration activities at the Project site on City property, which consists of the Parking Lot Area located within Dahl Beach Park and the Bulkhead Removal Area located in Meldrum Bar Park (Figure 1).

2.1 Parking Lot Area

The Parking Lot Area is an asphalt parking lot with riprap armoring located at the confluence of the Willamette and Clackamas Rivers. Site restoration would include removing approximately 60% of the existing parking lot and removing the existing asphalt, concrete, and riprap below ordinary high water (OHW) and in the riparian area. After removing the imported material, the area will be graded and native vegetation will be established (Figures 2a and 2b). The concrete and associated riprap armoring would be recycled or repurposed outside of the river channel and floodplain; typical shoreline contours would be restored, and native trees and shrubs would be established. This will result in approximately 0.28 acre of active channel margin (ACM) habitat and 0.01 acre of riparian habitat in an area currently covered by an asphalt parking lot, concrete, and riprap.

2.2 The Bulkhead Removal Area

The Bulkhead Removal Area is located on the bank and within the channel of the Willamette River, approximately 600 feet downstream of the Parking Lot Area, and includes a failing sheetpile bulkhead and eroding riverbank. The bulkhead was constructed sometime in the 1950s, fell out of use, and ultimately failed in the early 2000s, apparently due to the undermining of the sheetpiles from the Willamette River channel degradation and erosion. The bulkhead area, which spans low to high flow elevations, creates localized bank erosion and degraded channel habitat conditions. Site restoration would include removing the existing failed bulkhead structure, including all riprap and sheetpiles, grading the riverbank to a stable gradient at the bulkhead and adjacent bank areas, and restoring native vegetation. These actions will result in restoration of approximately 0.25 acre of ACM and shallow water habitat and 0.22 acre of riparian habitat (Figures 2a and 2b).

3. BENEFITS OF MITIGATION

The Project would provide the following ecological benefits:

- Mitigation would be provided in the tidally influenced Lower Willamette River, near the confluence of the Clackamas and Willamette Rivers, an important location for aquatic organisms, including ESA-listed salmonids.
- Mitigation includes restoration of the river's active channel margin (ACM), shallow water, and riparian habitat at two work areas, for a combined total of 0.76 acre.
- Mitigation includes restoration of 0.53 acre of ACM (and some shallow water) habitat by removal of hardened bank (concrete, asphalt, riprap, and sheetpile) and 0.23 acre in the riparian area.

- The combined mitigation would include restoration activities that would occur between elevations of approximately -4 to +42 feet NAVD88 (Figures 3a and 3b), overlapping with elevations of the impact site, and significant restoration activities would occur below OHW in the ACM.

The Project compliments the City's other nearby restoration efforts, including the Rinearson Natural Area Portland Harbor Superfund Natural Resource Damages Assessment (NRDA) restoration project and the Clackamas Basin River Council's Dahl Beach off-channel habitat improvement project funded by Oregon Watershed Enhancement Board. Providing additional restoration in the vicinity of these projects expands on the benefits of all the projects.

4. PROJECT SITE—BASELINE CONDITIONS

4.1 Location

The Project is located along the northeast bank of the confluence of the Clackamas and Willamette Rivers (near Willamette river mile 25) in the City of Gladstone, Oregon, within Section 19 in Township 2 South, Range 2 East (Figure 1). It consists of two work areas located on adjacent city-owned parks; the Parking Lot Area at the Dahl Beach Park (0.29 acre) and the Bulkhead Removal Area (0.47 acre) at Meldrum Bar Park, located approximately 600 feet downstream.

The Project site is bounded on the north by Dahl Park Road and a golf course, on the south by the Willamette and Clackamas Rivers, and on the east and west by City park land and beach (Figure 4).

4.2 Topography

Elevations within the Project boundaries range from approximately the ordinary low water (OLW), which varies to +42 feet NAVD88. Topography at the Parking Lot Area is nearly level and situated on a riprap-reinforced terrace between a gently sloping lower beach and upper riverbank; the Bulkhead Removal Area includes steeply sloped beach (60 to 80% grade) and an approximately 40-foot-high eroding riverbank with areas of nearly vertical slopes.

4.3 Land Use—Historical and Current

Prior to settlement, it is assumed that the Project site functioned as part of the ACM and riparian area of two major rivers and provided habitat for salmonid species as well as other fish and wildlife. Pre-settlement vegetation maps obtained from the Bureau of Land Management General Land Office depict the Project site as covered in closed canopy wetland and riparian forest featuring a mix of deciduous trees and shrubs with small quantities of conifers.

Land use and conditions at the Project site have changed significantly over time as the metropolitan area has developed, including along the Willamette River shoreline. Historical aerial photographs (University of Oregon 2015; Appendix A) dating from 1936 to the present were reviewed to assess site land use alterations and history.

Inspection of the historical aerial photographs indicates that the area surrounding the Project site was largely in agricultural cultivation from 1936 to 1980. The condition of the beach and banks within the Project site fluctuates through the years due to the dynamic nature of the Willamette River channel. The quantity and type of riparian vegetation cover also changes over time. By 1980, the Project site's

use as a recreational area is evident. The Project site looks mostly unchanged since the 1998 aerial photo, other than the failure of the sheetpile bulkhead.

The sheetpile bulkhead appears to have been constructed in the early 1950s for a log ship loading facility that was in operation from the early 1950s to the early 1970s. During the winter of 2005/2006, the riverbank destabilized, a slope failure occurred, and a large portion of the bulkhead metal structure fell into the river channel. The slope failure likely occurred due to the metal structure becoming undermined as a result of Willamette River bed degradation and resulting erosion. The Willamette River bed began degrading in the 1950s as a result of upstream damming and gravel mining, which reduced bedload and lowered channel elevations. Since the initial failure, the structure has continued to degrade and the riverbank has continued to erode. The bulkhead and bulkhead appurtenances currently protrude from the water and the eroding riverbank with thick wire cables, riprap, and large metal anchors present along the eroding riverbank.

Development of the Dahl Beach Park parking lots (clearing and/or grading) appears to have begun by 1980. By 1990, the parking lots are in use, and by 1998, the lots have been paved and appear much as they do currently. The Project site is zoned by the City as Open Space (OS).

An underground utility locate found no underground utilities other than the NW Natural high-pressure gas transmission line just southeast of the Bulkhead Removal Area.

4.4 Hydrology and Soils

Hydrology at the Project site is driven almost entirely by the Willamette River, and hydrology at the Project site is subject to dynamic fluvial processes of flooding, channel deposition, and bank scour from high velocity flows.

The OHW for the Project site was delineated based on Willamette River gauge data collected at sites upstream (#14207770 Oregon City) and downstream (#14211720 Portland) of the Project site and adjusted to account for the Project site location relative to the gauges. The OHW was determined to be +25.4 feet NAVD88 based on a 2-year return interval, though seasonal and tidal influences cause fluctuations (sometimes dramatic) in water level within the site diurnally and throughout the year. Field indicators of OHW, such as scour and drift lines and the transition from gravel/cobble beach to vegetated bank, occur at elevations that vary between +20 to 26 feet, corroborating the flow data. Due to the primary influence of the Willamette River on site hydraulics, the OHW elevation of +25.4 feet was applied for this plan. OLW levels have not been established; however, at the #14207770 Oregon City gauge on October 5, 2015, low water levels were at approximately +5.7 NAVD88 (+2.2 feet NGVD29).

Soil survey maps produced by the Natural Resource Conservation Service Web Soil Survey for Clackamas County shows Camas gravelly sandy loam occurring over the upper elevations of the bulkhead removal area and the remainder of the project site as Riverwash. Camas gravelly sandy loam consists of very deep, excessively drained soils formed in mixed sandy and gravelly alluvium occurring on floodplains with slopes of 0 to 5% at elevations of 50 to 3,000 feet. This series is rated as predominantly nonhydric (2% of map units rated as hydric) and is prone to frequent flooding.

The area of Riverwash occurs at slopes of 0 to 3%. Riverwash occurs on floodplains and is composed of well-drained sand and gravel alluvial deposits. It is rated as hydric (100% of map units rated hydric) and also prone to frequent flooding.

4.5 Existing Habitat Types

The following habitat definitions relate to habitat for juvenile Chinook salmon in the Lower Willamette River. These definitions have been derived from a variety of sources and are meant to precisely describe types of habitat that are included in the Portland Harbor Natural Resources Trustees' Habitat Equivalency Analyses (HEA). Both work areas within the Project site include the ACM and riparian forest habitat types.

4.5.1 ACM

The ACM is defined as shoreline area occurring between OHW and OLW, and much of the Project site is located within this zone. ACM at the Project site is composed of gravel-cobble beach and steep riverbank, with armoring or other hardened surfaces such as asphalt, concrete, sheetpile materials of the bulkhead, and riprap. The vegetation communities are composed of species tolerant of frequent flooding. Species identified within the Project site include young black cottonwood (Populus balsamifera; facultative species [FAC]), sandbar willow (Salix fluviatilis; facultative wetland [FACW]), Himalayan blackberry (Rubus armeniacus; facultative upland species [FACU]), field bindweed (Convolvulus arvense; no indicator [NI]), and prostrate knotweed (Polygonum aviculare; FAC), along with a few occurrences of Japanese knotweed (Fallopia japonica; FACU) and large-flowered collomia (Collomia grandiflora; obligate upland species [UPL]). The ACM at both work areas within the Project site are heavily degraded due to the presence of hardened surfaces (sheetpile bulkhead, riprap, and the parking lot), steep slopes (>11%) caused by development, lack of habitat structure, lack of vegetation cover, and the presence of invasive vegetation.

4.5.2 Riparian

Riparian habitat is defined as area within 200 feet landward of the OHW and is present within the two Project work areas. The riparian area within the Parking Lot Area is paved; the riparian area in the Bulkhead Removal Area includes forested and paved areas. Forest vegetation includes black cottonwood of mixed ages with an understory composed largely of Himalayan blackberry. Patches of wild Clematis (Clematis vitalba; UPL), English ivy (Hedera helix; NI), and false brome (Brachypodium sylvaticum; NI) also occur within the forest stand. Riparian habitat in both areas of the Project site are currently degraded due to the presence of steep and eroding slopes, hardened surfaces, impervious pavement, lack of habitat structure, lack of vegetation cover, and presence of invasive species.

4.5.3 Aquatic Habitat

A wetland and other waters delineation was conducted by Cascade Environmental Group in summer 2015 for the Project site. No wetlands were found within the project site, and the WOTUS delineated within the Project site includes the Lower Willamette and Clackamas Rivers. The Lower Willamette is a large and highly modified river that is 303d listed as water quality limited by the Oregon Department of Environmental Quality (ODEQ) for many parameters including temperature, bacteria, heavy metals, polychlorinated biphenyls, and other pollutants (ODEQ 2012).

The lower Clackamas River has a smaller active channel and more limited flow regime than the Willamette River; however, the Clackamas River at the confluence shares the same characteristics as the Lower Willamette River: it is 303d-listed as water quality limited for the same parameters, the riverbank and channel habitats are degraded, and it supports ESA listed salmon and steelhead trout populations.

The presence of a parking lot, remnant bulkhead structures, associated riprap, asphalt and concrete below OHW, lack of a developed riparian vegetation community, and limited large wood in and adjacent to the channel all contribute to the poor aquatic habitat quality at the Project site.

4.6 Fish and Wildlife

As described above, the Project site contains ACM and riparian forest habitat types. Riparian habitat quality is compromised due to abundant invasive species cover and the presence of asphalt, concrete, riprap in both areas, and metal structures at the bulkhead. The presence of a few mature black cottonwoods and Douglas fir trees in the forested areas provides limited roosting and nesting sites for some large raptors, and a dense shrub layer provides some cover, foraging, and nesting sites for other birds and wildlife. These habitats, however, are degraded by the predominantly invasive understories that do not provide adequate habitat to support a diversity of wildlife uses. The riparian forest habitat most likely supports bird and mammal species adapted to urbanized areas dominated by Himalayan blackberry: American crows (Corvus brachyrhynchos), turkey vultures (Cathartes aura), song sparrows (Melospiza melodia), black-capped chickadees (Poecile atricapillus), American robins (Turdus migratorius), Eastern gray squirrels (Sciurus carolinensis), nutria (Myocastor coypus), opossum (Didelphis virginana), and raccoons (Procyon lotor).

The gravel-cobble beach provides some ACM habitat for wading birds and piscivorous mammals to hunt, but the lack of riparian vegetation and large wood, and the presence of the paved areas and metal structures severely limit habitat quality. Waterfowl less sensitive to habitat impacts, such as Canada geese (Branta canadensis) and mallards (Anas platyrhynchos), are likely to use existing ACM habitat and have been observed in the area.

The Project site historically and currently supports ESA-listed anadromous fish species, including rearing and migration habitat for Chinook and coho salmon and steelhead trout (ODFW 2013). The area is documented as Essential Salmonid Habitat by the Oregon Department of State Lands (DSL; Oregon Administrative Rule 141-102), and Essential Fish Habitat (EFH) for Chinook and coho salmon by the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) EFH mapper (NOAA 2015).

5. MITIGATION DESIGN

The Project design approach is direct restoration accomplished by removing human-constructed features, restoring habitats, and re-engaging river processes. The Project will remove hardened features (parking lot, riprap, boulders and debris, and sheetpile and other structures associated with the remnant bulkhead); recontour the riverbanks underneath and adjacent to the bank hardening features to more stable and natural profiles; revegetate the restored riverbank with native species; and incorporate wood habitat structures at the Parking Lot Area.

The Project site 30% design (Appendix E) has been developed based on available information including topographic and bathymetric surveys, geotechnical analysis, geomorphic analysis, reference site reconnaissance, and historical aerial photo review. In addition to achieving the restoration goals of re-engaging riverine processes, the design also considered input from the City and public safety factors. The Parking Lot Area mitigation limits are defined by providing adequate area of hardened ACM habitat removal to satisfy Port mitigation needs while minimizing the impact on parking space; the Bulkhead Removal Area mitigation limits are defined by grading requirements to establish a stable bank gradient, post bulkhead removal, to avoid potential slope failure. To meet the objectives for habitat restoration, as well as the needs of the City, the design will establish stable conditions along the riverbanks. After the stable conditions are established, the site is expected to engage river process that over time will result in small-scale evolution of the ACM, including bank scour, evolution of substrate through deposition, and creation of small bank and shallow water habitat elements associated with localized scour and deposition.

5.1 Construction Overview

Construction of the Project will be accomplished using heavy equipment, including front end loaders, excavators, and dump trucks. All construction activities will comply with local, state, and federal regulations, and authorization will be obtained from all applicable agencies, as required. Impacts to existing natural resources will be avoided or minimized to the extent possible.

5.2 Construction Sequencing and Timing

Construction will begin with invasive vegetation removal in both the Parking Lot Area and the Bulkhead Removal Area in the spring, before earthwork begins, to minimize the spread of propagules through construction activities. Invasive species will be disposed of, and appropriate agencies will be informed, in accordance with noxious weed laws; invasive species may be composted at a City facility or hauled to a landfill for disposal.

Demolition of the hardened areas including removal of asphalt, riprap, boulders, gravel, and debris in the Parking Lot Area, removal of the sheetpile, and other appurtenances at the Bulkhead Removal Area (concrete blocks, cables, etc.) will begin following invasive species removal. Work will be performed in dry conditions, at low river water levels, to the extent possible and in accordance with permit conditions. All work performed below OHW will occur during the in-water work window for the Project site, established by the Oregon Department of Fish and Wildlife (ODFW) as July15 to August 31; work above OHW may commence earlier to meet the Project schedule.

Grading within the ACM and riparian area will occur at both work areas after invasive species removal is complete and hardening features have been removed. At the Bulkhead Removal Area, grading will begin at the top of slope and then move downslope as final grade is established.

Large wood habitat structures will be installed in the Parking Lot Area, as part of site grading. Three multi-piece structures will be installed and anchored to remain stable beyond the monitoring period. Wood structure design may include rock ballast or chain for anchoring, pending final design and permit approval. All graded areas will be seeded for erosion control with a native seed mix. After work is completed, construction fencing will be removed and a new section of permanent fence will be installed at the edge of the parking lot, located above the Bulkhead Removal Area. Signs identifying the

restoration areas and discouraging heavy public access to allow vegetation to be established will also be installed at locations indicated on site plans.

An irrigation "tie in" is available from park facilities near the Bulkhead Removal Area; and an irrigation system will be developed to provide irrigation directly to that mitigation area. The Parking Lot Area will be irrigated from other sources, such as a water truck.

Additional invasive vegetation treatment will occur as needed in the fall after construction is completed and will be ongoing during the maintenance period. Native woody plants will be installed in fall/winter following site grading work.

Timing	Activity
Spring 2016	Removal of invasive plants
Summer 2016	Additional follow-up removal of invasive plants as needed
	Demolition of paved areas
	Removal of riprap, boulders, gravel, and debris
	Removal of sheetpile and bulkhead artifacts
	Grading at both mitigation areas
	Installation of large wood structures at Parking Lot Area
	Seeding for erosion control
	Construction of new Bulkhead Removal Area fence section
	Installation of "Natural Area" signage
Fall 2016	Additional removal of invasive plants as needed
Fall 2016/Spring 2017	Installation of irrigation system at Bulkhead Removal Area
	Installation of native woody plants

5.3 Parking Lot Area Demolition and Grading

Parking Lot Area demolition and grading includes removing approximately 60% of the existing parking lot asphalt, removal of boulders, riprap, gravel, and debris on the northern edge of the lower parking lot and recontouring the previously paved area to a more natural ACM profile (Appendix E, Sheet C1). Slope grading has been designed to preserve as many existing trees as possible; however, the design requires that an existing tree be removed.

5.4 Bulkhead Removal Area Demolition and Grading

Construction at the Bulkhead Removal Area will include removal of sheetpile and its associated artifacts (cables, anchoring blocks, and riprap) from the ACM and shallow water habitat and grading the ACM to a more stable and natural profile (Appendix E, Sheet C2). Stable bank profiles have been identified adjacent to the site and along the Willamette River at the nearby reference sites. All design elements are in accordance with the recommendations of the Report of Geotechnical Engineering Services

(Appendix B) and appropriate for the site's geomorphic conditions. The proposed slope at the Bulkhead Removal Area is 2H:1V to establish stable slope conditions in a manner that will engage riverine processes and allow for some minor erosion and evolution of the ACM over time. Buried debris, such as cables or anchoring blocks (i.e., deadman) will be cut flush with finished grading surface and left in place when complete removal is infeasible.

Some minor areas of filling will be necessary in scour areas, located near the existing sheetpiles. Scour areas will be filled with native material and compacted to stabilize placed material, to support the 2H:1V slope. Above the slope, approximately 2,909 square feet of asphalt will need to be removed from an existing parking lot to facilitate the full grading extent. At the top of the slope, a 5-foot offset will be maintained from the top of slope to the edge of the parking area to remain. The existing fence along the existing edge of pavement will be removed and a new fence will be installed along the parking area, tying in to the existing fence to remain. Slope grading has been designed to preserve as many existing trees as possible; however, the design requires that a few existing trees be removed.

5.4.1 Sheetpile Removal

The concrete, riprap, and associated bulkhead metal structures and associated debris will be removed to the greatest extent practicable during site demolition activities. The sheetpiles will be pulled out of the ground using an excavator, chains, and other methods to gain leverage for removal. The contractor will excavate at the base of the piles to remove pressure, as well as pull on the structures as necessary to remove the piles. If piles cannot be fully removed, sections will be cut a minimum of 36 inches below finish grade and covered with soil to match finish grade.

A 34-foot section of sheetpile wall extends parallel to the shoreline and is buried in the riverbank slope. This section will be excavated to below grade, cut in place, and then buried. Abandonment of this section of wall in place follows recommendations of the Report of Geotechnical Engineering Services (Appendix B) to maintain slope stability.

5.4.2 NW Natural Gas Transmission Line

A NW Natural gas transmission line is located near the southeastern edge of the Bulkhead Removal Area. No excavation is proposed directly above the gas transmission line, but excavation will occur within the 10-foot safety zone on the west side of the line. According to preliminary conversations with NW Natural, the gas transmission line in this area is buried sufficiently deep to accommodate the proposed removal of 1-foot depth of material within 5 feet of the gas line. NW Natural is currently verifying the depth of the line and will be on site when excavation occurs within 10 feet of the line.

5.5 Material Placement

Nonnative materials, such as concrete, asphalt, riprap, and sheetpiles, will be removed and disposed of off-site at appropriate disposal or recycling facilities. Native materials excavated to establish design grades will be placed on gravelly beach areas near the Project site to allow for substrate recruitment into the river system. Materials will be primarily a mix of cobbles, pebbles, and mineral soil excavated from the slope above the existing bulkhead; materials will be hauled to beach areas with similarly sized substrate and spread in shallow lifts. Once spread, spoils will be washed to allow translocation of fines into the beach, below the larger particles. Gravelly material will not be disposed of in portions of the beach with sandy or finer substrate.

5.5.1 Sediment Evaluation

An application has been submitted to the U.S. Army Corps of Engineers (USACE) Portland Sediment Evaluation Team for review. The Dahl Beach Mitigation Site Level 1 Sediment Evaluation (Appendix C) states that multiple lines of evidence demonstrate that sediments at the project areas should qualify for beneficial use as habitat material based on a "very low" ranking (formerly exclusionary status), according to the guidelines provided in the Sediment Evaluation Framework (SEF; USACE et al. 2009). The report states that these lines of evidence include a lack of fines and carbon, lack of potential sources and exposure pathways (e.g., stormwater conveyances), and no exceedances of SEF screening levels. The report states that there is no reason to believe contamination is present and no additional sediment testing is warranted. Site sediments are, therefore, suitable for use as habitat material during regrading of the restoration areas to form a more natural shoreline or to be placed on the beach in surrounding areas to keep the material within the system. Controlling sediment erosion and turbidity will be the primary environmental concerns during construction, and these can be controlled through project permits using standard upland and in-water BMPs. The Port will coordinate with USACE through the construction permitting process.

5.6 Large Wood Structures

Three to four large wood structures are expected to be constructed at the Parking Lot Area to improve habitat for listed species. The structures will consist of three to six members each, with a mix of rootwads and cut logs. Each member will be 20 to 30 feet in length with a minimum diameter of 18 inches. Large boulders and compacted granular fill will be placed on top of the structures as ballast, and individual members will be pinned together with threaded rebar at junction points. Hex nuts and washers will be threaded onto the rebar to secure the members together, and these will be countersunk into the log. The rebar will be trimmed to minimize the extent of these features beyond the outside diameter of the log. The pins are necessary to allow the downward forces of the ballast to act on the entire structure as a single unit and prevent movement of individual members.

5.7 Stormwater

Existing stormwater quality for areas of existing pavement that drain toward the Project site will be improved, if determined to be feasible. Due to relatively shallow slopes and warped pavement surfaces, the area of pavement draining to these areas has not been determined due to lack of opportunities to observe stormwater routing since project design has begun. Under existing conditions, runoff may receive treatment if sheet flows route through the grass and vegetation growing adjacent to the pavement, eventually flowing down the riverbank to the beach below. Some degree of treatment is probably occurring currently due to this filter strip condition.

If appropriate, treatment of any runoff from these surfaces could be improved through shallow vegetated basins or improvements to the existing filter strip function. Shallow vegetated basins would allow sediment and attached pollutants to settle out and allow for vegetative uptake or adsorption of other pollutants. The existing filter strip function might be improved through topsoil amendments and seeding to promote a denser vegetation stem count. Both of these options ideally would maintain the existing sheet flow condition to the river below.

A bioswale will also be considered, but may not be feasible to implement effectively since bioswales are designed to treat flow that has already been concentrated (i.e., in a roadside gutter, ditch, or pipe). Sheet flow entering along the length of a bioswale often does not meet minimum residence criteria typically used in the design of these facilities. Also, concentrating the flow in a swale would result in a point-source discharge that would likely require a rock-lined channel to the river below to serve as erosion protection and require additional inspection and maintenance time into the future.

Further evaluation and recommendations on managing stormwater quality will be part of the 60% design development as opportunities to observe stormwater routing increases.

5.8 Plantings

Native vegetation communities will be restored to improve habitat. Native vegetation will be restored above the scour line at the Project site by seeding and installing native species, controlling invasive species, and retaining existing native vegetation where present. Vegetation restoration elements are shown in Figure 2b (see also Appendix E—30% Design Plans).

The Project planting plan was developed based on multiple criteria: review of reference sites, consideration of native plant recruitment potential, consistency with Portland Harbor NRDA restoration guidance, and to discourage heavy public intrusion. Four reference sites were reviewed in the Project vicinity; species occurrence relative to both observable scour line and estimated OHW elevations were recorded and considered for use in the Project planting plan (Appendix D). The reference site findings were incorporated into the other project goals as follows:

- Sandbar willow is the only native woody species observed in the reference sites occurring below the scour line, and only at sites with flatter beach gradients. This species is included in the Parking Lot Area planting plan only, where beach gradients appear appropriate.
- Black cottonwood is a dominant tree species in all reference sites, occurring throughout both the ACM and riparian elevations. This species will be planted within the ACM zone of the Project site; natural recruitment of black cottonwood is expected to occur and allow it to spread to the riparian areas over time.
- Douglas fir was observed in only one of the reference sites, but it was observed to occur in the Project vicinity. For this reason, Douglas fir is included in the riparian areas of the Bulkhead Removal Area. Douglas fir was included to diversify detritus inputs beyond deciduous species alone. Inputs of Douglas fir will provide more durable materials into the Willamette system as trees mature and are eventually recruited into the channel. Big leaf maple is also planted in the Bulkhead Removal Area riparian zone because it was observed at reference sites.
- The riparian zone of the Parking Lot Area is very small (0.01 acre) and, therefore, planted with the same planting palette as the ACM portion of that mitigation area.
- Planting densities follow guidance developed by the Portland Harbor Trustees Restoration subcommittee, establishing dense stands and vegetative cover to meet project goals.

Woody vegetation will be container stock, bare root, live stakes, or a combination of these. All container plants will be procured from native plant nurseries in northwestern Oregon or southwestern Washington. Trees and shrubs will generally be installed at 4 to 5 feet on-center (oc), except in areas

planted to control public access, where they will be planted at 4 feet oc. Willow stakes will be planted at 2 feet off-center.

Table 1

Proposed Planting Plan

Common Name	Scientific Name	Quantity
Parking Lot Area—Scrub-shrub ACM Planting Area 16 to 18 feet NAVD88 (0.05 acre or 2,178 ft^2)		
Sandbar willow	*Salix fluviatilis*	135
Parking Lot Area—Forested ACM Planting Area 18 to 25.4 feet NAVD88 (0.12 acre or 5,227 ft^2)		
Black cottonwood	*Populus balsamifera sp. trichocarpa*	25
Black hawthorn	*Crataegus douglasii*	25
Nootka rose	*Rosa nutkana*	140
Snowberry	*Symphoricarpos albus*	140
Bulkhead Removal Area—ACM Planting Area 18 to 25.4 feet NAVD88 (0.10 acre or 4,356 ft^2)		
Black cottonwood	*Populus balsamifera sp. trichocarpa*	20
Black hawthorn	*Crataegus douglasii*	20
Nootka rose	*Rosa nutkana*	115
Snowberry	*Symphoricarpos albus*	115
Bulkhead Removal Area—Riparian Planting Area 25.4 to 42 feet NAVD88 (0.23 acre or 10,019 ft^2)		
Big leaf maple	*Acer macrophyllum*	100
Douglas fir	*Pseudotsuga menziesii*	100
Tall Oregon grape	*Berberis aquifolium*	250
Snowberry	*Symphoricarpos albus*	250

5.8.1 Invasive Species

Invasive vegetation will be fully removed and disposed of off-site prior to grading, to limit spreading these species throughout the Project site. Post-earthwork, graded areas will be seeded with seed mixes developed for the varying hydrologic conditions that will be present post-restoration.

Follow-up treatment of invasive species will occur in the fall after construction is complete and continue throughout the maintenance and monitoring period.

5.9 Irrigation

The Project occurs within park properties, where existing irrigation infrastructure is present. Irrigation will be provided directly to the Bulkhead Removal Area by tying into an existing water line parallel to Dahl Beach Road. An irrigation system will be established to irrigate the Bulkhead Removal Area, as well as provide facilities to fill a portable irrigation system (i.e., watering truck) to irrigate the Parking Lot Area. The irrigation system makes use of existing park infrastructure and should be adequate for both sites, as the Bulkhead Removal Area is steeper and includes higher slopes, likely requiring more frequent irrigation than the Parking Lot Area.

5.10 Signage

Signs that discourage heavy public access will be installed along the edges of the revegetated areas and at potential access points, as shown in Figure 2a. The signs will be approximately 8 × 10 inches, installed on metal posts, and will incorporate text that is designed to discourage heavy public access.

6. RESTORED HABITAT AREAS—PROPOSED CONDITIONS

This section describes the elevations and restored condition of the target habitat types in the Project area.

6.1 Active Channel Margin

Existing ACM habitat will be improved and expanded through removal of existing hardened surfaces (concrete, asphalt, riprap, and sheetpile material), grading to restore stable slopes along Willamette riverbanks, and by restoring native vegetation. Fish will have access to a larger amount of ACM habitat after hardening material is removed from both work areas and riverbanks are graded to stable gradients, exposing additional beach and vegetation below OHW. The total post-restoration ACM habitat will include approximately 0.53 acre currently impacted by the presence of pavement, a sheetpile bulkhead wall, riprap, and debris; this includes 0.28 acre in the Parking Lot Area and 0.25 acre in the Bulkhead Removal Area. This habitat type will extend from the OLW (varies in elevation) to the OHW of +25.4 feet NAVD88, or the approximate 2-year flood elevation.

Post-restoration, ACM habitat areas will include native plant communities, large wood habitat structures where appropriate, and gravel beach. The restored gravel beach occurs below approximately +16 feet NAVD88 at the Parking Lot Area and below +18 feet NAVD88 at the Bulkhead Removal Area, consistent with the adjacent beach areas. These areas occur below the observable existing scour line, at elevations where native species were not observed near the mitigation areas or at reference sites. Planted areas below +25.4 feet NAVD88 provide a transition community between the shallow water area of the Willamette River and the riparian community upslope.

6.2 Riparian Forest

Riparian habitats will be improved by removing hardened surfaces, grading to establish stable riverbank slopes; and planting native scrub-shrub and forested communities. The total post-restoration riparian habitat will be 0.23 acres, including 0.01 acre in the Parking Lot Area and 0.22 acre in the Bulkhead Removal Area. The riparian habitat in the Project extends from +25.4 feet NAVD88 to approximately +42 feet NAVD88.

The riparian habit will be planted with trees and shrubs to promote a native vegetation community. Existing habitat will be enhanced with supplemental native species plantings and invasive species control, where needed.

7. REFERENCES

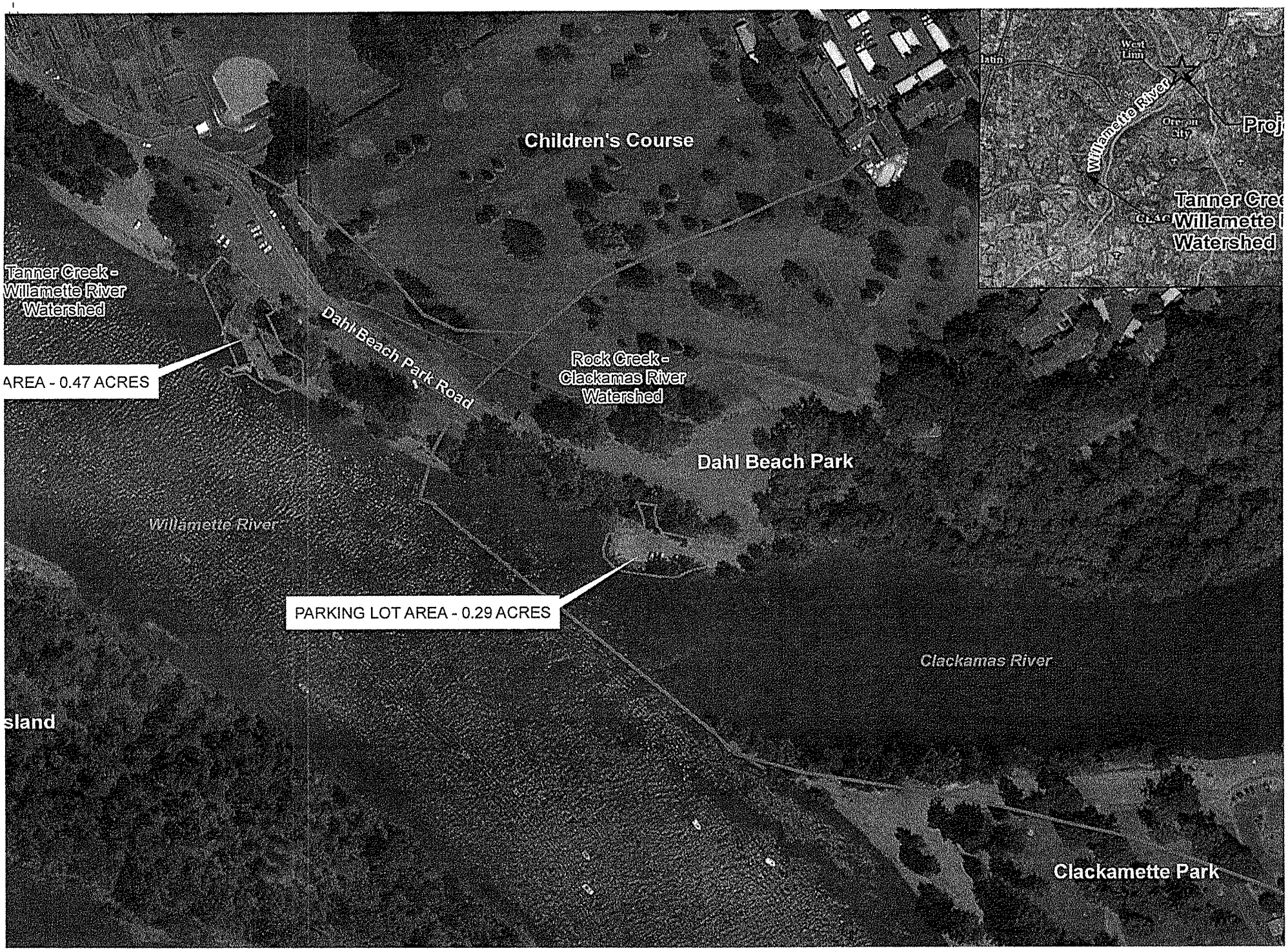
NOAA, 2015. NOAA Habitat Conservation. Essential Fish Habitat Mapper. Available from: http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html.

ODFW, 2013. Oregon Fish Habitat Distribution. Vector digital data. June 27, 2013. Available from: http://nrimp.dfw.state.or.us/nrimp/default.aspx?pn=fishdistdata.

Oregon Department of Environmental Quality (ODEQ). 2012. 2012 Integrated Report and 303(d) List. Submitted to the U.S. Environmental Protection Agency November 2014. Portland, Oregon.

USACE (U.S. Army Corps of Engineers [Portland, Seattle, Walla Walla, and Northwest Districts]), USEPA (U.S. Environmental Protection Agency, Region 10), Ecology (Washington Department of Ecology), Washington Department of Natural Resources, DEQ (Oregon Department of Environmental Quality); Idaho DEQ, NMFS, and U.S. Fish and Wildlife Service, 2009. Sediment Evaluation Framework for the Pacific Northwest. May 2009.

FIGURES


Children's Course
Tanner Creek -
Willamette River
Watershed
Dahl Beach Park Road
Rock Creek -
Clackamas River
Watershed
AREA - 0.47 ACRES
Dahl Beach Park
Willamette River
PARKING LOT AREA - 0.29 ACRES
Clackamas River
sland
Clackamette Park
West
Linn
Willamette River
Oregon
City
Proj
Tanner Cree
Willamette
Watershed

APPENDIX E
30% DESIGN PLANS

Date: 10/16/2015
Scale: 1 inch = 500 feet
Data Source: ESRI, 2015; Metro, 2012.

Reference Site Locations

CASCADE ENVIRONMENTAL GROUP

0 500 1,000 Feet

Dahl Beach Park Mitgation Site

Z:\GIS\89_DahlBeach\Mapfiles\DahlBeach_ReferenceSites.mxd

CASCADE
ENVIRONMENTAL GROUP

Key Observations and Applicability to Dahl Beach Mitigation Project Plant Selection

1. **Observation**: Black cottonwood is the dominant tree species in forested areas on the reference sites, extending from near the scour line to the upper limits of riparian areas. Black cottonwood is known as an aggressive colonizer and will likely spread readily once established.

   Recommendation: Plant black cottonwood at the Project site in elevation ranges where there are no existing dominant tree species and allow to spread to other elevations; allow additional native species to establish in other elevation ranges to promote site diversity long term.

2. **Observation:** Vegetation establishment on the reference sites appears to be related to a combination of beach slope and assumed exposure to higher flow velocities: sites with flatter slopes featured intact sandbar willow communities and vegetation present at lower elevations than sites with steeper slopes.

   Recommendation: The Bulkhead Removal Area appears too steep to support favorable conditions for sandbar willow based on the proposed finished gradient and the absence of sandbar willow at the Meldrum Bar Park Reference site (adjacent to the Bulkhead Removal Area). Install sandbar willow only at Parking Lot Area where proposed finished gradients are more gradual and employ adaptive management to inform maintenance of plantings.

3. **Observation:** Himalayan blackberry, English ivy, wild Clematis, and Scotch broom are prevalent on all reference sites and will likely present ongoing management challenges. Non-persistent ruderal forbs are also widespread in areas subject to regular scour.

   Recommendation: Develop specific strategies for control of Himalayan blackberry and English Ivy; control of non-persistent ruderal forbs, however, will provide little benefit.

Photo 7. Meldrum Bar Park Beach: looking upstream

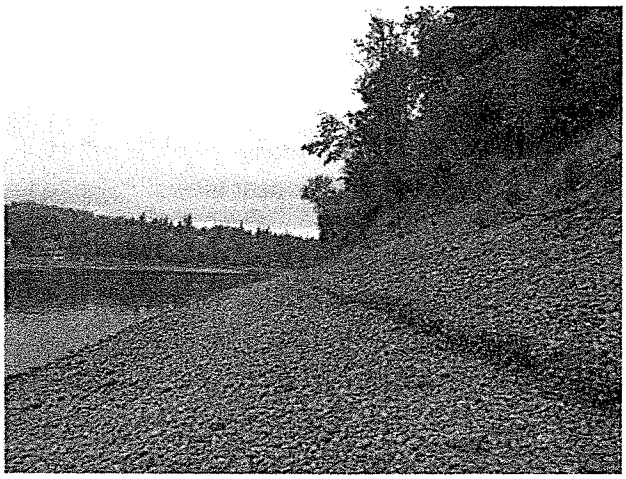


Photo 8. Meldrum Bar Park Beach: looking downstream

Reference Site Summary Table

Reference Site	ACM Slope Range (%)	Vegetation Community	Elevation Range (ft. NAVD88)
Maddax Woods - Burnside Park	10-30	weedy forbs	<14
		Black cottonwood- Oregon ash/Himalayan blackberry/English ivy	14-48
		Doug fir-bigleaf maple	>48
Lonesome Bottom	5-15	Indian hemp-weedy forbs	10-11
		Sandbar willow/ smartweed	11-15
		Black cottonwood- Oregon ash/St John's wort	15-25
Goat Island	5-20	Indian hemp-weedy forbs	10-11
		Sandbar willow/weedy forbs	11-15
		Black cottonwood- Oregon ash/Himalayan blackberry/English ivy	15-30
		Bigleaf maple/ snowberry	>30
Meldrum Bar Park Beach	15-50	Scotch broom-weedy forbs	14-20
		Black cottonwood/ bigleaf maple-Himalayan blackberry-English ivy	>20

3. **Goat Island**

Goat Island is a large, undeveloped, low-lying island located in the Willamette River, directly across from the Mitigation Project; it is owned and managed by the Oregon Department of State Lands as a public park. The site consists of a gently-to-moderately sloped cobble-gravel beach (5-20%) grading to a level forested floodplain. Similar to Lonesome Bottom, Goat Island features vegetation communities that are distinctly stratified by elevation. At 10-11 ft. NAVD88, the community is composed of Indian hemp along with *Aster* spp., prostrate knotweed, smartweed, and bird's foot trefoil along with sandbar willow shoots. The sandbar willow community colonizes the elevations between 11-14 ft. NAVD88 and includes an understory of beggar's tick, St. John's wort, tansy ragwort, common plantain (*Plantago lanceolata*), and common evening-primrose (*Oenothera biennis*). Above 14 ft. NAVD88, black cottonwood/Oregon ash forest occurs and includes an understory of Himalayan blackberry, English ivy, and, occasionally, redosier dogwood and Pacific ninebark (*Physocarpus capitata*). Scotch broom (*Cytisus scoparius*) also occurs within this elevation range. At elevations above 30 ft. NAVD88, small groves of bigleaf maple are found along with some snowberry.

Photo 5. Goat Island: looking downstream

Photo 6. Goat Island: looking upstream

4. **Meldrum Bar Park Beach**

This site consists of a stretch of beach upstream of the Mitigation Project in the adjacent Meldrum Bar Park, owned and managed by the City of Gladstone. It is characterized by a moderately to very steeply sloped (15-50%) cobble-gravel beach grading to a high vertical bank and broad river terrace; a distinctive scour line is present at around 13.5 ft. NAVD88. Above the scour line, the beach is sparsely vegetated by weedy species to 20 ft. NAVD88 including Scotch broom (occurring around the 20 ft. mark), prostrate knotweed, evening primrose, and mullein (*Verbascum thapsus*). Above 20 ft. NAVD88, black cottonwood/bigleaf maple forest is present which features occasional Oregon ash, Oregon oak (*Quercus garryana*), and honey locust (*Gleditsia triacanthos*) trees and a non-native dominated understory of Himalayan blackberry, English ivy and false brome (*Brachypodium sylvaticum*); redosier dogwood and hazelnut (*Corylus cornuta*) also occur occasionally.

Photo 1. Maddax Woods–Burnside Park: looking upstream

Photo 2. Maddax Woods–Burnside Park: looking downstream

2. Lonesome Bottom

This reference site consists of accreted land on an inside bend of the Willamette River, just upstream of the Mitigation Project; ownership is unknown. It features a gently-to-moderately sloped (5-15%) sand-gravel-cobble beach grading to a broad, flat terrace. Vegetation consists of three distinct communities forming bands stratified by elevation. The lowest elevations (10-11 ft. NAVD88) are colonized by Indian hemp (*Apocynum cannabinum*) along with prostrate knotweed and bird's foot trefoil. At elevations of 11-15 ft. NAVD88, a sandbar willow (*Salix fluviatilis*) dominated community occurs and includes pennyroyal (*Mentha pelugium*), St. John's wort (*Hypericum perforatum*), smartweed (*Persicaria* spp.) and beggars tick (*Bidens cernua*). Above 15 ft. NAVD88, young black cottonwood and Oregon ash have established along with St. John's wort.

Photo 3. Lonesome Bottom: looking downstream

Photo 4. Lonesome Bottom: looking upstream

CASCADE
ENVIRONMENTAL GROUP

Date: October 14, 2015

To: Kelly Madalinski, Port of Portland

From: Cascade Environmental Group, LLC

Re: Dahl Beach Reference Sites

This memo presents four sites selected to serve as restoration design reference for the Dahl Beach Mitigation Project. Sites were selected based on their proximal location to the Mitigation Project site and shared hydrogeomorphic and topographical characteristics. Slope, elevation, substrate type, and vegetation community were assessed at each site; the information was used to inform planting plan species selection and installation elevations on the Project site, as well as weed management planning. Reference site vegetation communities vary in composition and elevation ranges, but several trends were observed and contributed to the development of planting recommendations for the Project site. The observations and related recommendations are presented at the end of this memo. The reference sites are described in detail in the next section, including photographs, and summarized in a table following the descriptions. The location of the reference sites relative to the Project site is depicted in the attached map.

Reference Site Descriptions

1. Maddax Woods – Burnside Park

The Maddax Woods – Burnside Park reference site is located along the Willamette River, on the opposite bank and just downstream of the Mitigation Project. The site is owned and managed by the City of West Linn as a public park. It is characterized by a moderately-to-steeply sloped (10-30%) sand-cobble beach grading to a short vertical bank and a forested river terrace bordered by a steep upland escarpment. Vegetation occurring on the beach (below 14 ft. NAVD88) is very sparse and dominated by weedy, herbaceous species such as prostrate knotweed (*Polygonum aviculare*), tansy ragwort (*Senecio jacobea*), and bird's foot trefoil (*Lotus corniculatus*). Vegetation occurring on the terrace (above 14 ft. NAVD88) consists of black cottonwood (*Populus balsamifera*) forest with emerging Oregon ash (*Fraxinus latifolia*) and an understory dominated by non-native species including Himalayan blackberry (*Rubus armeniacus*), English ivy (*Hedera helix*), wild Clematis (*Clematis vitalba*), and reed canarygrass (*Phalaris arundinacea*); redosier dogwood (*Cornus sericea*) occurs occasionally. Above the floodplain elevation (48 ft. NAVD88), vegetation consists of Douglas fir (*Pseudotsuga menziesii*)/bigleaf maple (*Acer macrophyllum*) forest with an understory dominated by snowberry (*Symphoricarpos albus*) and English ivy.

APPENDIX D
REFERENCE SITE MEMORANDUM

City of Gladstone and Port of Portland
Dahl Beach Mitigation Project
October 13, 2015

Overview of the Mitigation Project:
The Dahl Beach Mitigation Project encompasses two habitat restoration sites at Meldrum Bar Park in the City of Gladstone: Bulkhead removal and Dahl Beach parking area. Restoration at these sites is designed to address both City of Gladstone and Port of Portland priorities. Enclosed are figures on the proposed project. Information on the project had previously been provided during the June 9, 2015 City Council meeting.

General Benefits:

- Restoring habitat in Dahl Beach Park is important in the context of the metropolitan region because the two sites are located near the confluence of the Clackamas and Willamette Rivers, an area critical to fish and wildlife.
- Implementing habitat restoration at the two sites provides an opportunity for the City to demonstrate environmental stewardship in the Park.
- Improving habitat and native vegetation at the two sites will improve the environment while also enhancing the Park's safety and reducing long-term maintenance.
- The partnership between the City and Port offers an opportunity to provide resources to address Park infrastructure improvements and remove the bulkhead at no cost to the City. Total construction cost of the project is estimated at $460,000.

Bulkhead Site Benefits:

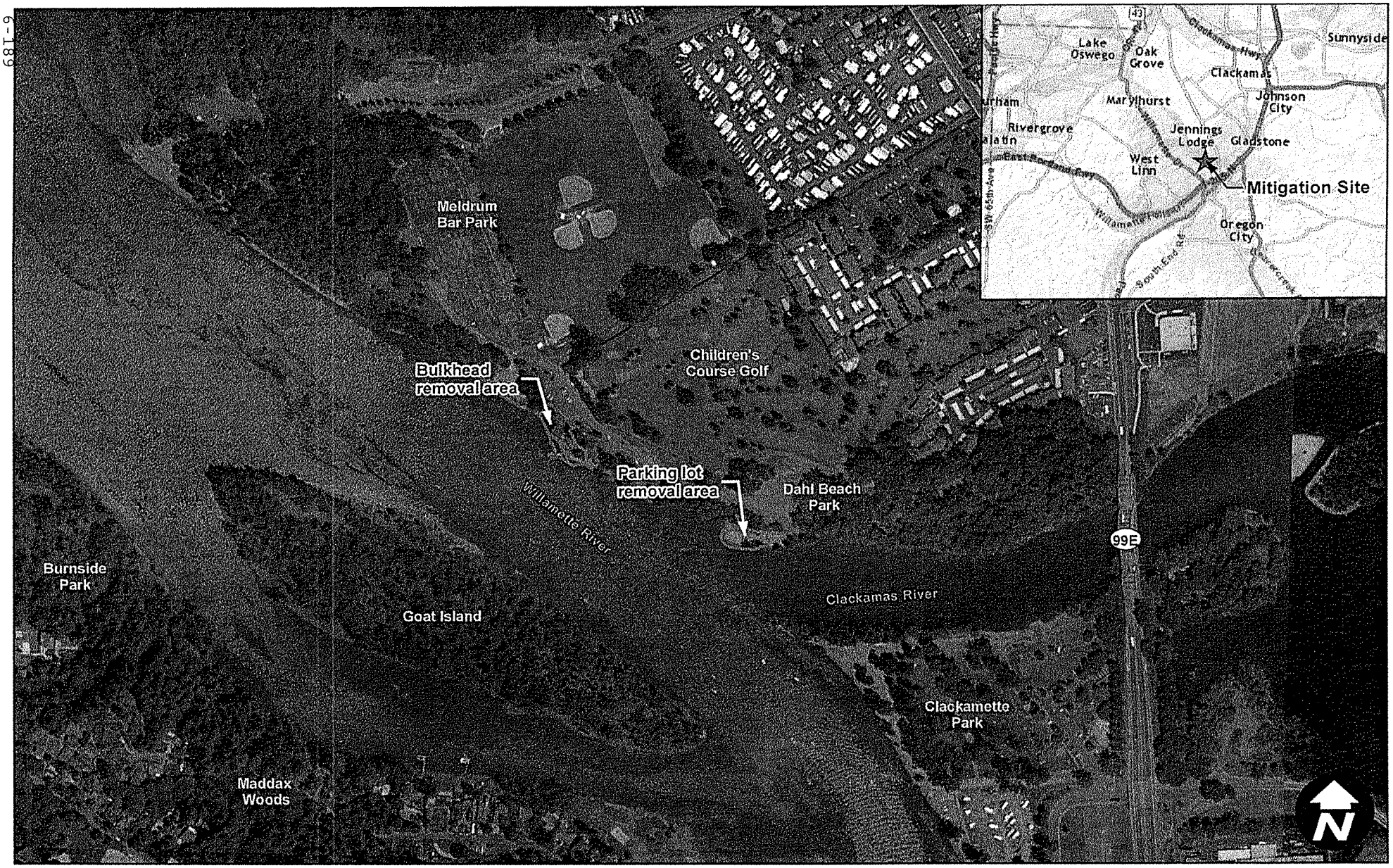
- Bulkhead removal will stabilize an area that has steep, unstable slopes; will continue to erode if not fixed; and could over time threaten the top of bank area including the parking area.
- The current steep slopes and metal structures are an attractive nuisance which creates potential liabilities for the City. The project will address the public safety hazard by removing the metal structures and improving the steep, unstable slopes.
- Bulkhead removal is expensive and does not qualify for any typical habitat restoration grant funding sources. The bulkhead removal is estimated to cost $325,000 of the total estimated construction cost of the project.

Dahl Beach Parking Area Site Benefits:

- Ecological restoration at the site will improve habitat benefits while still providing parking and recreational access. An estimated eight to ten parking spots will be available in the lower parking area.
- Removing a portion of the lower parking area will provide the City with a reduction in impervious surface and stormwater runoff that can help meet the City's EPA/DEQ storm water management requirements. The stormwater improvements are estimated at a cost of $15,000.
- Reducing the parking area, which floods annually, will help to minimize City maintenance related to flooding.

Contacts

- Kelly Madalinski, Port of Portland, 503-415-6676, kelly.madalinski@portofportland.com
- Lise Glancy, Port of Portland, 503-415-6519, lise.glancy@portofportland.com



Date: 10/12/2015

Data Source: ESRI, 2015; OR Dept. of Transportation, 2013.

Scale: 1 inch = 500 feet

0 500 1,000 Feet

Figure 1. Vicinity Map

Dahl Beach Mitigation Site

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APPENDIX F
GEOMORPHOLOGY REPORT

This page is a placeholder. The report will be available the first week of November 2015.

ED (3 TOTAL)

EXISTING FENCE

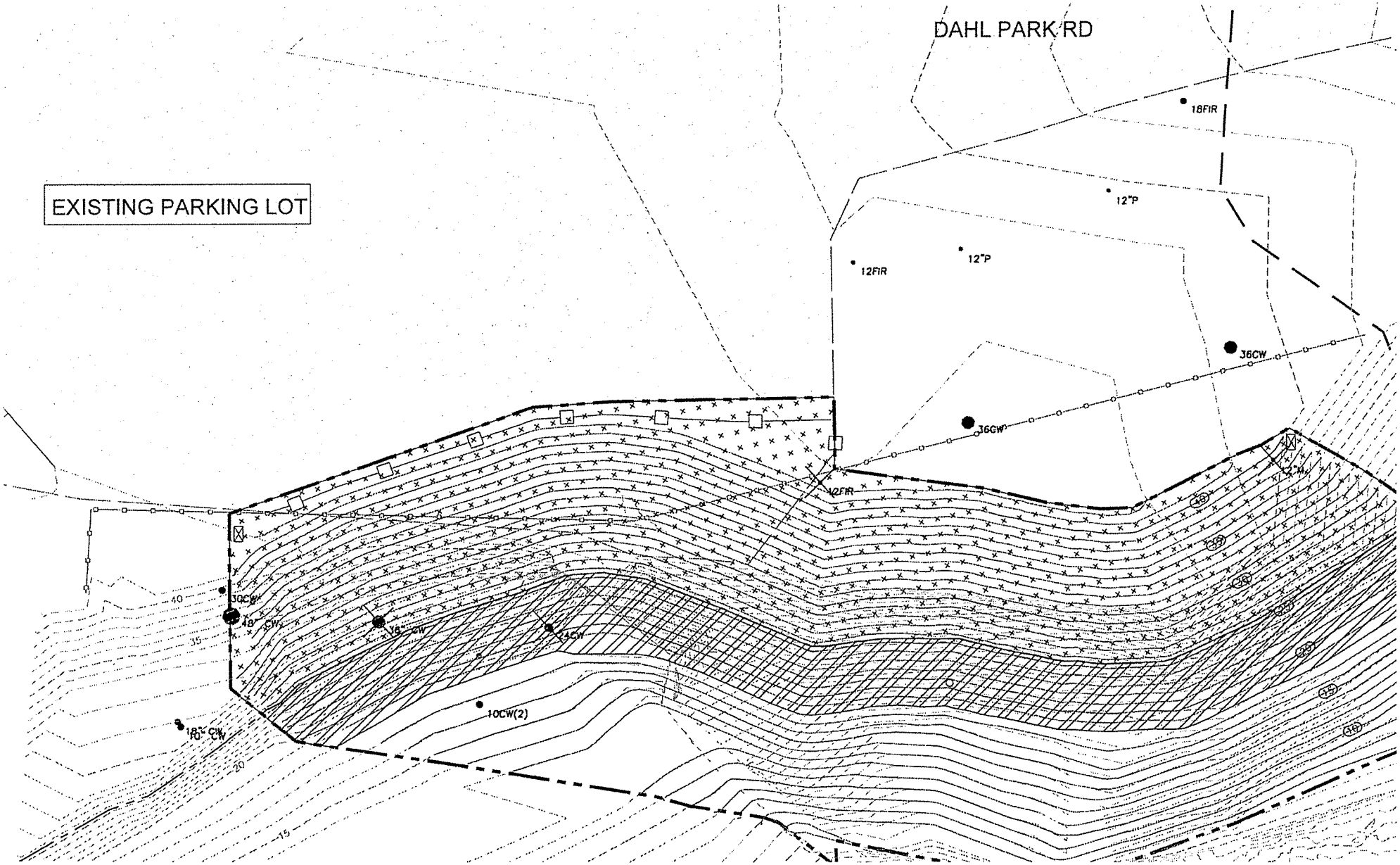
NEW FENCE

PROPOSED HABITAT AREA SIGNAGE (2 TOTAL)

Symphoricarpos albus	Common Snowberry	230

ACM FORESTED (EL. 18-25.4)

Latin Name	Common Name	Quantity
TREES		
Crataegus douglasii	Black Hawthorn	20
Populus balsamifera sp. trichocarpa	Black Cottonwood	20
SHRUBS		
Rosa nutkana	Nootka Rose	115
Symphoricarpos albus	Common Snowberry	115



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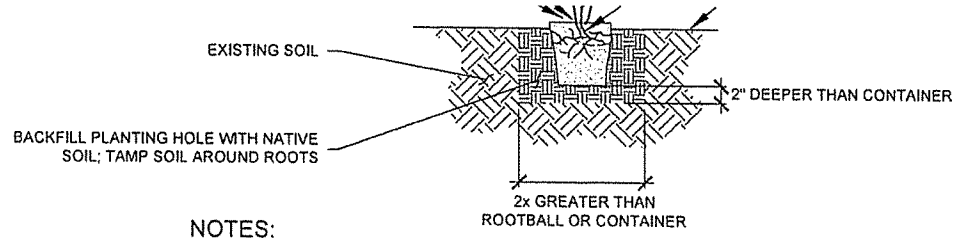


NOTES:

1. SEE SPECIFICATIONS FOR BACKFILL REQUIREMENTS

1 1 GALLON TREE & SHRUB PLANTING

Not to Scale

24CW
18CW(2)
EXISTING TREES TO REMAIN

12CW(3)
EXISTING TREE TO BE REMOVED (1 TOTAL)

EDGE OF PAVEMENT

25
EXISTING CONTOURS

10
PROPOSED CONTOURS

BOULDER BARRIER; SEE GRADING PLANS

PROPOSED HABITAT AREA SIGNAGE (3 TOTAL)

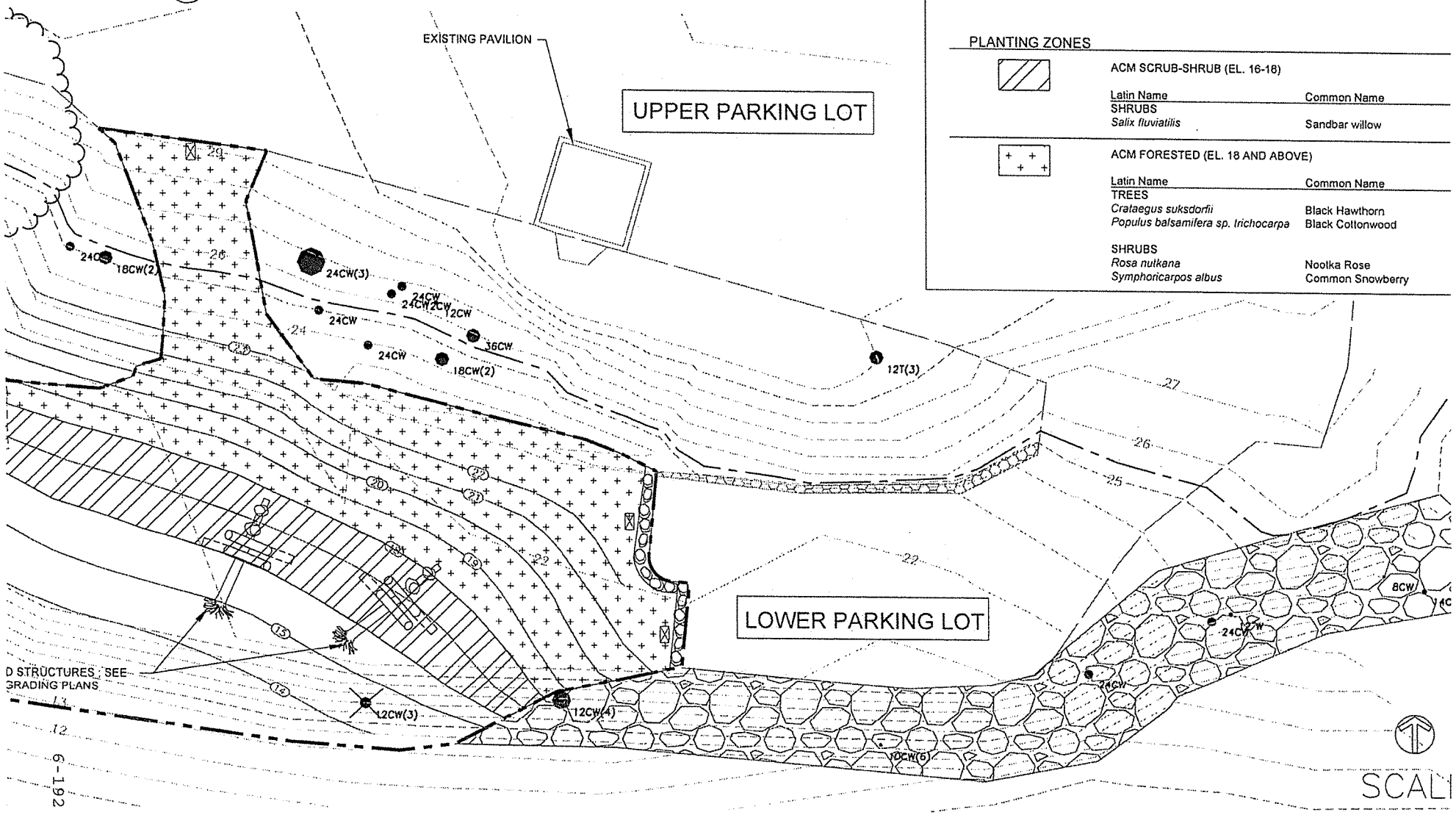
PLANTING ZONES

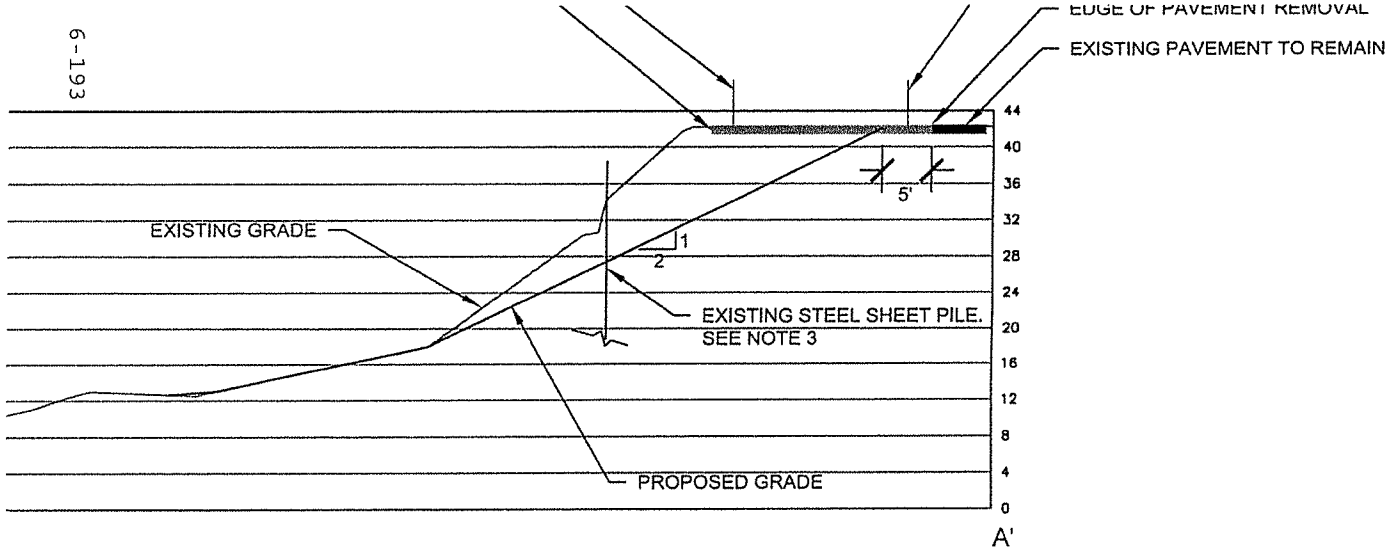
ACM SCRUB-SHRUB (EL. 16-18)

Latin Name	Common Name
SHRUBS	
Salix fluviatilis	Sandbar willow

ACM FORESTED (EL. 18 AND ABOVE)

Latin Name	Common Name
TREES	
Crataegus suksdorfii	Black Hawthorn
Populus balsamifera sp. trichocarpa	Black Cottonwood
SHRUBS	
Rosa nutkana	Nootka Rose
Symphoricarpos albus	Common Snowberry





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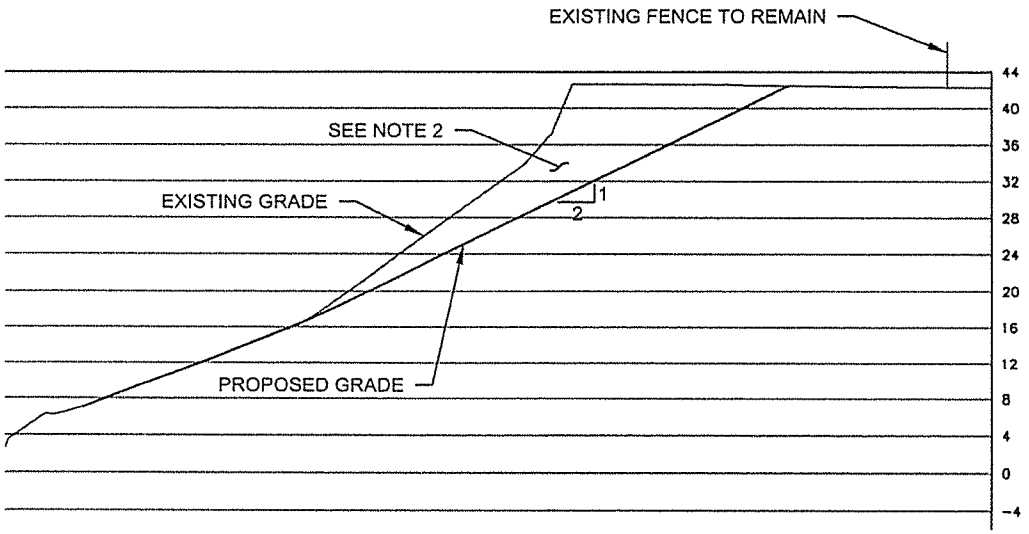
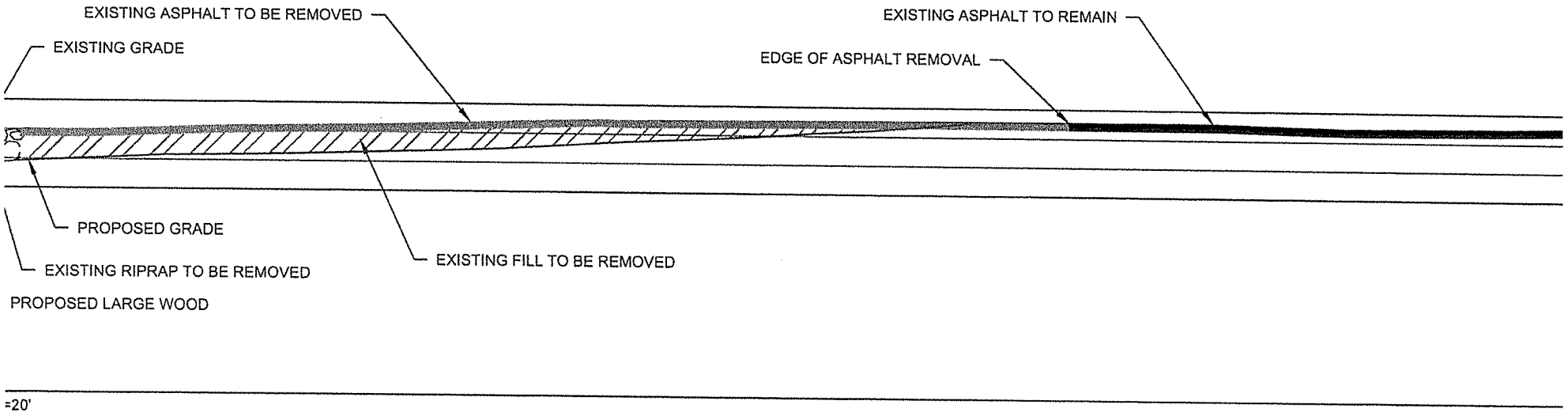
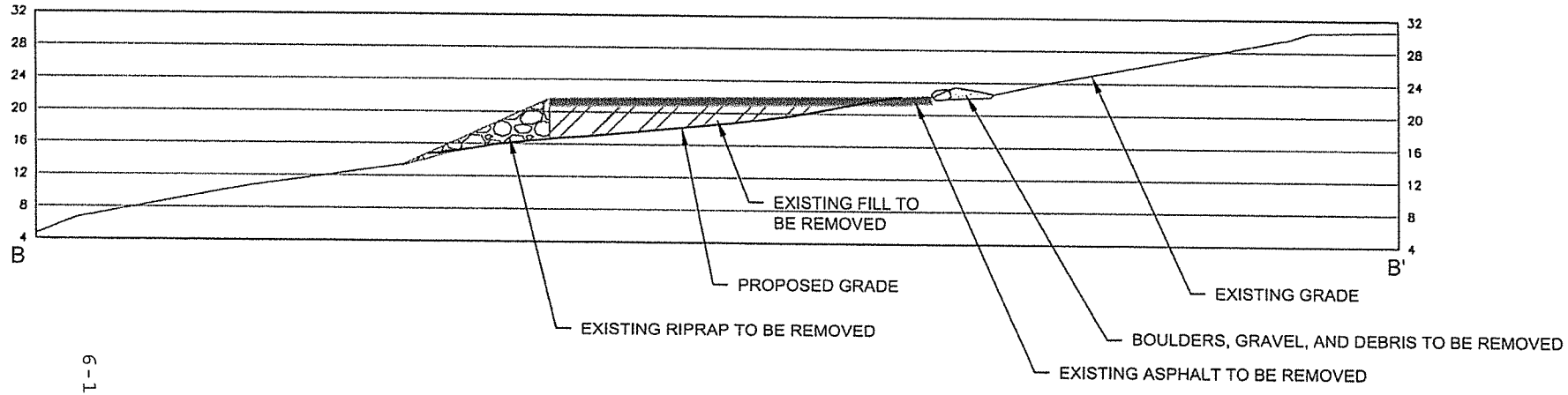


NOTES

1. REMOVE EXISTING CABLES, HARDWARE, AND OTHER APPUI IF FEATURE EXTENDS BELOW FINISH GRADE, CUT OFF 2-3 F
2. MASS EXCAVATION MATERIAL EXPECTED TO BE SPREAD OI WASHED OF FINES.
3. CUT EXISTING STEEL SHEET PILE 2 FEET BELOW FINISH GR STRUCTURAL FILL.


EXISTING ASPHALT TO BE REMOVED
EXISTING GRADE
EXISTING ASPHALT TO REMAIN
EDGE OF ASPHALT REMOVAL
PROPOSED GRADE
EXISTING FILL TO BE REMOVED
EXISTING RIPRAP TO BE REMOVED
PROPOSED LARGE WOOD

=20'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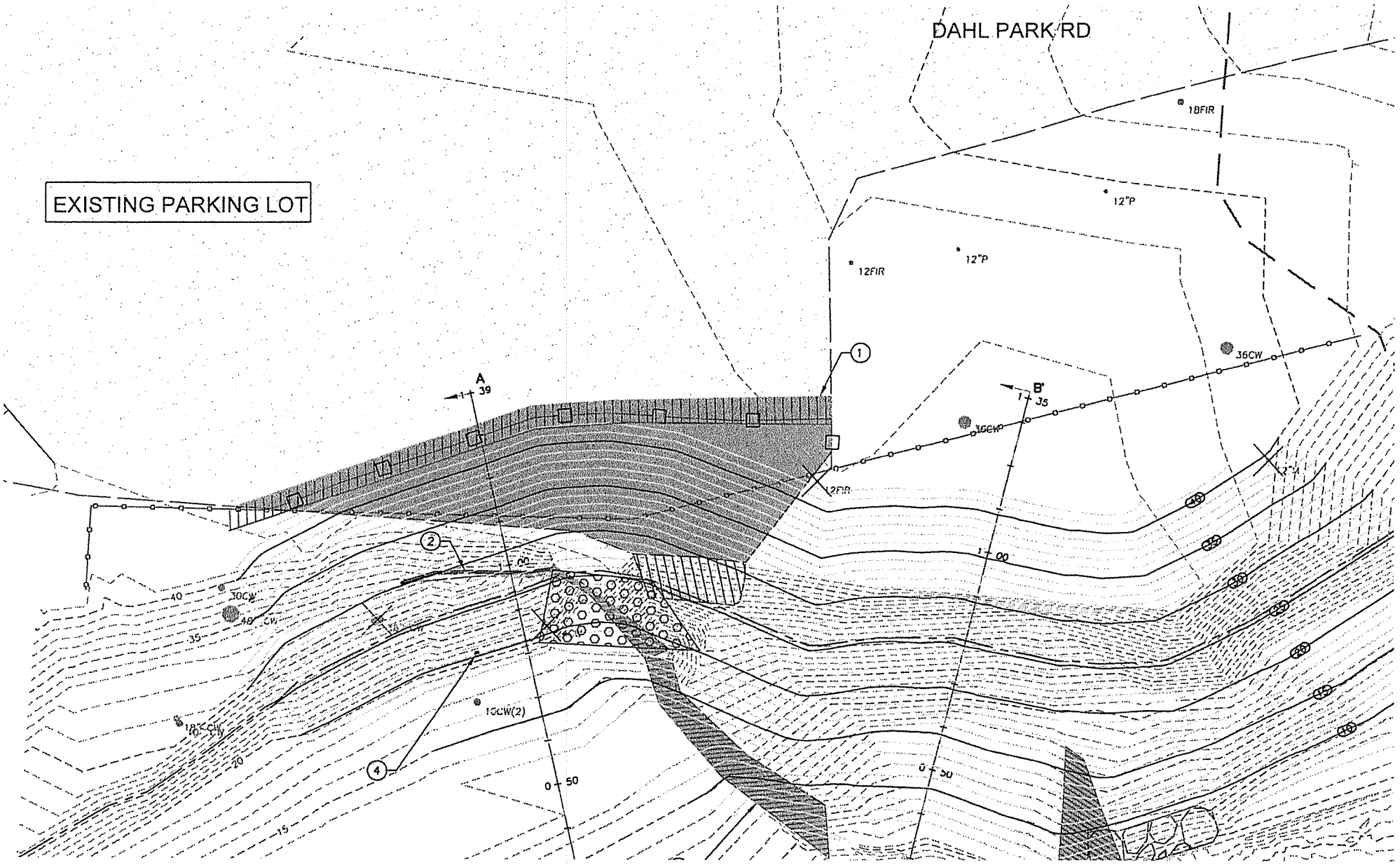

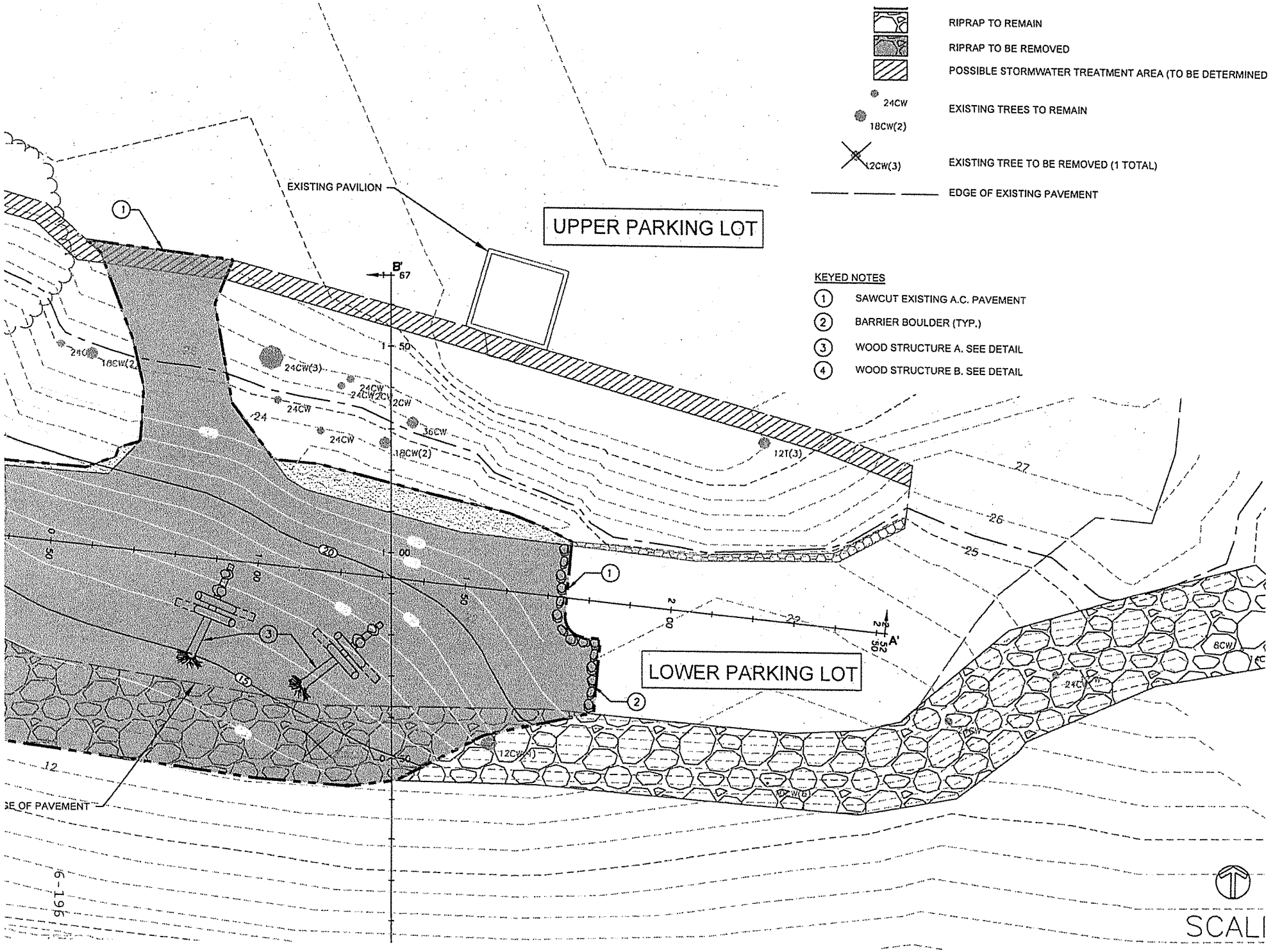
RIPRAP TO REMAIN
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12CW(3)
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EDGE OF EXISTING PAVEMENT
EXISTING PAVILION
UPPER PARKING LOT
LOWER PARKING LOT
KEYED NOTES
1 SAWCUT EXISTING A.C. PAVEMENT
2 BARRIER BOULDER (TYP.)
3 WOOD STRUCTURE A. SEE DETAIL
4 WOOD STRUCTURE B. SEE DETAIL
B'
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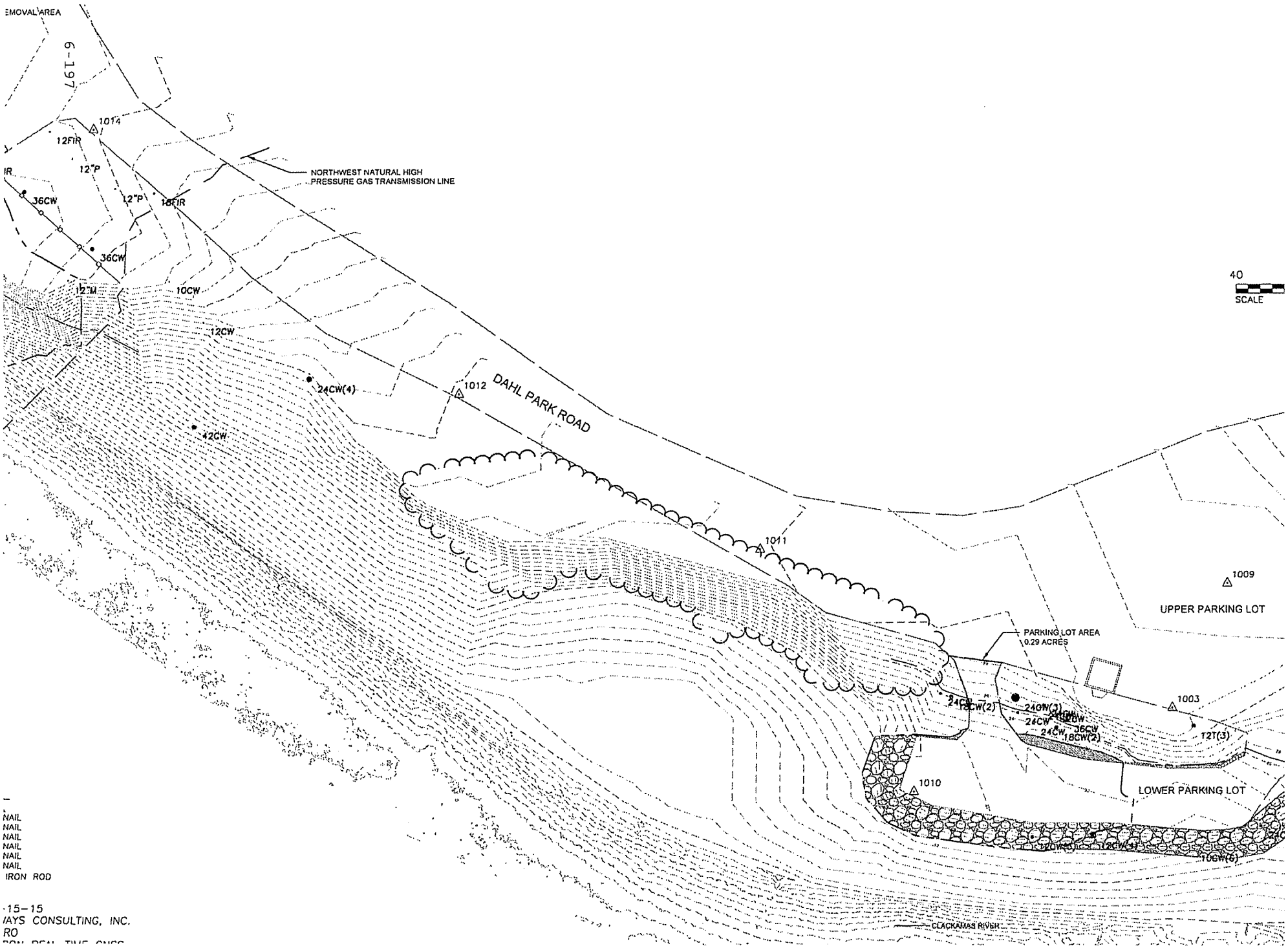
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UPPER PARKING LOT
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6-198

COPIES OF THE RULES BY CALLI
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(NOTE: THE TELEPHONE NUMBER
THE OREGON UTILITY NOTIFICATIC
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POTENTIAL UNDERGROUND FACILIT

Dig Safely.

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NORTHWEST NATURAL

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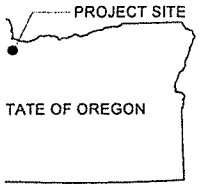
CITY OF GLADSTONE, OREGON

30% DESIGN DRAWINGS
OCTOBER 2015



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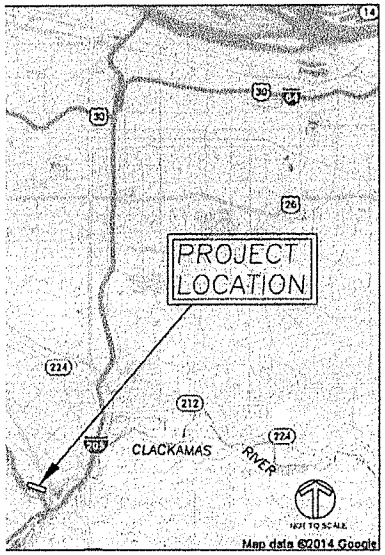
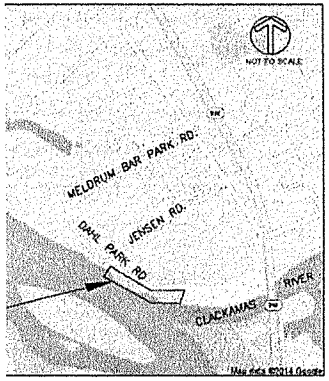


INITY MAP



SITE MAP

SHEET INDEX

SHEET NUMBER	SHEET NAME	SHEET DESCRIPTION
1	G1	COVER
2	G2	NOTES, GENERAL INFORMATION, AND ABBREVIATIONS
3	G3	PROPOSED SITE OVERVIEW
4	C1	GRADING PLAN: PARKING LOT AREA
5	C2	GRADING PLAN: BULKHEAD REMOVAL AREA
6	C3	CROSS SECTION: PARKING LOT AREA
7	C4	CROSS SECTION: BULKHEAD REMOVAL AREA
8	P1	PLANTING PLAN: PARKING LOT AREA
9	P2	PLANTING PLAN: BULKHEAD REMOVAL AREA

PROJECT TEAI

LANDOWNER
CITY OF GLADSTONE
CONTACT: SCOTT TABOR
525 PORTLAND AVE.
GLADSTONE, OR 97027
PH: 503-656-7957

ENVIRONMENTAL CONSULTANT / CIVIL ENGINEER
CASCADE ENVIRONMENTAL GROUP
CONTACT: BRENT HADDAWAY
222 NW DAVIS ST., SUITE 317
PORTLAND, OR 97209
PH: 503-894-8585

SURVEYO
WATERWA
CONTACT:
1020 SW T
PORTLANI
PH: 503-2

SURVEYO
HYDRO SC
6635 N. BA
PORTLANI
PH: 206-2

GEOTECH
HARTCRO
CONTACT:
300 W. 15T
VANCOUV
PH: 206-8

City of Gladstone and Port of Portland
Dahl Beach Mitigation Project
October 13, 2015

Overview of the Mitigation Project:
The Dahl Beach Mitigation Project encompasses two habitat restoration sites at Meldrum Bar Park in the City of Gladstone: Bulkhead removal and Dahl Beach parking area. Restoration at these sites is designed to address both City of Gladstone and Port of Portland priorities. Enclosed are figures on the proposed project. Information on the project had previously been provided during the June 9, 2015 City Council meeting.

General Benefits:

- Restoring habitat in Dahl Beach Park is important in the context of the metropolitan region because the two sites are located near the confluence of the Clackamas and Willamette Rivers, an area critical to fish and wildlife.
- Implementing habitat restoration at the two sites provides an opportunity for the City to demonstrate environmental stewardship in the Park.
- Improving habitat and native vegetation at the two sites will improve the environment while also enhancing the Park's safety and reducing long-term maintenance.
- The partnership between the City and Port offers an opportunity to provide resources to address Park infrastructure improvements and remove the bulkhead at no cost to the City. Total construction cost of the project is estimated at $460,000.

Bulkhead Site Benefits:

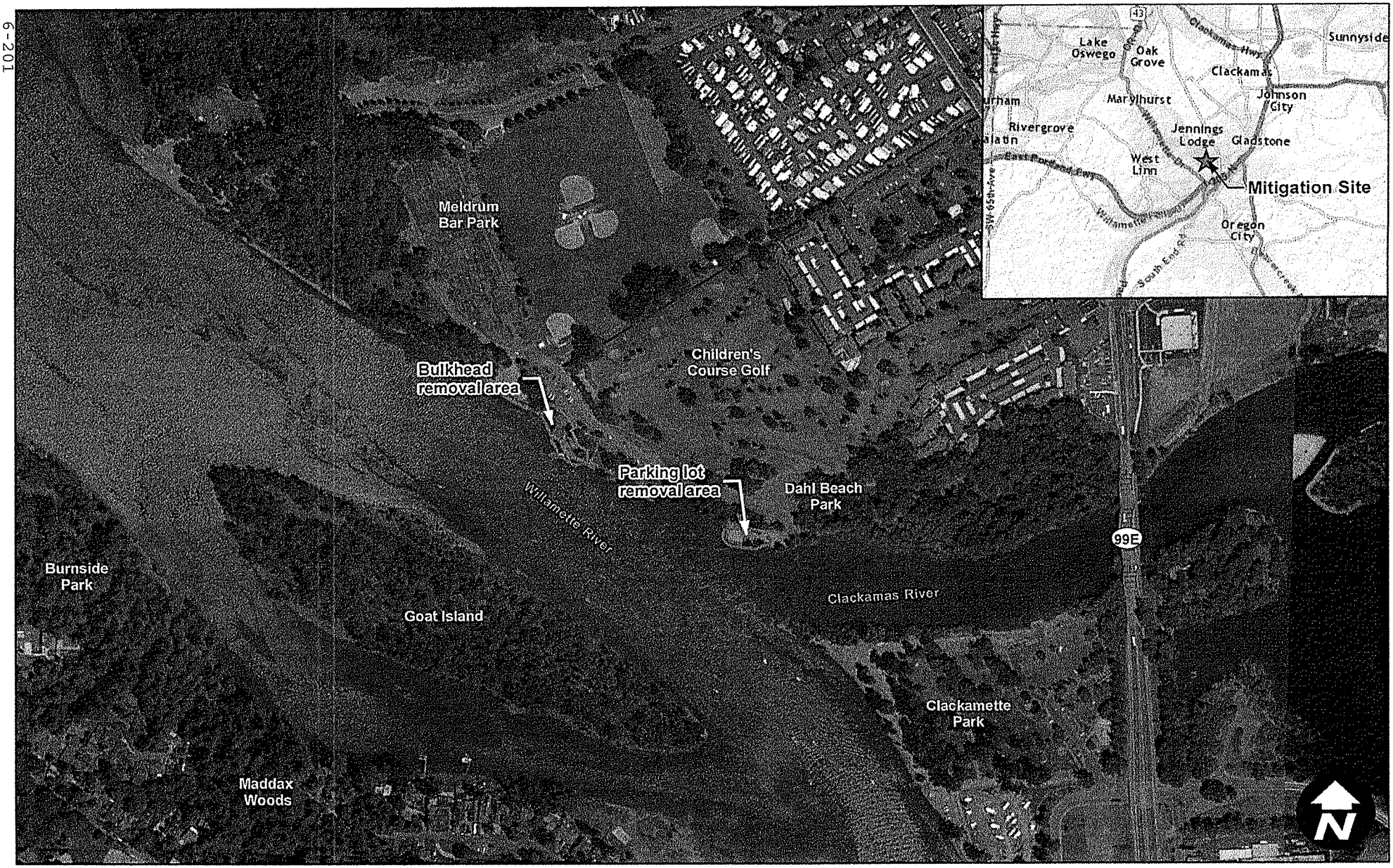
- Bulkhead removal will stabilize an area that has steep, unstable slopes; will continue to erode if not fixed; and could over time threaten the top of bank area including the parking area.
- The current steep slopes and metal structures are an attractive nuisance which creates potential liabilities for the City. The project will address the public safety hazard by removing the metal structures and improving the steep, unstable slopes.
- Bulkhead removal is expensive and does not qualify for any typical habitat restoration grant funding sources. The bulkhead removal is estimated to cost $325,000 of the total estimated construction cost of the project.

Dahl Beach Parking Area Site Benefits:

- Ecological restoration at the site will improve habitat benefits while still providing parking and recreational access. An estimated eight to ten parking spots will be available in the lower parking area.
- Removing a portion of the lower parking area will provide the City with a reduction in impervious surface and stormwater runoff that can help meet the City's EPA/DEQ storm water management requirements. The stormwater improvements are estimated at a cost of $15,000.
- Reducing the parking area, which floods annually, will help to minimize City maintenance related to flooding.

Contacts

- Kelly Madalinski, Port of Portland, 503-415-6676, kelly.madalinski@portofportland.com
- Lise Glancy, Port of Portland, 503-415-6519, lise.glancy@portofportland.com



Date: 10/12/2015

Data Source: ESRI, 2015; OR Dept. of Transportation, 2013.

Scale: 1 inch = 500 feet

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Figure 1. Vicinity Map

Dahl Beach Mitigation Site

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Date: 10/12/2015

Data Source: ESRI, 2015

Figure 2. Bulkhead Removal

Scale: 1 inch = 100 feet

0 100 200 Feet

Dahl Beach Mitigation Site

Z:\GIS\89_DahlBeach\Mapfiles\DahlBeach_City_Fig2_BulkheadRemovalArea.mxd

6-202

Date: 10/12/2015

Data Source: ESRI, 2015

Figure 3. Parking Lot Removal

Dahl Beach Mitigation Site

Scale: 1 inch = 100 feet

0 100 200 Feet

Z:\GIS\89_DahlBeach\Mapfiles\DahlBeach_City_Fig3_ParkingLotRemovalArea.mxd

Dahl Beach Mitigation Project – Update

September 8, 2015

Overview

The Port of Portland (Port) and the City of Gladstone have been working to develop the Dahl Beach Mitigation Project at the City-owned Dahl Beach Park. The Gladstone City Council approved on June 9, 2015, pursing the development of the restoration project, with final approval pending City Council review of the agreement and final scope of the project. The Port's overall goal in working with the City is to develop a project mutually beneficial to both parties.

The mitigation project includes restoring two areas: the "Parking Lot" area and the "Bulkhead" area (Figure 1). Initially, the proposed restoration project involved only the Parking Lot area. This proposal entailed removing the entire asphalt parking area and rip rap, restoring the banks to a typical shoreline contour along the river, and installing native plants. This initial proposal best matched the Port's needs to develop an environmental mitigation project as a result of the cleanup work performed at the Port's Terminal 4 facility. However, based on City Council feedback to preserve a portion of the parking, the Port agreed to scale back the removal of the parking area and remove the bulkhead structure downstream of the parking area. The removal of the bulkhead structure was identified by the City as a high priority. The restoration project now reflects this feedback.

Since the City Council approval, the Port has been working with City staff to develop the project and overall agreement. This work is being done in a "parallel path" to gain regulatory agency approval and ensure it meets the needs of the City. The agreement will include specific terms for use of the property and the City will bear no costs for project development. The Port has completed baseline studies and begun project design and is providing updates to keep all parties informed on progress.

Design Updates

Parking Lot Area- The Port has completed a conceptual design, consistent with the approach presented to the City Council (Figure 2 and 3). The concept was presented to city staff and to permitting agencies for review. The Port continues to evaluate approaches to optimize the space for parking. Rough estimates are in the range of 8 to 10 parking spaces, with a large footprint for each space (9 feet by 18 feet) being assumed. Input from the City and permitting agencies will be incorporated into the next design phases. Because restoration of the Bulkhead site requires greater baseline data gathering, the Parking Lot site is further along in the design process.

Bulkhead Area- Baseline studies are complete, including geotechnical analysis, geomorphic analysis, and review by construction contractor. Concept design for this area is beginning in early September; design will include removing the bulkhead structure, restoring a natural shoreline, and establishing a stable river bank. A concept design for this area is scheduled to be complete by the end of September.

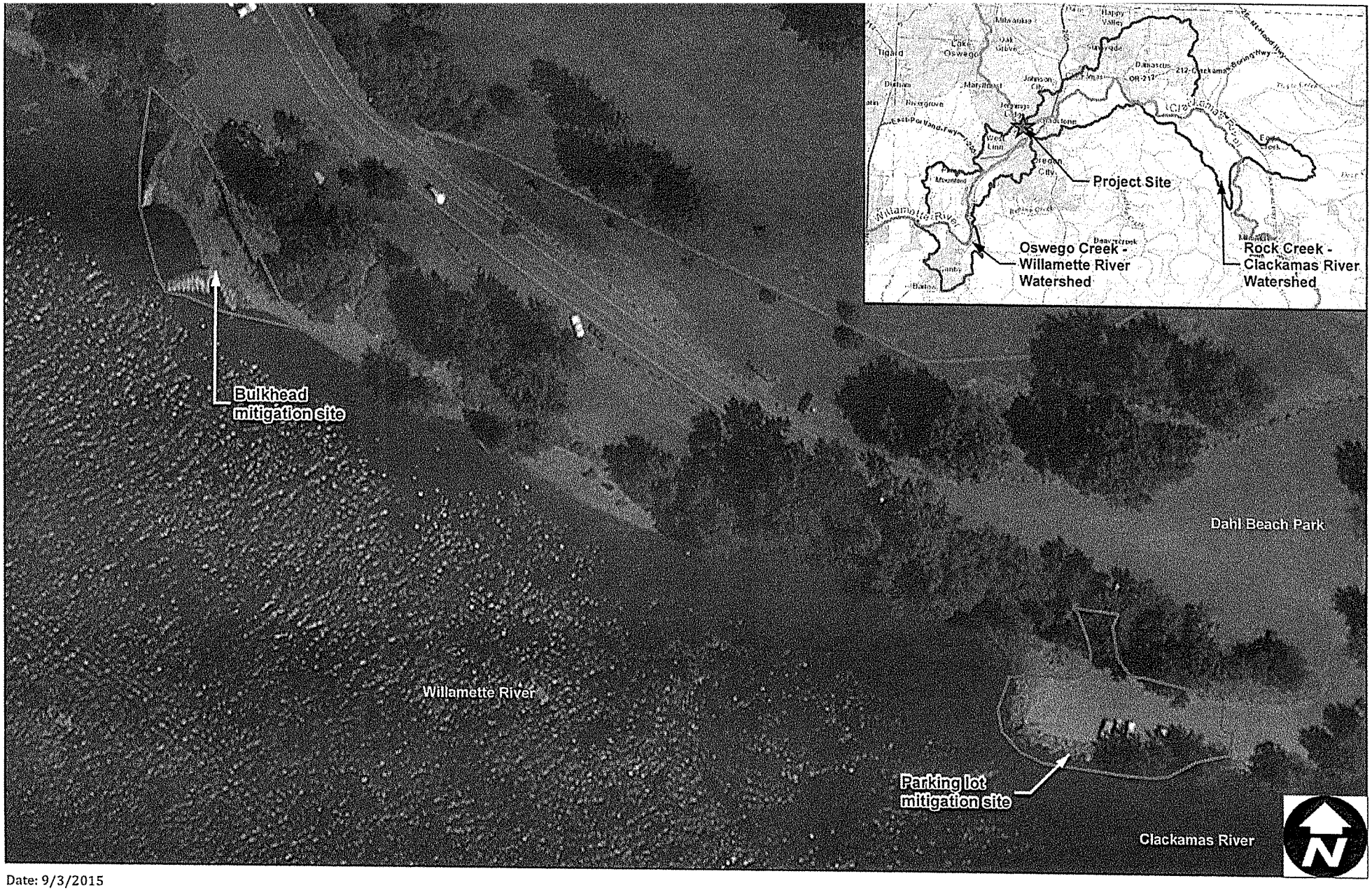
Next Steps

The Port will continue to work jointly with the permitting agencies and the City of Gladstone to further develop the project as a mutually beneficial effort for both the Port and the City. The Port and the City will begin developing an agreement structure in September and will continue to work towards a formal

agreement. The City and the Port are currently planning for a joint working session on October 13, 2015 with the City Council and public to walk-through and receive further input on the mitigation project. Finally, the Port will also work with the permitting agencies to make certain the Port's needs for mitigation will be met by the project.

Contacts

- Kelly Madalinski, Port of Portland, 503-415-6676, kelly.madalinski@portofportland.com
- John Runyon, Cascade Environmental, 503-894-8585, Ext. 3, jrunyon@cascadeenv.com



Date: 9/3/2015
Scale: 1 inch = 100 feet
Data Source: ESRI, 2015.

Figure 1. Site Map

6-206

CASCADE ENVIRONMENTAL GROUP

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Dahl Beach Park Shallow Water Mitgation Project

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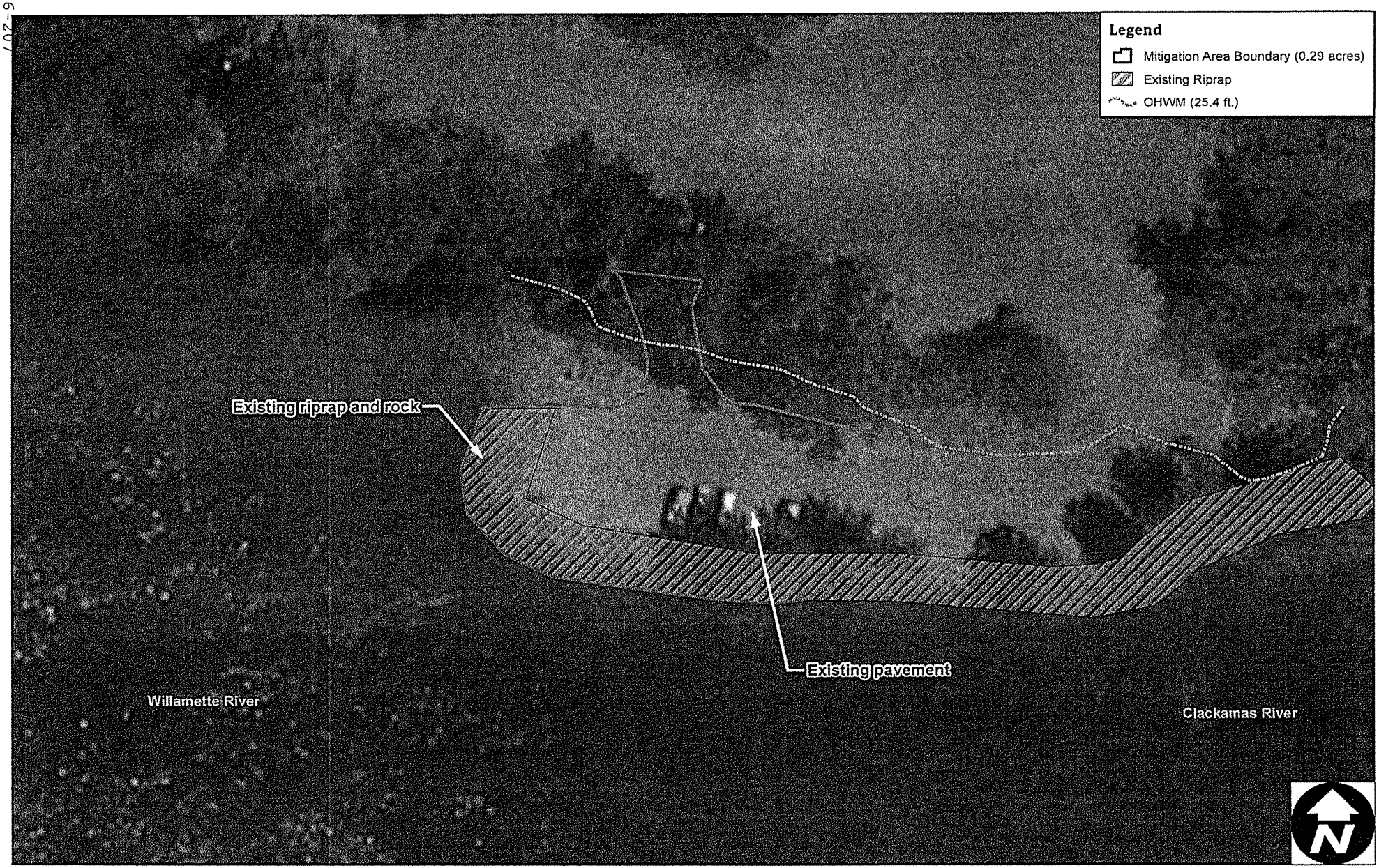

Date: 9/2/2015

Scale: 1 inch = 50 feet

Data Source: ESRI, 2015.

Figure 2. Existing Conditions

CASCADE ENVIRONMENTAL GROUP

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Dahl Beach Park Shallow Water Mitgation Project

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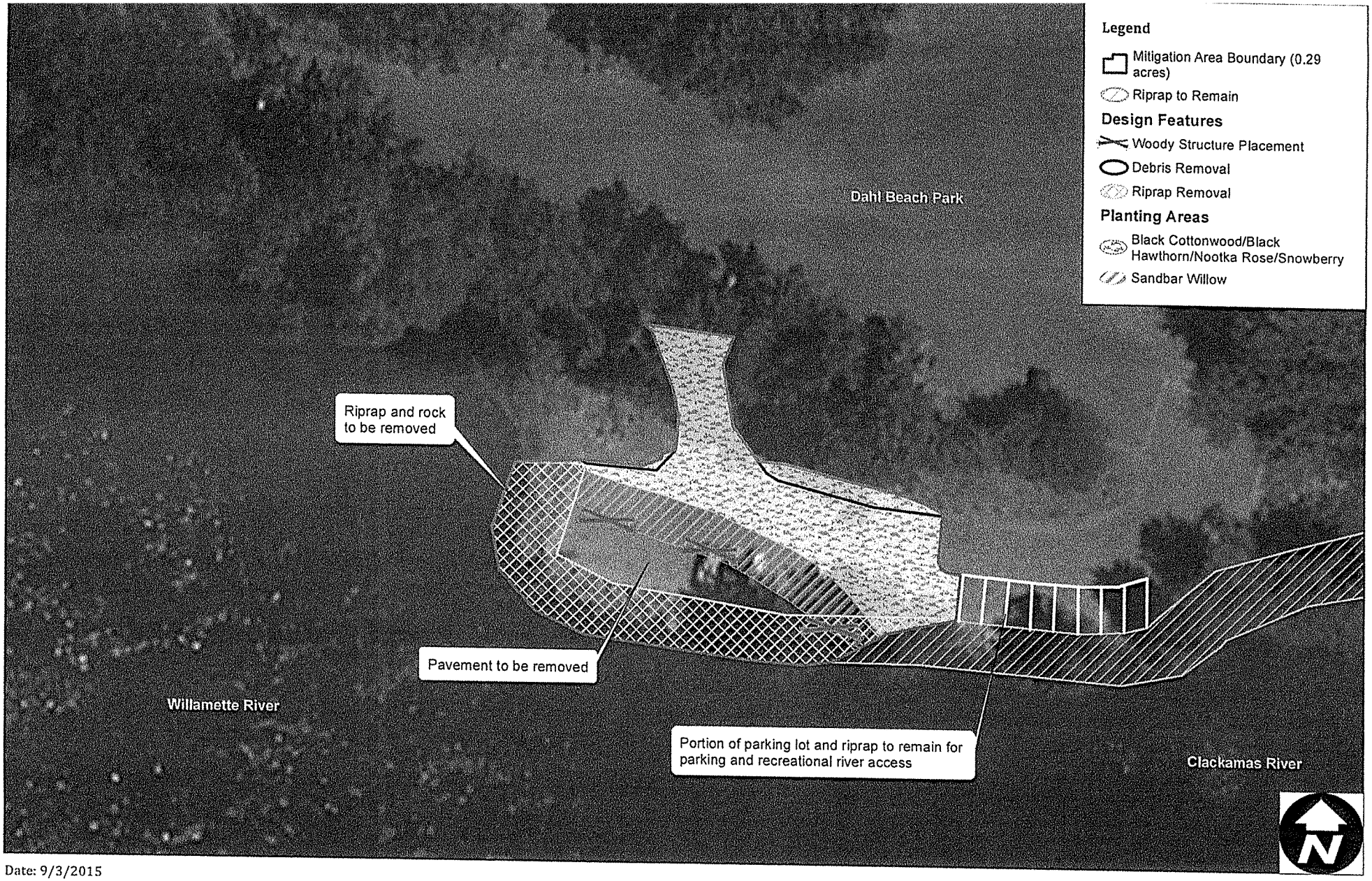

Date: 9/3/2015
Scale: 1 inch = 50 feet
Data Source: ESRI, 2015.

Figure 3. Proposed Conditions

6-2018 CASCADE ENVIRONMENTAL GROUP

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Dahl Beach Park Shallow Water Mitigation Project

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City of Gladstone
Staff Report

Report Date:	November 2nd, 2015
Meeting Date:	November 10th, 2015
To:	Gladstone City Council
From:	Ross Schultz

NEW AGENDA ITEM –

This agenda item is a request for Council to approve two proposed agenda items for the Tri City Advisory Board.

History/Background

In an effort to be proactive in our participation in the Tri City Service District (TCSD), staff has prepared the attached two Tri City Service District Resolution Sheets for consideration by the TCSD Advisory Committee. That committee could then evaluate the two proposals for recommendation of action to the County Board of Commissioners.

Proposal

Staff would like Councils approval to send 1 or both of the attached Tri City Service District Resolution Sheets on to the TCSD Advisory board for action.

Options

Council can approve 1, both or none of the attached Tri City Service District Resolution Sheets for further action.

Cost Impact

To be determined by the Advisory Board.

Recommended Staff Action

Staff recommends a motion to direct staff to move both Resolution Sheets to the Tri City Advisor Board.

Ross C. Schultz 11/3/15

Department Head Signature — Date

City Administrator Signature — Date

Tri City Service District
Resolution Sheet

Report Date: October 20th, 2015
Meeting Date: November 18th, 2015
To: Tri City Advisory Board
From: Ross Schultz - City of Gladstone

AGENDA ITEM – XX

Request staff to perform Engineering Study

History/Background

At this time staff from WES has informed Tri City Service District (TCSD) that it is at or beyond capacity for the two digesters that operate for the Tri City Plant. They have also informed TCSD that their recommended option is to increase capacity by the addition of two new digesters at an estimated cost of $50 million Dollars.

Staffs from Gladstone and Oregon City have reviewed the Omni Processor and feel that it could be a viable long term option to the proposed major construction project. Gladstone and Oregon City would like to engage a professional engineer to evaluate the Tri City Plant and the Omni II processor and provide a report on the pros and cons of this solution.

Jancki Enterprises offers the Omni Processor for sale, and as part of their sales effort, they have offered to begin the process of permitting the system in Oregon. To further their efforts to permit the system, they have requested a truck load of our solids be delivered to their plant for processing.

Proposal

- TCSD would like to authorize staff to issue an RFQ for engineering support to evaluate this situation. Staff would return the list of Candidates to the Advisory Board for further action.
- As part of this evaluation process the TCSD Advisory Board would like to authorize staff to work with Janicki Industries to treat one truck load of solids from our plant.

Ross Schultz
Interim City Administrator City of Gladstone

Tri City Service District
Resolution Sheet

Report Date:	October 20th, 2015
Meeting Date:	November 18th, 2015
To:	Tri City Advisory Board
From:	Ross Schultz - City of Gladstone

AGENDA ITEM – XX

Request staff to secure legal representation to evaluate options

History/Background

At the Oct. 20th BCC meeting, the Board choose Dec. 12th as their deadline to decide whether or not to merge the River Health Board and the TCSD Board. In order that the TCSD organization may continue to serve its citizens in the manor intended, TCSD should seek legal Council to review our options and make sure the interests of our constituents is protected.

This review should include the option of moving the Tri City Service District from a 451 organization to a 190 organization.

Proposal

Hire an attorney to review the relationship between TCSD and the Board of County Commissioners and report back to the advisory board for further evaluation and action.

Ross Schultz
Interim City Administrator City of Gladstone

City of Gladstone
Councilor Report

Report Date:	October 21, 2015
Meeting Date:	October 26, 2015
To:	Gladstone Parks and Recreation Board (Parks Board)
From:	Councilor Neal Reisner

AGENDA ITEM
Parks Master Plan Request For Qualifications (RFQ)

History/Background
Earlier this year the City Council decided the Gladstone's Parks Master Plan needed to be updated, which was last written sometime in the 1980's. City Council has asked the Parks Board to be involved in the creation of the new Master Plan and being they are not experts in the field, authorized the hiring of a consultant to create the Master Plan.

Proposal
To review the attached proposed Request For Qualifications (RFQ), make changes (if needed), and then make a recommendation to the City Council. REQ is a requirement by the State when selecting a consultant.

Options
The Parks Board may choose to not make a recommendation, or may choose to make a recommendation accepting the RFQ with changes, or recommend accepting the RFQ without any changings.

Cost Impact
$50,000 is in the current budget for the Master Plan, which should be ample funding.

Recommended Action
I recommend the Parks Board make a recommendation to accept the RFQ with changes as the Parks Board deem necessary.

GLADSTONE
Home of the Pow Wow Tree

Request for Qualifications
City of Gladstone Park Master Plan
Gladstone, Oregon

Sponsoring Jurisdiction:	The City of Gladstone, Oregon
Project Name:	The City of Gladstone Park Master Plan
Project Number:	2015-0601-PK
Project Date:	October 2015 – February 2016
Qualifications Due:	August 1, 2015 no later than 4:00pm PDT
Qualifications Submitted To:	City Staff, 525 Portland Avenue, Gladstone, OR 97027 (See RFQ for details)
Project Description:	Develop a Parks and Recreation Comprehensive Master Plan. This plan will be developed to help the city assess and prioritize necessary and proposed projects for city recreational assets including all city parks.

Applicant qualifications will be evaluated based on response to the Request for Qualifications (RFQ), and a live interview to be conducted after submission of the statement of qualifications. Qualifications criteria are more fully set forth in the RFQ document.

Public notice is hereby given that the City of Gladstone has issued the above mentioned RFQ. The complete RFQ, including all submittal requirements, can be found on the City of Gladstone's website at www.ci.gladstone.or.us. Please call (503)656-5225 if unable to access the RFQ documents online.

City Staff
525 Portland Avenue
Gladstone, OR 97027

Project Description and Preliminary Scope of Work

The City of Gladstone, Oregon is soliciting qualifications from consulting firms for assistance in the following:

Project Description

Assist the City of Gladstone in creating a Parks and Recreation Comprehensive Master Plan. This plan will be developed to help the city assess and prioritize necessary and proposed projects for city recreational assets including all city parks.

Completion Date

The required completion dates are set according to the "Tasks" listed below. The city may award extensions for tasks upon written request from the selected firm. Such extensions must be by resolution from the Gladstone City Council. Such extensions will not be unreasonably withheld.

Preliminary Scope of Work

The following is a preliminary scope of work that may be modified during contract negotiations with the selected consultant. The preliminary scope of work is intended to outline and describe the range of tasks anticipated for the project but is not intended to be complete.

It is anticipated that planning and design will be completed within three phases as described below. Public involvement will be an element of each phase.

PHASE 1 – Inventory and Site Assessment, Development of a Park Design Program
PHASE 2 – Schematic Design and Implementation Program for Meldrum Bar Park
PHASE 3 – Schematic Design and Implementation Program for Remaining City Parks

Future phases will be contingent upon securing necessary funding, and would include Design Development, Construction Documents, Construction Monitoring and Observation.

The selected consultant shall initially complete the Phase 1, 2 and 3 scope of work. The City of Gladstone reserves the right to award additional work for future phases to the same firm, or another firm, as necessary to complete the project.

Public Involvement

This project will involve significant public involvement, with participation by the City Council – appointed Park Advisory Board, identified stakeholders, and interested citizens. Tasks will include:

- Develop and implement a public involvement process that encourages the participation of all interested parties.
- Attend periodic meetings of the City Council and Park & Recreation Board to gather input and provide project updates.
- Attend and facilitate three to four public workshops to keep community members informed and to solicit input from the public during the planning process.
- Provide graphic and written information as required to support the public outreach efforts of the city.

Department and City Reviews

- Prepare written and graphic materials and assist with presenting the project at 4-5 reviews by Parks and City Department staff.
- Present project or provide updates at 3-4 meetings of the Parks & Recreation Board.
- Present project or provide updates at 2-3 City Council meetings.

Permitting and Environmental Review

- Identify permitting/regulatory requirements and deadlines.
- Complete NEPA checklist for the schematic design.

Phase 1 Tasks May Include

a. Participate in a kickoff meeting with the City Council – Parks and Recreation Dept. to review project parameters, gather available materials, identify additional information requirements, review preliminary community involvement strategy, and establish project timetable and products.
b. Conduct site visit with city staff and Parks and Recreation board members.
c. Conduct and prepare a site survey identifying and locating natural and man-made features. Include topography, wetlands, streams, vegetation, utilities, structures, and other features as necessary for the purposes of master planning and permitting.
d. Gather and review relevant background materials relating to the project. These materials are limited as past planning activities for the parks has been sporadic and at times informal. Materials may include: past planning documents, GIS maps, existing surveys, assessor's maps, utility maps, historical plans and documents, and as-builts. Communicate and coordinate with various local, state, and federal permitting authorities necessary for understanding regulatory issues and constraints, particularly related to sensitive (wetland) areas, shoreline access and recreation activities.
e. Conduct meetings (or phone interviews) with agency representatives from Parks and Recreation Board, Public Works Dept., Planning Commission, Planning Dept., as well as representatives from the regional jurisdictional authorities. City Council members may also be interviewed.
f. Prepare a graphic summarizing site opportunities and constraints at an appropriate scale, using both existing and prepared maps, surveys, GIS maps and other available information.
g. Prepare a report that summarizes identified issues and opportunities. In addition to existing uses, it is anticipated that opportunities for new recreation uses will be explored, some at a perfunctory level, some at a more detailed level. These new uses may include some or all of the following: parking, interpretive trails and viewpoints, picnicking/group gathering areas, and community connections to nearby regional trail and neighborhood/business amenities.
h. Facilitate and conduct a public workshop to ascertain public sentiment towards needs, desires, opportunities and constraints.
i. Based upon the results of site analysis, technical input, Park and Recreation Board input and public workshops, develop a preliminary Park Design Program detailing proposed park uses, design character and design criteria. Design Program review and approval process to include Public Workshop(s), Parks and Recreation Board, and City Council (for final approval).

Phase 2 and 3 Tasks May Include

a. Assist the Parks and Recreation Board and city staff in establishing evaluation criteria for schematic alternatives.
b. Prepare at least two schematic design alternatives based upon the approved Design Program. Prepare conceptual level line-item construction cost estimates for each alternative. Assist staff in preparing operational/maintenance cost models.
c. Prepare a narrative which summarizes the existing conditions, design alternatives, cost implications and regulatory criteria, and identifies issues which require further study at the next stage of project development.
d. Meet with the Parks and Recreation Board to review the design alternatives, using the evaluation criteria established earlier.
e. Meet with the Parks staff team to review the design alternatives.
f. Conduct a community workshop(s) to solicit input on the schematic design alternatives.
g. Meet with City, County, State and Federal permitting authorities to review initial schematic design direction.
h. Meet with the Parks and Recreation Board to review comments from workshop and to solicit direction on draft schematic design.
i. Provide briefing to the City Council.
j. Create a draft schematic design based upon the preferred elements from the alternative designs and consistent with the approved Design Program. Update cost estimate and operational models.
k. Create a draft implementation strategy/phasing program for development of the parks that identify priorities for improvements, responsibilities for improvements and a timeline for implementing improvements.
l. Identify scope and schedule of permitting process.
m. Attend meetings with the Parks staff team to review draft schematic design and phasing program.
n. Conduct a community workshop to solicit input on the draft schematic design and phasing program.
o. Meet city permitting authorities to review draft schematic design and phasing program.
p. Meet with the Parks and Recreation Board to present draft schematic design and phasing program for Board's recommendation to the City Council.
q. Refine the draft schematic design and phasing program incorporating gathered input.
r. Revise cost estimates.
s. Meet with the Parks and Recreation Board to review workshop comments.
t. Make minor revisions to the schematic design following the presentations.
u. Prepare NEPA Checklist if needed.

Tentative Schedule

The following schedule contains major milestones and may be modified as a result of consultant proposals and contract negotiations:

July 15, 2015 (4:00pm PST)	-	Deadline for Questions
July 24, 2015 (Noon)	-	Answers to Questions Released
August 1, 2015 (4:00pm PST)	-	RFQ Submittal Deadline
By August 12, 2015	-	City to short-list for interviews
Week of August 17, 2015	-	Consultant Interviews (tentative)
By August 28, 2015	-	Consultant Selection
October 2015	-	Project Start; Survey, Inventory and Site Analysis
October 2015	-	Initial Public Meeting(s)
October/November 2015	-	Complete Public Process for Design Program
December 2015	-	City Council Approval of Design Program
January/February 2016	-	Develop Schematic Design Alternatives
March 2016	-	Public review and comment; Design refinement
May 2016	-	City Council Approval of Schematic Design

Statement of Qualifications Submission Requirements

All submittals must be in conformance with the requirements set forth in this RFQ. Qualifications submitted electronically should be 8-1/2" x 11" format, with a font no smaller than Calibri size 11, and shall not exceed twenty (20) single sided pages. A front cover, back cover, and a maximum two-page cover letter may be submitted in addition to the twenty (20) single sided pages. If a paper copy is submitted, pages should be printed double sided. At a minimum, the following information shall be submitted:

- An organizational chart and biographies for your project team, including all sub-consultants.
- A statement of the percentage of time your proposed key resources will have available to devote to this project.
- Your firm's identification of the critical work elements and how your team would address these issues.
- A discussion of your firms approach to the project and your plan to produce the required documents.
- A proposed schedule for completing the work, including intermediate project stages leading to a final project and in sufficient detail to allow an assessment of the firm's ability to provide the resources necessary to meet the schedule.
- References from past similar projects. Provide the contact name and number of the owner, or if not available, a contact name and number of the current most knowledgeable person associated with the project. References from past City of Gladstone projects will not be accepted.

Submittals
Qualifications titled "City of Gladstone Park Master Plan RFQ 2015-0601-PK" may be submitted as an email attachment in PDF or MS Work format to: Morishita@ci.gladstone.or.us.

Note that faxed proposals or electronic proposals submitted as compressed files will not be accepted.

OR

One (1) unbound original and four (4) digital storage devices (CD or USB Flash Drive) in PDF or MS Word format mailed or delivered to:

City of Gladstone
Attn: Jolene Morishita, Asst. City Manager
Job #2015-0601-PK
525 Portland Avenue
Gladstone, OR 97027

Contact
For additional information concerning this RFQ, any other aspect of the selection process or the project in general, please contact via email:

Jolene Morishita
Assistant City Administrator
Email: Morishita@ci.gladstone.or.us

All questions must be submitted by email and must be received prior to 4:00 pm PST on July 15, 2015. Answers will be released to all interested parties prior to noon on July 24, 2015.

Absolutely no communication shall occur regarding this RFQ, including requests for information, or speculation between Offeror's or any of the individual members and any City elected official or employee other than those named above. Failure to comply with this provision may result in Offeror's proposal being removed from consideration. Any cost incurred by Offeror in preparation, transmittal, or presentation of any information or material submitted in response to the RFQ shall be borne solely by the Offeror.

Right to Reject Submittals
The City reserves the right to reject any and all submittals at any time with no penalty, or to waive immaterial defects and minor irregularities in any submittal.

Submittal Disposition
All material submitted in response to this RFQ shall become the property of the City upon delivery to the City staff and will not be returned.

Project Contract
The Offeror will be required to use the City of Gladstone Professional Services Agreement [Attachment A] and accept all language contained within. Any Offeror that has significant reservations concerning this agreement should not submit on this request.

Consultant Selection Criteria

Consultants will be evaluated on the following items:

- Responsiveness to the requirements of this RFQ.
- Understanding of project scope and project requirements including discussion of firm's approach to the project.
- Ability to meet the project schedule, within budget.
- Expertise of key personnel – provide a biography, educational background, number of years with this firm/other firms, and three (3) project reference with contact information. Also discuss other responsibilities assigned to key staff and their availability for this project.
- Proposed use of sub-consultants – if sub-consultants are proposed, explain how the work process and communication between the Firm and the sub-consultant will be managed. Discuss the sub-consultants experience and availability for the project.
- Response of reference from past similar projects.
- Is consultant located within the City of Gladstone, employ Gladstone residents or is the proposed sub-consultant located within the City of Gladstone or employ Gladstone residents.

Short List / Final Selection Procedures

After review of the submittals by the Owner's Selection Committee, the three (3) highest ranked firms will be notified and invited to participate in a short list/final selection phase. It is intended that the final selection phase will include the following steps:

- Notification: Written notification of the three top-ranked firms.
- Presentation/Discussion: A 1-hour presentation/discussion question and answer period will be scheduled and conducted at the City of Gladstone City Hall. The Offeror will be given 20-minutes for a presentation. The remaining time will be reserved by the City for questions.
- Final Ranking: After the presentations and discussions are completed, the Selection Committee will rank the firms interviewed. The qualifications proposal and presentation/discussion will be weighted equally and scored as follows:

Component	RFQ/Presentation Score
Responsiveness to the RFQ	5 Points
Previous experience in similar projects	20 Points
Understanding of project scope and requirements	25 Points
Ability to meet the schedule/budget	10 Points
Expertise of key personnel	20 Points
Response from references/past projects	15 Points
Located within Gladstone or employ Gladstone residents	5 Points
TOTAL	100 Points

- Negotiation/Scope Development: The top-ranked firm will be notified in writing and be asked to meet and submit their prospective scope or services, schedule and a fee proposal.

If, after negotiation and consideration, the Owner is unable to reach an acceptable agreement with the top-ranked firm, the Owner will terminate negotiations with the top-ranked firm and, at its sole discretion, may enter into negotiations with the second ranked firm and/or withhold the award for any reason and/or elect not to proceed with any of the proponents and/or re-solicit via a new RFQ.

- Final Selection: Once an agreement is reached with a preferred A/E firm, the Owner's Purchasing Agent will provide a professional Services Agreement for signatures and full execution. A Notice to Proceed will be issued to formally begin work.

LIST OF CURRENT GLADSTONE PARKS

- **Abernethy Lane Trail:** 1.8 acres. In 1988 the City of Gladstone purchased the entire section of abandoned rail road right of way between Glen Echo Avenue and Portland Avenue to allow for widening of Abernethy Lane and for development of a walkway/trail.

- **Cross Park:** 5.58 Acres. Located along the Clackamas River, Cross Park is improved with permanent restrooms, paved walking/bicycle paths, picnic tables, irrigation system, overhead lighting. Depending on water level in the river, this park is used year round by fishermen, picnickers, and for other passive recreation uses. Cross Park is about 50% landscaped, with the steeper banks in natural vegetation. One acre expansion was completed in 2003.

- **Dahl Beach:** 15.33 Acres. Located on the north bank of the Clackamas River at the confluence of the Clackamas and Willamette Rivers, Dahl Beach is used year round by fishermen and has inviting beaches for swimmers and picnickers during the summer months. Potable water is not available; restrooms are of the portable type. Except for the road and parking areas, Dahl Beach is almost entirely in natural vegetation. Access is obtained from Meldrum Bar Park Road. As the result of park property acquisition in 1990, which connected Meldrum Bar with Dahl Park, the public now has more than one mile of continuous river frontage along the Clackamas and Willamette Rivers.

- **Dierickx Field:** 2.27 Acres. Located on Risley Avenue north of W. Gloucester, Dierickx Field is used during the spring and summer for little league and junior baseball/softball and is improved with two baseball fields, permanent restrooms, snack shack, bleachers, baseline fencing and playground equipment.

- **Gladstone Nature Park:** Approximately 10 acres. Located between Oatfield Road and Webster Road, north of Kearns Market. This property is primarily undeveloped and contains a paved walking trail through the park.

- **Glen Echo Wetland:** 2.97 Acres. Located north of Glen Echo Avenue, it is undeveloped and contains the southern most area of Boardman Swamp. This property consists of 1.79 acre wetlands that were dedicated to the city in 1988. In 1993 the city purchased an additional 1.18 acre parcel adjacent to the wetlands for passive recreation.

- **High Rocks Park:** 1.55 Acres. Located on the Clackamas River in the 82nd Drive commercial area, High Rocks Park is used year round by fishermen and during the summer by some picnickers and swimmers. The lower level, which is subject to yearly flooding, is unimproved. **High Rocks Park Lifeguard Program:** An agreement between the City of Gladstone, the City of Oregon City and American Medical Response (AMR) continues the lifeguard program each summer at the High Rocks area beginning on Memorial Day and continuing through Labor Day. This service, which is provided at no cost to either city, is intended to reduce water related accidents along this hazardous stretch of the Clackamas River. Thanks to AMR for their excellent community service!

- Max Patterson Memorial City Park, 450 E. Exeter: 1.84 Acres. Adjacent to the John Wetten Elementary School. Patterson Park contains two tennis courts, a large play structure, permanent restrooms, a spray park, picnic shelters, small stage, irrigation system, and drinking fountain. This is the most popular park with city residents and is the site of the city summer recreation programs and the annual Chautauqua Festival. Patterson Park is 100% landscaped. **Picnic & Parties at Max Patterson Park:** Patterson Park has been the site of many picnics and birthday parties. Reservations are not required to reserve covered shelters or picnic tables at the park for a picnic or birthday party – picnic tables and covered shelters are available on a first come, first served basis. When using the park (or any city park), residents are advised that inflatable jumpers, such as bouncy houses, and climb-on play equipment, such as rock climbing walls, are not permitted. **Spray Park at Max Patterson Park:** The spray park at Patterson Park is open the week following dismissal of school for the summer through Labor Day, Monday – Saturday, 12:00-6:00 p.m. and Sundays from 1:00-5:00 p.m. (weather permitting). The interactive spray park feature utilizes a recirculating water system with a filtration unit and chlorine sanitizer. For safe, responsible fun at the spray park, please follow the spray park rules: 1) Parental supervision of children is required; 2) Swim diapers are required for all persons who are not toilet trained; 3) Dogs/animals are not allowed in the feature (dog hair clogs the water recirculatory system and there is potential of introducing fecal matter into the water system); 4) Do not use the spray park if you have had diarrhea in the last two weeks. Here are a few additional tips when using the spray park: 1) For effective sunscreen application, allow the sunscreen to dry before entering the water; 2) Rinsing off in the designated shower area is recommended prior to entering the spray park; 3) Swim socks or shoes are recommended to avoid injury; 4) Drinking and spitting of water from the feature is discouraged. Your health and safety is our priority. **Summer Recreation Program:** A summer recreation program for children begins the week following dismissal of school for the summer through the fourth Friday of August, Monday-Friday, 10:00 a.m. to 4:00 p.m. Daily activities will include limited games, sports, crafts and special events for all ages. Watch the city's website and newsletter for a complete schedule of events during the summer.

- Meldrum Bar Park: 85.37 Acres. Located off River Road – Meldrum Bar Park is a regional facility, used year round by fishermen and boaters and receives heavy use during the spring, summer and fall by organized baseball, softball and soccer leagues. The portion of Meldrum Bar Park along the Willamette River is improved with a boat ramp and floating dock, potable water, portable restrooms, and a parking lot for boat trailers. Above the ordinary high water mark is a small picnic area, community gardens and a twelve acre sports field complex with four soccer fields, five softball/baseball fields and permanent restrooms. There is about a mile of paved bicycle/pedestrian paths in Meldrum Bar Park. About 30% of the park is in natural vegetation, including large wetlands. **Picnic & Parties at Meldrum Bar Park:** Reservations are not required to reserve covered shelters or picnic tables at the park for a picnic or birthday party – picnic tables and covered shelters are available on a first come, first served basis. When using the park (or any city park), residents are advised that inflatable jumpers, such as bouncy houses, and climb on play equipment, such as rock climbing walls, are not permitted. **Ball fields at Meldrum Bar Park:** Reservations, fees and certificate of liability insurance are required to reserve any of the soccer or softball/baseball fields at Meldrum Bar Park. **Community Gardens:** Gladstone Community Gardens are located in Meldrum Bar Park along the scenic Willamette River. This land is leased by the City to the Gladstone Community Garden Association, who is responsible for administering garden usage. The gardens are one of the older, and larger, community gardens in the Portland Metro area. The gardens cover nearly 5 acres and comprise 134 separate garden

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lots. Gardeners help maintain the area and work with the City of Gladstone to keep it neat and productive. Visit their website, http://www.gladstonegarden.org, for additional information.

- Nick Shannon Park: 0.6 acres located adjacent to the Oak Lodge Water Reservoir Site on Valley View Road. This property was acquired in 1996, partially with Greenspaces funds, and is developed for neighborhood park use with play equipment and picnic tables. About half the site will remain undeveloped in natural vegetation.

- **Olson Property:** 3.50 Acres. Located at the north end of Risley Avenue, just east of McLoughlin Blvd., this property was deeded to the city in 1983. It is undeveloped and contains a wetland.

- **Ridgegate Tracts:** Two parcels totaling 1.80 acres located on Ridgegate Drive were deeded to the city on the plat of the Ridgegate Subdivision in 1975. Tract 'D' contains a path to Kraxberger Middle School; otherwise the tracts are undeveloped and unimproved. In 1989, the City Council decided not to pursue the sale and residential development of Tract "D".

- **Robin Hood Park:** 0.19 acres. The park contains play equipment, including swings and a slide, a half-court basketball hoop and lawn areas and serves as a neighborhood park in the Sherwood Forest area. (Renamed in 2006 from Tot Lot in Sherwood Forest)

- **Salty Acres Wetlands:** This approximate .44 acre wetlands was deeded to the city in 1991 on the plat of the Salty Acres Subdivision. A small dam and outfall structure were created to help control storm water discharge.

- **Stocker Park:** 0.05 acres located at the easterly end of E. Clarendon Street. Stocker Park serves as a memorial to a former Gladstone resident; it is entirely landscaped.