BSRE POINT WELLS, LP REDEVELOPMENT PROJECT CRITICAL AREAS REPORT

In Support of Application # PFN 11-101457

Snohomish County, Washington

Prepared for:

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April 2018

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ACRONYMS AND ABBREVIATIONS

BMPs	Best Management Practices
BNSF	Burlington Northern Santa Fe
BO	Biological Opinion
BSRE	Blue Square Real Estate
BTEX	Benzene, Toluene, Ethylbenze and Xylenes
CAP	Cleanup Action Plan
CESCL	Certified Erosion and Sediment Control Lead
Corps	U.S. Army Corps of Engineers
CSL	Cleanup Screening Level
CWA	Clean Water Act
dBA	A-weighted Decibels
DEA	David Evans and Associates, Inc.
DEIS	Draft Environmental Impact Statement
DO	Dissolved Oxygen
DPS	Distinct Population Segment
DW	Dry Weight
Ecology	Washington State Department of Ecology
EFH	Essential Fish Habitat
ELLW	Extreme Lower Low Water
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FAC	Facultative
FACW	Facultative Wetland
GIS	Geographic Information System
HPA	Hydraulic Project Approval (as required in the State Hydraulic Code).
L_{eq}	Equivalent Sound Pressure Level
LID	Low Impact Development
LWD	Large Woody Debris
µg/kg DW	Micrograms per Kilogram, Normalized to Dry Weight
mg/kg DW	Milligrams per Kilogram, Normalized to Dry Weight
mg/L	Milligrams per Liter
MHHW	Mean Higher High Water
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
MTCA	Model Toxics Control Act
MUGA	Municipal Urban Growth Area
NFA	No Further Action
NHP	Natural Heritage Program
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System

NWI	National Wetlands Inventory
OBL	Obligate Wetland
OHWM	Ordinary High Water Mark
PAH	Polycyclic Aromatic Hydrocarbon
PBDE	Polybrominate Diphenyl Ethers
PBR	Potential Biological Removal
PCB	Planned Community Business
PCE	Primary Constituent Elements
PFO	Palustrine Forested
PHS	Priority Habitats and Species
PSAMP	Puget Sound Ambient Monitoring Program
PSCAA	Puget Sound Clean Air Agency
PSM	Practical Spreading Model
PSS	Practical Salinity Scale
SCC	Snohomish County Code
SCS	Soil Conservation Service
SEL	Sound Exposure Level
SPH	Separate-Phase Hydrocarbon
SQS	Sediment Quality Standard
SRKW	Southern Resident Killer Whale
SWPPP	Stormwater Pollution Prevention Plan
TESC	Temporary Erosion and Sediment Control
TMDL	Total Maximum Daily Load
UGA	Urban Growth Area
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VCP	Voluntary Cleanup Program
VREW	Vapor Recovery and Extraction Well
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources
WSDOT	Washington State Department of Transportation
WSGA	Washington State Gap Analysis

1 INTRODUCTION

At the request of Blue Square Real Estate (BSRE) Point Wells, LP, David Evans and Associates, Inc. (DEA), conducted this investigation to document the presence of critical areas, existing habitat conditions, level of potential fish and wildlife use in the project vicinity, and project-related impacts that could result from the proposed redevelopment of the project site. This investigation also evaluated priority habitats and species (PHS) as identified by the Washington Department of Fish and Wildlife (WDFW), and federally listed species under jurisdiction of the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) that could potentially occur in the project vicinity. Restoration opportunities were investigated and impact minimization measures for project-related actions are proposed.

1.1 Report Background

Previous versions of this report were prepared in April of 2016 and April of 2017 as part of the Point Wells Urban Center Application package. It has been revised to reflect the current status of project design, including the addition of a secondary full access to the site, as well as any applicable updates to existing conditions (for example, updated list of threatened and endangered fish and wildlife species), in order to better support the preparation of a Draft Environmental Impact Statement (DEIS) that is conducting a comprehensive analysis of the impacts of the project to the natural and built environments. Also, the report has been revised to respond to Snohomish County comments on the draft land use application, comments dated October 7, 2017. This report supports BSRE's current land use application submittal – PFN 11-101457.

This report only addresses wetlands, streams, and fish and wildlife habitat conservation areas. Floodplains and geologically hazardous areas

1.2 Project Site History

The facilities on Point were reportedly constructed in 1912 after Standard Oil (now Chevron), Shell, and other smaller oil companies purchased the property. The facility was previously used as an asphalt refinery and light products/lube oil distribution terminal. The various types of petroleum products stored or processed at Point Wells included crude oil, asphalt products, lubrication oils, fuel oils, aviation fuels, motor vehicle and marine vessel fuels, and thinners. The light products/lubrication oil distribution terminal is no longer in operation. The asphalt refinery ceased operations in 2000. BSRE Point Wells, LP, purchased the site in 2005. Currently, the facility is used for the storage and distribution of marine fuels and asphalt.

The existing facility was reportedly constructed on a salt marsh, which was filled with 4 to 15 feet of imported sand and gravel. The fill has been overlaid with pavement. Groundwater is typically present at depths ranging from 1 to 2.5 feet below the surface in the eastern area and 5 to 8 feet in the western area.

1.3 Project Proposal

The Snohomish County's Comprehensive Plan Map designation of the site has changed from Urban Industrial to the designation of Urban Center (during which time the Point Wells proposal was submitted and became vested), and then changed again to Urban Village. The zoning of the site has also been changed from Heavy Industrial to Planned Community Business with special

provisions that require County approval prior to major site redevelopment for mixed use. These plan map and zoning changes were necessary in order to allow the complete, master-planned redevelopment of the industrial portion of Point Wells to be implemented in a manner that successfully facilitates the transformation of this area into a distinct, new mixed-use commercial, recreation, and residential site that is pedestrian-oriented and takes full advantage of its unique and very attractive waterfront setting.

The Point Wells redevelopment project consists of a 4 lot short plat in preparation for a future multi-phased urban center application. The urban center will consist of mixed-use commercial, retail, residential, and public recreational uses (**Appendix A**). This version of the report addresses the addition of a secondary full access to the site from the east (**Appendix A**).

1.4 Project Location

The project site is located north of Seattle, Washington, in southwest Snohomish County, along the Puget Sound shoreline, at Point Wells (**Figure 1**). Point Wells is located in Township 27 North, Range 3 East, Section 35. The approximate latitude and longitude of the central project area is 47.78157° N by 122.39490° W. The general location of the project site on United States Geological Survey (USGS) topographic maps is depicted on **Figures 1** and **2**. **Figures 3** and **4** include aerial photographs of the general project area.

1) The project site encompasses approximately 56 acres to the west of the Burlington Northern Santa Fe (BNSF) tracks and 5 acres to the east of the BNSF tracks. The area to the west of the BNSF tracks consists of five parcels (**Figure 5**). Parcel-specific data from the Snohomish County Assessor webpage is as follows:

2) Parcel Numbers 27033500301200 and 27033500302700. This area is identified as being Urban shoreline environment, Southwest County Urban Growth Area (UGA), and Woodway Municipal Urban Growth Area (MUGA). These parcels represent the northern half of the project area. The total size of both parcels is 25.95 acres.

3) Parcel Number 27033500302800. This parcel is identified as being Urban shoreline environment, Southwest County UGA, and Woodway MUGA. This parcel represents the central portion of the project area. The total size is 15.90 acres.

4) The southern portion of the project site includes three parcels, which were used as a construction/staging area for the Brightwater outfall project. These parcels are all identified as being Urban shoreline environment, Southwest County UGA, and Woodway MUGA. Parcel numbers include:

   - 27033500304000: Total size is 2.62 acres.
   - 27033500301100: Total size is 5.75 acres.
   - 27033500303900: Total size is 5.79 acres.

The shoreline immediately west of the project site is identified as Puget Sound Conservancy Shoreline Environment.

The west side of the site consists of a semicircular area adjacent to Puget Sound, referred to as the “Lower Bench” because it is at a lower elevation than the rest of the site. The southeast portion of the site is a more or less rectangular area of about 5 acres, referred to as the “Upper

Bench" because it is at a higher elevation. The two areas are separated by the approximately north–south Burlington Northern Santa Fe (BNSF) railroad tracks.

On the east side of the proposed development, across the railroad tracks, is an ascending slope. The slope is approximately 150 to 200 feet high and is covered with vegetation. The average overall slope gradient ranges from about 18 to 50 percent (or about 3H:1V to 2H:1V), with gradients generally increasing from the south end to the north end of the site (**Figure 4**). The slope gradient varies locally, maximizing at 100 percent (1H:1V). Several buildings and a retention pond are on the Upper Bench. The Upper Bench is relatively flat, with a steep ascending slope along its eastern perimeter having an average gradient of about 50 percent and locally steeper sections approaching 100 percent. A short concrete block retaining wall is located on the east portion of the Upper Bench, adjacent to the toe of the existing slope. The western boundary of the Upper Bench descends on a short steep slope to the BNSF railroad tracks. The Lower Bench contains an asphalt plant and marine fuel terminal. The Lower Bench is generally flat with less than 10 feet of elevation change across the site. The Lower Bench is protected from the adjacent Puget Sound by a concrete seawall, sheet pile wall, and/or riprap.

Figure 1: Vicinity Map

Source:
Google Pro, 2018

N

0 250 500 1000
Scale in Feet

Gx1973

Project Vicinity Map

BSRE Point Wells, LP

PARA0000-0007

April 2018

Figure 1

DAVID EVANS AND ASSOCIATES INC.

Figure 2: Site Map

Source:
National Geographic, TOPO, 2002

N

0 .5 1
Scale in Miles

Gx1973

Project Site Map	
BSRE Point Wells, LP	
PARA0000-0007	*Figure 2*
April 2018	

DAVID EVANS AND ASSOCIATES INC.

Figure 3: Aerial Photograph

Source:
U.S. Geological Survey 2002 via Microsoft Research Maps.

N

Gx1973

Aerial Photograph		
BSRE Point Wells, LP		DAVID EVANS AND ASSOCIATES INC.
PARA0000-0007	*Figure 3*	
April 2018		

Figure 4: Shoreline Aerial Photograph

Source:
Washington State Department of Ecology, 2010.

N

Shoreline Aerial Photograph	
BSRE Point Wells, LP	
PARA0000-0007	*Figure 4*
April 2018	

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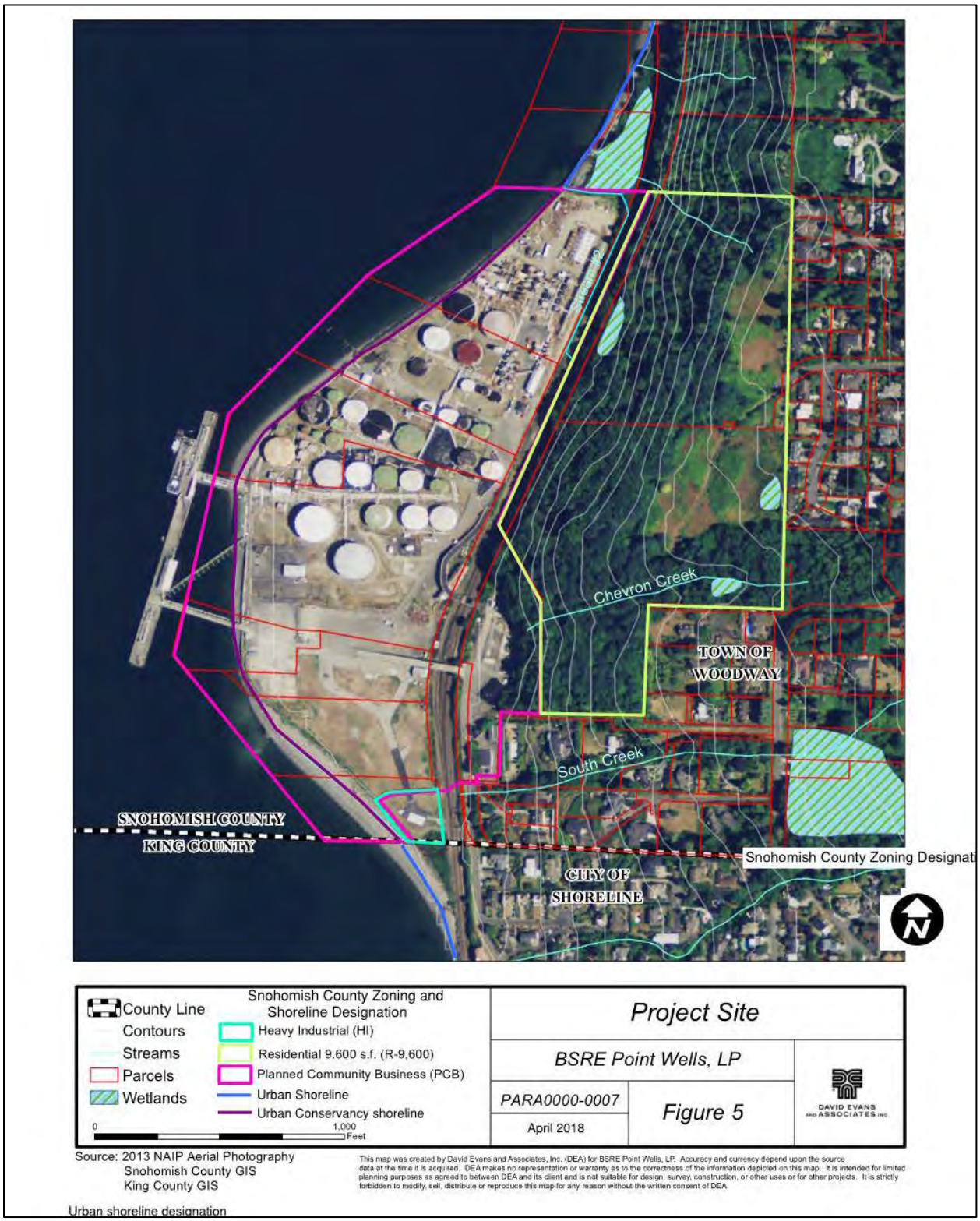
Figure 5: Snohomish County GIS Map



2 PROJECT DESCRIPTION

The site includes approximately 61 acres of uplands, tidelands, and submerged lands. Approximately 45 acres of uplands would be used for mixed-use redevelopment (**Appendix A**). The adjoining tidelands would remain undeveloped, except for the site's existing deepwater pier and small concrete boat launch ramp. The tidelands would retain their current Shoreline Master Program Conservancy Environment designation. Approximately one acre of the upland area, adjacent to the southwestern corner of the site, will be used indefinitely for the new Brightwater Regional Wastewater Treatment System outfall portal facility (**Figure 5**).

The purpose of the Short Plat is to establish four legal lots representing the main project phases of the future redevelopment of the site pursuant to Snohomish County Code (SCC) 30.34A. Additional lots are proposed for open space, recreational and other common area purposes. The Urban Center proposal will include approximately 3,085 residential units. A variety of multi-family, townhouse, and senior housing unit types and sizes will be included. The average residential unit size will be approximately 850 square feet. This proposal will also include approximately 32,000 square feet of commercial space for various office, business, and civic uses. It will also include approximately 94,000 square feet of retail, entertainment, and eating establishment uses.

The proposed development includes primary access from the north terminus of Richmond Beach Drive. A secondary full access has been proposed at the request of Snohomish County. The second access extends west from 116th Avenue W, and goes north around the proposed Urban Plaza and enters the property near the middle of the site. It would wrap around the back of the Upper Bench near the base of the slope where it would cross the BNSF railroad tracks via a bridge to the Lower Bench at the north end of the Upper Bench. To accommodate road grades, retained fill up to about 40 feet above existing grades (60 feet above the lowest basement level) is proposed near the base of the slope. Limited sections of roadway cuts (up to 8 feet) and fills (up to 20 feet) are anticipated. Project Phasing

The Urban Center will be constructed in four major phases over the course of approximately 20 years. The environmental cleanup action plan (CAP) and development marketing strategy will each have a strong ongoing influence on the phasing timetable. Building construction and site development will follow cleanup, starting with the primary site infrastructure and public amenities. These improvements will make the development attractive to both potential residents and the community at large. The infrastructure needed to support the proposed site development will be extensive. The development design and construction will be phased in a manner that most efficiently expands the infrastructure necessary to support the needs of the corresponding project phase. Please refer to the Phasing Plan Narrative and diagram contained in the project Urban Center Development Plan Application for more information.

The first phase of the project will begin immediately after project design approval and will include the initial portion of the CAP and related demolition of existing structures. The final project design approval date is TBD.

PHASE 1 – South Village and Initial Urban Plaza Improvements: This phase of the project will include public amenities (first phase of a shoreline public boardwalk and renovation of the existing

pier), retail uses, a mix of residential unit types, understructure parking, utilities, a police/fire station, interim on-site transit center, stream and shoreline restoration work, and off-site transportation and utility improvements. The esplanade west of the Central Village and a second access are included in this phase for emergency vehicles. The Energy Center and trash collection system will be constructed as part of this phase to provide the initial infrastructure for Phase 1 buildings. The South Village area is located at the south end of the site adjacent to Puget Sound. The Urban Plaza is located immediately east of the BNSF Seattle to Everett rail line.

PHASE 2 – Urban Plaza completion: This phase of the project includes the Urban Plaza, retail, commercial and residential construction, parking and the public transit hub.

PHASE 3 – Central Village: This is the largest phase of the project and will include over 1000 residential units of various types. It will also include retail uses, restaurants, understructure parking, utilities, public amenities including a public amphitheater, community building site, clean energy production and waste treatment center, shoreline public boardwalk extension, and shoreline restoration.

PHASE 4 – North Village: This final project phase will include residential units of various types, understructure parking, public amenities including a shoreline public boardwalk extension and large forested open space, and shoreline restoration and utilities. The esplanade and beach restoration work is completed in this phase.

A Sound Transit rail station is included in either Phase 3 or Phase 4 depending on resident demand. This station will consist of two grade-level platforms served by the north bridge over the railroad tracks. Vertical circulation will allow access to north and southbound platforms from the bridge.

2.1 PROJECT ELEMENTS

2.1.1 Urban Plaza

The Urban Plaza will also serve as the project's commercial center and public transit hub connecting pedestrians with its commuter rail and bus transit station via a new pedestrian bridge to the main portion of the site. It will have a village square character and scale accommodating a mix of uses serving the project's residents, employees, visitors and surrounding communities with boutique retail, grocery shopping, restaurants, entertainment and other services. The Urban Plaza will also include a mix of offices and senior housing as well as a police and fire station. As a place of arrival it will include landscaped and art filled public gathering spaces.

2.1.2 Urban Villages

The three urban villages (South, Central, and North Villages) will contain a mix of residential unit types, understructure parking, utilities, public amenities, shoreline public access, and natural feature restoration elements. The South and Central Villages will also include retail and restaurant uses. The Central Village will also create the opportunity to provide a multi-purpose community center facility to serve project residents and surrounding communities, which could include public meeting and exhibition spaces, a library, and an orientation center for the development. The community center site's central location within the development will make it

directly accessible from the project's main boulevard and pedestrian bridge, which is linked to the site's transit hub. The Central Village will also be the location for a clean energy and waste treatment center that will enable a significant amount of the project's energy to be produced on site.

The project's three urban villages would each have a crescent configuration of tower structures that would capture the panoramic views of Puget Sound and the Olympic Mountains. The larger scale of the crescent urban form is intended to create a unique place and character of smaller scaled village buildings. This in turn would generate a neighborhood of streets and lands that would offer intimate scaled spaces, views, and pathways connecting to the beachfront and shoreline. The North Village would have a distinct character and separate access road off the main boulevard, which would meander through a newly created wooded landscape arriving at the beachfront entrances to the residential buildings. All parking for residents is underground, allowing unrestricted pedestrian movement at ground level.

2.1.3 Proposed Shoreline Development

2.1.3.1 Seawall Reconstruction and Realignment

The site's existing, approximately 3,300-foot-long, combination sheet pile, rip-rap rock, and timber seawall would be totally removed and reconstructed. Most of the new seawall would be relocated 40 to more than 100 feet landward of its existing location. The primary purpose of this realignment would be to create approximately 7.4 acres of productive new intertidal habitat area (see **Appendix B**).

2.1.3.2 Deepwater Dock Renovation

The existing approximately 1,050-foot-long deepwater dock onsite would be extensively renovated to provide an array of new shoreline public access benefits. The dock's three existing land access piers would be replaced by a single new pedestrian access pier. The smaller dilapidated creosote piling-supported pier north of the deepwater dock and nearby mooring dolphin would also be removed. The deepwater dock's deteriorating creosote support piling would be systematically replaced by coated steel piling. Public viewing and fishing areas would be added to the dock along with shops selling fishing tackle, scuba, and boating gear, and small restaurants with outdoor eating areas. Storage and rental facilities for kayaks, scuba diving, and small sail boats would also be added.

Public Amenities – The proposal will include a wide range of amenities for public benefit throughout the site. Most of these amenities will be conveniently accessed by the public via the project's main boulevard beginning at the project entrance, passing through the Urban Plaza with its transit hub and various retail outlets, crossing over the BNSF rail line on a new bridge, and descending to a large beachfront plaza between the South and Central Villages. This centrally-located public space focal point will include a concentration of amenities including an outdoor amphitheater, shops and restaurant spaces with generous outdoor terraces oriented southwest to capture sun, and views of the waterfront environment. A beachfront pedestrian promenade extending the full length of the site will also be conveniently accessible from this location. It will provide good access to a new nature walk amenity, which will be provided by the creation of a wooded area between the North and Central Villages. The beachfront promenade will also

connect to a new pedestrian bridge, providing access to the previously-described repurposed main pier with its major public amenities.

2.1.4 Site Grading

Site grading would occur during initial site preparation and during all subsequent phases of site redevelopment. Initial site preparation would likely require an increase in elevation of approximately eight feet on most of the site to the west of the BNSF railroad line for drainage and ground improvements. Approximately 600,000 cubic yards of material would be imported to the site from an approved off-site source. Approximately 100,000 cubic yards of native material would be redistributed onsite—additional clean, granular imported fill may be required. It is anticipated that fill material would be barged to the site, delivered to the site via rail, and, to a minor extent, trucked to the site. Construction during all project phases following initial site preparation would require excavation and filling for construction of roads, building foundations, parking structures, public spaces, stormwater facilities, underground utilities, and habitat restoration. A total of approximately one million cubic yards of cut and fill could be necessary for site redevelopment. Additional grading would be required for the second access, but design details for that route were not available at the time of the publication of this report.

3 IMPACT MINIMIZATION MEASURES

3.1 Construction Erosion Control Measures

Erosion control measures will be implemented through the development, implementation, and management of site-specific temporary erosion and sediment control (TESC) plans and stormwater pollution prevention plans (SWPPP). These plans will be subject to review and approval from both Snohomish County and the Washington State Department of Ecology (Ecology) as part of the permit approval process. Proposed measures to reduce or control erosion will include use of multiple Best Management Practices (BMPs). Minimum standard BMPs typical to most construction sites, as well as site-specific measures based on existing conditions will include:

- Marking Clearing Limits
- Establishing Construction Access
- Controlling Flow Rates
- Installing Sediment Controls
- Stabilizing Soils
- Protecting Slopes
- Protecting Drain Inlets
- Stabilizing Channels and Outlets
- Controlling Pollutants
- Controlling Removal of Shallow Groundwater
- Routine Inspection and Maintenance of BMPs
- Routine Documentation and Reporting
- Managing the Project

A Certified Erosion and Sediment Control Lead (CESCL) shall be on-site or on-call at all times. Monitoring of on-site BMPs and stormwater outfalls will be required. Monitoring will be carried out to assure water leaving the site meets Washington State standards. Additional actions may be warranted based on the results of the monitoring. Project-specific erosion control measures will be fully defined in the TESC Plan and SWPPP.

3.2 Air Pollution Reduction Measures

Proposed measures to reduce or control air emissions or other impacts to air during construction will potentially include measures for reducing both equipment/vehicle exhaust emissions and fugitive dust. The Washington Associated General Contractors brochure "Guide to Handling Fugitive Dust from Construction Projects" and the Puget Sound Clean Air Agency (PSCAA) suggest a number of methods for controlling dust and reducing the potential exposure of people to emissions from diesel equipment.

The redeveloped site is not likely to produce more air quality impacts than its past and present use for petroleum products storage, processing, and distribution. A commuter trip reduction program for project employees and residents will be implemented and would reduce single occupant vehicle trips. The project's transit-oriented development design would also encourage site residents, employees, and visitors to use transit and assist in reducing vehicle trips.

3.3 Operational Water Quality Control Measures

A fully integrated, state-of-the-art, stormwater drainage system will be implemented to provide collection, treatment, and conveyance of stormwater runoff from the developed site based on the latest version of the *Stormwater Management Manual for Western Washington* (Ecology 2014). Implementing an appropriate combination of stormwater management measures and BMPs would mitigate impacts from the redeveloped site. These would include stormwater management facilities that would safely route runoff to receiving waters without creating additional erosion or sedimentation. These facilities would also use oil/water separators to trap potential pollutants. A spill response program tailored to the specific needs of the redeveloped site would also be implemented. The implementation of enhanced water quality treatment, use of emerging technologies, and adequate maintenance and monitoring will be required to improve baseline conditions.

3.4 Noise Control Measures

Construction noise could be minimized with properly sized and maintained mufflers, engine intake silencers, engine enclosures, and turning off equipment when not in use. Stationary construction equipment should be located away from sensitive areas where possible. Where this is infeasible, or where noise impacts would still likely occur, portable noise barriers should be placed around the equipment with the opening directed away from the sensitive areas. These measures are especially effective for engines used in pumps, compressors, welding machines, etc., that operate continuously and contribute to high, steady background noise levels. Portable noise barriers provide a reduction of about 10 A-weighted decibels (dBA) in equivalent sound levels, and should be placed between noise generating equipment and the marine environment. Substituting hydraulic or electric models for impact tools such as jack hammers, rock drills, and pavement breakers would also reduce construction noise. Electric pumps could be specified if pumps are required.

3.5 Marine Impact Reduction Measures

In-water work methods and BMPs will meet the most recent version of all regulatory and permit requirements (i.e., State Hydraulic Code [WAC 220-660]; Section 404 of the Clean Water Act; Section 10 of the Rivers and Harbor Act; Endangered Species Act [ESA]; Shoreline Management Act; and Marine Mammal Protection Act [MMPA]). In-water work includes installation of new piles at the primary dock; removal of select old piles at the primary dock; removal of piles and beams at the dilapidated dock and dolphin piling; potential removal of old/unneeded outfalls; construction of new outfalls; removal of existing shoreline riprap and seawall; and creation and restoration of intertidal and nearshore habitats between the existing shoreline and proposed shoreline. Potential impacts expected from in-water work include noise generated during installation of piles, disruption of substrate during pile removal and installation, localized increases in turbidity, and other potential water quality impacts associated with removal of existing shoreline armoring and creation of nearshore and intertidal habitat.

One of the primary actions used to reduce potential impacts to fish and wildlife associated with in-water work is to avoid in-water work when sensitive species could be present in the action area. The timing of in-water work is designed to limit impacts to specific species, including forage fish, juvenile salmonids, marine birds, and marine mammals. There can be multiple in-water work windows depending on the species present within the action area, the tidal reference area for the action area, and agency with jurisdiction.

Several agencies set in-water work windows for species and for the location in Puget Sound. The Point Wells project is located in tidal reference area 6. Assuming all work windows related to salmonids and forage fish are applied, WDFW, U. S. Army Corps of Engineers (Corps), and the federal services work windows would allow in-water work from July 16 to August 31. The final in-water work schedule would be based on the dates provided by the regulatory agencies and described in the permit conditions. Examples of past projects with similar in-water work include the Brightwater outfall project. The final in-water work window for the outfall project, that also included installing 30 piles at the Point Wells dock, was authorized to occur between October 15 and February 15 (Corps 2005).

In order to reduce impacts associated with in-water work and pile driving within marine waters, a standard set of impact reduction measures is typically applied above and beyond the in-water work window. The following impact measures may be modified after consultation with the USFWS, NMFS, Corps, WDFW, Ecology, tribal governments, and Snohomish County. Project actions are not detailed sufficiently enough at this time to prepare an all-encompassing list of impact minimization measures. The preliminary impact reduction measures include:

- General: In-water pile driving will be limited to work windows set by the regulatory authorities.
- NMFS Refined in-water work window: Conduct in-water pile driving during the months of November, December, and January (NMFS 2004).
- New piles will be constructed of steel (no creosote piles or lumber will be used).
- All treated lumber used for the project shall meet or exceed the standards established in *Best Management Practices For the Use of Treated Wood in Aquatic Environments*,

developed by the Western Wood Preservers Institute, revised July 1996. All ACZA (e.g., Chemonite treated) lumber shall be treated by the manufacturer per the Post Treatment Procedures outlined in BMP Amendment #1 – Amendment to the Best Management Practices for the Use of Treated Wood in Aquatic Environments: USA Version – Revised July 1996, by the Western Wood Preservers Institute dated April 17, 2002, or current version.

- A vibratory hammer will be the primary means of installing in-water piles. Use of an impact hammer will be limited to load testing.
- During load testing, a 6-inch-thick wood block shall be installed between the piling and the impact hammer. In addition, BMPs for noise reduction shall be employed where required by regulatory agencies (such as the use of a bubble curtain or double-walled pile).
- During creosote-piling removal and all in-water and over-water work, containment booms and absorbent sausage booms (or other oil absorbent fabric) shall be placed around the perimeter of the work area to capture wood debris, oil, and other materials released into marine waters as a result of construction activities. All accumulated debris shall be collected and disposed upland at an approved site.
- The existing pilings shall be removed and disposed of in such a manner that they do not enter waters of the state. In the event that the piles cannot be extracted from the sediment, the piles will be cut off 2 feet below the mudline and removed.
- Eelgrass and kelp shall not be adversely impacted due to any project activities (e.g., barge shall not ground, anchors and spuds shall not be deployed, equipment shall not operate, and other project activities shall not occur in eelgrass or kelp).
- All debris or deleterious material resulting from construction shall be removed from the beach area and bed and prevented from entering waters of the state.
- Abandoned outfalls shall be removed from waters of the state.
- An emergency spill containment kit must be located on site along with a SWPPP detailing planned fueling, materials storage, and equipment storage. Waste storage areas must be prepared to address prevention and cleanup of accidental spills.
- The SWPPP will identify personnel and procedures and specify materials to be kept on-site for use in responding to emergencies and contingencies.
- All on-site personnel will be trained in spill prevention and spill response procedures.
- No petroleum products or other deleterious materials shall enter surface waters.
- Grading will occur primarily during the dry season between May 1 and September 30.
- Perimeter controls will be installed and temporary pipes and channels will be used to route concentrated stormwater runoff to sediment ponds for treatment.
- Disturbed areas that are not undergoing active construction will be covered with plastic, straw, or temporary grass seed.
- Site remediation measures will be implemented per an approved remediation plan.

- A barge plan will be prepared and implemented to minimize impacts to eelgrass and macro algae present in the immediate location of the existing dock. The barge plan may include use of anchor lines and spuds.
- The new dock ramp and boat slips will be constructed to avoid impacting eelgrass and macro algae located between the existing dock and shoreline.
- Trash receptacles will be strategically placed around the site during both construction and operation of the project site. They will include a cover to eliminate wind from spreading trash and wildlife scavenging. All trash receptacles should be emptied prior to becoming a potential source of pollution.
- Lighting from outside sources will be directed downward and away from the marine environment to the maximum extent practicable. A lighting plan will be prepared that specifically addresses and minimizes impacts to the nearshore marine environment.
- Noise barriers will be installed along the shoreline during construction.

Monitoring and select surveying will be needed to further identify and protect fish, wildlife, and habitats that could be impacted by project-related activities.

- Monitoring will be carried out to assure water leaving the site meets Washington State standards.
- Eelgrass and macro algae surveys will be conducted around and under the dock and dolphin piles.
- Peak and RMS sound pressure levels for each pile will be monitored. A report to the services and Corps will be provided within 60 days of completion of pile driving. The report will describe size of hammer and impact force, depth of water at each pile, distance between hydrophone and each pile, and depth of hydrophone.
- Behavioral changes of marbled murrelets and marine mammals will be monitored. A report to the services and Corps will be provided within 60 days of completion of pile driving. The report will document number and species of any observed injured or dead fish or birds during pile driving. Observations of murrelets and marine mammals in the area of potential effect, and distance from dock via GPS, will be included in the report.
- Monitoring for forage fish spawning will start one week prior to start of in-water pile driving and during pile driving. Pile driving is to stop should forage fish be observed spawning during pile driving. Pile driving may commence one week after forage fish stop spawning. Immediately contact the local area habitat biologist should forage fish be observed spawning during pile driving. Confer with the WDFW local area habitat biologist on appropriate measures to protect spawning forage fish.

4 METHODS

4.1 Preliminary Data Gathering and Review

Published information about local critical areas was reviewed for evidence of wetlands, streams, and potential fish and wildlife habitat in the project vicinity. This report was prepared following the review of conceptual project plans, public domain resource data, and multiple site visits.

The WDFW PHS program and the Washington State Department of Natural Resources (WDNR) Natural Heritage Program (NHP) were consulted for documented occurrences of priority habitats or species, rare plants, and high quality native ecosystems in the project vicinity. Priority habitats include, but are not limited to, such features as wetlands, riparian areas, snag-rich areas, caves, cliffs, oak woodlands, rocky shorelines, and old-growth forests. Priority species are plants and animals listed by the state or federal government as endangered, threatened, sensitive, candidate, or species of concern. The potential use of the project vicinity by mammals, birds, amphibians, and reptiles was investigated through review of Washington State Gap Analysis (WSGA) data. The information reviewed included:

- WDFW PHS data (2018a)
- WDNR NHP data (2018a): http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf
- National Wetlands Inventory (NWI) Online Mapper (2018), USFWS: http://wetlandsfws.er.usgs.gov/wtlnds/launch.html
- Snohomish County - Geographic Information System (GIS) data
- Snohomish County Stream and Wetlands Survey, Snohomish County Public Works (1987)
- A Catalog of Washington Streams and Salmon Utilization – Volume 1 – Puget Sound Region. Washington Department of Fisheries (Williams et al. 1975)
- Breeding Birds of Washington State – Location Data and Predicted Distributions (Smith et al. 1997)
- Terrestrial Mammals of Washington State - Location Data and Predicted Distributions (Johnson and Cassidy 1997)
- Amphibians and Reptiles of Washington State - Location Data and Predicted Distributions (Dvornich et al. 1997)
- United States Department of Agriculture (USDA) – Soil Conservation Service (SCS): Soil Survey of the Snohomish County Area, Washington (1983)
- Snohomish County – Draft Supplemental Environmental Impact Statement: Final Docket XIII Comprehensive Plan Amendment – Paramount of Washington LLC, Snohomish County, February 2009. Available on the www: http://www.co.snohomish.wa.us/documents/Departments/PDS/Planning_Commision/2009/AgendaDocs/DraftSEISParamount.pdf
- King County Brightwater Project Data (multiple reports and data [published and unpublished]).

4.2 Action Area

The action area includes all areas that could be affected directly or indirectly by the proposed project and is not limited to the actual work area (project area). The action area represents the geographic extent of all physical, biological, and chemical impacts from the project (**Figure 6**).

The project area and secondary project features are considered when defining the action area. The action area will include potential effects from visual and audible disturbance, terrestrial habitat impacts, and impacts to aquatic environments.

Project-related construction requires pile driving. The project area is within a developed industrial site, but in-water work within the marine environment is proposed. It is assumed that pile driving at the dock would be the dominant underwater noise. Ambient terrestrial noise was determined based on reviewing population density data for the City of Shoreline, which was 4,544 people per square mile during the 2010 census. Based on this data, the ambient noise level (equivalent sound pressure level [L_{eq}]) would be 55 A-weighted decibels (dBA) (Washington State Department of Transportation [WSDOT] 2015). This was then increased to 60 dBA to factor in other variables such as trains and on-going facility day-to-day operations in the immediate project vicinity. Terrestrial noise was determined to attenuate to 60 dBA ambient noise in 0.95 mile.

Determining the extent and effect of underwater noise starts with establishing a baseline noise level. However, this task is not straightforward. Underwater noise levels vary by time of day, the taxa exposed to the sound (cetaceans, pinnipeds, diving seabirds), and location in the Puget Sound. Based on WSDOT measurements taken at the Edmonds ferry dock, which is approximately 1 mile north of the proposed project, underwater broadband background noise levels were 123 dB, which is the level used in this analysis. The ambient underwater noise level is compared to the level of noise produced by impact pile driving. This was determined by assuming that 14-inch steel piles driven with an impact driver would produce sound levels of 198 dBpeak at 22 meters, 182 decibels root mean square (dBrms) at 22 meters, and 170 dB sound exposure level (SEL) at 22 meters (WSDOT 2015). A bubble curtain or similar noise attenuation device would be used during impact pile driving. Average noise reduction for unconfined bubble curtains employed in similar environments (12-inch piles in silt and glacial till at Cape Disappointment boat launch was an 11-dB reduction per doubling distance (WSDOT 2015). Larger piles (36 inches) driven at a closer site (Mukilteo) in sand and silt observed an average noise reduction of 14.5 dB (WSDOT 2015). The lower reduction level was assumed for the purpose of this analysis. This resulted in 187 dBpeak at 22 meters and 171 dBrms at 22 meters.

Potential effects are species specific. The SEL thresholds involve several assumptions documented in the NMFS and USFWS noise calculators (**Appendix F**). The key assumption is the number of pile strikes per day, which is based on criteria outlined in the WSDOT Advanced Biological Assessment Training Manual (WSDOT 2015). According to this information, the number of strikes per pile for all piles measuring 24 inches in diameter or less was 309. Thus, this analysis assumed 300 strikes per pile for installation, with up to four piles installed per day, for a total of up to 1,200 impact pile strikes per day.

The above discussion applies only to impulsive sound sources (e.g., impact pile driving). Continuous sound will also be produced by the project in the form of vibratory pile driving. WSDOT considers 120 dBrms to be the threshold for disturbance to marine mammals from vibratory pile driving. However, in many cases, the estimated underwater background noise levels in Puget Sound are larger than 120 dBrms (underwater background level near Edmonds is 123 dB). In this case, WSDOT recommends that the larger of the two values be used when determining extent of impacts (WSDOT 2015). The regulatory agencies typically required

vibratory driving as a mitigation measure on projects to minimize risk of injury to aquatic species in marine environments (WSDOT 2015).

Based on the assumptions discussed above, the practical spreading model (PSM) was used to determine the distance of attenuation of underwater noise to the background underwater noise level (: R1= 22* (10^(171-123)/15) = 34,868 meters.

A summary of how noise levels will decrease as distance from the source increases based on the available data is outlined below.

- At 34,868 meters, noise will reach 123 dBrms which is the limit of environmental effects (aquatic action area) as well as the underwater disturbance threshold for marine mammals from vibratory pile driving
- At 1 meter, noise will be at 206 dBpeak and would cause injury to all fish (NMFS calculator)
- At 1.2 meters, noise will reach 190 dBrms, which represents the injury threshold for pinnipeds
- At 5.5 meters, noise will reach 180 dBrms, which represents the injury threshold for ceteceans
- At 1 meter, noise will reach 208dB cumulative SEL and cause barotrauma (non-auditory injury) to diving murrelets
- At 3 meters, noise will reach 202dB cumulative SEL and cause auditory injury to diving murrelets
- Within 42 meters, noise from pile driving may mask essential communication between foraging murrelets and reduce foraging efficiency
- At 119 meters, noise will reach 160 dBrms, which would disturb but not injure whales and pinnipeds
- At 34 meters, noise will reach 187 SEL dB, which would cause injury to fish greater than or equal to 2 grams (NMFS calculator)
- At 553 meters, noise will reach 150 dBrms, which represents the extent of the disturbance threshold for murrelets (USFWS calculator)
- At 62 meters, noise will reach 183 dB SEL, which would cause injury to fish less than 2 grams (NMFS calculator)

Secondary potential aquatic effects are associated with turbidity and sedimentation during construction and maintenance. The extent of turbidity and sedimentation effects can vary widely depending on area of disturbance, sediment sources, particle size, and tide fluctuations. All work in or near the water, and water discharged from the project area, are required to meet the State's Water Quality Standards, Washington Administrative Code (WAC) 173-201A. A mixing zone for turbidity is authorized within WAC 173.201A-030 during and immediately after necessary in-water or shoreline construction activities that result in the disturbance of in-place sediments. **Figure 6** provides a visual overview of the action area and extent of potential environmental effects due to underwater noise associated with pile driving.

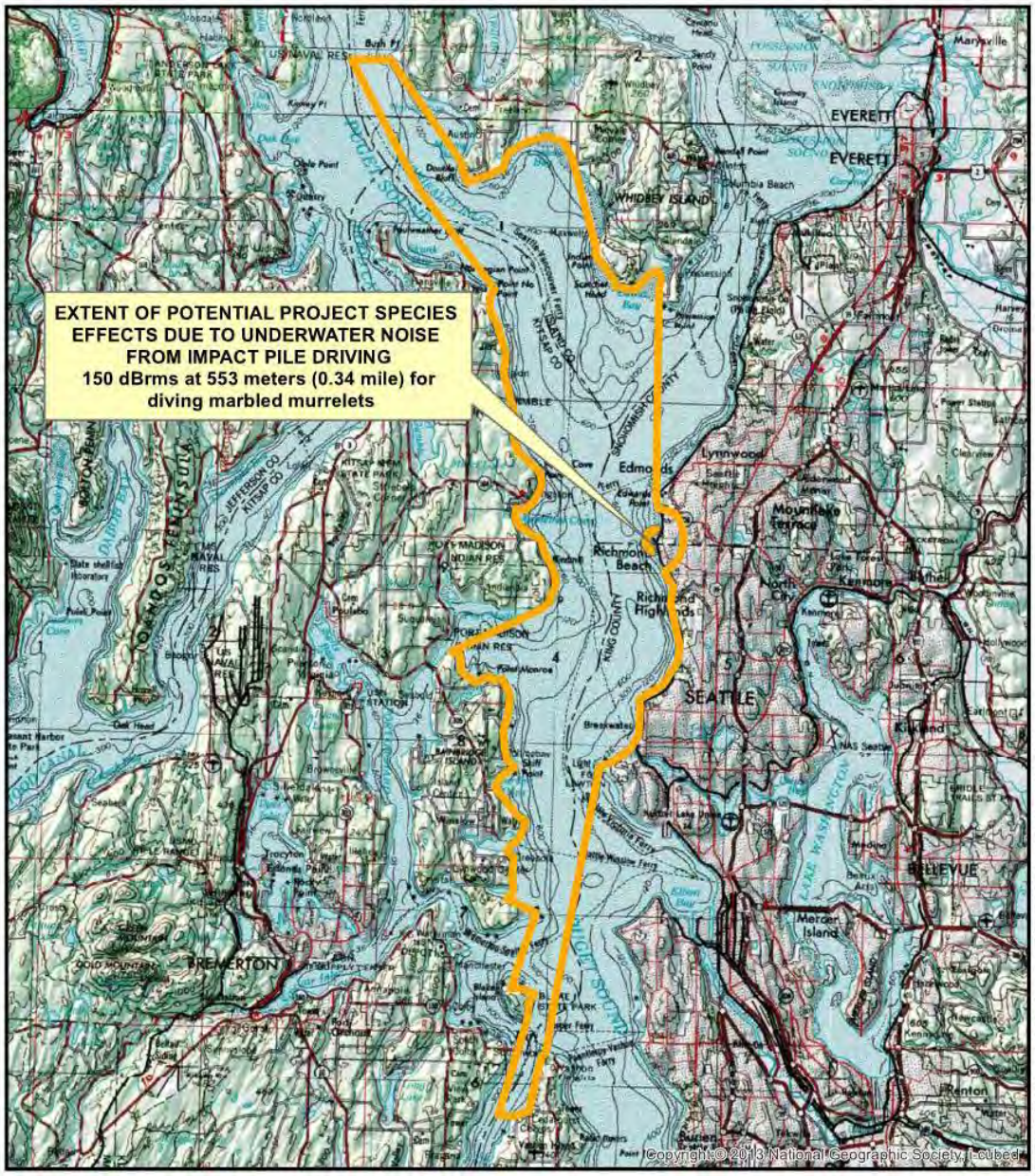
4.3 Field Investigation

DEA performed site visits on March 15 and April 2, 2018 to delineate wetland boundaries, flag stream ordinary high water marks (OHWM), flag jurisdictional ditches and document existing habitat conditions and wildlife use. Past site visits occurred on October 13 and November 23, 2009, and February 1, 2010. Wetlands were identified on the basis of hydrophytic vegetation, hydric soils, and evidence of wetland hydrology as described in the *Washington State Wetlands Identification and Delineation Manual* (Ecology 1997) and the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and subsequent Corps guidance. Hydrophytic vegetation (i.e., plants adapted to saturated soils) was determined to be present when dominant cover of plants observed (greater than 50 percent) had an indicator status of facultative (FAC), facultative wetland (FACW), or obligate wetland (OBL) (Reed 1988). Plant species in the project area were identified according to Cooke (1997), Pojar and MacKinnon (1994), and Hitchcock and Cronquist (1973), but updated nomenclature was used where known. Hydric soils were determined on the basis of organic matter content, chroma color, and presence of redoximorphic features or other hydric characteristics as stated in the methodology. Evidence of wetland hydrology was determined through the observation of soil saturation, surface ponding, or other indicators such as water-stained leaves, surface scouring, oxidized root channels, sediment deposits, and drainage patterns. Wetland boundaries and data plot locations were marked with flagging, then surveyed and mapped by professional land surveyors.

This investigation included an assessment of the presence or absence of wetlands within 300 feet of the project site. DEA staff viewed these offsite areas to the best of their ability, given the visibility and property access conditions at the time of the site visits. No access was granted for site investigations for most of the large properties east of the railroad tracks. Condition and location of wetlands in these areas was interpolated from public information on a proposed development near the top of the slope in the Town of Woodway (BD Giddings Engineering 2017).

The MHHW tide level was based on the Corps tidal datum for north Puget Sound of 8.61 feet when using datum plane NAVD88. All wetland and OHWM stream boundaries, classifications, and assigned buffer widths are subject to review and verification by Snohomish County, Ecology, WDFW, and the Corps.

Figure 6: Action Area Map



Extent of Species Effects

Project Action Area (21.6 miles)

10 5 0 Miles

Project Action Area	
BSRE Point Wells, LP	
PARA0000-0007	Figure 6
April 2018	

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Source: ESRI National Topo Map

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5 REGULATORY CONTEXT

5.1 Federal and State Regulations

Federal and state laws and regulations pertinent to sensitive wetland, stream, and fish and wildlife resources in the Project area are described in **Appendix C**.

5.2 Local Regulations

5.2.1 Snohomish County Regulations

Snohomish County Critical Area Regulations are established in Title 30 Chapter 62. This analysis was conducted under local regulations in effect when the Point Wells project became vested, which was on March 4, 2011. The County defines Critical Areas as:

- Wetlands
- Critical aquifer recharge areas
- Fish and wildlife habitat conservation areas
- Frequently flooded areas (flood hazard area)
- Geologically hazardous areas

5.2.1.1 Wetlands

Wetlands are defined as areas that are inundated or saturated by surface water or ground water at a frequency or duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention ponds, and landscape amenities. Wetlands do include those artificial wetlands intentionally created from nonwetland areas to mitigate conversion of wetlands.

Classification of wetlands is described in SCC 30.62A.230 (**Table 1**) and include Categories I through IV, based on Ecology's Wetland Rating System for Western Washington (Hruby 2004). Wetland buffer widths and other buffer standards are stipulated in SCC 30.62A.320. Required mitigation for wetland impacts is described in SCC 30.62A.340.

5.2.1.2 Critical Aquifer Recharge Areas

In the County, critical aquifer recharge areas are defined as:

- Sole source aquifers designated by the U.S. Environmental Protection Agency in accordance with the Safe Drinking Water Act of 1974 (Public Law 93-523);
- Areas within the 10-year travel zone of Group A wellhead protection areas, determined in accordance with delineation methodologies specified by the Washington Department of Health under authority of chapter 246-290 WAC; and
- Areas of high, medium, and low sensitivity to groundwater contamination, based on depth to groundwater and in accordance with The Groundwater System and Groundwater Quality in Western Snohomish County, Washington (USGS, Water Resources Investigations, Report #96-4312, 1997).

5.2.1.3 Fish and Wildlife Habitat Conservation Areas

In the County, fish and wildlife habitat conservation areas are defined as:

- Streams
- Lakes
- Marine waters
- Primary association areas for critical species
- Streams are classified in SCC 30.62A.230 (**Table 1**) and include Type S, F, Np, and Ns. Required buffer widths and other buffer standards for fish and wildlife habitat conservation areas are stipulated in SCC 30.62A.320.

Part 400 of SCC 30.62A describes required protections and regulations for critical wildlife species in the County. These species include:

> (1) Species listed as threatened or endangered under RCW 77.12.020 and Title 16 United States Code;
>
> (2) Species of local importance designated under SCC 30.62A.470; and
>
> (3) The following Washington State listed sensitive species:
>
> > (a) Larch mountain salamander;
> >
> > (b) Common loon;
> >
> > (c) Peregrine falcon;
> >
> > (d) Olympic mudminnow;
> >
> > (e) Pygmy whitefish;
> >
> > (f) Gray whale;
>
> (4) State natural area preserves, natural resource conservation areas, and state wildlife areas, collectively referred to as "state natural habitats." (Added by Amended Ord. 06-061, Aug. 1, 2007, Eff date Oct. 1, 2007; Amended by Amended Ord. 15-034, Sept. 2, 2015, Eff date Nov. 1, 2015; Amended by Ord. 17-039, July 12, 2017, Eff date Aug. 3, 2017).

For any development activity or action requiring a project permit occurring within the primary association area of a critical species or state natural habitats, the director may require all or a portion of the following:

> (1) A critical area study meeting the requirements of SCC 30.62A.140;
>
> (2) A map drawn to scale or survey showing the location and description of the primary association areas (s) of the critical species or state natural habitats on the subject property;
>
> (3) Evidence of use of the site by a critical species, including the location and nature of use;
>
> (4) An assessment of how the proposed activities will affect the critical species and/or its habitat or the state natural habitat, and how the proposal will avoid, minimize or mitigate impacts to those critical species and their habitats or state natural habitats pursuant to SCC 30.62A.450; and

(5) In the absence of an adopted administrative rule governing a listed species or state natural habitat, the applicant shall provide a habitat management plan consistent with the minimum requirements of SCC 30.62A.440. In addition, the habitat management plan shall contain an assessment of best available science applicable to the species or the state natural habitat, demonstrating how the proposal will provide sufficient protection of the critical species and its habitat or the state natural habitat.

"Primary association area" means the area necessary for the viability and protection of any critical species, including its habitat and surrounding areas needed for protection of the habitat. Primary association areas include habitat areas that are known to contain a critical species, or where evidence from the best available science indicates that a critical species is using a habitat area. Primary association areas include but are not limited to areas for breeding, feeding, cover and migration. The size of the primary association area is species and population dependent and based on the known habitat requirements of the species.

5.2.1.4 Frequently Flooded Areas (Flood Hazard Area)

In the County, frequently flooded areas (flood hazard area) means the land in the flood plain that is subject to a one percent or greater chance of flooding in any given year.

5.2.1.5 Geologically Hazardous Areas

In the County, geologically hazardous areas are defined as areas that because of their susceptibility to erosion, sliding, earthquake, or other geologic events, may not be suited to the siting of commercial, residential, or industrial development consistent with public health or safety concerns. Geologically hazardous areas include erosion hazard areas, landslide hazard areas, seismic hazard areas, mine hazard areas, volcanic hazard areas, and Tsunami hazard areas.

Geologically hazardous critical areas are addressed in a separate geotechnical report prepared by Hart Crowser (2018a).

5.2.1.6 Innovative Development Design

The applicant has requested that the proposed project be evaluated under the criteria of Innovative Development Design (IDD) as described in SCC 30.62A.350, which states:

(1) A project permit applicant may request approval of an innovative design, which addresses wetland, fish and wildlife habitat conservation area or buffer treatment in a manner that deviates from the standards contained in Part 300. The applicant shall demonstrate in a critical area study required pursuant to SCC 30.62A.140 how the innovative development design complies with the following requirements:

(a) The innovative design will achieve protection equivalent to the treatment of the functions and values of the critical area (s) which would be obtained by applying the standard prescriptive measures contained in this chapter;

(b) Applicants for innovative designs are encouraged to consider measures prescribed in guidance documents, such as watershed conservation plans or other similar conservation plans, and low impact stormwater management strategies that address wetlands, fish and wildlife habitat conservation area or buffer protection consistent with this section; and

(c) The innovative design will not be materially detrimental to the public health, safety or welfare or injurious to other properties or improvements located outside of the subject property.

(2) Applicants proposing development activities on properties designated as Urban Center Transit Pedestrian Village on the county's Future Land Use Map may utilize the innovative design provisions in this section to deviate from the requirements in Part 300. Such deviations may include but are not limited to provisions related to avoidance of impacts, standard buffer widths, allowed uses in buffers and wetlands, mitigation ratios and use of off-site mitigation. The applicant shall demonstrate in a critical area study required pursuant to SCC 30.62A.140:

(a) Why the deviation is necessary to implement the policies in the county's comprehensive plan General Policy Plan under objective LU 3.B; and

(b) How the innovative development design achieves protection at least equivalent to the treatment of the functions and values of the critical area(s) which would be obtained by applying the standard prescriptive measures contained in Part 300.

6 EXISTING CONDITIONS

6.1 WDFW PHS Data

The PHS map (2018) documents the nearshore marine waters as estuarine wetlands, which abuts the western edge of the project site (**Figure 7**). Two other wetlands are mapped near the project site. The closest is located immediately north of the project site and another approximately 0.25 mile to the east. Dungeness crabs (*Cancer magister*) are mapped as occurring approximately 0.7 mile north of the project site in the vicinity of Edwards Point. Subtidal geoducks (*Panope abrupta*) are mapped approximately 0.2 mile to the north and south of the project site.

Forage fish have been documented spawning along the shoreline at Point Wells (WDFW 2015). Surf smelt (*Hypomesus pretiosus*) and sand lance (*Ammodytes hexapterus*) have been documented spawning along the southwest edge of Point Wells, and sand lance have also been documented spawning immediately north of the project site. However, most of the shoreline along Point Wells is mapped as potential surf smelt/sand lance spawning areas.

Purple martins (*Progne subis*) have been documented nesting on a piling approximately 0.7 mile north of the project site. Two nests were reported as active in 2004 (WDFW 2018a). Great blue herons (*Ardea herodias*) have been documented nesting at the UNOCAL bulk fuel terminal. This area is over 1.25 miles north of the project site. Individual herons have been observed foraging along the shoreline at Point Wells.

No streams are mapped by the WDFW as occurring on the project site. The closest mapped stream with salmonids is Deer Creek, which enters Puget Sound approximately 0.4 mile north of the project site. Salmonid use of Deer Creek is limited to resident cutthroat trout (WDFW 2018a).

Figure 7: PHS Data

Bald Eagle Nest Site
PHS Polygon Borders
400 Foot Nest Buffer
800 Foot and Shoreline Nest Buffer
Dungeness Crab
Subtidal Geoduck
NWI Estuarine Wetland
Priority Fish Presence
Potential Surf Smelt/Sand Lance Spawning Areas
Documented Surf Smelt Spawning Areas
Documented Sand Lance Spawning Areas
Purple Martin Nest
Eelgrass Beds

0 0.1 0.2 0.3 0.4 Miles

PHS Data	
BSRE Point Wells, LP	
PARA0000-0007	Figure 7
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PHS.mxd

Source: WDFW PHS Data 2010
King County Dept. of Nat. Res. & Parks

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6.2 WDNR NHP Rare Plant Data

The WDNR reports that 34 rare plants potentially occur in Snohomish County (**Table 1**). Based on a review of the *Sections that Contain Natural Heritage Features Associated with Wetlands* (current as of February 2, 2018), no rare plants or high quality native ecosystems have been documented in T27N R03E S35 (WDNR 2018a). The following data are from the WDNR NHP on-line list of known occurrences of rare plants for Snohomish County, updated April 2018.

Table 1: Rare Plants of Snohomish County

Common Name	Scientific Name	State	Federal	Historic
Crab eye lichen	*Acroscyphus sphaerophoroides*	E	None	No
Tall agoseris	*Agoseris elata*	S	None	No
Witch's hair lichen	*Alectoria nigricans*	T	None	No
False apple moss	*Bartramiopsis lescurii*	E	None	No
Western moonwort	*Botrychium hesperium*	S	None	No
Stalked Moonwort	*Botrychium pedunculosum*	S	None	Yes
Alaska Harebell	*Campanula lasiocarpa*	S	None	No
Few-flowered Sedge	*Carex pauciflora*	S	None	No
Several-flowered Sedge	*Carex pluriflora*	S	None	No
Smoky Mountain Sedge	*Carex proposita*	S	None	No
Long-styled Sedge	*Carex stylosa*	S	None	No
Spleenwort-leaved goldthread	*Coptis aspleniifolia*	S	None	No
Yellow mountain-avens	*Dryas drummondii*	S	None	No
Salish Fleabane	*Erigeron salishii*	S	None	Yes
Black Lily	*Fritillaria camschatcensis*	T	None	No
Burnet's skin lichen	*Leptogium burnetiae*	E	None	No
Skin lichen	*Leptogium cyanescens*	E	None	No
Water Lobelia	*Lobelia dortmanna*	S	None	Yes
Treelike clubmoss	*Lycopodium dendroideum*	S	None	No
Branching montia	*Montia diffusa*	S	None	Yes
Kidney lichen	*Nephroma occultum*	S	None	No
Harford's ragwort	*Packera bolanderi var.harfordii*	X	None	Yes
Hydrothyria lichen	*Peltigera hydrothyria*	S	None	No
Pine-foot	*Pityopus californicus*	T	None	No
Choris' bog-orchid	*Platanthera chorisiana*	T	None	Yes
Rainier pseudocyphellaria	*Pseudocyphellaria rainierensis*	S	None	No
Powdery twig lichen	*Ramalina pollinaria*	T	None	Yes
Cooley's buttercup	*Ranunculus cooleyae*	T	None	No
Pygmy saxifrage	*Saxifraga rivularis*	S	None	No
Swertia	*Swertia perennis*	T	None	Yes
Urn lichen	*Tholurna dissimilis*	S	None	No
Beard lichen	*Usnea lambii*	T	None	Yes

Common Name	Scientific Name	State	Federal	Historic
Beard lichen	*Usnea longissima*	S	None	No
Flat-leaved Bladderwort	*Utricularia intermedia*	S	None	No

Note 1. Status Key: E = endangered, T = threatened, S = sensitive, R1 = review group 1 (potential concern but need more field work),
R2 = review group 2 (potential concern but unresolved taxonomic questions), LT = listed threatened, SC = species of concern, and Yes under Historic Record indicates the most recent sighting in the county is before 1977.

The 34 rare plants identified as potentially occurring in Snohomish County by the WDNR typically have very specific habitat requirements. These range from being associated with prairie/grassland habitats, bogs and fens, freshwater wetlands or lake margins, high elevation/subalpine habitats, old growth forests, or coniferous forests. No suitable habitat for these rare plants exists on the immediate Point Wells property. Suitable habitat for some of these species could exist in the wetlands and riparian corridors offsite to the north and east. No specific rare plant surveys were conducted for the project.

6.3 U.S. Department of Agriculture Soil Data

The Soil Survey of Snohomish County mapped soils within the project area (west of the BNSF railway tracks) as Urban land. Urban land is defined as nearly level to gently sloping areas covered by streets, buildings, and other structures that obscure or alter the soils such that identification is not feasible (USDA 1983). Two different soil types are identified as occurring on the east side of the BNSF railroad tracks along the bluff. Alderwood-Everett gravelly sandy loam on 25 to 70 percent slopes is mapped along the north east edge of the project site. Alderwood-Urban land complex on 8 to 15 percent slopes is mapped along the southeast edge of the project site. Alderwood soils are moderately deep over hardpan and moderately well drained. Permeability is moderately rapid above the hardpan and very slow within the hardpan. The Everett soil is very deep and somewhat excessively drained with rapid permeability. Runoff is described as rapid with a moderate water erosion hazard. These soils types are not considered hydric.

6.4 Wetlands

Based on a review of the NWI and PHS maps, Snohomish County GIS data, and 1987 Snohomish County Stream and Wetland Inventory map, no wetlands are identified in the site. There are wetlands identified on adjacent properties to the north, east, and south. The Snohomish County GIS data is shown in **Figure 5,** the Snohomish County wetland and stream map is in **Figure 8**, and the NWI map (**Figure 9**) shows a palestine forested wetland (PFO) wetland north of the project site. The Snohomish County GIS data (**Figure 5**) shows a wetland east of the site and BNSF tracks and a critical area site plan for the parcel to the south. The nearshore marine shoreline is identified on the NWI (**Figure 9**) and PHS maps as an estuarine intertidal wetland unconsolidated shore that is regularly flooded or irregularly exposed (E2USM – E2AB/USN).

The marine shoreline is based on the Corps MHHW elevation datum for central Puget Sound.

Figure 8: Snohomish County Stream-Wetland Aerial Map

Source:
Snohomish County Stream and Wetlands Survey, 1987.

N

Gx1973

Snohomish County Stream and Wetland Survey Map

BSRE Point Wells, LP

PARA0000-0007

April 2018

Figure 8

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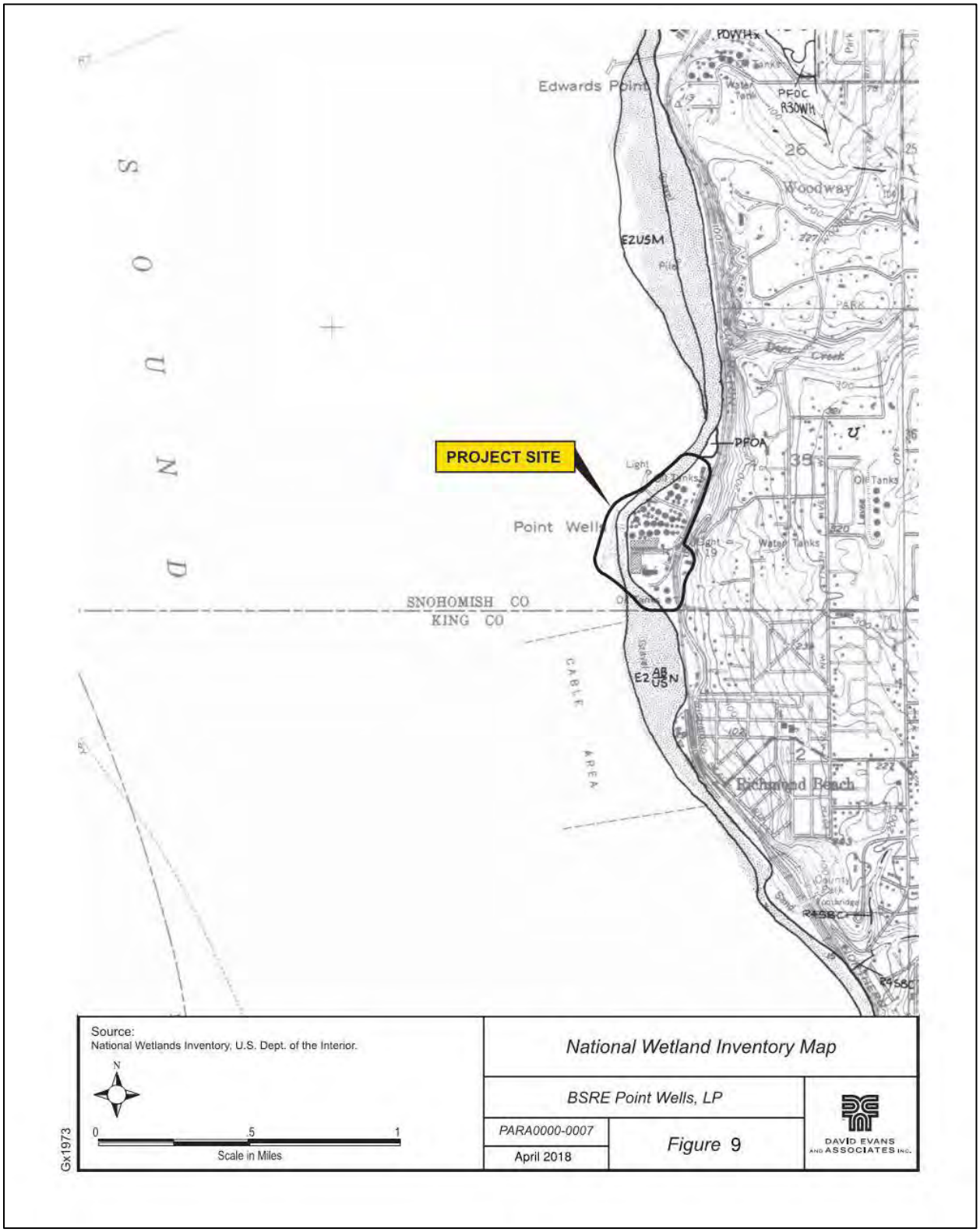
Figure 9: National Wetland Inventory Map



No wetlands were identified in the site. The marine shoreline was assessed and the NWI assessment was confirmed. The shoreline is an estuarine intertidal wetland unconsolidated shore. The MHHW is based on the elevation datum for central Puget Sound.

Snohomish County has requested information of wetlands and streams on adjacent properties within 300 feet of the site boundary. None of the properties with identified wetlands granted access to assess off site wetlands. Therefore, no offsite delineations or data could be collected. The information and data presented in this report are from third party reports and observation made form adjacent properties. Wetlands identified offsite are shown in **Figure 10**.

The property to the north that includes a PFO wetland was observed from the shoreline. Wetland conditions were observed and there is a PFO system present. The wetland conditions do not start at the site as shown on the NWI map, there is an upland ridge and the wetland characteristics start approximately 100 feet north of the site in the vicinity of Stream S1.

There are extensive wetlands on the properties east of the BNSF tracks and around the second access road (**Figure 10**). Access was not granted but a recent third party delineation report and map was obtained (BD Giddings Engineering. 2017). That report identified eight wetlands, five of which are within 300 feet of the site. The portions of the eight wetlands were observed from adjacent properties and generally match the reported characteristics and mapping. The wetlands were all PFO with slope hydrogeomorthic type. The wetlands are Category III systems based on the third party report (BD Giddings Engineering. 2017). Ratings completed for this report verify the Category III systems with a standard 110-foot buffer. There is a series of three parallel tracks between this wetland area and the site.

Data from one of the wetlands on the properties to the east of the BNSF tracks was obtained from a previous Point Wells document. This wetland is named Wetland T in this document and was named Wetland A in past project documents. Wetland T is located immediately south of Chevron Creek and east of the Upper Bench (**Figure 10**). This wetland is dominated by red alder (*Alnus rubra*), salmonberry (*Rubus spectabilis*), and piggy-back plant (*Tolmiea menziesii*). It is contained within what appears to be an old roadway cut.

Hydrology in Wetland T (formerly Wetland A) is dominated by groundwater, with a water table at 4 inches below the surface on November 23, 2009. The soil profile consisted of very dark grayish brown (10YR 3/2) silt loam without mottles from 0 to 10 inches, and gray (5Y5/1) silt loam with strong brown (7.5YR 6/5) mottles from 10 to 16 plus inches. Soils were classified as being depleted below dark surface (A11). Data plot and Ecology rating forms are contained in **Appendix E**.

The property to the south of the site is the Brightwater outfall site and includes a mapped PSS wetland (**Figure 10**). This wetland is on the extreme south side of the one-acre parcel that was purchased by King County. The north side of the buffer was significantly impacted by the Brightwater project, which resulted in 0.05 acre of impact with mitigation being undertaken by King County as part of the overall Brightwater project.

Figure 10: Critical Areas Map

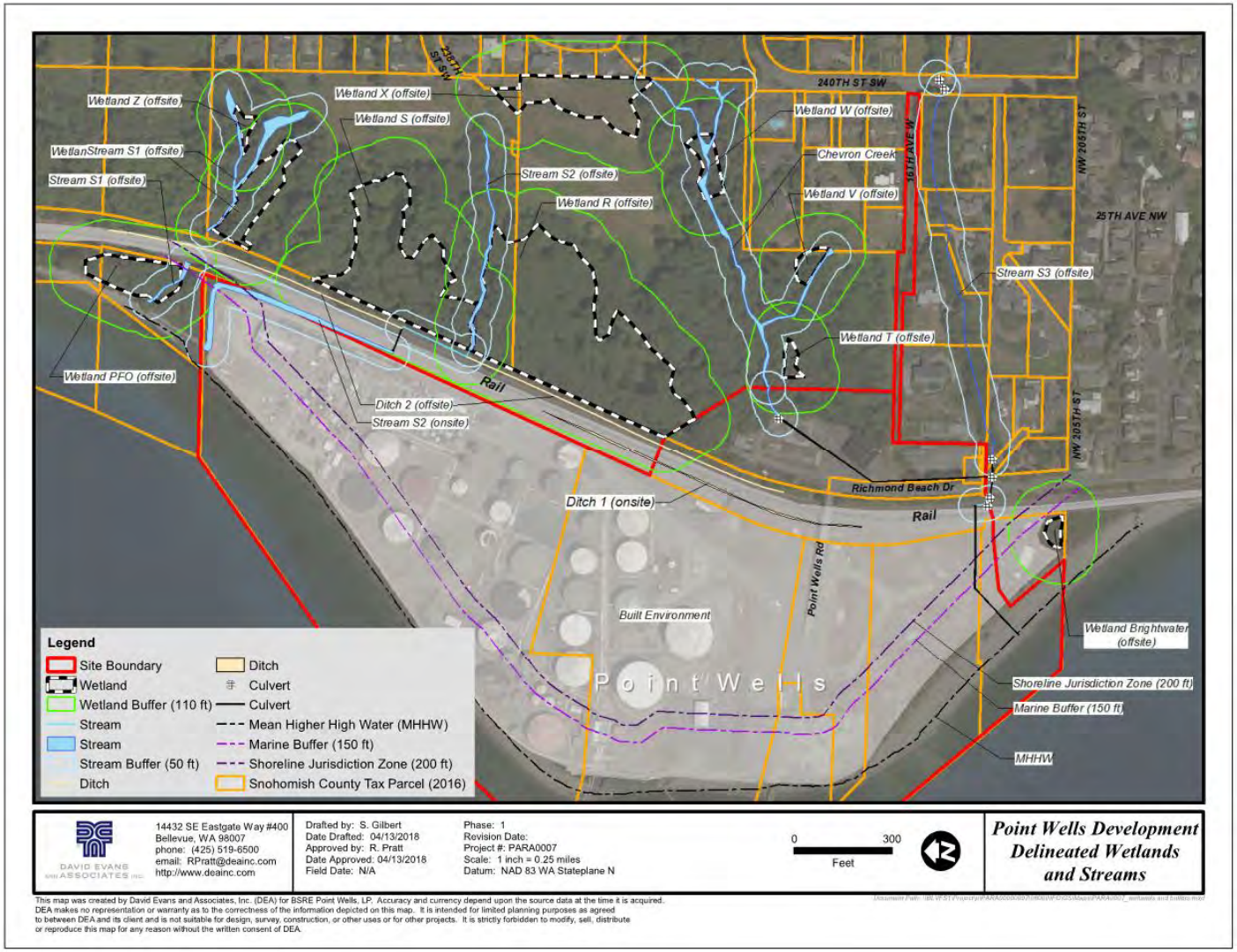


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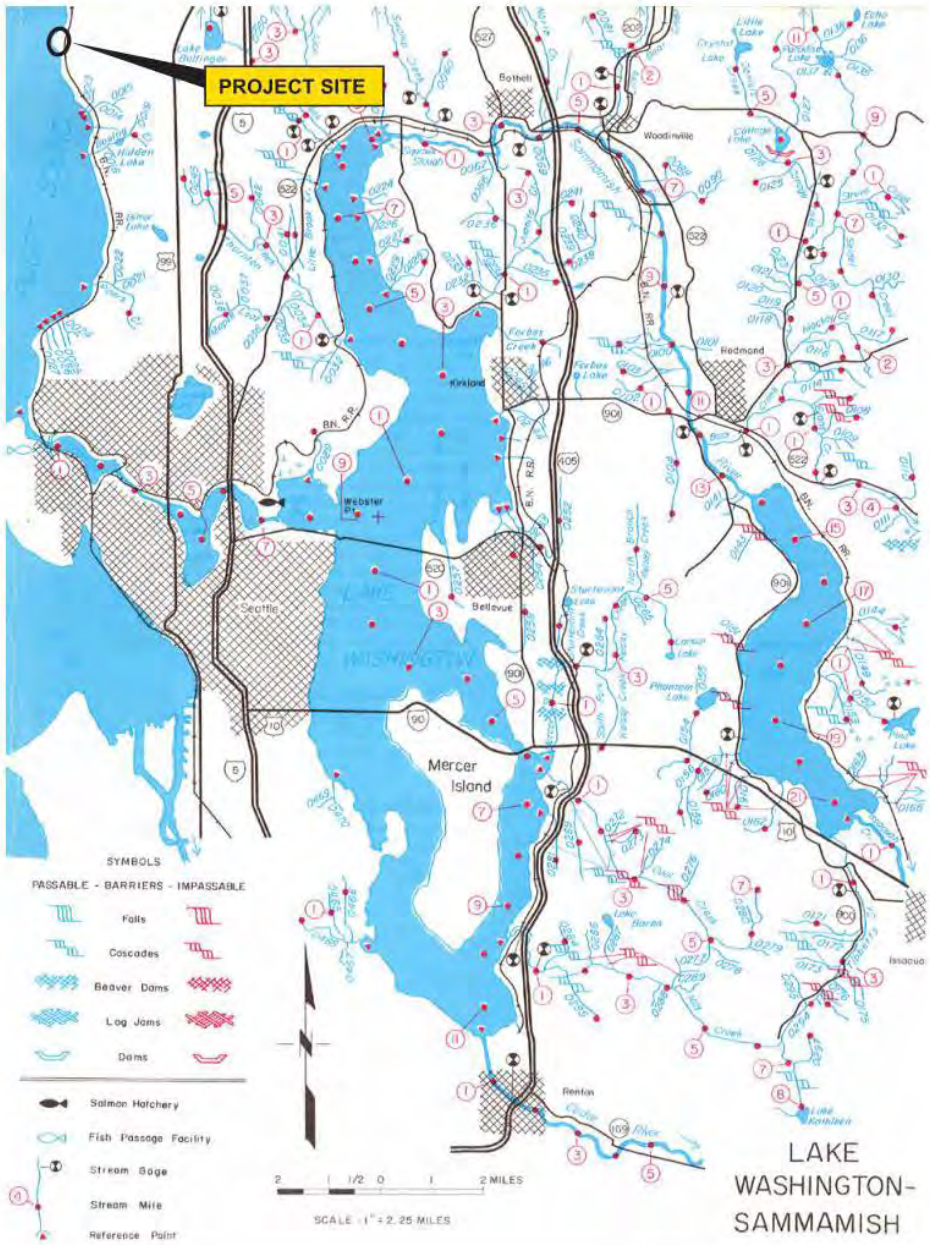
Figure 11: Wetlands, Streams, Jurisdictional Ditches, and MHHW



Source: Washington Departtment of Fisheries, 1975.

N

Gx1973

WDFW Stream Map	
BSRE Point Wells, LP	
PARA0000-0007	*Figure 11*
April 2018	

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6.5 Streams

The USGS map (**Figure 2**), WDFW PHS map (**Figure 7**), and the Catalog of Washington Streams map (**Figure 11**) do not depict any streams on or immediately adjacent to the project site. However, the Snohomish County Stream and Wetland Survey map (**Figure 8**) indicates four small unnamed streams that drain off the eastern bluff and into Puget Sound. They are labeled creek #1 to #4. This map does not identify Chevron Creek.

Field visits and a third party report (BD Giddings Engineering, 2017) identify four seasonal streams flowing off the bluff (**Figure 10**). Two of the streams (Stream S2 and Chevron Creek) cross portions of the site. The other three are within 300 feet of the site. All of the streams are similar. They originate as groundwater discharge on the upper portion of the bluff. They are small Type N streams that likely flow seasonally. Type N streams in Snohomish County require a standard 50-foot-wide buffer. They are generally very small streams that are steep and lack habitat required to sustain either anadromous or resident salmonid populations. The absence of suitable habitat is due to steep gradient, seasonal flow, and lack of pool habitat. The presence of long culverts, outfalls, ditches, and retention pond further negates fish use of these streams.

Stream S1 is north of the site. It flows from the bluff and is collected in a constructed ditch along the railroad, flows under the railroad track in a culvert, and then flows to Puget Sound north of the project. Stream S2 originates for groundwater discharge on the bluff. This stream collects in a constructed ditch along the eastern side of the railroad tracks and flows north, under the railroad tracks in a culvert, and flows in a constructed ditch north between the project site and the railroad tracks and then west to Puget Sound. Chevron Creek flows down bluff slope to the site east of the BNSF tracks. It is collected in a catch basin and piped to an outfall in Puget Sound. Streams S3 (this creek is also named South Creek in some project documents) flows down the bluff slope through the residential development south of the site. There are additional stream south of the site that are not described in this report (**Figures 5 and 8**). The stream that transect the site are described in more detail in **Figure 12**.

Figure 12: Stream Summaries for the Site.

Stream S2 – INFORMATION SUMMARY	
Location: BSRE Point Wells (Lat. 47.7851° N Long. -122.3910° W).	
Stream S2 from the south looking north along the eastern property line. The BNSF tracks are to the right.	Stream S2 channel and sediments at the outflow of the culvert under the BNSF tracks.
HUC	17110019000272 – Puget Sound
WA Stream Catalog #	Not listed on WDFW map
DNR FPARS mapper	N = Non-Fish
Snohomish County PDS Map Portal	U = Unknown, Untyped
Documented Fish Use	WDFW (2018b) does not identify this stream. PHS (WDFW 2018a) does not identify this stream.
Location of Stream Relative to Site	S2 drains the bluff to the east of the site and runs along the northeastern and north property boundaries in unincorporated Snohomish County.
Connectivity (where stream flows from/to)	S2 originates from offsite Wetland R and S on the east side of the railroad prism. The stream passes under the rail prism through a culvert and flows along the property boundary and directly into Puget Sound.
Stream Characteristics	Channel type in the site is an excavated and maintained ditch. The channel is approximately 5 to 8 feet wide, the channel is deeply excavated, the substrate is fine sediments, and the flow is likely seasonal.
Riparian/Buffer Condition	The buffer is a petroleum industrial site to the west and the BNFS tracks to the east. There is forest to the north along the northern property boundary.
General Description and Comments	
Stream S2 drains from wetland to the east of the railroad track and flows through a maintained ditch along a industrial site, and flows directly into Puget Sound.	

Figure 13: Stream Summaries for the Site, continued.

Chevron Creek – INFORMATION SUMMARY	
Location: BSRE Point Wells (Lat. 47.7804° N Long. -122.3922° W).	
Chevron Creek from the east looking west to the catch basin on site.	Chevron Creek catch basin.
HUC	17110019000272 – Puget Sound
WA Stream Catalog #	Not listed on WDFW map
DNR FPARS mapper	Not listed on DNR FPARS map
Snohomish County PDS Map Portal	U = Unknown, Untyped
Documented Fish Use	WDFW (2018b) does not identify this stream. PHS (WDFW 2018a) does not identify this stream.
Location of Stream Relative to Site	Chevron Creek drains the bluff to the east of the study and runs into a culvert on the site east of the BNSF tracks. The stream is piped to Puget Sound.
Connectivity (where stream flows from/to)	Chevron Creek originates from offsite Wetland X, W, and V on the east side of the railroad prism. The stream is piped south and combined with Stream S3 and then west to Puget Sound.
Stream Characteristics	Channel type in the site is a steep and deeply incised channel flowing down the bluff. The channel is approximately 4 to 7 feet wide, the substrate cobble, gravel, and fines with areas of clay. The flow is likely seasonal.
Riparian/Buffer Condition	The buffer forested bluff with a fully developed canopy that includes red alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*), western red cedar (*Thuja plicata*), salmonberry (*Rubus spectabilis*), western swordfern (*Polystichum munitum*), The creek ends on the industrial site.
General Description and Comments	
Chevron Creek drains from wetland to the east, is collected in a catch basin, and piped to Puget Sound.	

Please refer to **Appendix D** for photographs of these features. Photograph 9 includes Outfall 003, Photograph 25 includes Outfall 002, Photograph 32 includes Stream S2 (ditch) discharging to the shoreline, Photograph 33 includes the on-site portion of the ditch (Stream #2), Photograph 34 includes the ditch on the east side of the railroad tracks, Photograph 35 includes the Chevron Creek catch basin, and Photograph 36 includes Chevron Creek immediately upslope of the retention pond.

6.6 Jurisdictional Ditches

There are jurisdictional ditches along and among the BNSF tracks (**Figure 10**). Ditch D1 is mapped between the two mainline tracks and the side track that accesses the site. Features are created along the BNSF tracks and have ponded water and patches of broadleaf cattail (*Typha latifolia*). These characteristics support that the ditches were created in upland and have standing water for more than 3 months of the year. Remote observations of Ditch D2 indicate similar characteristics as D1. The ditch was not accessed because of its location along the east side of the BNSF tracks. Access from BNSF to investigate these ditches was not available within the limited project schedule. Remote observation confirmed that all or a major portion of Ditch D2 includes ponding and running water. The two jurisdictional ditches are mapped in **Figure 10**.

6.7 Marine Nearshore Habitat

For purposes of this assessment, marine nearshore habitat includes both built and natural features that occur in or immediately adjacent to the shoreline that influence or affect fish and wildlife. These can be either natural or man-made, and may be either beneficial or detrimental to fish and wildlife. The purpose of this section is to describe the existing condition of marine nearshore habitat at Point Wells. **Figure 12** depicts the project area as outlined on National Oceanic and Atmospheric Administration (NOAA) Chart 18446, with depths in fathoms (1 fathom equals 6 feet) at mean lower low water (MLLW). A summary of the marine shoreline characteristics and photo different shoreline types is shown in **Figure 13**.

6.7.1 Marine Riparian

The existing marine riparian habitat is degraded and generally void of native vegetation. Upland species present along the shoreline at Point Wells includes several weeds and grasses atop the seawall and along the perimeter of the chain-link fence. Some additional vegetation is present along the southwestern edge of the shoreline, including American dunegrass (*Elymus mollis*), Japanese knotweed (*Polygonum cuspidatum*), and Himalayan blackberry (*Rubus armeniacus*). Shoreline photos are contained in **Appendix D**.

Figure 14: NOAA Chart 18446

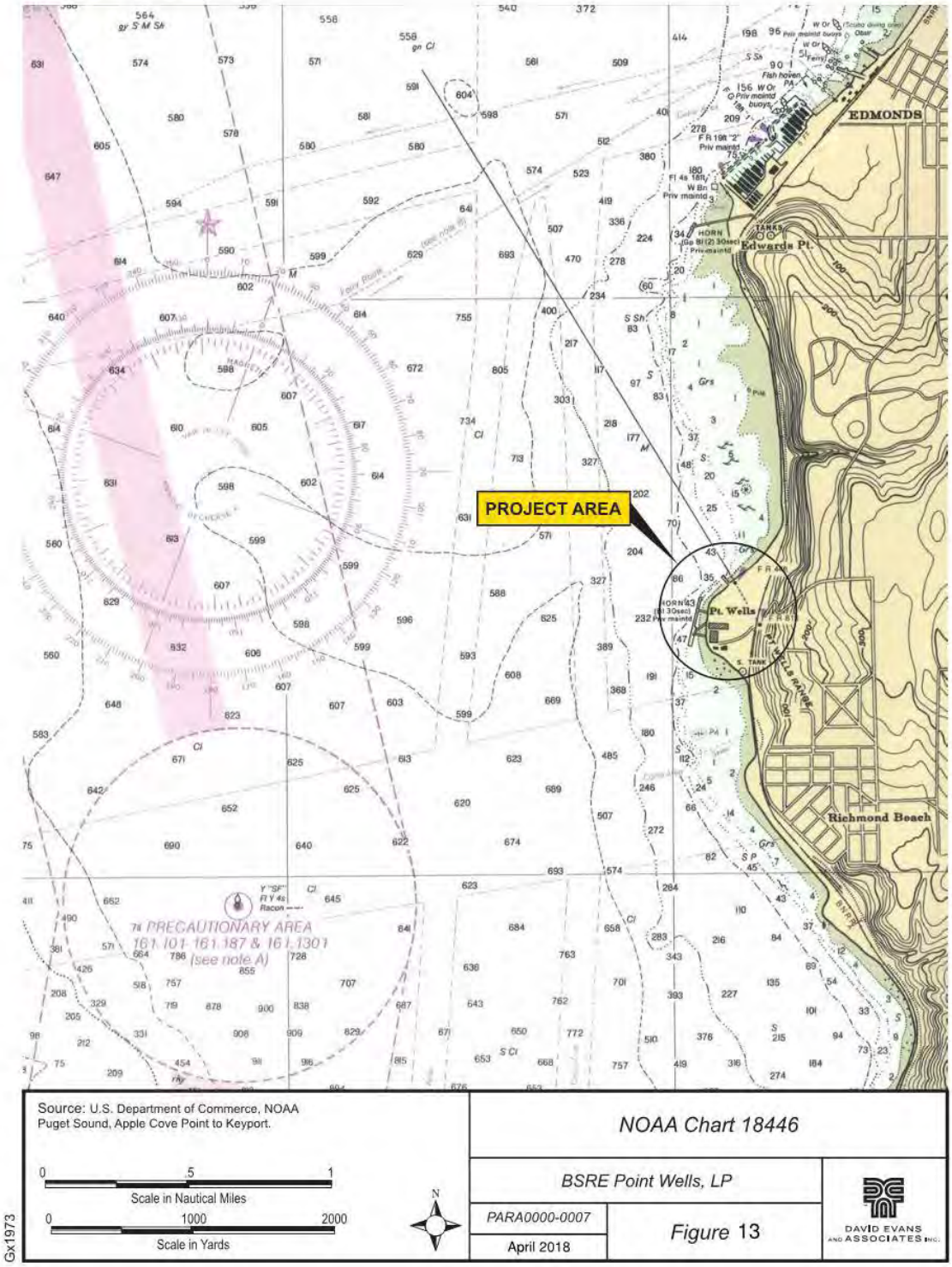


Figure 15: Shoreline Summary.

Marine Shoreline – INFORMATION SUMMARY	
Location: BSRE Point Wells (Lat. 47.7810° N Long. -122.3971° W).	
Marine shoreline north of the main pier looking south along shoreline rip rap, sheet pile wall, and petroleum storage tanks..	Marine shoreline looking north along the rip rap and petroleum storage tanks.
Marine Shoreline south of the main pier looking southeast.	Marine Shoreline south of the main pier looking northwest.
HUC	17110019000272 – Puget Sound
DNR FPARS mapper	POSSESSION SOUND-NORTH ELLIOT BAY
Snohomish County PDS Map Portal	S = Shoreline of State Significance
Fish Use	See Section 6.10
Location of Shoreline Relative to Site	The marine shoreline extends the entire west side of the site.
Shoreline Characteristics	The shoreline along this project ranges from sand/gravel beach, rip rap, sheet pile wall, to wood bulkhead.
Shoreline Riparian/Buffer Condition	The buffer is largely industrial with rip rap, sheet pile, and bulkheads along the shoreline. The southern portion of the shoreline is sand beach. There is limited vegetation. Dune grass and other grass species occur along the southern beach area.
General Description and Comments	

6.7.2 In-water Development

Existing in-water development at the project site includes shoreline fill, docks, dolphin piles, and multiple outfalls. The type of material used to construct the edge of fill or seawall varies along the shoreline at Point Wells. The northwest half is composed primarily of large riprap, but changes to steel sheet pile in the vicinity of the dilapidated dock and shoreline building. The shoreline building extends over the shoreline and is supported by wooden piles with a wooden outer edge in the vicinity of the large primary dock. The seawall changes to a concrete wall for a short distance to the south of the large dock, but then changes back to sheet pile and then a combination of wooden planks, wood piles, and large riprap further to the south. The seawall or edge of fill moves away/upland of the shoreline as the site becomes narrower in the vicinity of the King County Brightwater sewage outfall.

There are two existing docks at Point Wells. The primary large dock is still in use, while the second smaller dock is dilapidated and used primarily by cormorants as a perching platform. The primary dock is approximately 1,050 feet long by 60 feet wide, has two ramps, and is supported by over one thousand piles. Piles are primarily composed of treated wood, but several of them have been replaced or stabilized with steel and/or pile wrap. The remnants of a third dock along the northwest edge of the project site were noted during a site visit. All that remains are pile stubs protruding from the sand. A dolphin piling—a cluster of pilings strapped together near the top—is located immediately north of the primary dock. Photos of these in-water features are included in **Appendix D**.

6.7.3 Large Woody Debris

Large woody debris (LWD) provides various functions along the marine shoreline including fish and wildlife habitat, invertebrate habitat, formation of micro habitat, and beach stabilization. Shoreline development influences how or if LWD can be deposited along the upper shoreline, and is typically inhibited from being deposited where seawalls or fill material have been placed along the shoreline. This impact from shoreline development is apparent at the project site in that LWD is generally restricted to the north and south of the project site.

6.7.4 Macro Algae

Numerous species of seaweed are present within the marine waters off Point Wells. Species distribution is influenced by factors including depth, substrate, and season. King County conducted macro algae surveys during the Brightwater outfall project. Seaweed is typically divided into three primary groups based on color.

Green algae documented by King County (Kimberle Stark 2010 pers. comm.) in the project vicinity included *Acrosiphonia*, green filaments, and ulvoids. Sea lettuce (*Ulva fenestrata*) is one of the most dominant species within the nearshore environment. Red algae documented in the project vicinity included *Ceramium* sp., *Cryptosiphonia woodii*, *Cumagloia andersonii*, *Gelidium* spp., *Gracilaria pacifica*, *Mastocarpus* sp., *Mazzaella splendens*, *Mazzaella heterocarpa/oregona*, *Microcladia borealis*, *Odonthalia floccose*, *Petalonia fascia*, *Porphyra* sp., *Polysiphonia* sp. (unidentified), *Prionitis* sp. (unidentified), *Sarcodiotheca* sp. (unidentified), and *Smithora naiadum*. Brown algae documented in the project vicinity included *Desmarestia* spp., *Punctaria expansa*, and *Scytosiphon simplicissimus*.

Seagrasses are flowering seed plants that have adapted to the marine environment. One of the most ecologically important species in our region is eelgrass (*Zostera marina*). This species can form thick beds in muddy areas from just below tide level to about 20 feet deep. Eelgrass beds have been documented in the marine waters off Point Wells (WDFW 2014). These beds were located along the southwest side of Point Wells. **Figure 7** includes GIS eelgrass data from Battelle's sonar and underwater video surveys conducted in 2008. One eelgrass bed is located immediately south of the primary dock at Point Wells. No eelgrass beds were observed during the site visit, but the tide was not low enough to encounter this species. However, eelgrass (both native and non-native [*Z. japonica*]) were observed washed up along the shoreline.

6.7.5 Substrate Composition

Sand is the dominant substrate along the predominance of the uppermost shoreline. However, gravels are also present, especially near the primary dock and to the north and south of Point Wells. **Appendix D** includes photos of the substrate along the shoreline of Point Wells. It is important to note that substrate grain size will shift or change from year to year and that substrate size influences the type of organisms present, which can also change from year to year. A notable gravel/cobble area is off the southern shoreline, which must be relatively stable due to presence of numerous large butter clams and other marine organisms.

6.7.6 Sediment Quality

Ecology and NOAA have monitored surficial sediment quality in Puget Sound for several years. The purpose of this sampling effort was to determine the quality of sediments in terms of the severity, spatial patterns, and spatial extent of chemical contamination, toxicity, and adverse alterations to benthic infauna. Based on a review of Sediment Quality in Puget Sound Year 2 – Central Puget Sound (NOAA and Ecology 2000), two sampling sites are located in the general vicinity of Point Wells. Stations 121 and 123 are located in the marine waters generally northwest of Point Wells and southwest of Edmonds. Station number 123 is slightly farther west in deeper water. Station 121 lacked any significant chemistry and toxicity parameter. Station number 123 had at least one significant chemistry and toxicity parameter. The compound 4-Methylphenol exceeded sediment quality standard (SQS) and cleanup screening levels (CSL) at Station 123, but not at Station 121. Miscellaneous compounds that exceeded SQS and CSL at Station 121 included 1,2-Dichlorobenzene. Hexachlorbenzene exceeded SQS at Station 121, but not 123.

Mean amphipod survival at Station 121 was 81 percent, while the control was 89 percent. Mean amphipod survival at Station 123 was 78 percent, while the control was 86 percent. The difference between the sample and control was statistically significant at Station number 123. Amphipod survival and urchin fertilization testing indicated samples were "generally" not toxic.

More information on potential sediment quality and contamination at the Point Wells site is included in Hart Crowser (2018b).

6.7.7 Water Quality

The Ecology 2012 Water Quality Assessment for Washington includes data for Puget Sound. Data specific to the general project area near Point Wells includes four listings based on the

requirements of Sections 303(d) and 305(b) of the Clean Water Act. **Table 2** summarizes water quality data specific to Puget Sound waters off Point Wells.

Table 2: Puget Sound 2012 Water Quality Assessment

Parameter	Category	Medium	Area
Bacteria	1	Water	Puget Sound Central
Temperature	1	Water	Puget Sound Central
Mercury	1	Tissue	Puget Sound Central
Sediment Bioassay	5	Sediment	Puget Sound North-Central
Nickel	1	Tissue	Puget Sound Central

The listed categories are defined as follows:

- Category 1 – Meets tested standards for clean waters.
- Category 2 – Waters of concern: Waters where there is some evidence of a water quality problem, but not enough to require production of a water quality improvement project total maximum daily load (TMDL) at this time.
- Category 3 – Insufficient data: This category will be largely empty. Water bodies that have not been tested will not be individually listed, but if they do not appear in one of the other categories, they are assumed to belong here.
- Category 4 – Polluted waters that do not require a TMDL: Waters that have pollution problems that are being solved in one of three ways:
    - Category 4a – has a TMDL: Water bodies that have an approved TMDL in place and are actively being implemented.
    - Category 4b – has a pollution control program: Water bodies that have a program in place that is expected to solve the pollution problems. While pollution control programs are not TMDLs, they must have many of the same features and there must be some legal or financial guarantee that they will be implemented.
    - Category 4c – is impaired by a non-pollutant: Water bodies impaired by causes that cannot be addressed through a TMDL. These impairments include low water flow, stream channelization, and dams.
- Category 5 – Polluted waters that require a TMDL: The traditional list of impaired water bodies known as the 303(d) list. Placement in this category means that Ecology has data showing that the water quality standards have been violated for one or more pollutants, and there is no TMDL or pollution control plan. TMDLs are required for the water bodies in this category.

King County has sampled the marine environment near the project site (King County 2009). The following data is from *Water Quality Status Report For Marine Waters, 2005-2007* (King County 2009). The two closest sampling stations are JSUR01 (offshore from Point Wells) and JSVW04 (beach at Point Wells). Data from JSUR01 is limited to bacteria and general water quality parameters, while data from JSVW04 includes organics, metals, and conventional parameters from sediment, water, shellfish, and algae. The water quality standard for marine

surface waters and sediment standards are fully defined in the *Water Quality Status Report for Marine Waters, 2005-2007* (King County 2009).

Station number JSUR01 meets primary contact recreation marine surface water standards during all months/years sampled. Station number JSVW04 was in compliance with fecal coliform standards during all months. Generally speaking, offshore sites typically meet fecal bacteria standards, while beach sites tend to be more variable.

Basic water quality data from JSVW04 (beach at Point Wells) collected during 2007 was as follows. Ammonia ranged from <0.010 to 0.0696 milligrams per liter (mg/L); the highest measurement occurred on July 18, 2007. Nitrate/Nitrite NO2 + NO3 ranged from 0.181 to 0.444 mg/L; the highest measurement occurred on January 17, 2007. Total Phosphorous (Total P) ranged from 0.0673 to 0.0968 mg/L; the highest measurement occurred on February 20, 2007. Salinity ranged from a low of 27.019 to a high of 29.906 practical salinity scale (PSS). Salinity is typically lower during the winter/spring rainy season and higher during the drier summer season. Water temperature was seasonally variable, ranging from a low of 7.0ºC (44.6ºF) on January 17, 2007, to a high of 13.4ºC (56.1ºF) on July 18, 2007.

Other parameters such as transparency, dissolved oxygen, turbidity/transmissivity, chlorophyll-a, photosynthetically active radiation, and salinity were measured as part of the conventional water quality monitoring program. Except for the maximum turbidity value being measured at Station JSUR01 at a depth of 173 meters during March, no other anomalies or significant deviations from the norm were reported for offshore or beach monitoring stations near Point Wells.

The marine waters monitoring program conducted by King County (2009) included sampling intertidal sediments for the presence of 14 different metals. Four of the metals (arsenic, cadmium, selenium, and silver) were not detected at any sample sites. Mercury was detected at Golden Gardens and Alki Beach, but not Point Wells. Oil and grease was detected at all 8 beach sites (including Richmond Beach [JSVW04]) with concentrations from all sites ranging from 180 to 250 milligrams per kilogram, normalized to dry weight (mg/kg DW). Organic carbon was not detected in samples collected at Richmond Beach. Pyridine was detected at Richmond Beach at a concentration of 38 micrograms/kilogram DW (µg/kg DW), which is just above the level of detection. Potential sources of pyridine include antifreeze and fungicides. No polycyclic aromatic hydrocarbons (PAHs) were detected at Richmond Beach. The highest PAH readings were noted at the Salt Water State Park station.

Sampling for polybrominated diphenyl ethers (PBDEs) at Point Wells detected concentrations ranging from 1.59 to 2.59 µg/kg DW, which was similar to concentrations detected at West Point. Other compounds detected at Point Wells include benzyl alcohol at 93 µg/kg, and chlorinated pesticide at 1.65 µg/kg.

The presence of metals in shellfish tissue was also analyzed by King County (2009). The mean level of total Chromium in shellfish tissue from Point Wells was 2.01 mg/kg DW, which was about average when looking at the five sites sampled. The mean level of total Copper in shellfish from Point Wells was 16.0 mg/kg DW, which was the highest level recorded. The next highest Copper level recorded was from Alki Point, which was 11.7 mg/kg DW. The mean level of total Nickel in shellfish tissue from Point Wells was 5.29 mg/kg DW, which was about average when

looking at the five sites sampled. The mean level of total Zinc in shellfish tissue from Point Wells was 85.2 mg/kg DW, which was the highest recorded. The next highest Zinc level was recorded from Normandy Park, which was 83.3 mg/kg DW.

6.8 Invertebrates

Invertebrates include a wide array of different species, which were included in the marine surveys conducted for the Brightwater outfall project (Kimberle Stark 2010 pers. comm.). The following table includes, when known, the scientific name, common group, and common name of marine invertebrates observed during the Brightwater surveys conducted in 2006. Many invertebrates in **Table 3** do not have common names, and some species have several.

Table 3: Invertebrates

Scientific Name	Common Group / Name
Allorchestes angusta	Amphipod
Ampithoe dalli	Amphipod
Ampithoe lacertosa	Amphipod
Anisogammarus pugettensis	Amphipod
Anthopleura spp.	Anemone
Armandia brevis	Polychaete worm
Boccardiella hamata	Polychaete worm
Bryozoa (miscellaneous)	Bryozoan
Capitella capitata	Polychaete worm
Caulleriella pacifica	Polychaete worm
Clinocardium nuttallii	Bivalve / Heart Cockle
Crepidula dorsata	Gastropod
Crangon franciscorum ssp. franciscorum	Shrimp / Sand Shrimp
Crassostrea gigas	Bivalve / Pacific oyster
Diopatra ornata	Polychaete worm
Edwardsia sipunculoides	Anemone / Sipunculid Anemone
Epiactis prolifera	Anemone / Brooding, proliferating, or small green anemone
Eteone californica	Polychaete worm
Eteone longa	Polychaete worm
Eteone pacifica	Polychaete worm
Euclymene spp.	Polychaete worm
Eulalia sanguinea	Polychaete worm
Evasterias troschelii	Seastar / Mottled Seastar
Exosphaeroma inornata	Isopod
Fabia subquadrata	Crab / Grooved mussel, mussel, or pea crab

Scientific Name	Common Group / Name
Family Hippolytidae	Shrimp
Flatworm (unidentified)	Flatworm
Gammarid amphipods	Amphipod
Glycera americana	Polychaete worm
Glycinde picta	Polychaete worm
Gnorimosphaeroma oregonense	Isopod / Oregon pillbug
Harmothoe imbricata	Polychaete worm / Fifteen-scaled worm
Haminoea vesicula	Gastropod / Sea Slug
Hemipodus borealis	Polychaete worm
Hermissenda crassicornis	Gastropod / Opalescent Nudibranch
Hemigrapsus nudus	Crab / Purple shore crab
Hemigrapsus oregonensis	Crab / Green shore crab
Hesionid sp. (unidentified)	Polychaete worm
Hyale frequens	Amphipod
Idotea sp.	Isopod
Lacuna spp.	Gastropod
Leptosynapta clarki	Sea cucumber / Burrowing sea cucumber
Leitoscoloplos pugettensis	Polychaete worm
Littorina scutulata	Gastropod / Checkered periwinkle
Lophopanopeus bellus bellus	Crab / Black-clawed crab
Lottid limpets	Gastropod
Lucina tenuisculpta	Bivalve
Lumbrineris zonata	Polychaete worm
Magelona hobsonae	Polychaete worm
Macoma inquinata	Bivalve / Pointed macoma
Majid (spider) crab	Crab
Macoma nasuta	Bivalve / Bent-nose macoma
Malmgreniella nigralba	Polychaete worm
Margarites sp.	Gastropod
Mediomastus californiensis	Polychaete worm
Megalorchestia pugettensis	Amphipod
Metridium sp.	Anemone
Micropodarke dubia	Polychaete worm
Mopalia lignosa	Chiton / Woody chiton
Mopalia muscosa	Chiton / Mossy chiton
Mytilus trossulus	Bivalve / Foolish mussel

Scientific Name	Common Group / Name
Mysella tumida	Bivalve / Robust mysella
Naineris dendritica	Polychaete worm
Nassarius sp.	Gastropod
Nephtys caeca	Polychaete worm
Neotrypaea californiensis	Shrimp / Ghost shrimp
Nephtys caecoides	Polychaete worm
Nephtys ferruginea	Polychaete worm
Nemertean (unidentified)	Nemertean worm
Nereis procera	Polychaete worm
Nereis vexillosa	Polychaete worm
Notomastus tenuis	Polychaete worm
Nucella lamellosa	Gastropod / Frilled dogwinkle
Odostomia sp. (unidentified)	Gastropod
Onchidoris bilamellata	Gastropod / Barnacle-eating nudibranch
Onuphis elegans	Polychaete worm
Onuphis iridescens	Polychaete worm
Owenia fusiformis	Polychaete worm
Pagurus spp.	Hermit crab
Paracalliopiella pratti	Amphipod
Phoronopsis harmeri	Phoronid worm
Phyllodoce maculata	Polychaete worm
Pholoe minuta	Polychaete worm
Photis spp.	Amphipod
Pinnixia faba	Crab / Pea crab
Pisaster ochraceus	Seastar / Purple or ochre star
Pinnixia schmitti/occidentalis	Crab / Pea crab
Platynereis bicanaliculata	Polychaete worm
Polydora brachycephala	Polychaete worm
Polydora cardalia	Polychaete worm
Pododesmus cepio	Bivalve / Jingle shell
Polydora columbiana	Polychaete worm
Podarkeopsis glabrus	Polychaete worm
Pontogeneia ivanovi	Amphipod
Polinices lewisii	Gastropod / Moon snail
Polydora quadrilobata	Polychaete worm
Protothaca staminea	Bivalve / Pacific littleneck

Scientific Name	Common Group / Name
Prionospio steenstrupi	Polychaete worm
Pseudopolydora kempi japonica	Polychaete worm
Ptilohyale plumulosa	Amphipod
Pugettia gracilis	Crab / Graceful kelp crab
Saxidomus giganteus	Bivalve / Butter clam
Scoloplos acmeceps	Polychaete worm
Spio filicornis	Polychaete worm
Sphaeromid isopods	Isopod
Spiochaetopterus tube	Polychaete worm
Leptochelia dubia	Tanaid
Tellina modesta	Bivalve / Plain tellin
Tonicella lineata	Chiton / Lined chiton
Tresus capax	Bivalve / Fat gaper
Transennella tantilla	Bivalve
Urticina sp.	Anemone

A reconnaissance level survey of the nearshore marine environment was conducted by DEA on February 1, 2010. The survey was timed to occur during a low tide of +1.3 that occurred at 3:05 p.m. Photos taken during this and other site visits are included in **Appendix D**.

The seawall at Point Wells is composed of riprap, sheetpile, concrete, and wood. Use of the seawall by marine organisms is extremely variable. No marine organisms were noted attached or utilizing the seawall composed of steel, concrete, or treated wood planks. However, the riprap seawall was generally encrusted with barnacles (acorn and thatched), as well as mussels, chitons, limpets, snails, anemones, amphipods, rock weed, and a few unidentified red/brown algae. Based on the presence of seashells along the beach, mollusks in the project vicinity include pacific oyster, cockle, butter clam, horse clam, littleneck, mossy chiton, and moon snail. The predominance of the upper nearshore beach is dominated by sand and therefore not typical habitat for most clam species. However, a rocky area near the southeast shoreline is dominated by gravels, and butter and littleneck clams are extremely abundant within that area. This area is closed to the harvest of clams due to marine biotoxins and pollution. Seastars (mottled) and jellyfish (lion’s mane) were also observed during the site visit.

6.9 Amphibians and Reptiles

The WSGA data for amphibians and reptiles contain limited site-specific occurrence data, but include a map for each species outlining its core and peripheral zones (Dvornich et al. 1997). These zones represent the potential distribution of each species based on the presence of suitable habitat within each zone. Therefore, the species outlined below in **Table 4** have the potential to occur in the general project area if suitable habitat is present.

Table 4: Amphibians and Reptiles

Common Name	Scientific Name
Northwestern Salamander	*Ambystoma gracile*
Long-toed Salamander	*Ambystoma macrodactylum*
Pacific Giant Salamander	*Dicamptodon tenebrosus*
Roughskin Newt	*Taricha granulosa*
Western Redback Salamander	*Plethodon vehiculum*
Ensatina	*Ensatina eschscholtzii*
Pacific Treefrog	*Hyla regilla*
Red-legged Frog	*Rana aurora*
Bullfrog	*Rana catesbeiana*
Slider	*Trachemys scripta*
Northern Alligator Lizard	*Elgaria coerulea*
Western Terrestrial Garter Snake	*Thamnophis elegans*
Northwestern Garter Snake	*Thamnophis ordinoides*
Common Garter Snake	*Thamnophis sirtalis*

Aside from the ditch along the northern edge of the project site, no potential amphibian habitat is present on the developed portion of Paramount Petroleum west of the BNSF railroad tracks. Reptiles that could potentially utilize the developed portion of the project site include garter snakes and alligator lizards.

6.10 Fisheries Resources

A review of existing resource data indicates that streams in the immediate project vicinity do not contain fisheries resources. However, the nearshore marine waters of Puget Sound contain a wide variety of fisheries resources. The use of fish within the nearshore marine waters was assessed by reviewing beach seine data from Richmond Beach, which is located less than 0.5 mile south of the project area. Beach seine data was collected between May and October 2001, and April and December 2002 (Brennan et al. 2004). A summary of this data is provided in **Table 5**.

Table 5: Richmond Beach and Total Fish Capture Summary

.	Common Name	2001 Total Captured At Richmond Beach	2001 Total Captured in Overall Study Area	2002 Total Captured At Richmond Beach	2002 Total Captured in Overall Study Area
1.	Chinook Salmon	57	1066	124	1354
2.	Coho Salmon	23	234	102	1053
3.	Chum Salmon	676	2556	2413	24740
4.	Sockeye Salmon	39	113	4	4
5.	Atlantic Salmon	0	1	0	0
6.	Pink Salmon	0	0	775	2518
7.	Steelhead Trout	1	7	0	2
8.	Sea-run Cutthroat Trout	2	211	6	133
9.	Bull Trout	0	0	0	1
10.	Shiner Perch	1439	33659	2073	38965
11.	Striped Perch	29	325	20	179
12.	Pile Perch	4	68	19	188
13.	Butter Sole	Not Listed	Not Listed	0	2
14.	English Sole	94	1569	214	1131
15.	Rock Sole	19	632	19	213
16.	Starry Flounder	2	334	28	794
17.	Speckled Sanddab	1	88	52	161
18.	C-O Sole	2	39	6	9
19.	Sand Sole	0	7	4	50
20.	Flathead Sole	0	3	Not Listed	Not Listed
21.	Pacific Sanddab	0	2	0	15
22.	Sanddab spp.	1	14	0	2
23.	Unidentified Sanddab	0	105	Not Listed	Not Listed
24.	Unidentified Flatfish	55	119	2	109
25.	Staghorn Sculpin	49	1500	38	1633
26.	Great Sculpin	5	99	14	43
27.	Northern Sculpin	1	42	0	10
28.	Buffalo Sculpin	0	33	4	109
29.	Silverspotted Sculpin	0	9	3	6
30.	Cabezon	0	6	0	3
31.	Tidepool Sculpin	0	5	0	22
32.	Padded Sculpin	Not Listed	Not Listed	1	146
33.	Sailfin Sculpin	0	2	0	2
34.	Red Irish Lord	0	2	Not Listed	Not Listed

.	Common Name	2001 Total Captured At Richmond Beach	2001 Total Captured in Overall Study Area	2002 Total Captured At Richmond Beach	2002 Total Captured in Overall Study Area
35.	Unidentified Sculpin	0	17	26	166
36.	Sand Lance	0	1513	36	1176
37.	Surf Smelt	2	260	1	110
38.	Herring	7	424	13	343
39.	Penpoint Gunnel	10	135	42	90
40.	Crescent Gunnel	0	99	8	80
41.	Saddleback Gunnel	1	27	3	178
42.	Gunnel spp.	6	9	Not Listed	Not Listed
43.	Tubesnout	53	508	135	553
44.	Threespine Stickleback	3	117	3	67
45.	Bay Pipefish	1	24	0	56
46.	Skate spp.	1	6	Not Listed	Not Listed
47.	Big Skate	0	5	3	9
48.	Rockfish spp.	0	1	0	2
49.	Unidentified Snailfish	0	2	Not Listed	Not Listed
50.	Brown Rockfish	Not Listed	Not Listed	0	2
51.	Sturgeon Poacher	0	3	0	33
52.	Bay Goby	0	2	Not Listed	Not Listed
53.	Kelp Greenling	0	1	Not Listed	Not Listed
54.	Whitespotted Greenling	0	4	4	14
55.	Unidentified Greenling	0	13	1	5
56.	Pacific Cod	0	3	Not Listed	Not Listed
57.	Pacific Tomcod	1	5	3	7
58.	Pacific Midshipman	0	2	0	107
59.	Rat Fish	0	1	0	13
60.	Northern Spearnose	Not Listed	Not Listed	0	1
61.	Snake Prickleback	0	118	0	24
62.	Walleye Pollack	1	1	Not Listed	Not Listed
	Total Captured	**2585**	**46150**	**6196**	**78428**

Many of these species are year-round residents of the marine nearshore environment. However, all anadromous salmonids make at least one round-trip migration between their natal stream and marine waters. The timing of these migrations is variable, as is the amount of available data on when, where, and for how long they utilize marine waters. **Table 6** outlines the time period certain species/life-histories could be present near Point Wells. Although data is available for some species, it is not available for all species/life-histories, and use of a specific area can be

highly variable. Furthermore, most surveys are seasonal and do not occur year-round. Therefore, the time-periods outlined below in **Table 6** are general and not absolute. Generally speaking, juvenile salmonids occupy nearshore Puget Sound waters for at least six months of the year (April through September), with a peak abundance from May through July (NMFS 2004).

Table 6: Salmonid Timing

Common Name	Project Vicinity	Puget Sound	Comment
Adult Chinook Salmon	July - November	Spring - Fall.	Multiple runs (spring, summer, and fall) present. Year round for blackmouth.
Juvenile Chinook Salmon	May - October	December - October	Peak June and July.
Adult Coho Salmon	September - October	Late fall - early Winter.	Some adults start arriving early summer.
Juvenile Coho Salmon	May - August	April - September	
Adult Chum Salmon	October - November	October - January	Late runs south sound.
Juvenile Chum Salmon	May - June	January - July	Peak is earlier near estuaries, typically occurring from March to May.
Adult Sockeye Salmon	June - July	June - August	
Juvenile Sockeye Salmon	June		
Adult Pink Salmon	August - September	July - August	Most abundant during odd years.
Juvenile Pink Salmon	April	March - May	Most abundant during even years.
Adult Steelhead Trout	February - March	Snohomish River summer-run return May – Oct, winter-run return Nov – April.	Timing mentioned for project vicinity is based on fish returning to Lake Washington and being observed at the Ballard Locks.
Juvenile Steelhead Trout	April - July		Snohomish estuary: March - May
Adult Sea-run Cutthroat Trout	April - August	Year-round	Reported to rarely overwinter in saltwater.
Juvenile Sea-run Cutthroat Trout	Early October and late June	Year-round	
Adult Bull Trout	March – July	Year-round	Most abundant when prey items peak, such as juvenile salmonids and forage fish. Some may overwinter in lower river reaches and estuaries. Probably fewest present between September – October since that is peak spawning time.
Sub-adult Bull Trout	March - July	Year-round	

6.11 Birds

Based on a review of WSGA data, 78 bird species could potentially nest in the general project vicinity in or adjacent to T27N R03E (Smith et al. 1997). This determination is based on combining confirmed, probable, and possible breeding evidence. It is important to note that the species listed in **Table 7** are not necessarily associated with the project area, but could potentially utilize the project vicinity for nesting, foraging, or migrating where suitable habitat is present. As an example, a large percentage of the waterfowl breeding data is from Lake Ballinger, which is over 2.5 miles east of the project site; but this is close enough to the project area to be included.

Table 7: Breeding Bird Summary for T27N R03E and Surrounding Area

#	Common Name	Scientific Name
1.	Pied-billed Grebe	*Podilymbus podiceps*
2.	Great Blue Heron	*Ardea herodias*
3.	Green Heron	*Butorides virescens*
4.	Canada Goose	*Branta canadensis*
5.	Mallard	*Anas platyrhynchos*
6.	Blue-winged Teal	*Anas discors*
7.	Northern Shoveler	*Anas clypeata*
8.	Gadwall	*Anas strepera*
9.	Bald Eagle	*Haliaeetus leucocephalus*
10	Cooper's Hawk	*Accipiter cooperii*
11	Red-tailed Hawk	*Buteo jamaicensis*
12	Ring-necked Pheasant	*Phasianus colchicus*
13	California Quail	*Callipepla californica*
14	Virginia Rail	*Rallus limicola*
15	American Coot	*Fulica americana*
16	Killdeer	*Charadrius vociferus*
17	Spotted Sandpiper	*Actitis macularia*
18	Glaucous-winged Gull	*Larus glaucescens*
19	Rock Dove	*Columba livia*
20	Band-tailed Pigeon	*Columba fasciata*
21	Mourning Dove	*Zenaida macroura*
22	Great Horned Owl	*Bubo virginianus*
23	Barred Owl	*Strix varia*
24	Vaux's Swift	*Chaetura vauxi*
25	Anna's Hummingbird	*Calypte anna*
26	Rufous Hummingbird	*Selasphorus rufus*
27	Downy Woodpecker	*Picoides pubescens*

#	Common Name	Scientific Name
28	Northern Flicker	*Colaptes auratus*
29	Pileated Woodpecker	*Dryocopus pileatus*
30	Olive-sided Flycatcher	*Contopus borealis*
31	Western Wood-Pewee	*Contopus sordidulus*
32	Willow Flycatcher	*Empidonax traillii*
33	Pacific-slope Flycatcher	*Empidonax difficilis*
34	Tree Swallow	*Tachycineta bicolor*
35	Violet-green Swallow	*Tachycineta thalassina*
36	Cliff Swallow	*Hirundo pyrrhonota*
37	Barn Swallow	*Hirundo rustica*
38	Steller's Jay	*Cyanocitta stelleri*
39	American Crow	*Corvus brachyrhynchos*
40	Black-capped Chickadee	*Parus atricapillus*
41	Chestnut-backed Chickadee	*Parus rufescens*
42	Bushtit	*Psaltriparus minimus*
43	Red-breasted Nuthatch	*Sitta canadensis*
44	Brown Creeper	*Certhia americana*
45	Bewick's Wren	*Thryomanes bewickii*
46	Winter Wren	*Troglodytes troglodytes*
47	Marsh Wren	*Cistothorus palustris*
48	Golden-crowned Kinglet	*Regulus satrapa*
49	Swainson's Thrush	*Catharus ustulatus*
50	American Robin	*Turdus migratorius*
51	Cedar Waxwing	*Bombycilla cedrorum*
52	European Starling	*Sturnus vulgaris*
53	Hutton's Vireo	*Vireo huttoni*
54	Warbling Vireo	*Vireo gilvus*
55	Red-eyed Vireo	*Vireo olivaceus*
56	Orange-crowned Warbler	*Vermivora celata*
57	Yellow Warbler	*Dendroica petechia*
58	Black-throated Gray Warbler	*Dendroica nigrescens*
59	Common Yellowthroat	*Geothlypis trichas*
60	Wilson's Warbler	*Wilsonia pusilla*
61	Western Tanager	*Piranga ludoviciana*
62	Black-headed Grosbeak	*Pheucticus melanocephalus*
63	Spotted Towhee	*Pipilo maculatus*
64	Savannah Sparrow	*Passerculus sandwichensis*

#	Common Name	Scientific Name
65	Song Sparrow	*Melospiza melodia*
66	White-crowned Sparrow	*Zonotrichia leucophrys*
67	Dark-eyed Junco	*Junco hyemalis*
68	Red-winged Blackbird	*Agelaius phoeniceus*
69	Brewer's Blackbird	*Euphagus cyanocephalus*
70	Brown-headed Cowbird	*Molothrus ater*
71	Bullock's Oriole	*Icterus bullockii*
72	Purple Finch	*Carpodacus purpureus*
73	House Finch	*Carpodacus mexicanus*
74	Red Crossbill	*Loxia curvirostra*
75	Pine Siskin	*Carduelis pinus*
76	American Goldfinch	*Carduelis tristis*
77	Evening Grosbeak	*Coccothraustes vespertinus*
78	House Sparrow	*Passer domesticus*

Use of the adjacent marine waters by birds was assessed by reviewing the *Report of Marine Bird and Mammal Component, Puget Sound Ambient Monitoring Program for July 1992 to December 1999 Period* (Nysewander et al. 2005). **Table 8** summarizes the data based on summer and winter aerial surveys representing density within two-minute grid cell (summer) and one-minute cells (winter) that encompass the marine waters adjacent to Point Wells. Winter density within **Table 8** includes data from one- or two-minute grid cells. When the winter survey data was presented using one-minute cells, the cell location was divided at the tip of Point Wells. The first density range represents Point Wells south and the second range represents Point Wells north. When two-minute grid cells were used, only one number range is presented in **Table 9**. All densities represent animals per kilometer squared.

Table 8: Point Wells Vicinity Marine Bird Summer and Winter Density

#	Common Name	Summer Density	Winter Density
1.	All Species	75 – 200	200 – 400
2.	Gull Density	50 – 100	25 - 50
3.	Heermann's Gull	None	None
4.	California Gull	0 – 5	None
5.	Bonapartes Gull	None	None
6.	Caspian Tern	0 – 5	None
7.	Rhinoceros Auklet	None	None
8.	Common Murre	None	0 - 5
9.	Pigeon Guillemot	5 – 10	0 - 2
10.	Marbled Murrelet	None	None
11.	Ancient Murrelet	No data	None

#	Common Name	Summer Density	Winter Density
12.	Scoter	None	25 – 50 and 0 – 10
13.	Canada Goose	None	None
14.	Merganser (3 spp.)	None	5 - 10
15.	Hooded Merganser	No data	None
16.	Harlequin Duck	None	0 – 10 and None
17.	Cormorant	None	10 - 25
18.	Great Blue Heron	2 – 5	None
19.	Bufflehead	No data	0 – 10 and 10 - 25
20.	Goldeneye	No data	25 – 50 and 50 - 100
21.	Scaup (2 spp.)	No data	None
22.	Ruddy Duck	No data	None
23.	Canvasback	No data	None
24.	Oldsquaw	No data	None
25.	Western Grebe	No data	10 – 25 and 100 - 1344
26.	Horned Grebe	No data	1 - 2
27.	Red-Necked Grebe	No data	0 - 2
28.	Pacific Loon	No data	None
29.	Red-Throated Loon	No data	None
30.	Common Loon	No data	None

The summer surveys documented that gulls and terns are the most common marine species in Puget Sound, representing 73 percent of the total observed. Alcids are the second most common group, representing 10 percent of the total observed. The remainder included duck or geese at 8 percent, cormorants at 4 percent, heron at 3 percent, and other species at 2 percent.

The winter surveys documented that dabbling duck or goose are the most common species in Puget Sound, representing 37 percent of the total observed. Diving ducks are the second most common group, representing 31 percent of the total observed. The remainder included gulls at 12 percent, shorebirds at 11 percent, grebe or loon at 5 percent, alcid at 2 percent, and cormorant at 2 percent. Winter diving ducks (31 percent of total) were further divided into scoters at 36 percent, bufflehead at 23 percent, goldeneyes at 17 percent, other species at 16 percent, and scaup at 8 percent.

Species observed utilizing the nearshore marine area during the February site visit included numerous pigeons at the primary dock; cormorants on the old dilapidated dock; as well as western grebes, common goldeneye, seagulls, belted kingfisher, and common loons (*Gavia immer*). Arctic loons (*G. arctica*) also utilize the marine nearshore environment during the winter season.

6.12 Mammals

6.12.1 Terrestrial Mammals

Based on a review of WSGA data (Johnson and Cassidy 1997), twenty mammals have been documented in or adjacent to Township 27 North Range 03 East (**Table 9**). This list is not all-inclusive and only includes species that were documented in the WSGA database prior to 1997.

Table 9: Mammal Record Summary for T27N R03E

#	Common Name	Scientific Name
1.	Trowbridge's Shrew	*Sorex trowbridgii*
2.	Shrew-mole	*Neutotrichus gibbsii*
3.	Coast Mole	*Scapanus orarius*
4.	Townsend's Mole	*Scapanus townsendii*
5.	Big Brown Bat	*Eptesicus fuscus*
6.	Mountain Beaver	*Aplodontia rufa*
7.	Eastern Gray Squirrel	*Sciurus carolinensis*
8.	Douglas' Squirrel	*Tamiasciurus douglasii*
9.	Northern Flying Squirrel	*Glaucomys sabrinus*
10.	Beaver	*Castor canadensis*
11.	Forest Deer Mouse	*Permyscus keeni*
12.	Creeping Vole	*Microtus oregoni*
13.	Townsend's Vole	*Microtus townsendii*
14.	Muskrat	*Ondatra zibethicus*
15.	Pacific Jumping Mouse	*Zapus trinotatus*
16.	House Mouse	*Mus musculus*
17.	Black Rat	*Rattus rattus*
18.	Coyote	*Canis latrans*
19.	Raccoon	*Procyon lotor*
20.	Mink	*Mustela vison*

6.12.2 Marine Mammals

The project area abuts the marine waters of Puget Sound. Eleven species of marine mammals utilize Puget Sound or adjacent marine waters either year-round or seasonally and could, therefore, be present near the project area (**Table 10**). Each of these species has been observed in either the Puget Sound and/or the San Juan Island region during certain periods of the year. Some of these species are common, while others are extremely rare within the inland waters of Puget Sound.

Table 10: Marine Mammals of Puget Sound

#	Common Name	Scientific Name	Comment
1.	Harbor seal	*Phoca vitulina richardsi*	Observed near project site. Only year-round resident. densities at Point Wells during the summer averages 0.1 to 5 animals/ per square kilometer, but none were observed during the winter (Nysewander et al. 2005).
2.	California sea lion	*Zalophus californianus*	Only males occur in northwest waters.
3.	Steller sea lion	*Eumetopias jubatus*	Rare in Puget Sound, no breeding rookeries occur in Washington state. Present during fall and winter months.
4.	Northern elephant seal	*Mirounga angustirostris*	Rare but solitary individuals have been sighted in inland waters. Pups have been reported from a variety of locations in Puget Sound in recent years, including Whidbey Island.
5.	Harbor porpoise	*Phocoena phococena*	Not often observed south of Whidbey Island.
6.	Dalls porpoise	*Phocoenoides dalli*	More common south of Whidbey Island during winter.
7.	Pacific white-sided dolphin		Extremely rare in Puget Sound, but regularly observed in Strait of Juan de Fuca and San Juan Islands, primarily during the summer and fall. Prefers deeper off-shore waters.
8.	Killer whale	*Orcinus orca*	Typically occurs in Puget Sound from June through October, but primarily in the fall (September and October) and winter. J pod is often present during the fall when adult salmon abundance peaks.
9.	Humpback whale	*Megaptera novaeangliae*	Most have been observed in Puget Sound between April and July.Becoming more common in recent years (Calambodkis 2015). .
10.	Gray whale	*Eschrichtius robustus*	Generally rare but may now be the most common whale sighted in Puget Sound. Timing is variable but peak is March through May. Forty eight observed in Puget Sound and Hood Canal in 2004 and 2005.
11.	Minke whale	*Balaenoptera acutorostrata*	Present year-round but most observed between March and November. Common in San Juan Islands and Strait of Juan de Fuca, but uncommon in Puget Sound. Less than 30 observations in Puget Sound between January 2005 and August 2008.

Based on a review of the *Atlas of Seal and Sea Lion Haulout Sites in Washington* (Jeffries et al. 2000), there are two seal haulout sites within three miles of the project site. The closest is Yellow 'SF' buoy (ID # 352), which is a deep water buoy east of Jefferson Head or approximately two miles west of the project site. This haulout is utilized by harbor seals. The next closest haulout site is at the Wreck/Scuba float (ID # 336), which is located on rafts and floats north of the ferry dock at Edmonds or approximately two and one-half miles north of the project site. This haulout is utilized by California sea lions and harbor seals.

6.12.2.1 Harbor Seal

Harbor seals are members of the true seal family (Phocidae). Harbor seals are the most numerous marine mammal within Puget Sound. In 1999, Jefferies et al. (2003) recorded a mean count of 9,550 harbor seals in Washington's inland marine waters. The population across Washington

increased at an average annual rate of 10 percent between 1991 and 1996 and is thought to be stable. The stock is also considered within its Optimum Sustainable Population level.

Harbor seals are non-migratory with local movements associated with such factors as tides, weather, season, food availability, and reproduction. They are not known to make extensive pelagic migrations, although some long distance movement has been reported.

Harbor seals haul out on rocks, reefs, beaches, buoys, and drifting glacial ice; and feed in marine, estuarine, and occasionally fresh waters. Harbor seals display strong fidelity for haulout sites. Group sizes range from small numbers of animals on intertidal rocks to several thousand animals found seasonally in coastal estuaries.

Harbor seals are the only seal that breeds in the inland waters of Washington. Pupping seasons vary by geographic region. Pups are born from June through September, and have weaned by October. Based on currently available data, the level of human-caused mortality and serious injury is less than 10 percent of the potential biological removal (PBR) of 771 harbor seals per year (Caretta and Chivers 2003).

6.12.2.2 California Sea Lion

California sea lions are members of the family Otariidae or eared seals (sea lions and fur seals). They do not breed in Puget Sound. Breeding areas are on islands located in southern California, western Baja California, and the Gulf of California.

The U.S. stock was estimated to be approximately 238,000 animals in 2006. California sea lions were unknown in Puget Sound until approximately 1979 (Steiger and Calambokidis 1986). Everitt et al. (1980) reported the initial occurrence of large numbers at Port Gardner, just north of Everett (in northern Puget Sound), in the spring of 1979. The number of California sea lions in the San Juan Islands and the adjacent Strait of Juan de Fuca totaled fewer than 3,000 in the mid-1980s (Bigg 1985, Gearin et al. 1986). More recently, 3,000 to 5,000 animals are estimated to move into northwest waters (both Washington and British Columbia) during the fall (September) and remain until the late spring (May) when most return to breeding rookeries in California and Mexico. Peak counts of over 1,000 animals have been made in Puget Sound (Jeffries et al. 2000).

California sea lions do not avoid areas with heavy or frequent human activity, but rather may approach certain areas to investigate. This species typically does not flush from a buoy or haulout if approached. They are known to capitalize on reoccurring food sources (such as salmon) and are infamous for eating listed salmonids at manmade bottleneck areas such as the Hiram M. Chittenden Locks in Seattle and at the Bonneville Dam on the Columbia River. This species is difficult to remove and does not respond well to hazing efforts (Brown et al. 2007).

6.12.2.3 Northern Elephant Seal

Northern elephant seals are the largest pinniped found in Puget Sound. Populations of northern elephant seals in the United States and Mexico are the offspring of a few hundred survivors remaining after hunting nearly led to the species extinction (Stewart et al. 1994). Elephant seals present in Puget Sound are considered part of the California breeding stock (Carretta et al. 2007a). The California breeding stock is considered an isolated population from the Mexican stock. Northern elephant seals breed and give birth primarily on islands off California and

Mexico from December through March. After their winter breeding season and annual molt cycles, individuals seasonally disperse northward along the Oregon and Washington coasts, and into the Strait of Juan de Fuca.

In recent years, pups have been seen at beaches at Destruction, Protection, and Smith/Minor Islands in the Strait of Juan de Fuca (Jeffries et al. 2000). The WDFW has identified at least seven haulout sites in inland Washington waters. In March of 2015, an elephant seal pup was observed on a beach on south Whidbey Island (Orca Network 2015). There are several haulout sites in the Strait of Juan de Fuca where small numbers frequent and pupping occurs. The Whale Museum occasionally reports incidental observations of northern elephant seal individuals throughout Puget Sound. This species has been considered abundant and increasing within its range since the early 1990's (Calambokidis and Baird 1994). Abundance estimates for Puget Sound waters are not available due to the infrequency of sightings and the low numbers encountered.

6.12.2.4 Steller Sea Lion

Steller sea lions primarily use haulout sites on the outer coast of Washington and in the Strait of Juan de Fuca along Vancouver Island in British Columbia. Steller sea lions numbers have risen steadily in Washington since the early 1990s. Aggregate annual counts have increased from 250-300 animals in the early 1990s to a count of 2,157 animals in July 2014, which is the highest population count to date (Wiles 2015). Typically, only sub-adults or non-breeding adults are found in Puget Sound and San Juan Islands (Pitcher et al. 2007).

A few Steller sea lions can be observed year around in Puget Sound, although most of the breeding age adults return to the rookeries off Oregon and British Columbia during the spring and summer. Adult males and juveniles disperse widely and travel great distances outside of the breeding season. These are typically the animals observed in Puget Sound. They are usually observed in small groups of one to four individuals.

Steller sea lion breeding was first documented in Washington in 1992, with a single pup observed on Carroll Island (Wiles 2015). As of 2014, a total of 60 pups were documented at haulout sites on the outer coast, mostly at Carroll Island, Sea Lion Rock, and Bodelteh Island (Wiles 2015). Haulout sites have increased in recent years and include most navigation buoys. Haulout sites in Puget Sound include Port Gardner near Everett, Shilshole Bay adjacent to Seattle, Toliva Shoals buoy south of Steilacoom, and buoys off McNeil and Eagle Islands.

6.12.2.5 Harbor Porpoise

Harbor porpoise are found in coastal and inland waters of the eastern North Pacific Ocean from Point Barrow, Alaska, south to Point Conception, California (Gaskin 1984). Although harbor porpoises have been spotted in deep water, they tend to remain in shallower shelf waters (<150 meters) where they are most often observed in small groups of one to eight animals (Baird 2003).

Little information regarding food habits of harbor porpoise is available for British Columbia or inland Washington waters (Hall 2004). Walker et al. (1998) examined stomach contents for 26 harbor porpoises collected over a seven-year period (1990-1997) in Washington and British Columbia. Documented prey species included juvenile blackbelly eelpout, opal squid, Pacific

herring, walleye pollock, Pacific hake, eulachon, and Pacific sanddab. Harbor porpoises are opportunistic feeders, with prey species varying based on seasonal abundance. Herring and hake may comprise a fundamental component of harbor porpoise diet and may be locally important as a year-round food source. Harbor porpoise may inhabit particular locations and prey on herring as they become available. Species such as juvenile blackbelly eelpout, opal squid, and sand lance may be seasonally important. Small numbers of harbor porpoise are eaten by transient killer whales.

Mean abundance estimates based on 2002 and 2003 aerial surveys conducted in the Strait of Juan de Fuca, San Juan Islands, Gulf Islands, and Strait of Georgia is 10,682 (J. Laake, unpubl. data as cited in Carretta et al. 2007b). Abundance estimates of harbor porpoise for the Strait of Juan de Fuca and the San Juan Islands in 1991 were approximately 3,300 animals (Calambokidis et al. 1993). Harbor porpoise were once considered common in southern Puget Sound; however, there has been a significant decline in sightings since the 1940s.

The last comprehensive surveys of Puget Sound in 1994 produced no harbor porpoise observations (Osmek et al. 1994). Surveys conducted as part of the marine mammal component of the Puget Sound Ambient Monitoring Program (PSAMP) detected no harbor porpoises in central and southern Puget Sound from 1992 to 1998. The apparent decline in harbor porpoises observed since the 1940s may be due to by-catch from gill net fisheries coupled with the sharp decline of the herring fishery. Harbor porpoise are considered vulnerable to human activities (Calambokidis and Baird 1994) and avoid vessel traffic. Contaminants, as well as unusual mortality events and competition with Dall's porpoise, may also be factors in their decline.

During winter aerial surveys conducted from 1993 to 1998, 21 individuals were observed in Northern Puget Sound. No observations were documented in central and southern Puget Sound during this same time period. From 1999 to 2008, winter aerial surveys detected 73 individuals in Northern Puget Sound, as well as 12 and 6 individuals in Central and Southern Puget Sound, respectively. Summer observations from 1992 to 1999 yielded a total of 32 individuals and one individual in Northern and Southern Puget Sound, respectively. The majority of winter and summer harbor porpoise observations from 1992 to 2008 occurred in the marine waters surrounding the San Juan Islands, including the Strait of Juan de Fuca, Strait of Georgia, Rosario Strait, Haro Strait, and Boundary Pass.

Research conducted in the southern Vancouver Island waters indicated a marked increase and greatest abundance in harbor porpoise numbers from April to October (673 animals), with peak abundance in August and September (Hall 2004). Numbers were considerably lower during other months of the year, with 208 animals observed from November to March. During a 12-month line transect survey period, harbor porpoise group sizes ranged from one to five animals, with a mean annual group size of 1.89. The sighting frequency of harbor porpoise along the 12-month line transect survey was greatest at water depths less than 150 meters. The highest numbers of harbor porpoise were observed at water depths ranging from 61 to 100 meters. Although harbor porpoise have been observed in waters exceeding depths of 150 meters, they are primarily found in areas with water depths less than 150 meters and topography consisting of submarine shelves.

Harbor porpoise appear to be rebounding and re-colonizing Puget Sound, perhaps in response to a reduction in fisheries and fewer commercial gill-netters resulting from declining salmon populations. In addition, there have been recent confirmed sightings of harbor porpoise in southern Puget Sound (WDFW 2008). Recent data suggests increasing numbers of harbor porpoises in central and southern Puget Sound since 1999. Harbor porpoise are common in the Strait of Juan de Fuca and south into Admiralty Inlet (near Port Townsend), but not common south of Admiralty Inlet. Harbor porpoise occur year-round and breed in the waters around the San Juan Archipelago and north into Canadian waters (Calambokidis and Baird 1994).

Recent ongoing studies by the Pacific Biodiversity Institute at near the north end of Whidbey Island between Burrows Pass and Rosario Beach have consistently observed harbor porpoise throughout the year, usually in small groups but occasionally in groups as large as 50 porpoises. Porpoises have been documented raising calves in the Burrows Pass area, usually between August and December (Jeffries 2014).

6.12.2.6 Dall's Porpoise

Dall's porpoise occur in the North Pacific Ocean and are divided into two stocks: 1) waters off California, Oregon, and Washington; and 2) Alaska waters. During a ship line-transect survey conducted in 2005, Dall's porpoise was the most abundant cetacean species off the Oregon and Washington coast (Forney 2007). Dall's porpoise are migratory and appear to have predictable seasonal movements driven by changes in oceanographic conditions (Green et al. 1993).

Dall's porpoise feed mainly on small schooling fishes and cephalopods, including herring, anchovies, sardines, mackerels, sauries, octopuses, squid, and cuttlefish (Miller 1988). They often chase fish at the water surface, and have been observed cooperatively herding prey when herring balls were present. This species may also target deeply distributed single prey items by performing prolonged deep dives lasting up to seven minutes.

Aerial surveys conducted from 1992 to 1999 by Nysewander et al. (2005) indicated that Dall's porpoise favored certain areas in the Puget Sound, particularly Haro Strait and the central portion of the Strait of Juan de Fuca during both summer and winter. Dall's porpoises entered southern and central Puget Sound in larger numbers during winter, reaching up into Saratoga Passage, as well as south of the Narrows near Tacoma. During winter, numbers as high as 21-25 were observed in Colvos Passage on the West side of Vashon Island. Groups of one to two animals and a group of six to ten animals were also observed south of the Tacoma Narrows Bridge, north of Penrose Point in Carr Inlet and Henderson Bay. During summer, Dall's porpoises are much less common, with observations ranging from groups of one to two animals primarily in the northern third of Puget Sound. Based on incidental observations from the PSAMP during July aerial surveys from 1992-1999, groups of one to two animals were observed as far south as Bainbridge Island.

The California, Oregon and Washington stock mean abundance estimate based on 2001 and 2005 ship surveys is 57,549 Dall's porpoise (Barlow 2003, Forney 2007). Estimated abundance of Dall's porpoise in the San Juan Island region was 133 animals, while estimated abundance in the Strait of Juan de Fuca was 3,015 animals (Calambokidis and Baird 1994). The Dall's porpoise is found year-round in low numbers in Puget Sound, ranging south through Admiralty Inlet into central and southern Puget Sound. The population of Washington's inland waters was most

recently estimated at 900 individuals (Calambokidis et al. 1997). Prior to the 1940s, Dall's porpoise were not reported in Puget Sound. In recent years, the number of observations and confirmed reports has increased. Animals have been seen as far south as Tacoma Narrows, Hartstein Island, Key Peninsula, and Fox Island (Nysewander et al. 2005).

6.12.2.7 Pacific White-sided Dolphin

Pacific white-sided dolphins are divided into northern and southern stocks comprising two discrete, non-contiguous areas: 1) waters off California, Oregon, and Washington; and 2) Alaskan waters (Carretta et al. 2007b). Pacific white-sided dolphins are occasionally seen in the northernmost part of the Strait of Georgia and in western Strait of Juan de Fuca, but are generally only rare visitors to this area (Calambokidis and Baird 1994). This species is rarely seen in Puget Sound. Pacific white-sided dolphins have been documented primarily in deep, offshore areas (Calambokidis et al. 2004). The Pacific white-sided dolphin is capable of diving up to six minutes to feed, preying on small schooling fish including capelin, sardines, and herring (Reeves et al. 2002).

Pacific white-sided dolphins have been reported to be regular summer and fall inhabitants of the Strait of Juan de Fuca and San Juan Islands (specifically Haro Strait) (Osborne et al. 1988), but are extremely rare in Puget Sound. The Pacific white-sided dolphin is primarily a pelagic species that feeds along the continental slope or off the shelf. Ship transect surveys conducted between 1995 and 2002 off the northern Washington coast documented Pacific white-sided dolphins far from shore (>40 kilometers) and in deep waters (>200 meters) (Calambokidis et al. 2004).

The California, Oregon, and Washington stock mean abundance estimate based on the two most recent ship surveys is 25,233 Pacific white-sided dolphins (Forney 2007). This abundance estimate is based on two summer/autumn shipboard surveys conducted within 300 nautical miles of the coasts of California, Oregon, and Washington in 2001 and 2005. Surveys in Oregon and Washington coastal waters resulted in an estimated abundance of 7,645 animals. Fine-scale surveys in Olympic Coast slope waters and Olympic Coast National Marine Sanctuary resulted in an estimated abundance of 1,196 and 1,432 animals, respectively. There are no known estimated numbers for Washington's inland waters. Pacific white-sided dolphins were not observed in Puget Sound during yearly summer and winter aerial surveys from 1992 to 1999, and winter aerial surveys from 2000 to 2008, conducted as part of the PSAMP (Nysewander et al. 2005, WDFW 2008). During aerial surveys conducted as part of the PSAMP from 1992 to 2008, three Pacific white-sided dolphins were observed in the Strait of Juan de Fuca during the summer of 1995.

6.12.2.8 Killer Whale

The killer whale is the largest member of the dolphin family (Delphinidae) and occurs in most marine waters of the world. Killer whales are distinct among all cetaceans with their black-and-white coloration, with characteristic gray or white saddle patches behind the dorsal fin, and white eye patches. Killer whales live in family groups called pods, are highly social, and communicate with a highly developed acoustic sensory system that is also used to navigate and find prey. Vocal communication is particularly advanced in killer whales and is an essential element of the species social structure.

Two sympatric ecotypes of killer whales are found within this region—transient and resident. These types vary in diet, distribution, acoustic calls, behavior, morphology, and coloration (Ford et al. 2000). The ranges of transient and resident killer whales overlap; however, little interaction and high reproductive isolation occurs among the two ecotypes. Resident killer whales are primarily piscivorous; whereas, transients primarily feed on marine mammals, especially harbor seals. Resident killer whales also tend to occur in larger (10 to 60 individuals), stable family groups, known as pods; whereas transients occur in smaller (less than 10 individuals), less structured pods.

West Coast Transient Stock

One stock of transient killer whale—the 'West Coast Transients'—occurs in Washington State. This stock ranges from southern California to southeast Alaska and is distinguished from two other Eastern North Pacific transient stocks that occur further north, the 'AT1' and the 'Gulf of Alaska' transient stocks (Angliss and Outlaw 2005). This separation was based on variations in acoustic calls and genetic distinctness. West Coast Transients primarily forage on harbor seals (Ford and Ellis1999), but other species such as porpoises and sea lions are also taken (NMFS 2008a).

The West Coast Transient stock, which includes individuals from California to southeastern Alaska, was estimated to have a minimum of 314 individuals (including animals identified in Canada) based on whales catalogued by photo identification (Angliss and Outlaw 2005). In addition, another 30 individuals were provisionally classified as transients in this stock. Unlike Southern Residents, re-sighting transients is more infrequent and, therefore, the population estimate was conservative based on individually identified animals. Human-caused mortality and serious injury are estimated to be zero animals per year and do not exceed the population's biological removal rate, which is estimated at 3.1 animals.

West Coast Transients are documented intermittently year-round in Washington inland waters. Records from 1976 – 2006 document West Coast Transients in the inland waters of Washington during the months of March through June and October through December, with the primary area of occurrence in Puget Sound being north of Admiralty Inlet (Whale Museum 2008b).

Southern Resident Stock

Two stocks of resident killer whales occur in Washington State—the Southern Resident and Northern Resident stocks. Southern Residents occur within Puget Sound, in the Strait of Juan de Fuca, Strait of Georgia, and in coastal waters off Washington and Vancouver Island, British Columbia (Ford et al. 2000). Northern Residents occur primarily in inland and coastal British Columbia and Southeast Alaska waters and rarely venture into Washington State waters. Little interaction or gene flow is known to occur between the two resident stocks.

The Southern Residents live in three family groups known as the J, K, and L pods. The entire southern resident population has been monitored since 1973 (Krahn et al. 2004). Individual whales are identified through photographs of unique saddle patch and dorsal fin markings. Each Southern Resident pod has a distinctive dialect or vocalizations and calls can travel ten miles or more underwater. The Southern Residents forage primarily on salmon, with Chinook salmon considered the major prey in the Puget Sound region in late spring through the fall (NMFS 2008a). Other prey identified includes chum, other salmonids, herring, and rockfish. Killer whale

hearing is well developed for their complex underwater communication structure. Southern Residents are highly vocal, while transients limit their use of vocalization and may travel silently.

Small population numbers make Southern Residents vulnerable to inbreeding depression and catastrophic events such as disease or a major oil spill. Ongoing threats to Southern Residents include declining prey resources, environmental contaminants, noise and physical disturbance (Wiles 2004). In Washington's inland waters, high levels of noise disturbance and potential behavior disruption are due to recreational boating traffic, private and commercial whale watching boats, and commercial vessel traffic. Other potential noise disturbance includes high output military sonar equipment and marine construction. Noise effects may include altered prey movements and foraging efficiency, masking of whale calls, and temporary hearing impairment.

In 1974, the southern resident population comprised 71 whales, peaked at 98 animals in 1995, and then declined to 79 in 2001 before increasing to 89 animals in 2006 (Carretta et al. 2007a). The population experienced an almost 20 percent decline from 1996 to 2001 (NMFS 2008a). As of November 7, 2007, the population collectively numbers 88 individuals (Center for Whale Research 2008). As of March 2015, J pod has 27 members, K pod has 19 members, and L pod has 35 members, for a total population of 81 whales (Orca Network 2015). Three orcas have been born in February and March of 2015, the most documented births in a two-month period for at least ten years (Orca Network 2015).

There are a limited number of reproductive-age Southern Resident males, and several females of reproductive age are not having calves. Three major threats were identified in the Endangered Species Act (ESA) listing: reduced quantity and quality of prey; persistent pollutants that could cause immune or reproductive system dysfunction; and effects from vessels and sound (NMFS 2008a). Other threats are demographics, small population size, and vulnerability to oil spills. Historically, declines in the Southern Resident population were due to shooting by fishermen, whalers, sealers, and sportsmen largely due to their interference with fisheries (Wiles 2004) and the aquarium trade, which is estimated to have taken a significant number of animals from 1967 to 1973 (Ford et al. 1994).

The estimated annual level of human-caused mortality and serious injury is 0.2 animals per year, which exceeds the PBR of 0.18 animals (Caretta et al. 2007b). The 0.2 rate reflects a vessel strike of one animal.

Killer whales are protected under the MMPA of 1972. The West Coast Transient stock is not designated as depleted under the MMPA or listed as "threatened or "endangered" under the ESA. Because the estimated level of human-caused mortality and serious injury (0 animals per year) does not exceed the PBR rate (3.1), the stock is not classified as strategic.

The Eastern North Pacific Southern Resident stock was declared depleted under the MMPA in May 2003 (68 FR 31980). The NMFS then announced preparation of a conservation plan to restore the stock to its optimal sustainable population.

On November 18, 2005, the Southern Resident stock was listed as an endangered distinct population segment (DPS) under the ESA (70 FR 69903). On November 29, 2006, the NMFS

published a final rule designating critical habitat for the Southern Resident killer whale DPS (71 FR 69054). Both Puget Sound and the San Juan Islands are designated as core areas of critical habitat under the ESA, but areas less than 20 feet deep (relative to extreme high water) are not designated as critical habitat (71 FR 69054). A final recovery plan for Southern Residents was published in January of 2008 (NMFS 2008a). In April 2004, the State upgraded their status to a state endangered species.

Southern Resident Stock Distribution

Southern Residents are documented in coastal waters ranging from central California to the Queen Charlotte Islands, British Columbia. Resident killer whales generally spend more time in deeper water and only occasionally enter water less than 15 feet deep (Baird 2000). Distribution is strongly associated with areas of greatest salmon abundance, with heaviest foraging activity occurring over deep open water and in areas characterized by high-relief underwater topography, such as subsurface canyons, seamounts, ridges, and steep slopes (Wiles 2004).

Spring/Summer Distribution

Beginning in May or June and through the summer months, all three pods (J, K, and L) of Southern Residents are typically located in the protected inshore waters of Haro Strait (west of San Juan Island), in the Strait of Juan de Fuca, and Georgia Strait near the Fraser River. Historically, the J pod also occurred intermittently during this time in Puget Sound; however, records from the Whale Museum from 1997 through 2007 indicate that J pod did not enter Puget Sound south of the Strait of Juan de Fuca from approximately June through August.

Fall/Winter Distribution

During the fall, all three pods occur in areas where migrating salmon are concentrated, such as the mouth of the Fraser River. They may also enter areas in Puget Sound where migrating chum and Chinook salmon are concentrated (Osborne 1999). In the winter months, the K and L pods spend progressively less time in inland marine waters and depart for coastal waters in January or February. The J pod is likely to appear year-round near the San Juan Islands, and in the fall/winter, in the lower Puget Sound and in Georgia Strait at the mouth of the Fraser River.

Over the last several years, K and L pods have arrived earlier to the area in the spring and departed the area in the fall (Osborne et al. 2001). The Whale Museum keeps a database of verified sightings by location quadrants. Sightings may be of individual or multiple whales.

6.12.2.9 Gray Whale

Gray whales are baleen whales. The North Pacific gray whale stock is divided into two distinct geographically isolated stocks: eastern and western “Korean” (Angliss and Outlaw 2005). Individuals in this region are part of the Eastern North Pacific stock. The majority of the Eastern North Pacific population spends summers feeding in the Bering and Chukchi seas, but some individuals have been reported in waters off the coast of British Columbia, southern Alaska, Washington, Oregon, and California. Gray whales migrate in the fall, south along the coast of North America to Baja California, Mexico to calve. Gray whales occur in Washington waters during feeding migrations between late spring and autumn with occasional sightings during the winter months (Calambokidis et al. 2002).

It is believed that commercial hunting for gray whales reduced population numbers to below 2,000 individuals. After listing of the species under the ESA in 1970, the number of gray whales increased significantly, resulting in their delisting in 1994. Surveys since the delisting estimate that the population fluctuates at or just below the carrying capacity of the species (~26,000 individuals) (Angliss and Outlaw 2005). Population estimates from 1990 to 1998 range between 18,178 and 26,635 individuals and from 2000 through 2002, range between 18,000 to 19,000 individuals. Abundance data since 2000 suggests that the number of gray whales dropped after 1998, but has stabilized in recent years (Rugh et al. 2008). Abundance for 2006 was estimated at just over 20,000 individuals.

Gray whale sightings reported to Cascadia Research and the Whale Museum between 1990 and 1993 totaled over 1,100 (Calambokidis et al. 1994). Forty-eight individual gray whales were observed in Puget Sound and Hood Canal in 2004 and 2005 (Calambokidis 2007). Abundance estimates calculated for the small regional area between Oregon and southern Vancouver Island, including the San Juan area and Puget Sound, suggest there were 137 to 153 individual gray whales from 2001 through 2003.

Gray whales migrate within five to fifteen miles of the coast of Washington during their annual north/south migrations. Gray whales migrate south to Baja California where they calve in November and December, and then migrate north to Alaska from March through May to summer and feed. A few gray whales are observed in Washington inland waters between the months of January and September, with peak numbers of individuals from March through May (Calambokidis 2007). The average duration within Washington inland waters is 47 days and the longest stay was 112 days.

Although typically seen during their annual migrations on the outer coast, a small group of 10 to 15 gray whales annually comes into the inland waters at Saratoga Passage and Port Susan from March through May to feed on ghost shrimp (Weitkamp et al. 1992; Orca Network 2015). During this time frame they are also seen in the Strait of Juan de Fuca, the San Juan Islands and areas of Puget Sound, although the observations in Puget Sound are highly variable between years (Calambokidis, et al. 2002). In 2007 and 2008 numerous sightings of gray whale(s) were reported in Puget Sound near Bremerton, Point Defiance, Whidbey Island, Mukilteo, Saratoga Passage, Mabana, Mariner's Cove, Skagit Bay, Penn Cove, Race Lagoon, and the Port Washington Narrows. There were also several reported sightings in the San Juan Islands during both years around the north end of Orcas Island and in Rosario Strait (Whale Museum 2008a).

6.12.2.10 Humpback Whale

Humpback whales are wide-ranging baleen whales that can be found almost worldwide. They summer in temperate and polar waters, and winter in tropical waters for mating and calving. Humpbacks are vulnerable to whaling due to their tendency to feed in near shore areas. Few humpback whales have been seen in Puget Sound, but more frequent sightings occur in the Strait of Juan de Fuca and near the San Juan Islands. Most sightings are in spring and summer. Humpback whales feed on krill, small shrimp-like crustaceans, and various kinds of small fish.

Whaling statistics estimate that before 1905, the population in the North Pacific was approximately 15,000 (Rice 1978). By 1966, the population dropped to 1,200 to 1,400 due to over hunting (Johnson and Wolman 1984). In the 1990s, the abundance of North Pacific

humpback whales was estimated at 6,000 (Calambokidis et al. 1997). Current estimates indicated that the total abundance is just over 18,000 individuals (Calambokidis et al. 2008). The majority of the population winters in Hawaiian waters and feeds in the Bering Sea and Aleutian Islands. The abundance estimate for Washington and Southern British Columbia is less than 500. Surveys in Washington waters between 1995 and 2000 estimated around 100 individuals.

Humpback whales were historically common in inland waters of Puget Sound and the San Juan Islands (Calambokidis et al. 2004). In the early part of this century, there was a productive commercial hunt for humpbacks in Georgia Strait that was probably responsible for their disappearance from local waters (Osborne et al. 1988). Individual humpback whales are rarely seen south of Admiralty Inlet. Approximately six individuals were seen between 1996 and 2001 (Calambokidis et al. 2004). Between January 2005 and August 2008, there were 34 total observations of humpback whales in Puget Sound south of Admiralty Inlet. The majority of these sightings were two individuals observed for several days in May, June, and July 2008, between Seattle and the southern tip of Puget Sound (Orca Network 2008).

Sightings in inland Washington waters occurred more often in the Strait of Juan de Fuca and the San Juan Islands, than in Puget Sound (Orca Network 2008). From 2005 through 2008, humpbacks were observed one to five days a month in the Strait of Juan de Fuca in May through December of each year. In the San Juan Island area, humpbacks were observed three days in June 2005, one day in July 2005, one day in June 2007, and two days each in February and June 2008. Within Puget Sound, humpback whales could be present between April and July.

Sightings of humpback whales have increased in recent years. More than 500 sightings of humpbacks have occurred in the Salish Sea in each of 2014 and 2015 (Cascadia Research 2018). Calambokidis et al. (2015) identifies the area surrounding the mouth of the Strait of Juan de Fuca as one of seven Biologically Important Areas for humpbacks on the west coast of the United States, with primary occurrence between May and November. There is evidence that the Strait and Puget Sound are becoming a more important resting and feeding area for humpbacks in the last decade.

6.12.2.11 Minke Whale

World-wide, minke whales are one of the most abundant whales (Calambokidis and Baird 1994). The Northern minke whale is separated into two distinct subspecies: the Northern Pacific and the Northern Atlantic subspecies. Within the Northern Pacific subspecies, there are three stocks of minke whale recognized: the Sea of Japan/East China Sea, the western Pacific, and the "remainder" of the Pacific. Within U.S. waters, the Northern Pacific stock is broken into three management stocks: the Alaskan stock, California, Oregon, and Washington stock, and the Hawaiian stock (NMFS 2008b). The California, Oregon, Washington management stock is considered a resident stock, which is unlike the other Northern Pacific stocks. This stock includes minke whales within the inland Washington waters of Puget Sound and the San Juan Islands.

Minke whales have small dark sleek bodies and a small dorsal fin. They feed by side lunging into schools of prey and gulping in large amounts of water. Food sources consist of krill, copepods, and small schooling fish, such as anchovies, herring, mackerel, and sand lance (NMFS 2008b).

Information on minke whale population and abundance is limited due to difficulty in detection. The total population size for the entire North Pacific is unknown (Carretta et al. 2007b). The number of minke whales in the California, Oregon and Washington stock is estimated between 500 and 1,015 individuals (NMFS 2008b). Over a ten-year period, 30 individuals were photographically identified around the San Juan Islands and demonstrated high site fidelity (Calambokidis and Baird 1994).

Minke whales are reported in Washington's inland waters year-round, although the majority of the records are from March through November (Calambokidis and Baird 1994). Minke whales are relatively common in the San Juan Islands and Strait of Juan de Fuca, but relatively rare in Puget Sound. Most incidental observations in the San Juan Island Region have occurred in July and August (Orca Network 2008). Few observations occur in Puget Sound south of Admiralty Inlet. Between January 2005 and August 2008, fewer than 30 observations of minke whales were recorded with Orca Network from Admiralty Inlet to the southern tip of Puget Sound. All of these observations occurred from March through November. The majority of these sightings (25) occurred in Admiralty Inlet or in Saratoga Passage. Very few (<5) observations of minke whales occurred south of Seattle between 2005 and 2008. Minke whales are also occasionally caught in salmon drift gillnet fishery in Puget Sound.

6.13 Species of Significant Importance

Species of significant importance are those listed or managed by either the federal government or state of Washington. This includes species listed as threatened, endangered, or species of concern under the ESA or MMPA. Species regulated by the state are those identified by the WDFW as priority species. Species of Concern in Washington include all State Endangered, Threatened, Sensitive, and Candidate species. Federal Species of Concern also include Federal Endangered, Threatened, and Candidate Fish stocks. Species of Concern are also considered priority species.

Included in these lists are species that have been documented in the project vicinity and that have a federal or state status. The project vicinity is defined as being within several miles of the project site. This is synonymous with the definition of "action area" utilized within ESA-related documents. The extent of the project vicinity factors in that these species are mobile and can traverse across large swaths of the landscape.

6.13.1 Federally Listed Species

The USFWS species list for the project (USFWS 2018) includes nine species listed as threatened or endangered and two species of concern. There are also several MMPA-listed marine mammals that occur off the Washington Coast and in Puget Sound. Based on a review of existing habitat conditions and the WDFW PHS data, no federally-listed species under the jurisdiction of the USFWS occur on the upland portion of the project site; however, several listed species and their critical habitat are present in the marine waters at the western edge of the Paramount Petroleum facility. Species under jurisdiction of the USFWS that could occur within the "action area" include bull trout (*Salvelinus confluentus*) and its designated critical habitat and marbled murrelet (*Brachyramphus marmoratus*).

The NMFS has jurisdiction over federally-listed anadromous salmonids, marine mammals and turtles, designated listed species critical habitat, and essential fish habitat (EFH). These species occur seasonally in the action area's marine waters. Listed species under jurisdiction of the NMFS and USFWS are presented in **Table 11**. Puget Sound Chinook salmon and listed rockfish critical habitat occur in the "action area" along with the proposed critical habitat for Puget Sound steelhead trout. The listed rockfish are rare in Puget Sound, but could be associated with the deepwater dock or nearby waters. Critical habitat for southern resident killer whale occurs in waters deeper than 20 feet.

Table 11: Federal Species of Significant Importance

#	Common Name	Scientific Name	Federal ESA Status	Federal MMPA Status
1	Bocaccio Rockfish	*Sebastes paucispinis*	Endangered	NA
3	Yelloweye Rockfish	*Sebastes ruberrimus*	Threatened	NA
4	Chinook Salmon	*Oncorhynchus tshawytscha*	Threatened	NA
5	Steelhead Trout	*Oncorhynchus mykiss*	Threatened	NA
6	Bull Trout	*Salvelinus confluentus*	Threatened	NA
7	Killer Whale	*Orcinus orca*	Endangered	Depleted
8	Humpback Whale	*Megaptera novaeangliae*	Endangered	Depleted
9	Marbled Murrelet	*Brachyramphus marmoratus*	Threatened	NA
10	Bald Eagle	*Haliaeetus leucocephalus*	Species of Concern	NA
11	Steller Sea Lion	*Eumetopias jubatus*	Species of Concern	Depleted
12	Gray Whale	*Eschrichtius robustus*	None	Not classified
13	Pacific White-sided dolphin	*Lagenorhynchus obliquidens*	None	Not Depleted
14	Northern Elephant Seal	*Mirounga angustirostris*	None	Not Depleted
15	Harbor Seal	*Phoca vitulina*	None	Not Depleted
16	Harbor Porpoise	*Phocoena phocoena*	None	Not Depleted
17	Dall's Porpoise	*Phocoenoides dalli*	None	Not Depleted
18	California Sea Lion	*Zalophus californianus*	None	Not Depleted

NA = not applicable
MMPA = Marine Mammal Protection Act
ESA = Endangered Species Act

6.13.2 State Listed Species

There are a total of eight state listed threatened, endangered, and sensitive species that could possibly occur in the study area and are listed in **Table 12** (WDFW 2018a). An additional 25 candidate species and two priority species for breeding are also included in **Table 12**.

Table 12: State Species of Significant Importance

#	Common Name	Scientific Name	WA State Status
1	Western Grebe	*Aechmophorus occidentalis*	State Candidate
2	Sand Lance	*Annodytes hexapterus*	Priority Species – Breeding Areas
3	Marbled Murrelet	*Brachyramphus marmoratus*	State Threatened
4	Vaux's Swift	*Chaetura vauxi*	State Candidate
5	Herring	*Clupea pallasii*	State Candidate
6	Townsend's Big-eared Bat	*Corynorhinus townsendii*	State Candidate
7	Pileated Woodpecker	*Dryocopus pileatus*	State Candidate
8	Gray Whale	*Eschrichtius robustus*	State Sensitive
9	Peregrine Falcon	*Falco peregrinus*	State Sensitive
10	Common Loon	*Gavia immer*	State Sensitive
11	Bald Eagle	*Haliaeetus leucocephalus*	State Sensitive
12	Surf Smelt	*Hypomesus pretiosus*	Priority Species – Breeding Areas
13	River Lamprey	*Lampetra ayresi*	State Candidate
14	Humpback Whale	*Megaptera novaeangliae*	State Endangered
15	Keen's Myotis	*Myotis keenii*	State Candidate
16	Chum Salmon	*Oncorhynchus keta*	State Candidate
17	Chinook Salmon	*Oncorhynchus tshawytscha*	State Candidate
18	Killer Whale	*Orcinus orca*	State Endangered
19	Brown Pelican	*Pelecanus occidentalis*	State Endangered
20	Harbor Porpoise	*Phocoena phocoena*	State Candidate
21	Purple Martin	*Progne subis*	State Candidate
22	Bull Trout	*Salvelinus confluentus*	State Candidate
23	Brown Rockfish	*Sebastes auriculatus*	State Candidate
24	Copper Rockfish	*Sebastes caurinus*	State Candidate
25	Greenstriped Rockfish	*Sebastes elongatus*	State Candidate
26	Widow Rockfish	*Sebastes entomelas*	State Candidate
27	Yellowtail Rockfish	*Sebastes flavidus*	State Candidate
28	Quillback Rockfish	*Sebastes maliger*	State Candidate
29	Black Rockfish	*Sebastes melanops*	State Candidate
30	China Rockfish	*Sebastes nebulosus*	State Candidate

#	Common Name	Scientific Name	WA State Status
31	Tiger Rockfish	*Sebastes nigrocinctus*	State Candidate
32	Bocaccio Rockfish	*Sebastes paucispinis*	State Candidate
33	Canary Rockfish	*Sebastes pinniger*	State Candidate
34	Redstripe Rockfish	*Sebastes proriger*	State Candidate
35	Yelloweye Rockfish	*Sebastes ruberrimus*	State Candidate

6.14 Matrix of Pathways and Indicators

Existing marine conditions were generally quantified by using watershed and habitat parameters as defined by the "Matrix of Pathways and Indicators" developed by NMFS (**Table 13**). However, NMFS has not published a matrix that addresses marine-related pathways and indicators. The following matrix was modified from the Matrix of Pathways and Indicators. Modifications include adding pathways and indicators applicable to the marine environment.

Table 13: Marine Nearshore Matrix of Pathways and Indicators Summary

	Indicators	Baseline Condition	Comments
Water Quality	Temperature	Properly Functioning	With the exception of Shilshole Bay near the Lake Washington Ship Canal, the available data does not indicate that overall temperature in marine waters is degraded due to anthropogenic factors. Temperature is highly variable.
	Turbidity	Properly Functioning	The available data does not indicate that turbidity levels in Puget Sound have increased or are impacting listed species.
	Chemical Contamination & Nutrients	At Risk	Several sites in Puget Sound are highly contaminated, but they tend to be isolated and near major ports, industrialized areas, and sewage outfalls.
	Fecal coliform	At Risk	Higher levels occur at beach sites than offshore sites. Areas near freshwater inputs typically experience higher colony counts. Some beach stations fail state standards on a consistent basis.
	Dissolved Oxygen (DO)	Properly Functioning	Unlike Hood Canal, Puget Sound has not experienced catastrophic low DO levels. This is likely due to the higher rate of flushing or circulation. Low DO levels have been reported in Puget Sound, but this is typically attributed to inputs of low-oxygenated Pacific water and consumption of oxygen by bacterial respiration (King County 2009).
Sediment	Sediment Quality	At Risk	A wide array of contaminants have been reported from sediment samples collected in Puget Sound. Although some areas are highly contaminated, the levels at most sites are below state standards.
Habitat Elements	Depth	At Risk	Impacted by seawalls, railroad, and other structures that have reduced the amount of shallow water habitat.
	Substrate	At Risk	Impacted by seawalls and railroad fill that increase scour, thereby reducing the amount of fines. The "at risk" condition is specific to nearshore areas impacted by development.
	Slope	At Risk	Impacted by seawalls and railroad fill that increase scour, thereby reducing the amount of fines. The "at risk" condition is specific to nearshore areas impacted by development.

	Indicators	Baseline Condition	Comments
Habitat Elements, continued.	Shoreline Modification	Not Properly Functioning	The shoreline along King and Snohomish County between Tacoma and Everett has been highly developed and modified.
	Shoreline Vegetation	Not Properly Functioning	The amount of native vegetation along the shoreline has been significantly reduced and altered.
	LWD	At Risk	The amount of LWD that gets deposited along the shoreline of Puget Sound has been reduced due to numerous factors. Primary factors include logging and shoreline development.
	Overwater Structures	At Risk	Docks and piers are locally present, sporadically abundant, but also absent along large sections of shoreline. However, railroad fill has covered the uppermost section of shoreline along a significant portion of western Puget Sound.
	Aquatic Vegetation	At Risk	Trend data for kelp and eelgrass is variable, but evidence of a decline in eelgrass has been documented at numerous sites.
Biota	Epibenthic and Pelagic Zooplankton	Properly Functioning	No data and no significant indication of a decline.
	Benthic Infauna	Properly Functioning	No data and no significant indication of a decline.
	Forage Fish	At Risk	Declines in abundance have been documented.
Watershed Conditions	Road and Railway Density and Location	Not Properly Functioning	Most shoreline areas impacted by either road or railroad infrastructure at or near shoreline.
	Disturbance History	At Risk	At risk due to seasonally and localized daily boat traffic, which includes freighters, ferries, commercial and recreational fishing, and pleasure boats.

6.15 King County Brightwater Outfall

The southernmost portion of Point Wells is currently in use by King County for the marine outfall for the new Brightwater treatment plant. Refer to **Figure 5** for an overview of the general location of the Brightwater project site. This site is also referred to as the Point Wells Portal. King County condemned and took control (through a temporary construction easement) of approximately 12 acres in August 2006. In addition, King County acquired an approximate one acre parcel (the “Fee Parcel”) at the southernmost portion of the property.

King County constructed a new regional wastewater treatment facility in Woodinville, Washington which went into full operation in November of 2012. The treated wastewater from the plant in Woodinville is conveyed by underground pipeline approximately 13 miles to Point Wells (Richmond Beach). The one-acre parcel purchased by King County is the site of a permanent access shaft (Portal 19) to the underground pipeline. The pipeline extends from Portal 19, underneath the Richmond Beach seawall, approximately one mile into Puget Sound where the treated wastewater is discharged through a series of diffuser pipes. Outfall construction was completed in 2008. Monitoring of nearshore marine habitat impacts from construction of the outfall was completed in 2014.

6.16 Site Contamination and Remediation

See the Hart Crowser (2018b) Point Wells Urban Center, Environmental Remediation Approach Memorandum for a description of the project's proposed remediation approach.

7 PROJECT IMPACTS

Project-related impacts to fish, wildlife, and/or habitat could occur during either construction or operation of the proposed project. Impacts can occur to specific species (e.g., juvenile Chinook salmon, bald eagle, etc.), specific habitat types (e.g., eelgrass beds, streams, wetlands, etc.), or can be general impacts that affect all species and/or habitats within a geographic area (e.g., water quality, noise [terrestrial or aquatic], clearing vegetation, etc.). Impacts can also be separated into direct, indirect, and cumulative effects.

Impacts associated with the construction and operation of the proposed project will be addressed on multiple scales. First, impacts of the proposed project on various specific habitat types will be addressed. Potential impacts from both construction and operation are identified based on the available data. Since site plans are generally conceptual, assumptions will be stated and worst-case scenarios will be utilized. Impact minimization measures were previously outlined in **Section 3.0**, which are designed to reduce potential project-related impacts to fish, wildlife, and their habitats. Adherence to all impact minimization measures is assumed and factored into both species-specific and habitat-related impacts. Species-specific impacts are then addressed based on the identified impacts and impact minimization measures. The species addressed are those that are listed or managed by the state or federal government that could potentially occur in the action area, which was previously reported in **Section 6.0**.

7.1 Habitat Impacts

Habitat types in the project area that could potentially be impacted by project-related activities are outlined in **Table 14**.

Table 14: Habitat Types

#	Habitat Type	Habitat Type Description
1.	Shoreline	Marine riparian zone along the shoreline above/upland of OHWM
2.	Intertidal	From OHWM to extreme lower low water (ELLW). Within Puget Sound this region or area is also referred to as estuary or estuarine wetlands.
3.	Subtidal	From ELLW to – 30 meters.
4.	Eelgrass Beds	Documented in project area immediately south of large dock (Figure 7).
5.	Macro Algae	Scattered throughout intertidal and subtidal marine environment.
6.	Forage Fish Spawning Beaches	Documented spawning beaches or shorelines with suitable habitat (Figure 7).
7.	Freshwater Wetlands and vegetated buffers	Freshwater wetlands.
8.	Streams and vegetated buffers	Within upper forested bluff and piped through/under project area.
9.	Upland Forest	Within upper bluff.

7.1.1 Construction Effects

Construction- impacts to wetlands, streams, shorelines, buffers, and other natural habitats could result from the proposed project, but will generally be limited to habitats along the periphery of the project site since the project area is currently developed (**Figure 14**). Buffer impacts to developed portions of the site are recorded separately for regulatory assessment. Temporary and permanent impacts to wetland buffer, stream channel, stream buffer, and forest habitat will occur in the proposed upper Urban Plaza and secondary full access road located on the east side of the BNSF tracks. Project impact areas are shown in **Table 15**. The only direct impact to critical areas is approximately 91 linear feet of impact to Chevron Creek. This will occur as the existing sediment trap at the base of forested slope needs to be moved upstream to accommodate the second access road (**Figure 14**).

Table 15: Critical Area Impacts

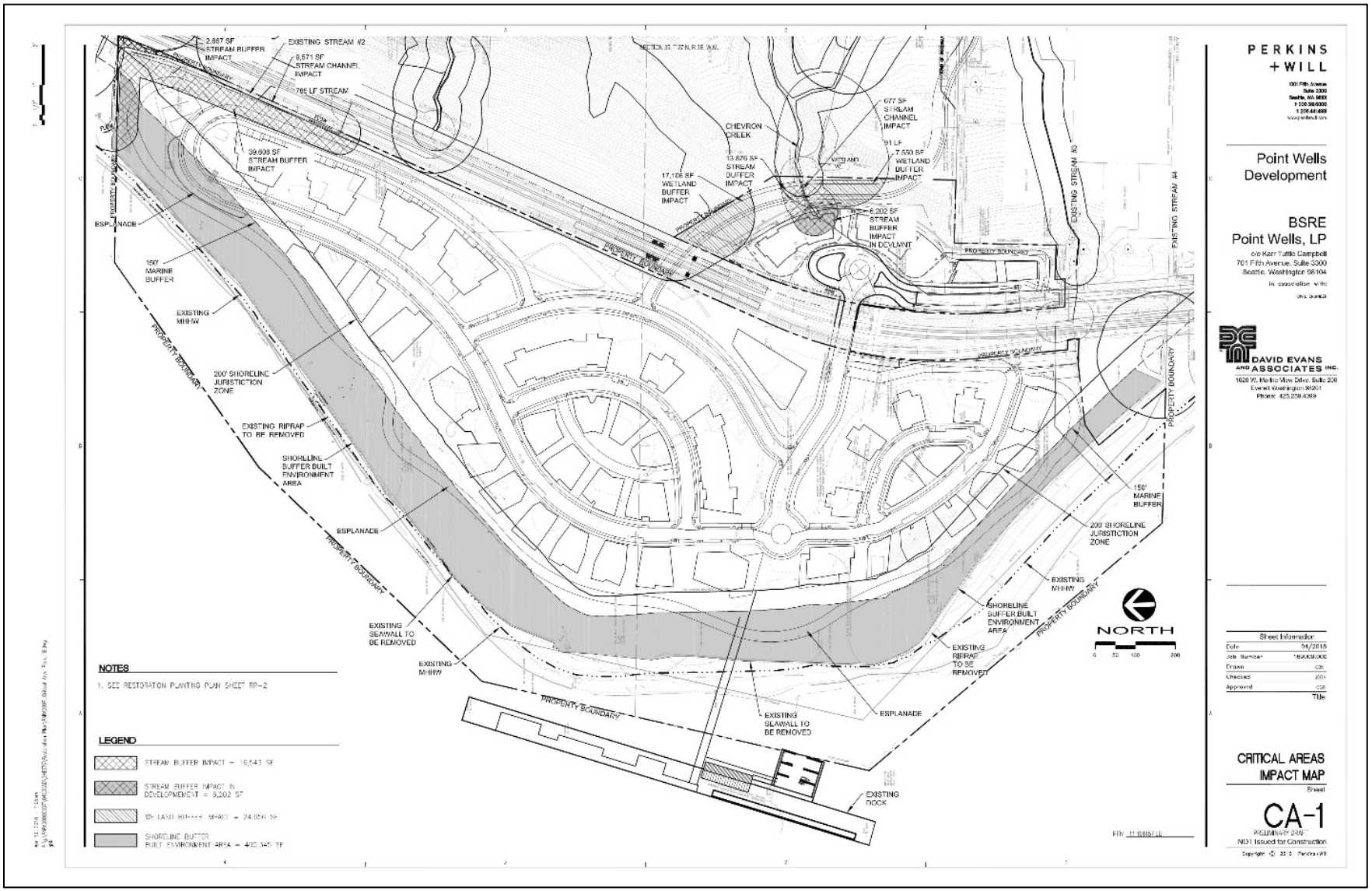
Habitat Feature	Area (sq. ft.)	Linear Feet
Wetland Buffer	24,656	
Stream	677	91
Stream Buffer	16,543	
Stream Buffer over Existing Developed Area	6,202	
Marine Shoreline over Existing Developed Area	400,345	

Wetland and stream buffer impacts will occur along the second access road (**Table 15**). Portions of the wetland and stream buffers and a majority of the marine shoreline buffer are presently developed. These developed buffer areas are recorded separately. Much of the buffer impact along the marine shoreline is associated with the mitigation work described in **Section 8**. General vegetation clearing impacts (including both inside and outside buffers) are anticipated to be from 1 acre to 1.5 acres.

Marine habitats may experience temporary disturbance in the form of localized sedimentation during shoreline restoration activities, pile driving, pile removal, outfall removal, and ditch/wetland relocation.

The removal and installation of piles can suspend sediment. The installation of new piles will also result in a loss of habitat; however, considering how few new steel piles are proposed and how many old creosote piles will be removed, there will be a net gain in habitat area and habitat quality. Sediment-related impacts are anticipated to be short-term and localized due, in part, to the implementation of the impact minimization measures outlined in **Section 3.0**. The exact number of piles to be installed, size, type, and location has not been defined at this time. Although numerous impact minimization measures will be employed, minor and localized sedimentation could also occur when the newly restored upper beach area is first exposed to tidal forces and wave action.

Figure 16: Project Impacts



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There will be temporary impacts from modifications to the existing dock. It is anticipated that the existing structure will be largely left unchanged, except for removal of all three existing access ramps, and installation of a new ramp near the center of the dock. Removal of these access ramps will create temporary disturbance to intertidal and subtidal habitat where existing pilings are proposed to be removed. Removing these piles will most likely be accomplished by cutting each pile below the mud line or pulling out with a crane. A limited amount of lower intertidal and subtidal habitat will be affected by pile removal. In addition, intertidal and subtidal habitat will be permanently affected by installation of new steel piles to support the new access ramp to the dock. However, this impact will be off-set by the removal of existing creosote piles. To support recreational boating on the existing pier, it will be necessary to construct new boat slips (**Appendix A**). These boat slips are likely to be floating piers located on the northeast side of the existing pier. Each of these piers are likely to be anchored with a single new piling.

No construction-related impacts to eelgrass beds are anticipated due to their absence from the immediate project footprint, but this assumption will be verified by conducting additional project-specific surveys. Surveys conducted as part of the Brightwater project did identify an eelgrass bed to southeast of the project site (**Figure 7**), but this area appears to be outside the zone of potential impact from sedimentation associated with pile removal, pile driving, outfall removal, or shoreline restoration. Macro algae may be present along the edge of the existing large dock where a new ramp is proposed. Potential impacts to macro algae can be avoided or minimized by spanning the area of concern, using clear or see-through decking, minimizing deck width, and carefully planned use of barge equipment during construction. As noted in the impact minimization measures, a barge plan will be implemented, which should include eelgrass avoidance measures.

Robust remediation efforts will reduce or eliminate the potential of contaminated soils from leaching or flowing into Puget Sound during construction. The remediation plan will include monitoring and contingency actions, and will require review and approval by the regulatory authorities prior to implementation (Hart Crowser 2018b).

7.1.2 Operation Effects

Operation-related impacts to fish and wildlife habitats are primarily associated with stormwater runoff, light, noise, and use of the nearshore marine environment. Stormwater runoff from the developed condition will be treated per the 2016 Snohomish County Drainage Manual . The project will utilize Low Impact Development (LID) strategies such as bioswales, pervious payment, dispersion, and soil amendment to infiltrate a portion of the sites stormwater runoff. Contech stormwater filters will be used to treat stormwater that cannot be infiltrated prior to being conveyed to Puget Sound via formal conveyance system or sheet flow dispersion (MIG/SvR 2018).

The efficiency of treatment is dependent upon quantity and type of stormfilters utilized, filtration media selected, and maintenance. It is assumed the approved filtration system will be designed to target a full range of pollutants associated with urban runoff, including total suspended solids, soluble heavy metals, oil and grease, and nutrients. According to the analysis conducted by SvR Design Company (2010), the amount of runoff for the developed condition will be less than that

of the existing conditions and should not cause significant adverse impact to Puget Sound. The proposed stormwater treatment system will be required to be reviewed and approved by both Snohomish County and Ecology as part of the permit approval process. Additional input may be provided by the WDFW, USFWS, and NMFS during project review.

Impacts to fish and wildlife from excessive lighting during operation are difficult to quantify or assess. However, light pollution can result in disorientation or disruption of normal behavior. Birds that migrate or hunt at night can be impacted, as can other migratory or nocturnal species. Lighting and shadows have been shown to affect salmon migration behavior. Consideration of potential impacts to fish and wildlife from excess light should be addressed as part of the overall design process. Measures to reduce excess light include shielding, timers and dimmers, use of long wavelength lighting, directing lights away from open water, and limiting wattage. The existence of vegetative buffers between areas of potentially excessive light and sensitive fish and wildlife habitats can further reduce impacts.

Impacts to fish and wildlife from excessive noise during operation are also difficult to quantify or assess. However, as with lighting, the project can be designed to reduce excessive noise impacts during operation through the design process and implementation of vegetative buffers.

Operational use of the nearshore marine environment also has the potential to impact fish and wildlife. However, areas such as the beach and buffers will be dual-use areas for both humans and fish and wildlife. Measures to reduce impacts can be incorporated into the design. Potential measures include, but are not limited to creation of established trails, strategic placement of trash receptacles, maintenance and operation plans, and educational outreach.

No significant long term adverse impacts to migrating fish and wildlife are anticipated. The site provides little or no habitat for neotropical migratory birds. Furthermore, while stocks of migrating anadromous salmon do use marine waters offshore of the project on their way to and from spawning grounds in large rivers in the south Puget Sound, these fish generally travel at deeper depths than what will be affected by the anticipated increase in small boat traffic due to the project. Also, the project site does not provide significant foraging and rearing habitat for outmigrating juvenile salmonids, which is typically the estuarine deltas of the primary spawning rivers.

7.1.3 Beneficial Effects

See **Section 8.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix B** contains a copy of the plan.

7.1.4 Salmonid Habitat Effects Matrix

The following Salmonid Habitat Effects Matrix (**Table 16**) describes potential impacts to salmonid habitat resulting from both construction and operation of the proposed project. It considers all life stages and all salmonids, not just federally listed salmonids as would be the case in ESA documentation. The project effects to baseline conditions factor in the use of BMPs and restoration activities that would be implemented as part of the overall project. It is assumed that BMPs and restoration actions will be successful, and monitored as appropriate. The effects

to baseline conditions can be maintain, degrade, or improve. These effects can also change over time and vary depending on if considering either the local or watershed scale.

Table 16: Salmonid Habitat Project Effects Matrix

	Indicators	Baseline Conditions	Project Effects to Baseline
Water Quality	Temperature	Properly Functioning	**Maintain**. A minor improvement is anticipated since the amount of impervious surface will be reduced.
	Turbidity	Properly Functioning	**Maintain**. A minor degradation could occur during construction, but this would be temporary and localized.
	Chemical Contamination & Nutrients	At Risk	**Improve**. An improvement is anticipated since site reclamation will occur and the risk of a major fuel spill will no longer be a potential impact. Stormwater treatment must be to the enhanced level to realize an improved condition after construction.
	Fecal coliform	At Risk	**Maintain**. A minor degradation could occur due to an increase in pet activity within the action area.
	Dissolved Oxygen	Properly Functioning	**Maintain**. No change to this function is anticipated.
Sediment	Sediment Quality	At Risk	**Maintain**. Future impacts to sediment quality are anticipated to be reduced through site clean-up and enhanced treatment of stormwater runoff. Beach restoration actions should also improve local conditions.
Habitat Elements	Depth	At Risk	**Improve**. This indicator will improve due to implementation of the proposed restoration plan. The project will result in an increase in nearshore intertidal habitat.
	Substrate	At Risk	**Improve**. This indicator will improve due to implementation of the proposed restoration plan.
	Slope	At Risk	**Improve**. This indicator will improve due to implementation of the proposed restoration plan.
	Shoreline Modification	Not Properly Functioning	**Improve**. This indicator will improve due to implementation of the proposed restoration plan.
	Shoreline Vegetation	Not Properly Functioning	**Improve**. This indicator will improve due to implementation of the proposed restoration plan.
Habitat Elements cont.	LWD	At Risk	**Improve**. This indicator will improve due to implementation of the proposed restoration plan.
	Overwater Structures	At Risk	**Improve**. The project will result in a reduction of area associated with overwater structures.
	Aquatic Vegetation	At Risk	**Improve**. This indicator will improve due to implementation of the proposed restoration plan.
	Wetlands	At Risk	**Maintain**. A minor improvement is anticipated due to additional opportunity for development of estuarine wetland habitat along the restored shoreline.

	Indicators	Baseline Conditions	Project Effects to Baseline
	Streams	At Risk	**Improve**. This indicator will improve due to implementation of the proposed restoration plan.
Biota	Epibenthic and Pelagic Zooplankton	Properly Functioning	**Improve**. This indicator will improve due to implementation of the proposed restoration plan.
	Benthic Infauna	Properly Functioning	**Improve**. This indicator will improve due to implementation of the proposed restoration plan.
	Forage Fish	At Risk	**Improve**. This indicator will improve due to implementation of the proposed restoration plan.
Watershed Conditions	Road Density and Location	Not Properly Functioning	**Maintain**. No change to this indicator is anticipated.
	Disturbance History	Functioning at Risk	**Degrade**. Degradation will occur during construction but stabilize once the site is developed. The overall level of activity will potentially increase over existing conditions even after construction.

Based on an analysis of project effects to baseline conditions, the project would result in the maintenance of all water quality and sediment related indicators. Improvements at the local scale are anticipated to several habitat indicators due to the amount and type of proposed restoration. The proposed restoration has the potential to provide a significant improvement to shoreline habitat due to the amount of existing fill material and length of shoreline to be restored. However, the level of disturbance will increase during construction and stay elevated above existing conditions once developed.

7.2 Species Impacts

This section addresses impacts associated with the proposed change from a petroleum industrial site to a site used for residential development. For purposes of this analysis, species have been grouped into salmonids, forage fish, resident marine fish, marine mammals, marine birds, upland birds, raptors, and marine invertebrates. Other species will be addressed as warranted, based on their potential presence in the action area and susceptibility of being impacted by project-related activities.

7.2.1 Salmonids

7.2.1.1 Construction Effects

No salmonids exist within the streams at Point Wells (WDFW 2018b; WDNR 2018b). The nearshore marine environment along Point Wells is utilized by multiple species of salmonids (King County 2004). Outmigrating juvenile/sub adult salmonids are more reliant on the nearshore marine environment than most returning adults and, therefore, have a higher probability of being impacted by project-related activities. Project-related impacts to salmonids that could occur during construction are primarily associated with pile driving and degradation of water quality.

The primary project-related direct impact to salmonids is associated with pile driving. Conducting pile driving when juvenile salmonids are not typically present can reduce potential

impacts. The WDFW in-water work window, which previously was from August 1 through February 15, does not protect juveniles that are present in the project area later in the summer. The Corps in-water work window is more restrictive, typically extending from September 1 through February 15. Note that in-water work windows are subject to change and factor in multiple species. The dates outlined above are from project area permits obtained during 2007 – 2008. Additional considerations such as potential presence of marine mammals, marbled murrelets, forage fish, and bald eagles are factored into the final in-water work window. The USFWS further reduced the work window for the Brightwater project from October 1 through February 15 to reduce potential impacts to molting marbled murrelets. **Table 17** outlines the probability of impacting specific salmonid life histories from pile driving from October 15 through February 15. Refer back to **Table 6** for a summary of salmonid timing. The probability column below assumes the impact minimization measures outlined in **Section 3.0** will be successfully implemented.

Based on the available data, pile driving has the highest probability of impacting individual adult coho and chum salmon, as well as adult winter-run steelhead and sea-run cutthroat trout. Adult sockeye will not be present within the action area during pile installation and would, therefore, not be impacted by construction-related activities. It is unlikely any adult pink salmon would be present as most, if not all, would have returned to their natal river system by October. Bull trout are typically most abundant in Puget Sound during the spring and early summer, but are also present during the fall and winter, especially in areas such as Skagit Bay where a relatively healthy population exists. Most, but not all, juvenile salmonids will have left the nearshore environment of Puget Sound by October.

Table 17: Salmonid Pile Driving Impact Summary

Common Name	Probability of being in action area during pile driving	Comments
Adult Chinook Salmon	Low	Fall Chinook could be present at beginning of work window.
Juvenile Chinook Salmon	Low	Some juveniles could still be present at the beginning or even the very end of the approved in-water work window. However, this appears unlikely but if present abundance would be very low.
Adult Coho Salmon	Moderate	Returning coho could be present at the beginning of the work window.
Juvenile Coho Salmon	Zero	All juvenile coho salmon should be gone by October 1.
Adult Chum Salmon	Moderate	Returning chum could be present at the beginning of the work window.
Juvenile Chum Salmon	Zero	All juvenile chum salmon should be gone by October 1.
Adult Sockeye Salmon	Zero	No adult sockeye salmon should be present in the action area during the in-water work window.
Juvenile Sockeye Salmon	Zero	No juvenile sockeye salmon should be present in the action area during the in-water work window.
Adult Pink Salmon	Low	Primarily odd years. Most should be out of action area by October 1.

Common Name	Probability of being in action area during pile driving	Comments
Juvenile Pink Salmon	Zero	Primarily even years. No juvenile pink salmon should be present in the action area during the in-water work window.
Adult Steelhead Trout	Moderate	Winter-run adult steelhead could be present.
Juvenile Steelhead Trout	Zero	No juvenile steelhead trout should be present in the action area during the in-water work window.
Adult Sea-run Cutthroat Trout	Moderate	Adult sea-run trout could be present in the action area during the in-water work window.
Juvenile Sea-run Cutthroat Trout	Low - Moderate	Uncertain but could be present.
Adult Bull Trout	Low	Could be present but probability appears low.
Sub-adult Bull Trout	Low	Could be present but probability appears low.

Construction-related impacts to salmonids associated with degraded water quality could occur if turbid or polluted runoff leaves the site untreated. This is unlikely since multiple erosion control measures will be installed and monitored during construction. The project will be required to implement and monitor an approved SWPPP that will include multiple BMPs as required by both Snohomish County and Ecology. The NPDES construction permit issued by Ecology requires inspection by a CESCL. The implementation of the impact minimization measures outlined in **Section 3.0** will further reduce the likelihood of project-related activities impacting salmonids during construction.

7.2.1.2 Operation Effects

Operational impacts to salmonids could occur if degraded stormwater runoff from the built project or on-site contaminants reach Puget Sound during operation. Refer to **Section 7.1.2** for an overview on potential operational impacts related to stormwater runoff and **Section 6.15** for a summary of contaminant remediation measures. Lighting and shadows have also been shown to affect salmon migration behavior, which may result in an increased risk of mortality due to delays in migration, loss of schooling refugia, or avoidance behavior resulting in movement to deeper waters (Simenstad et al. 1999). It is unknown at this time how future lighting from the developed condition will compare with the existing condition, or what changes in lighting are proposed at the dock. However, dock lighting for the developed condition should be designed to reduce impacts to juvenile salmonids. A detailed discussion of lighting and salmonids can be found in *Impacts of Ferry Terminals on Juvenile Salmon Migrating Along Puget Sound Shorelines – Phase I: Synthesis of State of Knowledge* (Simenstad et al. 1999).

7.2.1.3 Beneficial Effects

See **Section 8.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix B** contains a copy of the plan.

7.2.2 Forage Fish

As previously illustrated in **Figure 7**, forage fish have been documented spawning along portions of the shoreline at Point Wells. Therefore, project-related activities could potentially impact spawning forage fish or their habitats.

7.2.2.1 Construction Effects

Potential construction-related impacts are primarily associated with pile driving, shoreline restoration, stormwater runoff, and exposure to existing contaminants. Although the impact minimization measures outlined in **Section 3.0** have been designed to reduce potential impacts to forage fish and forage fish spawning habitat in the project vicinity, the in-water work window of October 15 through February 15 coincides with when sand lance and surf smelt could potentially spawn in the project area (**Table 18**).

Table 18: Forage Fish

Common Name	Spawning	Comment
Sand Lance	November - February	High regional variability in spawning period. Adults nearshore spring through summer.
Surf Smelt	Year round.	
Herring	January - April	Juveniles may disperse to deeper waters in the fall.

Pile driving has the highest probability of impacting individual forage fish if present during construction. Pile driving after forage fish spawning could impact eggs or juveniles in the immediate project vicinity. Since the area of potential effect due to underwater noise from pile driving includes documented spawning habitat, pile driving is considered the primary action of concern regarding direct impacts to forage fish.

Specific impact minimization measures that could reduce construction effects to forage fish include measures that reduce underwater noise and limit the probability of forage fish being present during pile driving. Potential noise reduction measures include the use of a vibratory hammer versus an impact hammer, installing a wood block between the pile and impact hammer, and using a bubble current. These measures will not eliminate underwater noise, but will reduce the amount of noise and area of potential effect.

The impact minimization measures outlined in **Section 3.0** include monitoring for forage fish spawning starting one week prior to start of in-water pile driving and during pile driving. Pile driving is to stop should forage fish be observed spawning during pile driving. Pile driving may commence one week after forage fish stop spawning. Immediately contact the local area habitat biologist should forage fish be observed spawning during pile driving. Confer with the local area habitat biologist on appropriate measures to protect spawning forage fish. The remainder of the impact minimization measures are designed to reduce potential impacts to existing spawning habitat.

7.2.2.2 Operation Effects

Operational impacts include impacts primarily associated with stormwater runoff, contaminants, and propeller wash impacting existing eelgrass beds. Stormwater-related operation effects previously described for salmonids in **Section 7.2.1.2** also apply to forage fish. The implementation and monitoring of an approved contamination remediation plan is assumed to adequately protect marine resources, including forage fish.

Pedestrian use of the shoreline, especially sandy upper intertidal areas, could affect forage fish spawning. Presently there is no indication of spawning at the site, but project construction could promote spawning by forage fish. This impact would be seasonal depending on the forage fish species.

The degradation of existing eelgrass beds within the project area from propeller wash may occur, especially if boats veer near the shoreline during low tide. Most of these potential impacts would be in areas already previously dredged for container ship berthing, so no eelgrass impacts would be anticipated.

7.2.2.3 Beneficial Effects

See **Section 8.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix B** contains a copy of the plan.

7.2.3 Resident Marine Fish

As previously outlined in **Table 5**, numerous species of fish have been documented in the project vicinity. Many of the species outlined in **Table 5** are resident fish that will utilize the project area throughout the year. These species are susceptible to project-related impacts, but would also benefit from the proposed restoration plan.

7.2.3.1 Construction Effects

Impacts to resident marine fish from construction are similar to those outlined in **Section 7.2.1.1** and **7.2.2.1**. However, some localized mortality to resident marine fish is anticipated from pile driving. This is most likely to occur to species such as pile perch and flatfish that could be in close proximity to where piles are to be installed. Impact minimization measures previously outlined in **Section 3.0** will reduce the level of effect associated with construction.

7.2.3.2 Operation Effects

Impacts to resident marine fish from operation are similar to those outlined in **Section 7.2.1.2** and **7.2.2.2**. However, since resident fish are present in the project area year-round, they are more susceptible to water quality-related impacts due to increased exposure to both dissolved and sediment bound contaminants.

7.2.3.3 Beneficial Effects

See **Section 8.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix B** contains a copy of the plan.

7.2.4 Marine Mammals

The use of the project vicinity by marine mammals was previously outlined in **Section 6.11.2**. Eleven species of marine mammals utilize Puget Sound or adjacent marine waters either year-round or seasonally and could, therefore, be present near the project area (**Table 10**). However, seasonal abundance is extremely variable and the only year-round resident is the harbor seal. Some marine mammals are common on a seasonal basis, while others are extremely rare. Several species of marine mammals are federally listed, and potential impacts to these species are addressed in **Section 7.3**.

7.2.4.1 Construction Effects

Construction effects to marine mammals is primarily associated with pile driving since the extent of potential effect from underwater noise may extend up to 0.54 mile from the project area (**Figure 5 and 6**). It is assumed in-water work will be allowed from approximately October 1 through February 15. This time period does not significantly reduce or exclude the potential for marine mammals from being in the general project vicinity during pile driving or in-water work. The impact minimization measures outlined in **Section 3.0** include multiple measures designed to reduce the potential of construction-related actions from impacting marine mammals. This includes measures to reduce impacts from water quality degradation and pile driving.

Although marine mammals could be impacted by construction-related activities, these impacts would be minor and short-term. Marine mammals are highly mobile and would likely avoid the immediate project area during pile driving. No haul-out or typical use areas are known to exist within the area of potential effect.

7.2.4.2 Operation Effects

Operation effects are generally similar to those outlined for salmonids and forage fish. Another factor is boat traffic, which could increase at the local scale, but is not anticipated to increase at the regional scale. Furthermore, this potential increase in pleasure craft traffic would be off-set by a reduction in tanker traffic. Collisions and oil spills from tankers is likely a much more significant impact to marine mammals than pleasure craft.

7.2.4.3 Beneficial Effects

See **Section 8.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix B** contains a copy of the plan.

7.2.5 Marine Birds

7.2.5.1 Construction Effects

Construction effects to marine birds are similar to those described for salmonids, forage fish, and marine mammals in that potential impacts are primarily associated with pile driving, in-water work, and water quality-related issues. The impact minimization measures outlined in **Section 3.0** would also reduce potential impacts to marine birds. Construction activities will temporarily impact marine birds that frequent the immediate project area. This impact will primarily impact cormorants and waterfowl that utilize the docks, piers, and nearshore marine environment. Construction-related activities will result in a temporary disturbance to roosting and foraging habitat.

7.2.5.2 Operation Effects

Operation effects are generally similar to those outlined for salmonids, forage fish, and marine mammals.

7.2.5.3 Beneficial Effects

See **Section 7.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix B** contains a copy of the plan.

7.2.6 Upland Birds

7.2.6.1 Construction Effects

Impacts to upland birds during construction will primarily be limited to those that nest or forage within the built environment, since natural upland habitats are generally lacking within the proposed development footprint. Species that nest on buildings in the project area are primarily limited to barn swallows, house sparrows, pigeons, and European starling, all of which are very common and not habitat-limited. Construction-related impacts to upland birds will be temporary and primarily associated with disturbance of uplands birds in adjoining habitats. Some species will be temporarily displaced from the project area during construction.

7.2.6.2 Operation Effects

Operational effects on upland birds are anticipated to be similar to those described in **Section 7.1.2**. Construction of taller buildings with large amounts of exposed glass near the shoreline could increase the risk of collision of birds into the newly constructed buildings and associated infrastructure. Bird collisions with buildings are a well-documented phenomenon nationwide (Klem 1990; Dunn 1993; Klem et al. 2009). A more recent study concluded that low-rise buildings (between 4 and 11 stories in height) made up 56 percent of bird mortality documented in the study, with a range of 16 to 27 birds killed per building per year (Loss et al. 2014). However, the preponderance of available research in this area is from urban areas in the eastern United States. Potential mitigation measures that can be implemented to reduce risk of bird collision is to incorporate bird-friendly design criteria into building designs and to reduce nighttime light emissions.

7.2.6.3 Beneficial Effects

See **Section 8.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix B** contains a copy of the plan.

7.2.7 Raptors

The three most common raptors in the immediate project vicinity are the red tailed hawk, osprey, and bald eagle. These species regularly utilize the general project vicinity. As noted in **Section 6.1** and illustrated in **Figure 7**, two bald eagle nests are mapped as occurring in the vicinity of Point Wells. The closest nest is approximately 0.75 mile northeast of the project site. The shoreline to the west of these nests and north of the project site is mapped as shoreline buffer. The shoreline buffer area extends onto the northernmost portion of the project site. No red tailed nests have been documented in the project vicinity, but suitable nesting habitat is present within the forested bluff to the east of the project site.

7.2.7.1 Construction Effects

No impact to nesting bald eagles is anticipated from construction due to the extended distance between the project site and closest documented nest. These nests are not within line of sight and are buffered by trees and terrain. Temporary disturbance to foraging bald eagles and red tailed hawks could occur during construction, primarily during pile driving. Impacts to raptors during construction would be temporary and would be limited to loss of foraging or perching habitat through displacement. Bald eagles or red tailed hawks attempting to forage or perch in the immediate project vicinity would be temporarily displaced from the project area to more suitable habitats along the shoreline. Construction-related activities will not remove any potential perching or roosting habitat.

7.2.7.2 Operation Effects

Operational effects to bald eagles and red tailed hawks would be similar to those previously described in **Section 7.1.2**.

7.2.7.3 Beneficial Effects

See **Section 8.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix B** contains a copy of the plan.

7.2.8 Marine Invertebrates

Marine invertebrates are included since they are an important prey item for numerous species of fish and wildlife, including several federally listed species. They represent a diverse and locally abundant group of organisms.

7.2.8.1 Construction Effect

Construction effects to marine invertebrates are primarily associated with pile driving, removal of existing piles, and other in-water work. It is assumed water quality leaving the project site during construction will meet state standards, and impact minimization measures outlined in **Section 3.0** will be successfully implemented. Although marine invertebrates will be impacted during construction, these impacts will be temporary and short-term.

7.2.8.2 Operation Effects

Impacts to resident marine invertebrates from operation are similar to those outlined in **Section 7.2.1.2** and **7.2.2.2**. However, since marine invertebrates are present in the project area year-round, they are more susceptible to water quality-related impacts due to increased exposure to both dissolved and sediment bound contaminants.

7.2.8.3 Beneficial Effects

See **Section 8.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix B** contains a copy of the plan.

7.3 Federally Listed Species

The following section describes the federal status, critical habitat, occurrence, potential impacts, and determination of effect for federally listed species documented in the action area. This is not

an official biological assessment since project-related details are still being developed. This section provides background data on federally listed species that may occur in the action area and provides a preliminary determination based on the project-related information available to date. The following preliminary ESA determinations (**Table 19**) assume that all proposed impact minimization measures are successfully implemented.

Table 19: Preliminary ESA Determination Summary

Common Name	Determination
Bocaccio Rockfish	May affect, not likely to adversely affect
Georgia Basin/Puget Sound DPS Yelloweye Rockfish	May affect, not likely to adversely affect
Rockfish Critical Habitat	May affect, not likely to adversely affect
Chinook Salmon	May affect, not likely to adversely affect
Chinook Salmon Critical Habitat	May affect, not likely to adversely affect
Steelhead Trout	May affect, not likely to adversely affect
Steelhead Trout Critical Habitat	May affect, not likely to adversely affect
Bull Trout	May affect, not likely to adversely affect
Bull Trout Critical Habitat	May affect, not likely to adversely affect
Killer Whale	May affect, not likely to adversely affect
Killer Whale Critical Habitat	No Effect
Humpback Whale	May affect, not likely to adversely affect
Marbled Murrelet	May affect, not likely to adversely affect
Marbled Murrelet Critical Habitat	No Effect
Essential Fish Habitat	No Adverse Effect

7.3.1 Listed Rockfish Species

7.3.1.1 Federal Status

Two species of rockfish have recently been listed in Puget Sound under the ESA—bocaccio and yelloweye. The NMFS is the lead regulatory agency for this listing under the ESA.

7.3.1.2 Critical Habitat

Critical habitat for this Evolutionary Significant Unit (ESU) was designated on November 13, 2014. The critical habitat includes 590 square miles of nearshore habitat for bocaccio, and 414 square miles of deepwater habitat for both species. Nearshore areas include kelp forests important for the growth and survival of juvenile rockfish. Deeper waters are used for shelter, food, and reproduction by adults. These habitats are along the project area and overlap with critical habitat for listed salmon, killer whales, and bull trout.

7.3.1.3 Occurrence

Unlike most other fish species, rockfish give birth to live young that are able to swim and survive outside the parent's body immediately. Rockfish larvae are typically found near the surface,

sometimes associated with macroalgae, and can be far offshore. As they mature, rockfish move closer to shore and settle to shallow demersal habitats with rock, eelgrass beds, or sand. Fish gradually move to deeper water as they mature, and are closely associated with natural or artificial rough substrates (e.g., rocky areas, derelict ships, or artificial platforms). While listed rockfish have not been observed in the project area, potential suitable habitat is present. All three listed rockfish are considered rare in Puget Sound at this time.

7.3.1.4 Impacts

Impacts described in **Section 7.1** and **Section 7.2.1** are applicable to rockfish. Based on this assessment of project effects to baseline conditions, the project would result in the maintenance of all water quality and sediment-related indicators. Improvements at the local scale are anticipated to several habitat indicators due to the amount and type of proposed restoration. The proposed restoration has the potential to provide a significant improvement to shoreline habitat due to the amount of existing fill material to be removed and length of shoreline to be restored.

The primary impact is associated with pile driving, which is anticipated to create an area of potential effect extending up to 0.34 mile from the project area (**Figure 6**). This is the area where impacts to rockfish could occur if they are present during pile driving. Risk of harm is higher for juvenile rockfish, which are more likely to be located close to shore and associated with the deepwater dock. However, in general, these three species of rockfish are very rare in Puget Sound and unlikely to occur in proximity of the proposed project.

7.3.1.5 Preliminary Determination

The proposed project *may affect, but is not likely to adversely affect*, bocaccio or yelloweye rockfish. The project *may affect* listed rockfish because:

- Listed rockfish are known to occur throughout Puget Sound.
- In-water work is proposed that includes pile driving.
- In-water work includes removing over 360 creosote piles.
- Over-water work includes removing existing structures.
- The project site includes approximately 3,600 linear feet of shoreline.
- The project includes remediation of contaminated soils and groundwater.

The project *is not likely to adversely affect* listed rockfish because:

- Individuals are unlikely to occur in the action area.
- Implementation of impact minimization measures should eliminate water quality impacts during both construction and operation of the proposed project.

The proposed project *may affect, but is not likely to adversely affect* rockfish critical habitat. The project *may affect* rockfish critical habitat because:

- Designated critical habitat occurs in the action area.
- In-water work is proposed that includes installation of new piles.
- In-water and near-shore construction activities could temporarily increase turbidity at the local scale.

The project is *not likely to adversely affect* rockfish critical habitat because:

- The project will result in a net decrease in overwater structures.
- The project will result in a net increase in nearshore marine habitat.
- The project will provide water quality treatment to a level higher than existing conditions.
- The project will eliminate a potential significant source of pollution to Puget Sound.

7.3.2 Chinook Salmon

7.3.2.1 Federal Status

The Puget Sound Chinook salmon is listed as a threatened species in Washington under the ESA. The NMFS is the lead regulatory agency for this listing under the ESA.

7.3.2.2 Critical Habitat

Critical habitat for this ESU was designated on September 2, 2005 (70 FR 52629). The project area is within the boundary of Puget Sound hydrologic unit number 17110019. Within areas designated as critical habitat, the Primary Constituent Elements (PCEs) essential for the conservation of this ESU are those sites and habitat components that support one or more life stages. The PCEs are further described as:

1) *Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development;*

2) *Freshwater rearing sites with:*

   a) *Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility;*

   b) *Water quality and forage supporting juvenile development; and*

3) *Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.*

4) *Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival;*

5) *Estuarine areas free of obstruction and excessive predation with:*

   (a) *Water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater;*

   (b) *Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and*

   (c) *Juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.*

6) *Nearshore marine areas free of obstruction and excessive predation with:*

   (a) *Water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and*

   (b) *Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.*

7) *Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.*

7.3.2.3 Occurrence

Chinook salmon utilize the nearshore marine environment along Point Wells as foraging habitat and during migration. Juveniles are typically present in the action area from May through September (peaking in June), while adults are present from July through October (peaking in late August). Peak abundance through the Hiram M. Chittenden Locks at Lake Washington occurs in mid to late August and is generally complete by early November (Kerwin 2001). Chinook salmon typically spawn from mid-May through October, peaking in October within North Lake Washington tributaries. Outmigration of juveniles (subyearlings and yearlings) to Puget Sound is variable but generally occurs between February and June. The fact that the project site is located along central Puget Sound means stocks from multiple watersheds move through the action area. This would include stocks from the Lake Washington watershed, Duwamish/Green River, Puyallup River, Nisqually River, and numerous independent drainages and hatcheries located to the south of Point Wells.

7.3.2.4 Impacts

Impacts described in **Section 7.1** and **Section 7.2.1** are applicable to Chinook salmon. Potential impacts based on the NMFS and USFWS matrix of pathways and indicators are summarized in **Table 16**. Based on this assessment of project effects to baseline conditions, the project would result in the maintenance of all water quality and sediment-related indicators. Improvements at the local scale are anticipated to several habitat indicators due to the amount and type of proposed restoration. The proposed restoration has the potential to provide a significant improvement to shoreline habitat due to the amount of existing fill material to be removed and length of shoreline to be restored.

The primary impact is associated with pile driving, which is anticipated to create an area of potential effect extending up to 0.54 mile from the project area (**Figure 6**). This is the area where impacts to Chinook salmon could occur if they are present during pile driving. Since in-water work is likely to be approved from October 15 through February 15, returning adult or outmigrating juveniles have a low probability of being in the action area during pile driving, but would be present during other construction-related activities.

7.3.2.5 Preliminary Determination

The proposed project *may affect, but is not likely to adversely affect*, Chinook salmon. The project *may affect* Chinook salmon because:

- Chinook salmon have been documented in the action area.
- In-water work is proposed that includes pile driving.

- In-water work includes removing over 360 creosote piles.
- Over-water work includes removing existing structures.
- The project site includes approximately 3,600 linear feet of shoreline.
- The project includes remediation of contaminated soils and groundwater.

The project *is not likely to adversely affect* Chinook salmon because:

- The in-water work window is likely to be from October 15 – February 15, which should avoid impacting most juvenile and adult Chinook salmon.
- Implementation of impact minimization measures should eliminate water quality impacts during both construction and operation of the proposed project.

The proposed project *may affect, but is not likely to adversely affect,* Chinook salmon critical habitat. The project *may affect* Chinook salmon critical habitat because:

- Designated critical habitat occurs in the action area.
- In-water work is proposed that includes installation of new piles.
- In-water and near-shore construction activities could temporarily increase turbidity at the local scale.

The project is *not likely to adversely affect* Chinook salmon critical habitat because:

- The project will result in a net decrease in piles within the project area.
- The project will result in a net decrease in overwater structures.
- The project will result in a net increase in nearshore marine habitat.
- The project will provide water quality treatment to a level higher than existing conditions.
- The project will eliminate a potential significant source of pollution to Puget Sound.

7.3.3 Steelhead Trout

7.3.3.1 Federal Status

The Puget Sound steelhead trout is listed as a threatened species in Washington under the ESA. The NMFS is the lead regulatory agency for this listing under the ESA.

7.3.3.2 Critical Habitat

Critical habitat for this ESU was designated on March 25, 2016 (81 FR 9251), and it included approximately 2,031 mi (3,269 km) of freshwater and estuarine habitat in Puget Sound, WA. The Primary Constituent Elements (PCEs) essential for the conservation of this ESU are those sites and habitat components that support one or more life stages. The PCEs are further described as:

1) *Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development. These features are essential to conservation because without them the species cannot successfully spawn and produce offspring.*

2) *Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade,*

submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. These features are essential to conservation because without them juveniles cannot access and use the areas needed to forage, grow, and develop behaviors (e.g., predator avoidance, competition) that help ensure their survival.

3) *Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival. These features are essential 9 to conservation because without them juveniles cannot use the variety of habitats that allow them to avoid high flows, avoid predators, successfully compete, begin the behavioral and physiological changes needed for life in the ocean, and reach the ocean in a timely manner. Similarly, these features are essential for adults because they allow fish in a non-feeding condition to successfully swim upstream, avoid predators, and reach spawning areas on limited energy stores.*

4) *Estuarine areas free of obstruction with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh-and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation. These features are essential to conservation because without them juveniles cannot reach the ocean in a timely manner and use the variety of habitats that allow them to avoid predators, compete successfully, and complete the behavioral and physiological changes needed for life in the ocean. Similarly, these features are essential to the conservation of adults because they provide a final source of abundant forage that will provide the energy stores needed to make the physiological transition to fresh water, migrate upstream, avoid predators, and develop to maturity upon reaching spawning areas.*

5) *Nearshore marine areas free of obstruction with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels. As in the case with freshwater migration corridors and estuarine areas, nearshore marine features are essential to conservation because without them juveniles cannot successfully transition from natal streams to offshore marine areas.*

6) *Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation. These features are essential for conservation because without them juveniles cannot forage and grow to adulthood.*

While nearshore marine areas of Puget Sound are included as a PCE for Puget Sound steelhead, NMFS concluded in their 2016 determination of DCH that specific marine areas within the geographical area occupied by steelhead that contain these physical or biological features essential to their conservation cannot be identified due to lack of information. Thus, no specific areas around Point Wells have been mapped as DCH for steelhead.

7.3.3.3 Occurrence

Data on use of the action area by steelhead trout is very limited. Steelhead trout utilize the nearshore marine environment and occur within the action area, but seasonal distribution and abundance information is not available or based on very little site specific data. The action area would be utilized as a migratory pathway and foraging habitat for both adult and juvenile steelhead trout. Peak abundance of juvenile steelhead trout is reported to be from April through July, while the adult peak would likely be bimodal and coincide with returning summer or winter runs in south Puget Sound.

7.3.3.4 Impacts

Impacts described in **Section 7.1** and **Section 7.2.1** are applicable to steelhead trout. Potential impacts based on the NMFS and USFWS matrix of pathways and indicators are summarized in **Table 16**. Based on this assessment of project effects to baseline conditions, the project would result in the maintenance of all water quality and sediment-related indicators. Improvements at the local scale are anticipated to several habitat indicators due to the amount and type of proposed restoration. The proposed restoration has the potential to provide a significant improvement to nearshore inter-tidal habitat due to the amount of existing fill material to be removed and length of shoreline to be restored.

The action area is very large due to the extended distance underwater noise travels when using an impact hammer on steel piles. The primary impact is associated with pile driving, which is anticipated to create an area of potential effect extending up to 0.54 mile from the project area (**Figure 6**). This is the area where impacts to steelhead trout could occur if they are present during pile driving. Since in-water work is likely to be approved from October 15 through February 15, returning adult winter-run steelhead trout would likely be present in the action area during this time period.

7.3.3.5 Preliminary Determination

The proposed project *may affect, but is not likely to adversely affect* steelhead trout. The project *may affect* steelhead trout because:

- Steelhead trout utilize the action area.
- The action area includes marine habitat utilized by multiple runs from multiple watersheds.
- The in-water work window is likely to be from October 15 – February 15, which avoids outmigrating juveniles, but not returning winter-run adults.
- In-water work is proposed that includes pile driving.
- In-water work includes removing over 360 existing creosote piles.
- Over-water work includes removing existing structures.
- The project site includes approximately 3,600 linear feet of shoreline.
- The project includes remediation of contaminated soils and groundwater.

The project *is not likely to adversely affect* steelhead trout because:

- The in-water work window is likely to be from October 15 – February 15, which should avoid impacting most juvenile steelhead trout.
- Impacts are likely to be temporary and of short duration.

- Implementation of impact minimization measures should eliminate water quality impacts during both construction and operation of the proposed project.

The proposed project *may affect, but is not likely to adversely affect*, steelhead trout critical habitat. The project *may affect* steelhead trout critical habitat because:

- Designated critical habitat has been identified in Puget Sound.
- In-water work is proposed that includes installation of new piles.
- In-water and near-shore construction activities could temporarily increase turbidity at the local scale.

The project is *not likely to adversely affect* steelhead trout critical habitat because:

- The project will result in a net decrease in piles within the project area.
- The project will result in a net decrease in overwater structures.
- The project will result in a net increase in nearshore marine habitat.
- The project will provide water quality treatment to a level higher than existing conditions.
- The project will eliminate a potential significant source of pollution to Puget Sound.

7.3.4 Bull Trout

7.3.4.1 Federal Status

Bull trout are listed as a threatened species in Washington under the ESA. The USFWS is the lead regulatory agency for this listing under the ESA.

7.3.4.2 Critical Habitat

Critical habitat was designated on October 26, 2005 (50 CFR Part 17), and then revised per a final rule on October 18, 2010. The project area is within the boundary of the Unit 2: Puget Sound, Sub-unit: Puget Sound Marine, which includes the nearshore marine environment along Point Wells. PCEs of critical habitat are the known physical and biological features that are essential to the conservation of the species. The PCEs for bull trout are as follows:

- Permanent water having low levels of contaminants, such that normal reproduction, growth, and survival are not inhibited.
- Water temperatures ranging from 36 to 59 degrees°F with adequate refugia available for temperatures at the upper end of the range.
- A complex stream habitat (LWD, side channels, pools, undercut banks).
- A substrate of sufficient size, amount, and composition, to ensure the survival of egg, fry, young of the year, and juvenile.
- A natural hydrograph with peak, high, low, and base flows within historic range.
- Springs, seeps, groundwater sources, and subsurface water connectivity.
- Migration corridors with minimum barriers between necessary habitats.
- An abundant food base.
- Few or no predatory, interbreeding, or competitive non-native species.

7.3.4.3 Occurrence

Bull trout utilize the nearshore environment as a migration corridor, adult and sub-adult foraging, and refugia. Peak abundance in the action area is likely to coincide with peak abundance of

juvenile salmonids and/or forage fish. However, since few individuals have been captured, very little site specific data for the action area is available. Anadromous adults migrate downstream after spawning and enter estuarine waters in the spring. Anadromous adults return to their natal streams to spawn in late summer. As previously mentioned, bull trout are typically most abundant in Puget Sound during the spring and early summer, but are also present during the fall and winter, especially in areas such as Skagit Bay where a relatively healthy population exists. They also tend to be most active and abundant in nearshore environments during dawn and sunset.

7.3.4.4 Impacts

Impacts described in **Section 7.1** and **Section 7.2.1** are applicable to bull trout. Potential impacts based on the NMFS and USFWS matrix of pathways and indicators are summarized in **Table 16**. Based on this assessment of project effects to baseline conditions, the project would result in the maintenance of all water quality and sediment-related indicators. Improvements at the local scale are anticipated to several habitat indictors due to the amount and type of proposed restoration. The proposed restoration has the potential to provide a significant improvement to shoreline habitat due to the amount of existing fill material to be removed and length of shoreline to be restored.

The action area is very large due to the extended distance underwater noise travels when using an impact hammer on steel piles. The primary impact is associated with pile driving, which is anticipated to create an area of potential effect extending up to 0.54 mile from the project area (**Figure 6**). This is the area where impacts to bull trout could occur if they are present during pile driving. In-water work is likely to be approved from October 15 through February 15. The amount of available data is not sufficient enough to confirm with 100 percent certainty that no bull trout will be present in the action area when pile driving is proposed.

7.3.4.5 Preliminary Determination

The proposed project *may affect, but is not likely to adversely affect*, bull trout. The project *may affect* bull trout because:

- Bull trout have been documented in the action area.
- In-water work is proposed that includes pile driving.
- In-water work includes removing over 360 creosote piles.
- Over-water work includes removing existing structures.
- The project site includes approximately 3,600 linear feet of shoreline.
- The project includes remediation of contaminated soils and groundwater.

The project is *not likely to adversely affect* bull trout because:

- The in-water work window is likely to be from October 15 – February 15, which would be the time-frame when fewest bull trout are likely to be in the action area.
- Impacts are likely to be temporary and of short-duration.
- Implementation of impact minimization measures should eliminate water quality impacts during both construction and operation of the proposed project.
- Potential prey species will not be adversely impacted.

The proposed project *may affect, but is not likely to adversely affect*, bull trout critical habitat. The project *may affect* bull trout critical habitat because:

- Designated critical habitat occurs in the action area.
- In-water work is proposed that includes installation of new piles and removal of old piles.
- In-water and near-shore construction activities could temporarily increase turbidity at the local scale.

The project is *not likely to adversely affect* bull trout critical habitat because:

- The project will result in a net decrease in piles within the project area.
- The project will result in a net decrease in overwater structures in the project area.
- The project will result in a net increase in nearshore and riparian marine habitat.
- Implementation of impact minimization measures will reduce or eliminate potential water quality impacts.

7.3.5 Killer Whale

7.3.5.1 Federal Status

The Southern Resident Killer Whale (SRKW) is listed as endangered under the ESA. The NMFS is the lead regulatory agency for this listing under the ESA.

7.3.5.2 Critical Habitat

Critical habitat was designated on November 29, 2006 (50 CFR Part 226). The project area is within the boundary of the Area 2: Puget Sound. Areas less than 20 feet deep relative to extreme high water are not designated as critical habitat. Primary PCEs in Area 2 include water quality, prey, and passage.

7.3.5.3 Occurrence

SRKW use of Puget Sound has been documented in all seasons, but more frequently during the fall than summer. J pod typically expands into this area during the fall to feed on late returning chum salmon, especially during the months of October and November. Based on data from 1990 through 2003, no sightings of SRKW occurred in this area in July. From August through October, they have been sighted a total of 6 to 25 days, and from December through February, they have sighted from 1 to 5 days over the 13 year period (NMFS 2006).

7.3.5.4 Impacts

Potential impacts to individual SRKW could occur if they are in the action area during pile driving. Based on the data reviewed for this report, SRKW are anticipated to potentially be present in the action area (**Figure 6**) during pile driving. Impacts would be in the form of harassment or disturbance. Impacts could result in a loss of foraging opportunity within the action area during pile driving. However, pile driving will be temporary and presence of SRKW within the action area is likely to be brief or sporadic. Implementation of the impact minimization measures in **Section 3.0** will reduce the probability of potentially impacting SRKW should they be present in the action area during construction.

7.3.5.5 Preliminary Determination

The proposed project *may affect, but is not likely to affect,* SRKW. The proposed project *may affect* SRKW because:

- SRKW have been documented in the action area.
- In-water work is proposed that includes pile driving.
- The in-water work window is likely to be from October 15 – February 15, which includes the time periods when they could be in the action area.
- Impact minimization measures reduce, but do not eliminate under water noise.

The proposed project *is not likely to adversely affect* SRKW because:

- Impact minimization measures will be implemented.
- Temporary avoidance of the action area during pile driving is not anticipated to significantly alter foraging or behavioral activities of SRKW.
- Potential prey items will not be significantly impacted.
- Pile driving will be temporary and short-term.

Use by SRKW of the action area during the proposed in-water work window is limited and sporadic.

The proposed project will have *no-effect* on critical habitat.

7.3.6 Humpback Whale

7.3.6.1 Federal Status

The humpback whale is listed as endangered under the ESA. The NMFS is the lead regulatory agency for this listing under the ESA.

7.3.6.2 Critical Habitat

Critical habitat has not been designated for this species.

7.3.6.3 Occurrence

Humpback whales are seasonally common along the Washington Coast, but rare in Puget Sound. Individual humpback whales are rarely seen south of Admiralty Inlet. Approximately six individuals were seen between 1996 and 2001 (Calambokidis et al. 2004). Between January 2005 and August 2008, there were 34 total observations of humpback whales in Puget Sound south of Admiralty Inlet. The majority of these sightings were two individuals observed for several days in May, June, and July 2008 between Seattle and the southern tip of Puget Sound (Orca Network 2008). The Orca Network has recorded increased numbers of sightings of humpback whales in Puget Sound during recent years, including a sighting on March 22, 2015, of an individual swimming north past Point Wells.

7.3.6.4 Impacts

Potential impacts to humpback whales are similar to those described for the SRKW.

7.3.6.5 Preliminary Determination

The proposed project may affect, but is not likely to affect, humpback whales.

The proposed project *may affect* humpback whales because:

- Humpback whales have been documented in the action area.
- In-water work is proposed that includes pile driving.
- Impact minimization measures reduce, but do not eliminate under water noise.

The proposed project *is not likely to adversely affect* humpback whales because:

- Impact minimization measures will be implemented.
- Use of the action area by humpback whales during the proposed in-water work window is limited and sporadic.
- Temporary avoidance of the action area during pile driving is not anticipated to alter foraging or behavioral activities of humpback whales.
- Potential prey items will not be significantly impacted.

7.3.7 Marbled Murrelet

7.3.7.1 Federal Status

The marbled murrelet is listed as threatened under the ESA. The USFWS is the lead regulatory agency for this listing under the ESA.

7.3.7.2 Critical Habitat

Critical habitat was designated on May 24, 1996, which is limited to upland breeding habitats. Critical habitat was last revised on October 5, 2011. No critical habitat occurs in the action area.

7.3.7.3 Occurrence

The following occurrence information is based on the USFWS Biological Opinion (BO) for the Brightwater project (Reference 1-3-04-F-0496 [pages 69–71]). Most of the data is from sightings near Edmonds, which is due, in part, to more intensive surveys in that area. The abundance of marbled murrelets in the action area varies by season, but may occur year-round. Abundance may increase during April with the start of the nesting season, and a few may be regularly present from May through July. Juveniles have been observed in the action area by September, but by October abundance appears to decrease and observations become less frequent from November through March. However, this conflicts with another statement in the BO that states higher concentrations may occur during forage fish spawning periods (October 1 through April 15). The maximum number observed during winter months near Edmonds was 10, but up to 17 have been observed south of the action area during the annual Seattle Audubon Christmas Bird Counts. Discrepancies in seasonal abundance are likely due to various sources of sighting information, survey effort and timing, and variability in seasonal use from year to year. In summary, marbled murrelets could potentially be present in the action area throughout the year. The documented presence of forage fish spawning along the shoreline of Point Wells indicates that peak abundance within the nearshore marine environment may coincide with periods of peak forage fish spawning.

7.3.7.4 Impacts

Potential impacts to marbled murrelets would be similar to those described in **Section 7.2**.

7.3.7.5 Preliminary Determination

The proposed project *may affect, but is not likely to affect,* marbled murrelets.

The proposed project *may affect* marbled murrelets because:

- Marbled murrelets have been documented in the action area.
- In-water work is proposed that includes pile driving.
- The in-water work window is likely to be from October 15 to February 15, which includes the time periods when they could be in the action area.
- Impact minimization measures reduce, but do not eliminate under water noise.

The proposed project *is not likely to adversely affect* marbled murrelets because:

- Impact minimization measures will be implemented.
- Temporary avoidance of the action area during pile driving is not anticipated to alter foraging or behavioral activities of marbled murrelets.
- Potential prey items will not be significantly impacted during construction.

The proposed project will have *no-effect* on critical habitat because no critical habitat occurs in the action area.

8 HABITAT MANAGEMENT PLAN

Part 400 of SCC 30.62A [2007] establishes standards and requirements for the protection of critical species, which includes: (1) species listed as threatened and endangered by the State of Washington or the federal government; (2) species of local importance; and (3) the following species:

- Larch Mountain salamander
- Common loon;
- Peregrine falcon
- Olympic mudminnow;
- Pygmy whitefish; and
- Gray whale

If a project site contains habitat (primary association areas) for one or more of these species, a habitat management plan must be developed for their protection. **Table 20**, below lists all vertebrate species that are currently considered critical species in Snohomish County, and their potential for any life stage to occur on the project site.

Table 20: List of Critical Species in Snohomish County and their Potential to Occur on the Site.

Common Name	Scientific Name	Status	Potential to Occur on the Project Site
Western pond turtle	*Clemmys marmorata*	SE	No. Does not occur in nearshore marine waters.
Marbled murrelet	*Brachyramphus marmoratus*	FT	Yes. Adults can forage and loaf on Puget Sound near the project site.
Western gray squirrel	*Sciurus griseus*	ST	No. This species is limited to native Garry oak woodlands associated with Puget Sound prairies.
Canada lynx	*Lynx Canadensis*	FT	No. Restricted to high elevation habitats above 4,000 feet asl in the Cascade Mountains.
Chinook salmon	*Oncorhynchus tshawytscha*	FT	Yes. Adults and juveniles could occur in Puget Sound offshore of the proposed site.
Olympic mudminnow	*Novumbre hubbsi*	SS	No. Limited to slow velocity freshwater habitats. Nearest population is in eastern Snohomish County.
Pygmy whitefish	*Prosopium coulteri*	SS	No. Limited to isolated populations in large lakes, like Chester Morse Reservoir.
Bull trout	*Salvelinus confluentus*	FT	Yes. Adults and juveniles could occur in Puget Sound offshore of the proposed site.
Steelhead trout	*Oncorhynchus mykiss*	FT	Yes. Adults and juveniles could occur in Puget Sound offshore of the proposed site.
Peregrine falcon	*Falco peregrinus*	SS	Yes. Peregrine falcons forage widely along the shoreline of Puget Sound.
Common loon	*Gavia immer*	SS	Yes. Common loons have been observed in the area of Puget Sound adjacent to the project site.
Sandhill crane	*Grus canadensis*	SE	No. Cranes are known to migrate along the shoreline of Puget Sound, but normally only stop in the large agricultural fields associated with the Skagit Valley and similar locations.
Northern spotted owl	*Strix occidentalis*	FT	No. Requires mature and old growth forest for nesting.
Gray wolf	*Canis lupus*	SE, FE	No. Limited to remote areas of the state with high prey populations.
Grizzly bear	*Ursus arctos*	SE, FT	No. Rare inhabitant of remote high elevation areas of the North Cascades.
Gray whale	*Eschrichtius robustus*	SS	Yes. Regular transient visitor to Puget Sound. Feeds on ghost shrimp in shallow nearshore waters.
Humpback whale	*Megaptera novaeangliae*	FE	Yes. Regular seasonal visitor to Puget Sound. More common in recent years.

Common Name	Scientific Name	Status	Potential to Occur on the Project Site
Killer whale	*Orca orcinus*	FE	Yes. Listed resident orcas routinely travel through central and southern Puget Sound in search of fish.
Margined sculpin	*Cottus marginatus*	SS	No. Fish limited to southeast Washington in the Tucannon and Walla Walla River drainages.
Yellow-eye rockfish	*Sebastes ruberrimus*	SC, FT	Yes. Juveniles can occur in nearshore areas of Puget Sound.
Bocaccio rockfish	*Sebastes paucispinis*	SC, FE	Yes. Juveniles can occur in nearshore areas of Puget Sound.

Eleven of the species in **Table 20** are documented or have the potential to occur in the study area, including five fish species, two whales and three birds. All of the species potentially affected by the project have a primary association only with the marine shoreline, specifically the permanent marine waters below the MHHW elevation. Table 21 below describes how this document addresses the requirements for a habitat management as described in SCC 30.62A.460.

Table 21: Habitat Management Plan Content

HMP Content Requirement	Where Information is Provided
1. Critical Area Study	Critical area study included herein.
2. Map drawn to scale showing the location and description of the primary association area(s) of the critical species on the subject property.	All critical species that could occur on the proposed site have as their only primary association area the marine waters of Puget Sound below the MHHW elevation. This area is shown on **Figure 10**. **Delineated Wetlands and Streams**.
3. Evidence of use of the site by a critical species, including location and nature of use.	Evaluation of the use of the adjacent marine waters by the critical species is evaluated in Section 6.7 (existing shoreline habitat conditions), Section 6.10 (fish community), Section 6.11 (bird community), and Section 6.12 (mammals, including cetaceans).
4. Assessment of how proposed activities will affect the critical species and/or its habitat, and how the proposal will avoid, minimize and mitigate impacts.	Impacts of the proposed project on the marine habitat of the critical species are evaluated in the following sections: • 7.1.4 and 7.2.1– Salmonids • 7.2.2 – Forage Fish • 7.2.3 – Resident Marine Fish • 7.2.4 – Mammals • 7.2.5 – Marine Birds • 7.3 – Listed Species (including rockfish, Chinook, steelhead, bull trout, killer whale, humpback whale, and marbled murrelet)
5. Use of best available science for protection of critical species	Section 3.0 described impact avoidance and minimization measures that will reduce potential impacts to critical species. Specifically, Section 3.5 addresses impact reduction measures for the marine environmental. Unavoidable impacts will be mitigated through innovative development design (See Section 9.0 below).

9 MITIGATION AND RESTORATION

9.1 Restoration

A restoration plan has been developed for the project along the marine shoreline (**Appendix B**). This restoration is proposed to mitigate for project impacts to critical areas and their buffers on the site. A full review and approval will be conducted. This process will involve several jurisdictions, such as Snohomish County, WDFW, Ecology, and Corps, as well as interested parties, which may include tribes or interested citizens. The following describes the major elements of the restoration plan.

Proposed restoration activities include pulling back the existing seawall along approximately 3,600 linear feet of shoreline. The existing MHHW is at the existing seawall, while the MHHW is outlined based on Corps elevation data for the project vicinity. The distance the existing seawall will be pulled back is variable, ranging from 0 (southern edge) to 300 feet. Within those two extremes, the distance tends to range between 50 and 200 feet. The new proposed MHHW would be near the base of the proposed esplanade, which will result in the restoration of approximately 7.36 acres of nearshore intertidal habitat. Existing fill would be removed as part of the site remediation plan. Once remediation is complete, which is estimated to take several years, the new intertidal area would be backfilled with clean beach sand and gravel. The slope would vary, but generally be defined by the existing slope west of the existing seawall and the elevation at the base of the esplanade.

The project also includes the removal of approximately 327 existing creosote piles, thereby eliminating a source of PAHs from the marine environment. The existing site where development is proposed is predominantly impervious. Impervious surface in the project area will be reduced by the proposed development plan.

Based on the proposed avoidance and minimization along with the remediation and proposed restoration activities, and providing enhanced water quality treatment, the proposed project has the potential to benefit numerous species of fish and wildlife. A summary of the primary fish and wildlife benefits are as follows:

1) The restoration of intertidal habitat will create additional refugia and foraging habitat for marine fishes such as juvenile salmonids. This habitat type is of critical importance to juvenile salmonids and has been severely impacted by previous development within Puget Sound.
2) The restoration of intertidal habitat will create additional spawning habitat for forage fish.
3) The potential increase in forage fish spawning habitat may increase forage fish abundance, thereby benefiting multiple species that feed on forage fish within Puget Sound.
4) The removal of large bulk fuel and oil storage containers near the shoreline will reduce the potential for a major oil spill along the marine shoreline of Puget Sound.
5) The implementation of enhanced water quality treatments will reduce the potential of stormwater runoff from impacting the marine shoreline.

6) Conversion of the site from heavy industrial to mixed use urban will reduce the potential for additional fuel or oil spills from impacting Puget Sound and reduce tanker traffic near Point Wells.

7) Demolition of the three existing ramps to the big dock and dilapidated dock will remove over one acre of shading and additional sources of PAHs.

9.2 Innovative Development Design

The existing site has been used for industrial use for over a century. The existing hardened shoreline is entirely hardened with sheet pile, rip rap, and other structures. Existing studies for the site document that the majority of area above the MHHW is impervious. Therefore, the existing site does not include ecologically functional wetland, stream or shoreline buffers. Any development on the property would include work within both the CAR 150-foot shoreline buffer and the 300-foot buffer near salmonid habitat, as well as the administrative buffer of other wetlands and streams. Currently, the site plan proposes construction of an esplanade within the outer portion of the 150-foot buffer, and a number of residential buildings within the 300-foot buffer. The upper portions of the project include development of a second access route and other development within administrative wetland and stream buffers.

While the proposed project will include redevelopment within the administrative buffers, the project would create both intertidal habitat and functional shoreline buffer which results in reduced impervious surfaces on the site. The development would include the following:

- Cleanup of all contaminated soils on the site and removal of all former industrial materials.
- Restoration (creation) of approximately 7.36 acres of nearshore intertidal habitat by pulling back the existing seawall and removing existing impervious surfaces along approximately 3,600 linear feet of shoreline.
- Removal of approximately 327 creosote piles and the removal of approximately 1 acre of intertidal shading.

The use of the IDD will allow the development to proceed with these beneficial changes within the project's administrative buffers. Overall, the project will result in net improvement to ecological function along the shoreline of Puget Sound equivalent to application of the standard prescriptive measures of SCC 30.62A. For these reasons the project is suitable for evaluation under the IDD criteria in SCC 30.62A.350.

Table 22 below explains how each code criterion of IDD is addressed by the proposed project.

Table 22: Innovative Development Design Criteria

IDD Criteria	How Criteria is Addressed by Project
1. The innovative design will achieve protection equivalent to the treatment of the functions and values of the critical area (s) which would be obtained by applying the standard prescriptive measures contained in this chapter;	Direct impacts to existing wetlands and streams and their functional buffers are only incurred by construction of the second access road, which is unavoidable. Allowing use of the marine shoreline restoration in lieu of standard buffer protections for Stream S2 and the existing marine shoreline will allow a significant improvement in net ecological function for nearshore Puget Sound compared to maintaining existing buffers from the hardened developed shoreline.

IDD Criteria	How Criteria is Addressed by Project
2. Applicants for innovative designs are encouraged to consider measures prescribed in guidance documents, such as watershed conservation plans or other similar conservation plans, and low impact stormwater management strategies that address wetlands, fish and wildlife habitat conservation area or buffer protection consistent with this section; and	The proposed project incorporates many comprehensive strategies for environmental protection, including extensive LID measures, on-site water conservation, removal of artificial hardened shorelines and remediation of nearshore contamination on a large scale. See the Targeted Drainage Report for more information on LID (MiG/SVR 2018). Removal of shoreline armoring is one of the primary implementation strategies of the Puget Sound Partnership (Shipman 2017).
3. The innovative design will not be materially detrimental to the public health, safety or welfare or injurious to other properties or improvements located outside of the subject property.	The proposed project significantly improves public health, safety and welfare by remediation of signficant contamination, offering public access to improved shoreline, and removing the land use that has led to numerous fuel and oil spils over the last 100 years.

9.3 Monitoring and Maintenance

9.3.1 Mitigation Objectives and Performance Standards

The mitigation is largely the creation of unconsolidated shoreline materials. Vegetation has been included along the shoreline where characteristics support vegetation establishment and persistence. The proposed mitigation planting measures are intended to replace critical area functions lost or impacted by construction on the site and along the access road and enhance the ecological and biological functions along the upper most tidal levels of the marine shoreline. The following performance standards (**Table 22**) will be used to measure success of the mitigation objective.

Table 22: Wetland Mitigation Performance Standards

Year	Performance Standard
Year 1	Survival of all native trees and shrubs in the buffers will be 100 percent one year after installation. If 100 percent survival is not achieved, plants will be replaced. Percent cover of native species in planted areas will be measured to establish a baseline for future measurement.
Years 2 through 5, 7 and 10	Percent cover of all native species in planted areas will be 80 percent during each year of monitoring.
All Years	Non-native invasive and noxious plant species such as Himalayan blackberry (*Rubus armeniacus*), evergreen blackberry (*Rubus laciniatus*), Scot's broom (*Cytisus scoparius*), and thistles (*Cirsium arvense* and *C. vulgare*) will not exceed 20 percent aerial cover in the upland buffer. If Japanese knotweed (*Polygonum cuspidatum*), purple loosestrife (*Lythrum salicaria*), and English ivy (*Hedera helix*) are observed at the mitigation site, maintenance actions will occur immediately to remove these aggressive non-native species.

9.3.2 Monitoring and Maintenance

9.3.2.1 Monitoring

Shoreline vegetative buffer areas will be monitored for 10 years following installation. Quantitative monitoring will be completed and documented each year after initial construction, for the first five years, then again in Years 7 and 10. The site should be evaluated informally at the time of construction and 30 days following plant installation to assess survival rates and

document the presence of non-native invasive species. Yearly monitoring will be designed to determine if the performance standards have been met. Monitoring visits will be conducted during the growing season while plants are leafed out, usually between June 15th and October 15th of each year. Monitoring reports will be submitted to the County prior to the end of each monitoring year.

General appearance, health, mortality, volunteer plant species, survival (first year only) and aerial cover (Years 2 through 5, 7 and 10) will be monitored. Quantitative monitoring methods shall include a comprehensive census at Year 1 monitoring to measure overall plant survival, and use of the line intercept method during Years 2 through 10 to sample aerial cover. Qualitative monitoring methods will include permanent photo points and visual inspections. Incidental observations of wildlife use of the mitigation site will be recorded.

9.3.2.2 Maintenance

Maintenance within the enhancement areas will be performed annually. Maintenance tasks include replacement of failed plantings, temporary irrigation, trash removal, repair and replacement of signs and fences, and invasive plant removal. If during the monitoring period it becomes evident that invasive species are impeding establishment of desirable native plants, measures will be implemented to control nuisance species. A progressively aggressive approach will be used to control nuisance species. Control measures will first include hand cutting and removal. If this hand removal is unsuccessful, an herbicide will be applied by a State licensed applicator.

9.3.2.3 Contingency

It is anticipated that the mitigation goals will be accomplished with the satisfactory construction and installation of the mitigation design as shown on the final mitigation plans. If the results of monitoring indicate that the site is not meeting performance objectives, contingency measures will be implemented. Prior to implementing any corrective actions, site conditions will be evaluated to determine the cause of the problem and the most appropriate countermeasure. Contingency revisions typically require coordination with the permitting agencies. If the contingency plan is substantial, the monitoring period may be extended.

10 SUMMARY

The proposed project would have minimal permanent impacts to streams and buffers compared to existing site conditions. The proposed design has no permanent wetland or stream impacts west of the BNSF railroad tracks. The secondary access road to the site (**Appendix A**) will include impacts to Chevron Creek along with areas of wetland buffers and stream buffers. These include 677 square feet of stream impact, 16,543 square feet of stream buffer impact, and 24,656 square feet of wetland buffer impact. There is additional stream buffer impact to buffer that is presently developed area. There would be no permanent impacts to marine wetlands or shoreline. Temporary impacts would occur when the existing shoreline revetments and sheet pile wall are removed and the restoration recontours the shoreline.

The 150-foot regulatory buffer extending inland from the existing shoreline (i.e., MHHW) is mostly developed industrial land that has been documented with both soil and groundwater contamination. The proposed shoreline mitigation design (**Appendix B**) would include

remediation of contaminated soils, restoration of upland buffer, and creation of intertidal shoreline. Approximately 7.36 acres of buffer (that is existing contaminated industrial land) would be converted to create intertidal shoreline habitat. The proposed change in land use would remove the risk of petroleum and other industrial discharges into groundwater and Puget Sound. Remediation would remove existing contaminants from being exposed and migrating to the air and waters of Puget Sound. Off shore, the existing pier and other structures would be renovated. At least 327 creosote-treated piles would be removed from the pier, approach docks, dolphins, and other structures. Structures that are retained would be renovated using coated steel piles. Large ships will no longer use the existing pier for on or off loading fuels and other chemicals.

Impacts from construction and operation of the site would include the creation of 3,085 residential units and removal of the existing shoreline revetment. Construction would disturb and expose contaminated soils and groundwater. Operation of these residential units would increase pedestrian access to the site, shoreline, and intertidal areas. Residential use and landscape maintenance could affect water quality in the surrounding waters. Pedestrian and small boat use would increase at the renovated off shore pier.

Despite the impacts summarized above, the proposed project would improve the net ecological function of the site, shoreline, and adjacent forest bluff through a combination of remediation and creation of 7.36 acres of nearshore habitat.

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APPENDICES

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APPENDIX A

SITE PLANS

(Please refer to site plans submitted as part of revised Land Use Application number PFN 11-101457 under separate cover)

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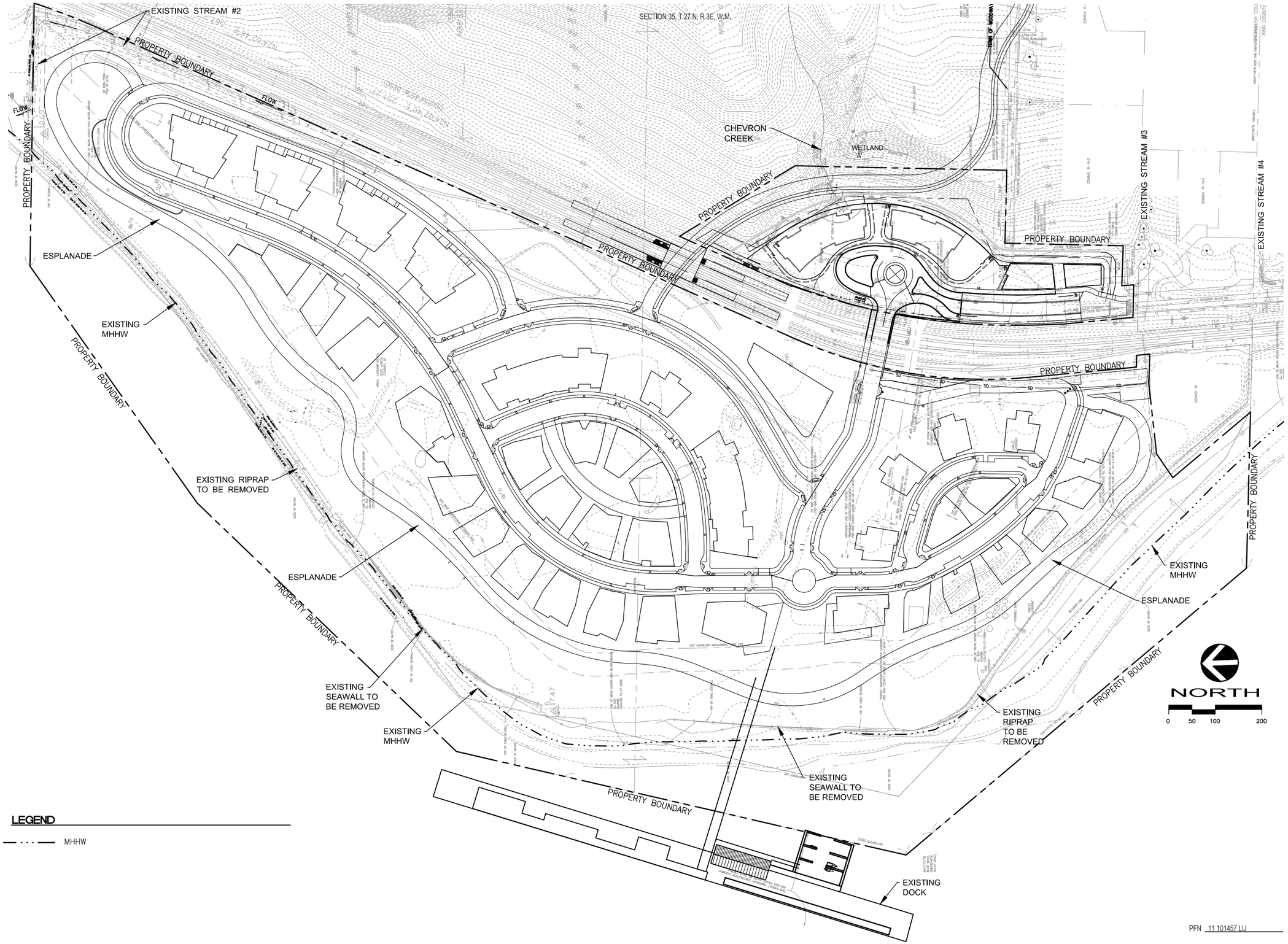

LEGEND

MHHW

PFN 11 101457 LU

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Seattle, WA 98101
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f: 206.441.4981
www.perkinswill.com

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701 Fifth Avenue, Suite 3300
Seattle, Washington 98104

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Sheet Information	
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Job Number	169009.000
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Checked	JCGA
Approved	OGR

Title

SITE PLAN

Sheet

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APPENDIX B

RESTORATION DESIGN SHEETS

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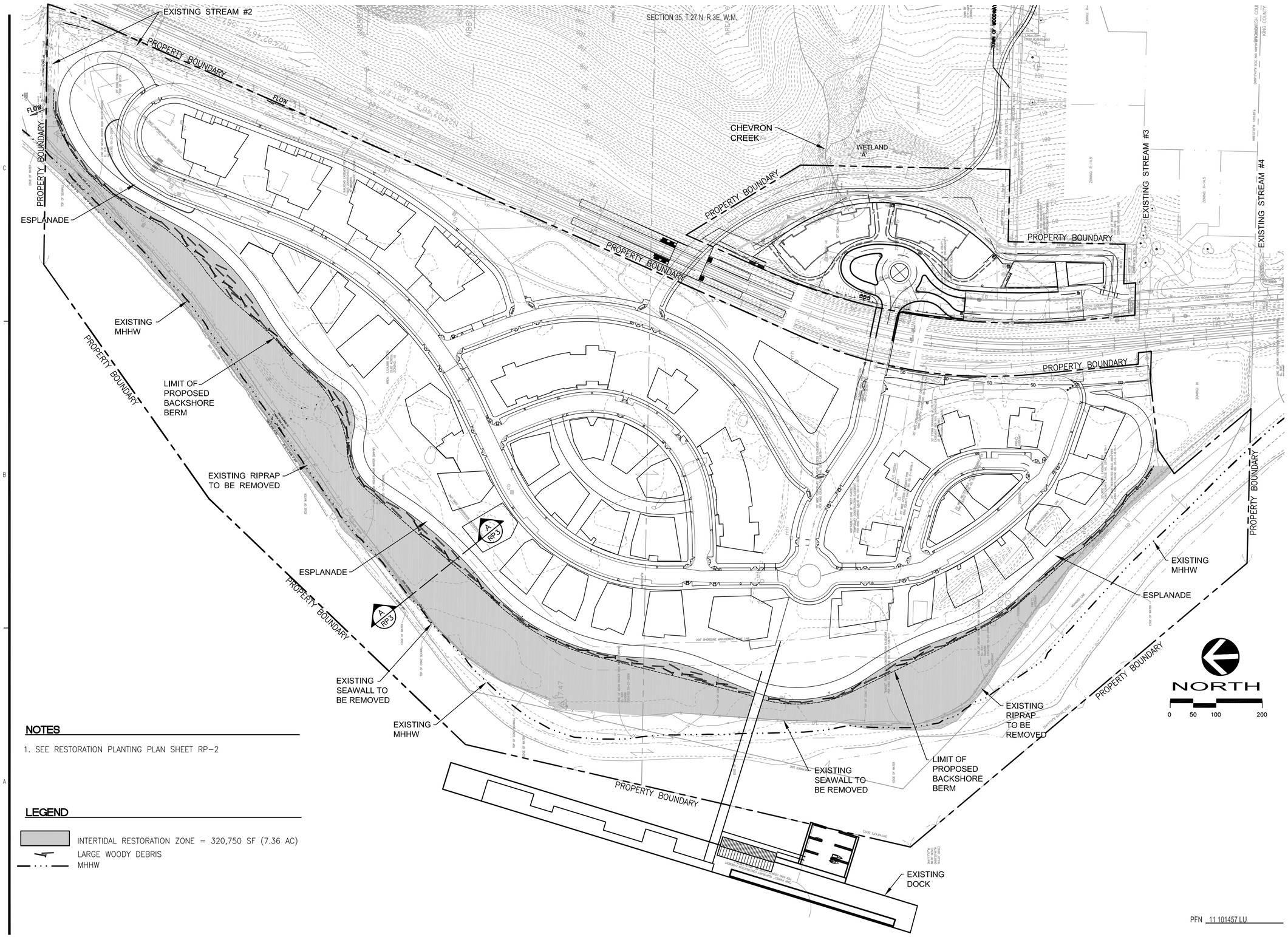

NOTES

1. SEE RESTORATION PLANTING PLAN SHEET RP-2

LEGEND

INTERTIDAL RESTORATION ZONE = 320,750 SF (7.36 AC)

LARGE WOODY DEBRIS

MHHW

PFN 11 101457 LU

PERKINS + WILL

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Seattle, WA 98101
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Sheet Information	
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Job Number	169009.000
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Title

SHORELINE RESTORATION PLAN

Sheet

RP-1

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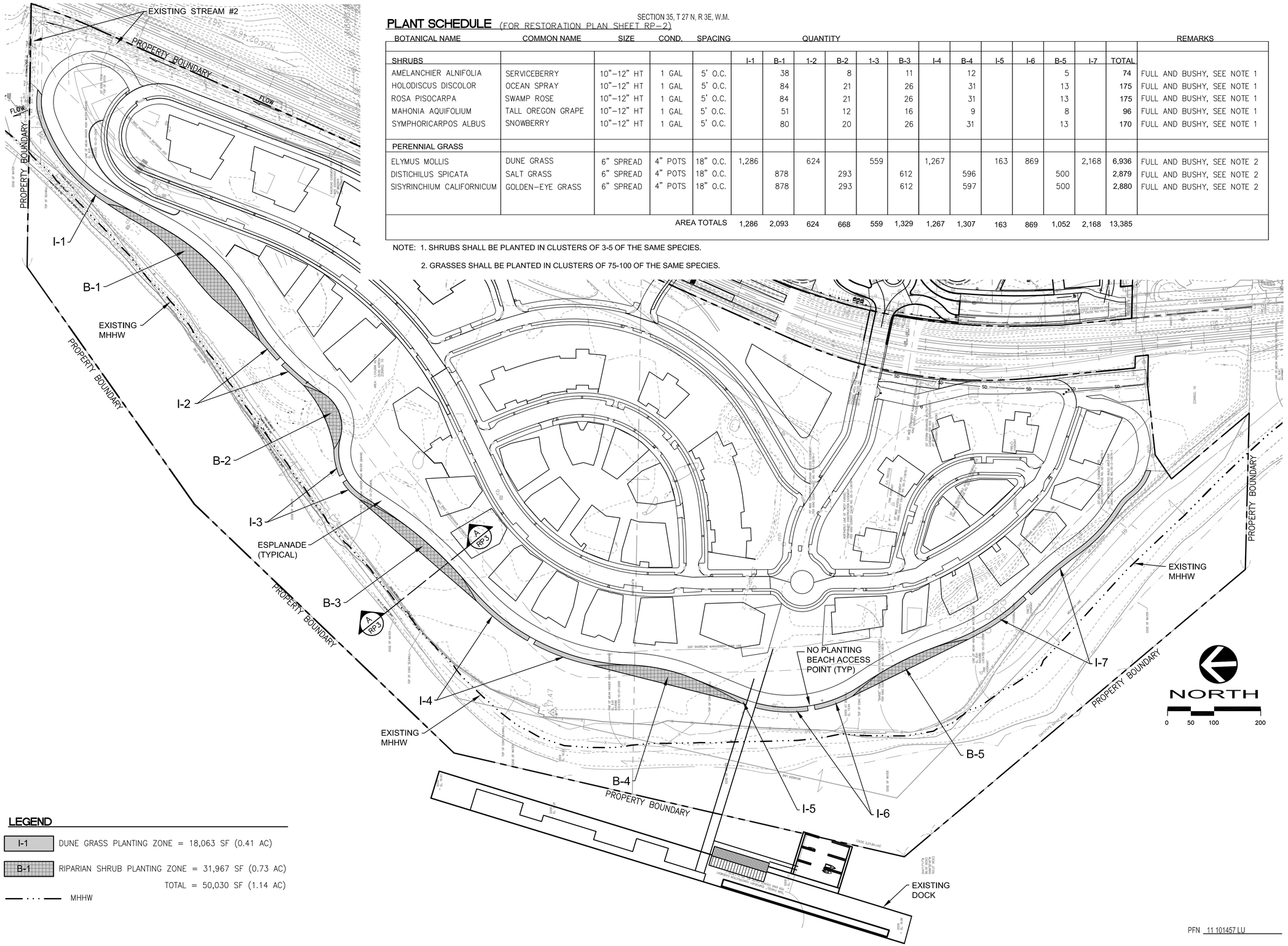

PLANT SCHEDULE (FOR RESTORATION PLAN SHEET RP-2)

SECTION 35, T 27 N, R 3E, W.M.

BOTANICAL NAME	COMMON NAME	SIZE	COND.	SPACING	QUANTITY I-1	B-1	I-2	B-2	I-3	B-3	I-4	B-4	I-5	I-6	B-5	I-7	TOTAL	REMARKS
SHRUBS																		
AMELANCHIER ALNIFOLIA	SERVICEBERRY	10"–12" HT	1 GAL	5' O.C.		38		8		11		12			5		74	FULL AND BUSHY, SEE NOTE 1
HOLODISCUS DISCOLOR	OCEAN SPRAY	10"–12" HT	1 GAL	5' O.C.		84		21		26		31			13		175	FULL AND BUSHY, SEE NOTE 1
ROSA PISOCARPA	SWAMP ROSE	10"–12" HT	1 GAL	5' O.C.		84		21		26		31			13		175	FULL AND BUSHY, SEE NOTE 1
MAHONIA AQUIFOLIUM	TALL OREGON GRAPE	10"–12" HT	1 GAL	5' O.C.		51		12		16		9			8		96	FULL AND BUSHY, SEE NOTE 1
SYMPHORICARPOS ALBUS	SNOWBERRY	10"–12" HT	1 GAL	5' O.C.		80		20		26		31			13		170	FULL AND BUSHY, SEE NOTE 1
PERENNIAL GRASS																		
ELYMUS MOLLIS	DUNE GRASS	6" SPREAD	4" POTS	18" O.C.	1,286		624		559		1,267		163	869		2,168	6,936	FULL AND BUSHY, SEE NOTE 2
DISTICHILUS SPICATA	SALT GRASS	6" SPREAD	4" POTS	18" O.C.		878		293		612		596			500		2,879	FULL AND BUSHY, SEE NOTE 2
SISYRINCHIUM CALIFORNICUM	GOLDEN-EYE GRASS	6" SPREAD	4" POTS	18" O.C.		878		293		612		597			500		2,880	FULL AND BUSHY, SEE NOTE 2
				AREA TOTALS	1,286	2,093	624	668	559	1,329	1,267	1,307	163	869	1,052	2,168	13,385	

NOTE: 1. SHRUBS SHALL BE PLANTED IN CLUSTERS OF 3-5 OF THE SAME SPECIES.

2. GRASSES SHALL BE PLANTED IN CLUSTERS OF 75-100 OF THE SAME SPECIES.

LEGEND

I-1	DUNE GRASS PLANTING ZONE = 18,063 SF (0.41 AC)
B-1	RIPARIAN SHRUB PLANTING ZONE = 31,967 SF (0.73 AC)
	TOTAL = 50,030 SF (1.14 AC)
— · · · —	MHHW

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RESTORATION PLANTING PLAN AND SCHEDULE

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SECTION 35, T 27 N, R 3E, W.M.

RESTORATION NOTES:

GENERAL

1. PRE–CONSTRUCTION MEETING BETWEEN THE OWNER, CONTRACTOR AND RESTORATION CONSTRUCTION MONITOR SHALL OCCUR PRIOR TO CONSTRUCTION. ALL MODIFICATIONS TO THE PLAN BASED ON FIELD CONDITIONS DURING CONSTRUCTION SHALL BE APPROVED BY THE RESTORATION CONSTRUCTION MONITOR.

2. INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS IN CONFORMANCE WITH THE PROJECT'S STORMWATER POLLUTION PREVENTION PLAN.

LOG INSTALLATION

1. RESTORATION CONSTRUCTION MONITOR SHALL APPROVE FINAL PLACEMENT OF ALL LOGS IN THE FIELD.

2. ALL LOGS SHALL CONSIST OF DOUGLAS FIR, WESTERN RED CEDAR, OR WESTERN HEMLOCK SPECIES AND SHALL BE WITHOUT LARGE SPLITS, BRANCHES, GOUGES OR ROT. THE ROOT SPREAD ON LOGS WITH ROOTWADS SHALL HAVE A MINIMUM OF 4' DIAMETER AS MEASURED FROM THE SHORTEST DIMENSION.

3. EARTH ANCHOR ASSEMBLY SHALL CONSIST OF A GALVANIZED DUCTILE HEAD ATTACHED TO A 7' SOLID THREADED ROD. INSERT THREADED ROD THROUGH A PREDRILLED A HOLE IN THE LOG AND FASTEN WITH A GALVANIZED MALLEABLE IRON WASHER. CUT OFF THREADED ROD IN EXCESS OF A $\frac{1}{2}$" IN LENGTH ABOVE WASHER AND HAMMER SMOOTH.

4. EARTH ANCHORS SHALL BE DRIVEN INTO THE GROUND AND LOCKED INTO POSITION. ANCHORS SHALL NOT BE AUGERED, DRILLED, OR DUG INTO PLACE. MAINTAIN COVER OVER ANCHORING AND FASTENINGS SO AS TO BE HIDDEN FROM VIEW.

PLANTING GENERAL

1. ALL PLANT MATERIALS SHALL CONFORM TO THE AMERICAN NURSERY LANDSCAPE ASSOCIATION (ANLA) STANDARDS FOR NURSERY STOCK (ANSI Z 60.1–2004) FOR GRADE AND SIZE UNLESS NOTED OTHERWISE ON PLAN.

2. PLANT SUBSTITUTIONS SHALL BE AUTHORIZED BY THE RESTORATION CONSTRUCTION MONITOR.

3. THE CONTRACTOR SHALL VERIFY THAT PLANT INSTALLATION CONDITIONS ARE SUITABLE WITHIN PLANTING AREAS. THE CONTRACTOR SHALL NOTIFY THE RESTORATION CONSTRUCTION MONITOR OF ANY UNSATISFACTORY CONDITIONS AND ADDRESS THEM PRIOR TO START OF PLANTING. BEGINNING OF WORK CONSTITUTES VERIFICATION THAT CONDITIONS ARE SATISFACTORY.

PLANT INSTALLATION

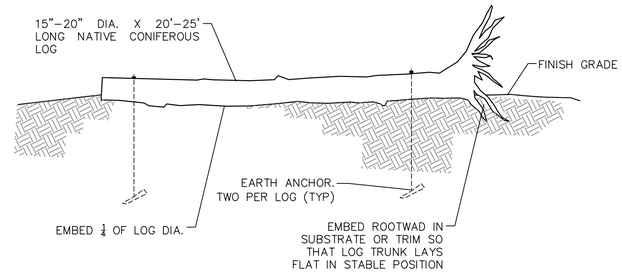
1. RESTORATION CONSTRUCTION MONITOR SHALL INSPECT THE METHOD AND LAYOUT OF PLANTING IN THE PLANTING AREAS PRIOR TO PLANT INSTALLATION.

2. ALL PLANT PITS SHALL RECEIVE MEDIUM BARK MULCH RINGS: 3" DEEP X APPROXIMATELY TWICE THE ROOTBALL DIAMETER.

3. RIPARIAN SHRUB RESTORATION PLANTING AREAS SHALL RECEIVE 12" MIN. DEPTH TWO–WAY TOPSOIL CONSISTING OF 1:1 MIXTURE OF SANDY LOAM AND COMPOST BY VOLUME.

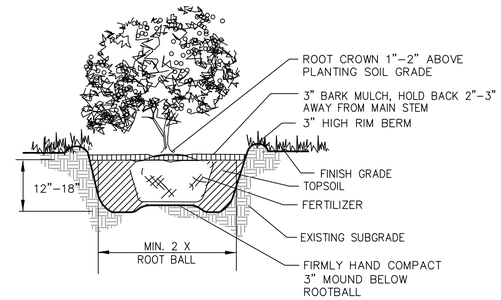
NOTES:

1. LOGS WILL BE PLACED IN THE BACKSHORE BERM AREA ONLY. SEE PLAN FOR LOGS WITH AND WITH OUT ROOTWADS.



LARGE WOODY DEBRIS

NOT TO SCALE



SHRUB PLANTING

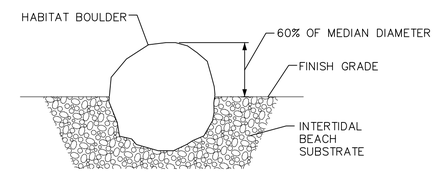
NOT TO SCALE

NOTES:

1. ENGINEER SHALL APPROVE FINAL PLACEMENT OF ALL HABITAT BOULDERS IN THE FIELD.

2. HABITAT BOULDERS SHALL BE ROUNDED 3–4 MAN STREAMBED BOULDERS MEETING THE FOLLOWING SIZE:

SIZE	APPROX. WT – LBS	APPROX. DIA.
3 MAN	700 – 2000	28" – 36"
4 MAN	2000 – 4000	36" – 48"



HABITAT BOULDER

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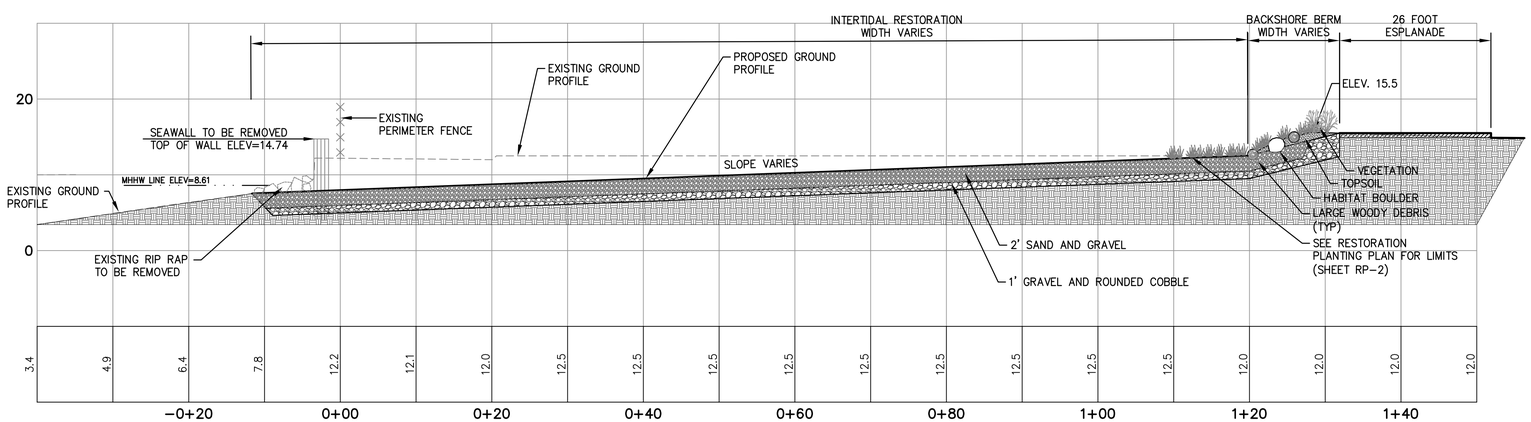


SECTION A-A

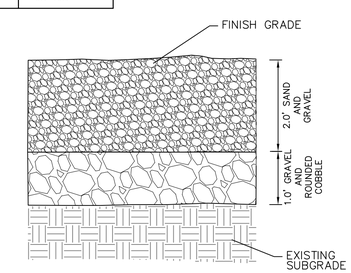
SCALE: H:1"=10' V:1"=10'

SAND AND GRAVEL

GRAIN SIZE	PERCENT PASSING
3"	100%
2"	75%–95%
1"	30%–55%
0.5"	10%–30%
0.25"	5%–15%
#4	5%–10%

GRAVEL AND COBBLE

GRAIN SIZE	PERCENT PASSING
6"	99%–100%
5"	70%–90%
2"	30%–60%
0.75"	10% MAX.



INTERTIDAL BEACH SUBSTRATE

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SHORELINE SECTION AND RESTORATION AND DETAILS

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1.0 RESTORATION PLAN OVERVIEW

1.1 PROJECT DESCRIPTION

THE PROJECT SITE IS LOCATED NORTH OF SEATTLE, WASHINGTON IN SOUTHWEST SNOHOMISH COUNTY, ALONG PUGET SOUND SHORELINE, AT BSRE POINT WELLS, LP. THE POINT WELLS DEVELOPMENT PROJECT INVOLVES THE REDEVELOPMENT OF APPROXIMATELY 50 ACRES OF HEAVY INDUSTRIAL USE LAND INTO A MIXED USE FACILITY CONSISTING OF COMMERCIAL, RETAIL, RESIDENTIAL AND PUBLIC RECREATION OPPORTUNITIES.

THE PROJECT INCLUDES APPROXIMATELY 16 ACRES (AC) OF ADJOINING TIDELANDS THAT WILL REMAIN UNDEVELOPED EXCEPT FOR AN EXISTING DEEP WATER PIER, BOAT DOCK AND BOAT LAUNCH RAMP. THE CONSTRUCTION OF THE PROJECT WILL INCLUDE 7.36 AC OF INTERTIDAL RESTORATION.

1.2 INTERTIDAL RESTORATION

7.36 AC OF RESTORATION WILL INCLUDE THE REMOVAL OF EXISTING SEAWALLS, RIPRAP AND FILL MATERIAL AND RE-GRADING TO RESTORE THE INTERTIDAL ZONE BACK TO ELEVATIONS AND GRADIENTS CONSISTENT WITH UNDEVELOPED SHORELINE OUTSIDE THE PROJECT AREA. RESTORATION WILL ALSO INCLUDE THE IMPORT OF 2 TO 3-FEET OF NATIVE SAND, GRAVEL AND COBBLE, AS WELL AS THE ADDITION OF NEARSHORE PLANTINGS AND WOODY DEBRIS.

1.2 NEARSHORE PLANTING

2.40 AC OF NEARSHORE VEGETATION CONSISTING OF NATIVE TREES AND SHRUBS WILL BE PLANTED TO PROVIDE A DIVERSITY OF SPECIES AND WILDLIFE HABITAT.

2.0 RESTORATION GOALS AND OBJECTIVES

GOALS

RESTORE LOST FUNCTIONS TO INTERTIDAL ZONE.

RESTORE LOST FUNCTIONS TO BACKSHORE HABITAT.

OBJECTIVES

1. RE-SLOPE 7.36 AC OF INTERTIDAL ZONE TO RESTORE NATURAL ELEVATIONS AND GRADIENTS FROM REMOVAL OF SEAWALL.

2. RESTORE 7.36 AC OF INTERTIDAL ZONE SUBSTRATE TO A NATIVE SAND/ GRAVEL/ COBBLE COMPOSITION TO PROVIDE BEACH NOURISHMENT.

3. PROVIDE 1.17 AC BACKSHORE ZONE NATIVE RIPARIAN PLANTINGS.

4. INSTALL LARGE WOODY DEBRIS TO ADD STRUCTURE AND COMPLEXITY AND REDUCE WAVE INDUCED EROSION.

3.0 PERFORMANCE STANDARDS

PERFORMANCE STANDARDS HAVE BEEN ESTABLISHED THAT CORRESPOND TO THE STATED RESTORATION GOALS AND OBJECTIVES. THESE STANDARDS ARE THE PRIMARY FACTORS THAT SHALL BE USED TO JUDGE THE SUCCESS OF THE RESTORATION PROJECT. IT SHALL BE EXCEEDINGLY IMPORTANT TO EVALUATE THE DEVELOPMENT OF THE RESTORATION PLAN OVER THE ENTIRE MONITORING PERIOD WHEN DETERMINING WHETHER EACH INDIVIDUAL STANDARD HAS BEEN MET OR NOT. WHILE SPECIFIC PERFORMANCE CRITERIA PROVIDE IMPORTANT BENCHMARKS AND SHALL HELP TO DIRECT MAINTENANCE AND CONTINGENCY EFFORTS, THE SUCCESS OF RESTORATION MUST BE MEASURED AGAINST THE GOALS AND OBJECTIVES OF THE OVERALL RESTORATION PLAN. BY MONITORING THE PROJECT AND COMPARING MONITORING RESULTS TO PERFORMANCE STANDARDS, A DETERMINATION CAN BE MADE FOR THE NEED TO IMPLEMENT MAINTENANCE EFFORTS OR THE CONTINGENCY PLAN. PERFORMANCE STANDARDS ARE IDENTIFIED IN THE TABLE BELOW.

4.0 MONITORING PLAN

RESTORATION MONITORING SHALL BE CONDUCTED BY A BIOLOGIST FOR FIVE (5) YEARS WHICH INCLUDES THE INSTALLATION INSPECTION (ONE YEAR WARRANTY INSPECTION). THE OBJECTIVE OF THE MONITORING PROGRAM SHALL BE TO ASSESS THE ESTABLISHMENT OF THE RESTORATION AREAS. ANNUAL REPORTS DESCRIBING MONITORING RESULTS SHALL BE SUBMITTED TO SNOHOMISH COUNTY BY DECEMBER 31 OF YEARS 1 THROUGH 5. THE MONITORING RESULTS SHALL BE RELATED TO THE PERFORMANCE STANDARDS AND IF WARRANTED, RECOMMENDATIONS SHALL BE MADE BASED ON THESE FINDINGS.

4.1 ESTABLISHMENT OF SENSITIVE (RESTORATION) AREAS

ENCROACHMENT INTO SENSITIVE AREAS SHALL BE MONITORED DURING EACH VISIT. THE SENSITIVE AREAS SHALL BE INSPECTED FOR CLEARING, TRASH DUMPING AND OTHER UNAUTHORIZED DISTURBANCES. ANY ENCROACHMENTS IN THE SENSITIVE AREAS SHALL BE NOTED AND DIRECTED TO THE ATTENTION OF ENVIRONMENTAL CONSTRUCTION MONITOR AND THE COUNTY.

4.2 VEGETATION ESTABLISHMENT

ALL PLANTINGS SHALL BE MONITORED FOR 5 YEARS AND SHALL INCLUDE REPRESENTATIVE SAMPLING FOR COVER, USING THE LINE-INTERCEPT METHOD ALONG TRANSECTS. OVERVIEW PHOTOGRAPHS SHALL BE TAKEN FROM CONSISTENT PHOTOPOINTS. ALL PLANTED TREES AND SHRUBS AND HERBACEOUS SPECIES, SHALL BE EVALUATED IN YEARS 1, 2, 3, 4, AND 5 TO DOCUMENT VEGETATION DEVELOPMENT. THE INITIAL MONITORING SHALL BE A COMPLETE CENSUS OF PLANTINGS AND SHALL OCCUR 1 YEAR AFTER INSTALLATION IN ORDER TO IMPLEMENT THE ONE YEAR WARRANTY TO BE PROVIDED BY THE LANDSCAPE CONTRACTOR.

4.3 RESTORATION MAINTENANCE

IF NECESSARY, MAINTENANCE ACTIONS SHALL BE RECOMMENDED BY THE BIOLOGIST. MAINTENANCE WITHIN THE RESTORATION AREAS SHALL BE THE RESPONSIBILITY OF THE OWNER DURING THE ONE YEAR WARRANTY PERIOD. FOLLOWING THE ONE YEAR WARRANTY PERIOD, MAINTENANCE SHALL BE PERFORMED AS NECESSARY TO ENSURE RESTORATION GOALS AND OBJECTIVES ARE MET. IMPLEMENTATION OF MAINTENANCE ACTIONS IS THE RESPONSIBILITY OF THE OWNER.

5.0 RESTORATION SEQUENCING

CONSTRUCTION OF THE RESTORATION AREAS SHALL GENERALLY INCLUDE:

1. A PRE-CONSTRUCTION MEETING;
2. MARKING LIMIT OF WORK FOR RESTORATION BOUNDARIES;
3. REMOVAL OF INVASIVE SPECIES AND INSTALLATION OF PLANTS AS SPECIFIED;
4. POST-CONSTRUCTION MEETING BETWEEN ALL INVOLVED PARTIES;
5. REMOVAL OF LIMIT OF WORK DEMARCATIONS;
6. IMPLEMENTATION OF MONITORING PROGRAM;
7. ON-GOING MAINTENANCE AS NECESSARY.

5.1 PRE-CONSTRUCTION MEETING

A PRE-CONSTRUCTION MEETING SHALL BE HELD ON-SITE BETWEEN THE PROJECT ENGINEER, ALL NECESSARY CONSTRUCTION CONTRACTORS (GENERAL AND LANDSCAPE CONTRACTORS), AND ENVIRONMENTAL CONSTRUCTION MONITOR. DURING THIS MEETING, SITE CONDITIONS, PERMIT, SPECIFICATIONS, AND THE RESTORATION PLANS SHALL BE REVIEWED. THIS SHALL ASSIST ALL INVOLVED PARTIES IN UNDERSTANDING THE INTENT, SPECIFICATIONS, AND REQUIREMENTS OF THE RESTORATION PLAN.

5.2 MARKING OF CONSTRUCTION LIMITS FOR RESTORATION AREA BOUNDARIES

THE LIMIT OF WORK BOUNDARIES OF THE RESTORATION AREAS SHALL BE MARKED IN THE FIELD PRIOR TO PRELIMINARY SITE PREPARATION, EARTHWORK, OR PLANTING BY THE CONTRACTOR. BOUNDARIES SHALL BE MARKED BY INSTALLING ORANGE TEMPORARY CONSTRUCTION FENCING TO CLEARLY DELINEATE THE RESTORATION AREAS.

5.3 POST-CONSTRUCTION MEETING

A POST-CONSTRUCTION SITE REVIEW OF THE COMPLETED WORK SHALL BE CONDUCTED BETWEEN THE ENVIRONMENTAL CONSTRUCTION MONITOR AND THE CONTRACTOR TO VERIFY THAT THE PLAN WAS PROPERLY IMPLEMENTED. THIS FIELD MEETING SHALL IDENTIFY ANY DISCREPANCIES BETWEEN THE PLAN AND THE FIELD PLANTINGS AND IF NECESSARY, PROPOSE CORRECTIVE MEASURES. IF THE PLAN WAS PROPERLY IMPLEMENTED, THE MONITORING PERIOD SHALL COMMENCE.

6.0 CONSTRUCTION OBSERVATION

THE ENVIRONMENTAL CONSTRUCTION MONITOR SHALL BE ON-SITE PERIODICALLY DURING THE IMPLEMENTATION OF THE RESTORATION AREA TO REVIEW THE PLANT INSTALLATION. THE RESPONSIBILITIES OF THE ENVIRONMENTAL CONSTRUCTION OBSERVER(S) SHALL INCLUDE: RESPONDING TO CONTRACTOR QUESTIONS REGARDING UNIQUE CONSTRUCTION OR PLANTING TECHNIQUES; REVIEW OF CONSTRUCTION MATERIALS AND NURSERY STOCK, AND REVIEW OF PLANT LOCATIONS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT PLAN SPECIFICATIONS HAVE BEEN MET.

7.0 CONTINGENCY PLAN

THE CONTINGENCY PLAN SHALL PROVIDE REMEDIATION FOR THE RESTORATION GOALS THAT HAVE NOT BEEN MET. IF THE DESIRED RESTORATION GOALS, AS MEASURED BY THE MONITORING PROGRAM AND PERFORMANCE STANDARDS, HAVE NOT BEEN MET AND CANNOT BE ACHIEVED THROUGH ROUTINE MAINTENANCE, THEN A DETERMINATION BY SNOHOMISH COUNTY AND THE PROJECT PROPONENT MAY BE MADE TO REQUIRE SUBMITTAL OF A CONTINGENCY PLAN. AFTER WRITTEN APPROVAL BY THE COUNTY, A CONTINGENCY PLAN SHALL BE IMPLEMENTED THAT COMPENSATES FOR THE FAILED GOALS OF THE APPROVED MITIGATION PLAN. IF THE CONTINGENCY PLAN IS SUBSTANTIAL, THE COUNTY SHALL EXTEND THE MONITORING PERIOD.

8.0 PERFORMANCE SECURITY

CERTIFICATE OF OCCUPANCY SHALL NOT BE COMPLETE UNTIL THE RESTORATION PLAN IS INSTALLED, INSPECTED, APPROVED AND BONDED. IN ORDER TO ENSURE THAT THE RESTORATION IS PROPERLY IMPLEMENTED, INCLUDING MONITORING AND CONTINGENCIES, THE PROJECT PROPONENT (PARAMOUNT PETROLEUM) SHALL PROVIDE A PERFORMANCE BOND FOLLOWING SNOHOMISH COUNTY PROCEDURES. THE TOTAL COST, PLUS CONTINGENCY FEES, SHALL BE THE AMOUNT OF THE PERFORMANCE BOND. THE PERFORMANCE BOND SHALL BECOME EFFECTIVE FOLLOWING INSTALLATION AND APPROVAL BY THE COUNTY.

PERFORMANCE STANDARDS	MONITORING METHODS	MONITORING INTERVAL
1. 100 PERCENT SURVIVAL OF ALL INSTALLED NATIVE AND SHRUBS AND HERBACEOUS ONE-YEAR POST INSTALLATION. 2. ESTABLISHMENT OF TRANSECTS IN RESTORATION MONITORING PLANTING AREAS FOR FIVE YEARS OF COVERAGE DATA. 3. FOR AERIAL COVER OF INTERTIDAL AND BACKSHORE PLANTING ZONES: SHRUB AND HERBACEOUS COVER: >60% BY YEAR 3, 85% BY YEAR 5, TREE, SHRUB AND HERBACEOUS SURVIVAL: 100% BY YEAR 1, 85% BY YEAR 3, 60% BY YEAR 5. 4. PRESENCE OF LARGE WOODY DEBRIS	1. TOTAL PLANT COUNT OF INSTALLED PLANTS SHALL DETERMINE ONE YEAR WARRANTY AND PERFORMANCE STANDARD OF SURVIVAL. 2. INSTALLED SHRUB AND HERBACEOUS COVERAGE SHALL BE ESTIMATED USING THE LINE-INTERCEPT METHOD ALONG TRANSECTS ESTABLISHED IN THE RESTORATION AREAS (AS NOTED IN PERFORMANCE STANDARDS) 3. PHOTOGRAPHIC DOCUMENTATION SHALL OCCUR WITH EACH MONITORING FROM ESTABLISHED PHOTOPOINTS TO PROVIDE ADDITIONAL DOCUMENTATION OF PLANT SUCCESS. 4. TOTAL COUNT OF LARGE WOODY DEBRIS BASED ON VISUAL INSPECTION.	YEARS 1, 2, 3, 4 AND 5 (RESTORATION VEGETATION AREAS)
6. AT LEAST 5 NATIVE SHRUBS AND 3 NATIVE HERBACEOUS SPECIES SHALL BE ESTABLISHED IN THE RESTORATION AREA.		YEARS 1, 2, 3, 4 AND 5 (RESTORATION VEGETATION AREAS)
7. UP TO 20% OF ANY STRATUM CAN BE COMPOSED OF DESIRABLE NATIVE VOLUNTEERS WHEN MEASURING COVER. NO MORE THAN 10% COVER OF NON-NATIVE OR OTHER INVASIVES, E.G., HIMALAYAN BLACKBERRY, JAPANESE KNOTWEED, EVERGREEN BLACKBERRY, REED CANARYGRASS, SCOTS BROOM, ENGLISH IVY, MORNING GLORY, ETC. IS PERMISSIBLE IN ANY MONITORING YEAR. BOND HOLDERS ARE ENCOURAGED TO MAINTAIN RESTORATION SITES WITHIN THESE STANDARDS THROUGHOUT THE MONITORING PERIOD, TO AVOID CORRECTIVE MEASURES.		YEARS 1, 2, 3, 4 AND 5 (RESTORATION VEGETATION AREAS)

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RESTORATION MONITORING PLAN

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APPENDIX C

FEDERAL AND STATE LAWS AND REGULATIONS

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FEDERAL REGULATIONS

Endangered Species Act

The criteria for determining threatened and endangered plant and animal species is provided by the Endangered Species Act (ESA), which is administered by National Oceanic and Atmospheric Administration (NOAA) Fisheries and the U.S. Fish and Wildlife Service (USFWS). The goals of the ESA include species conservation, ecosystem conservation, and species recovery. Section 4 of the ESA allows for the listing of species as threatened or endangered based on habitat loss or degradation, over utilization, disease or predation, inadequacy of existing regulatory mechanisms, or other human-cause factors. Section 4(D) allows for the promulgation of regulations to provide for the protection and conservation of listed species. It may allow for the "take" of threatened species. Take is defined as to "harass, harm, pursue, hunt, shoot, wound, kill, capture, or collect, or attempt to engage in such conduct" (1532(18)). Section 7 of the ESA requires each federal agency to ensure its actions to authorize, permit, or fund a project do not jeopardize the continued existence of any threatened or endangered species. It describes consultation procedures and conservation obligations. Section 9 of the ESA prohibits a take of listed species. An exception to the take prohibition applies to endangered plants on non-federal lands, unless the taking is in knowing violation of state law (1538(a)(2)).

Clean Water Act

The Clean Water Act (CWA) was established to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. The CWA makes it illegal to discharge pollutants from a point source to the waters of the United States. Any activity resulting in the placement of dredge or fill material to waters of the U.S. requires a permit from the Corps under Section 404 of the CWA. Fill is defined as any material that replaces any portion of a U.S. water with dry land or changes the bottom elevation of any portion of a U.S. water. Navigable waters, tributaries to navigable waters, and wetlands that abut any of these waters are "Waters of the U.S." Wetlands that are hydrologically isolated are not Waters of the U.S. based on the United States Supreme Court ruling of the Solid Waste Agency of Northern Cook County vs. U.S. Army Corps of Engineers (SWANCC Decision, 2001), No. 99-1178, January 9, 2001. Isolated waters, including wetlands, do not require permitting to fill, but still have ecological value.

Section 401(a) of the CWA requires that before issuing a license or permit that may result in any discharge to waters of the United States, a federal agency must obtain from the state in which the proposed project is located, a certification that the discharge is consistent with the CWA, CWA provisions to which Section 401 certification applies include EPA-issued National Pollutant Discharge Elimination System (NPDES) permits (described under Section 402), and Section 404 permits from the Corps (EPA 2011). In Washington State, EPA has delegated authority to manage Section 401and Section 402 of the CWA to Ecology.

Section 402 of the CWA creates the National Pollutant Discharge Elimination System (NPDES) regulatory program. The NPDES program requires construction site operators engaged in clearing, grading, and excavating activities that disturb one acre or more, including smaller sites in a larger common plan of development or scale, to obtain coverage under an NPDES permit for their stormwater discharges.

Section 10 of the Rivers and Harbors Act

The Rivers and Harbors Act of 1899 requires authorization from the Secretary of the Army, acting through the Corps of Engineers, for the construction of any structure in or over any navigable water of the United States. Structures or work outside the limits defined for navigable waters of the United States require a Section 10 permit if the structure or work affects the course, location, or condition of the water body. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States, and applies to all structures, from the smallest floating dock to the largest commercial undertaking. It further includes, without limitation, any wharf, dolphin, weir, boom breakwater, jetty, groin, bank protection (e.g. riprap, revetment, bulkhead), mooring structures such as pilings, aerial or subaqueous power transmission lines, intake or outfall pipes, permanently moored floating vessel, tunnel, artificial canal, boat ramp, aids to navigation, and any other permanent, or semi-permanent obstacle or obstruction.

National/State Environmental Policy Act

NEPA requires that all actions sponsored, funded, permitted, or approved by federal agencies undergo planning to ensure that environmental considerations such as impacts on surface water/water quality, floodplains, and groundwater are given due weight in the decision making process. SEPA mandates a similar procedure for state and local actions (Ecology 2003).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act, administered by the USFWS, makes it unlawful to take, import, export, possess, sell, purchase, or barter any migratory bird, with the exception of taking of game birds during established hunting seasons. The law also applies to feathers, eggs, nests, and products made from migratory birds. Executive Order 13186, signed by President Bill Clinton effective January 10, 2001, outlines federal agency responsibilities for protecting migratory birds under the Migratory Bird Treaty Act and other statures. It requires the Federal Highway Administration to enter into a Memorandum of Understating (MOU) with the USFWS on protecting a wide range of migratory bird species.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act, administered by the USFWS, makes it unlawful to take, import, export, sell, purchase, or barter any bald or golden eagle, their parts, products, nests, or egg. Take includes pursuing, shooting, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing the eagles. Permits may be issued by the USFWS for scientific or exhibition use, or for traditional and cultural use by Native Americans.

Sustainable Fisheries Act

Public Law 104-267, the Sustainable Fisheries Act of 1996, amended the Magnuson-Stevens Fishery Conservation and Management Act to (1) establish new requirements for Essential Fish Habitat (EFH) descriptions in Federal Fishery Management Plans, and (2) to require federal agencies to consult with NOAA Fisheries on Activities that may adversely affect EFH.

Marine Mammal Protection Act

The Marine Mammal Protection Act, administered by the NMFS, generally prohibits the take of marine mammals in U. S. waters. Take includes “to harass, hunt, capture, or kill, or attempt to

harass, hunt, capture, or kill any marine mammal". There are certain exceptions to the take prohibitions, including for small takes incidental to specified activities, when access by Alaska Natives to marine mammal subsistence resources can be preserved, and permits and authorizations for scientific research.

Other Federal Regulations

Fish and Wildlife Coordination Act (16 USC 661-667 (e))

Rivers and Harbors Act (33 USC 410)

Coastal Zone Management Act (15 CFR 923-930)

STATE REGULATIONS

Washington Department of Fish and Wildlife administered regulations (RCW Title 77; WAC 220.660))

WDFW and the Washington Fish and Wildlife Commission are charged with the authority and responsibility of protecting and managing Washington State fish and wildlife resources under Revised Code of Washington (RCW) Title 77. If WDFW determines that a native wildlife species is are risk, the agency director may request the Washington Fish and Wildlife Commission to designate that species as sensitive, threatened, or endangered (RCW 77.12.020). These species are listed under Washington Administrative Code (WAC) 232-12. Complete regulations governing the listed, delisted, and management of animal species are given in WAC 232-12-297. Primarily for the protection of fish life, WDFW must issue a Hydraulic Project Approval (HPA) for any work below the ordinary high water mark (OHWM) or mean higher high water (MHHW) mark that would use, divert, obstruct, or change the natural flow or bed of a water of the state (State Hydraulic Code, WAC 220-660).

Washington Department of Natural Resources administered regulations (RCW 79.70.030)

RCW 79.70.030 authorizes the Washington Department of Natural Resources (WDNR) to establish and maintain a natural heritage program that "shall maintain a classification of natural heritage resources," which, as defined in RCW 79.70.020, includes special plant species. The Washington Natural Heritage Program (WNHP) assigns endangered, threatened, or sensitive status to plants that face varying risks of extinction. These listings do not provide regulatory protection. Landowners whose property supports a state-listed plant species are encouraged to provide voluntary protection.

Washington State Department of Transportation

The Washington State Department of Transportation (WSDOT) Transportation Commission Policy Catalog contains a specific policy on fish and wildlife protection. Policy 6.3.3 states that: "Efforts will be made to mitigate the potential adverse effects that transportation activities can have on fish and wildlife populations." WSDOT intends to "protect, restore, and enhance, where feasible, fish and wildlife habitat and populations within transportation corridors." Action strategies include the following:

Conduct a study to inventory transportation barriers to fish passage; establish criteria for identifying which barriers pose the most significant environmental harm; prioritize the removal of identified transportation barriers; and seek program funding for fish passage barrier removal

Identify transportation corridors with significant wildlife losses due to “road kill” or habitat impacts, and develop strategies for reducing wildlife losses within these corridors.

Improve interagency communications, consultations, and agreements on habitat protection issues.

Minimize impacts to natural habitats in design, construction, and maintenance activities.

WSDOT is also currently developing a policy that will help minimize the effects of transportation projects on wildlife habitat connectivity. This policy will improve connectivity by rectifying existing problems and incorporating guidance into transportation planning, project development, and operation of the transportation system.

Growth Management Act (GMA)

RCW 36.70A establishes state goals, sets deadlines for compliance, and offers direction on how to prepare local comprehensive plans and development regulations and requirements for early and continuous public participation. The GMA requires state and local governments to manage Washington’s growth by identifying and protecting critical areas and natural resource lands, designating urban growth areas, preparing comprehensive plans and implementing them through capital investments and development regulations.

Other State Regulations

Washington State Department of Ecology (Ecology) SEPA Review

Shoreline Management Act

Water Quality Standards (WAC 173-201A)

- Federal Clean Water Act implementation

  Section 401 Certification

Section 402 NPDES Program

APPENDIX D

SITE PHOTOGRAPHS

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PHOTO 1

PHOTO 2

1 Site view looking north from access ramp.

2 Site view looking northwest from access ramp.

Site Photographs		
BSRE Point Wells, LP		DAVID EVANS AND ASSOCIATES INC.
PARA0000-0002	*Appendix D*	
November 2010		

Gx1973

PHOTO 3

PHOTO 4

3 View looking west atop ramp to Point Wells.	*Site Photographs*
4 Site photo.	*BSRE Point Wells, LP*
	PARA0000-0002 / *November 2010* — *Appendix D*
	DAVID EVANS AND ASSOCIATES INC.

Gx1973

PHOTO 5

PHOTO 6

5 On-site structures.

6 Overview of southern shoreline.

Site Photographs	
BSRE Point Wells, LP	DAVID EVANS AND ASSOCIATES INC.
PARA0000-0002	*Appendix D*
November 2010	

Gx1973

PHOTO 7

PHOTO 8

7 Southern shoreline where the Brightwater outfall is being constructed.

8 Southern shoreline where the Brightwater outfall is being constructed.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix D

DAVID EVANS AND ASSOCIATES INC.

Gx1973

PHOTO 9

PHOTO 10

9 Outfall 003, which conveys flow from Chevron and South Creek to Puget Sound.

10 View looking south toward primary dock.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix D

DAVID EVANS AND ASSOCIATES INC.

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PHOTO 11

PHOTO 12

11 Office area cantilevered over shoreline near central shoreline.

12 View looking south immediately north of shoreline office.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix D

DAVID EVANS AND ASSOCIATES INC.

Gx1973

PHOTO 13

PHOTO 14

13 American dunegrass near central portion of shoreline.

14 View of central shoreline from primary dock.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix D

DAVID EVANS AND ASSOCIATES INC.

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PHOTO 15

PHOTO 16

15 Central portion of project site at high tide.

16 Central portion of project site at high tide.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix D

DAVID EVANS AND ASSOCIATES INC.

Gx1973

PHOTO 17

PHOTO 18

17 View looking north from project site dock.

18 Upper beach along central project shoreline.

Site Photographs

BSRE Point Wells, LP

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Appendix D

DAVID EVANS AND ASSOCIATES INC.

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PHOTO 19

PHOTO 20

19 Dolphin near shoreline.

20 Old dock used by cormorants.

Site Photographs

BSRE Point Wells, LP

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Appendix D

DAVID EVANS AND ASSOCIATES INC.

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PHOTO 21

PHOTO 22

21 Shoreline armoring south-central edge.

22 Shoreline armoring south-central edge.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix D

DAVID EVANS AND ASSOCIATES INC.

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PHOTO 23

PHOTO 24

23 Different shoreline armoring along southwest edge.

24 Different shoreline armoring along southwest edge.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix D

DAVID EVANS AND ASSOCIATES INC.

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PHOTO 25

PHOTO 26

25 Outfall 002 that conveys stormwater runoff to Puget Sound.

26 Northwest shoreline.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix D

DAVID EVANS AND ASSOCIATES INC.

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PHOTO 27

PHOTO 28

27 View looking south atop riprap along northwest shoreline.

28 View looking north atop riprap along northwest shoreline.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix D

DAVID EVANS AND ASSOCIATES INC.

Gx1973

PHOTO 29

PHOTO 30

29 View of northern beach.

30 Shoreline along northwest portion of Point Wells. Remains of old piles in foreground.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix D

DAVID EVANS AND ASSOCIATES INC.

Gx1973

PHOTO 31

PHOTO 32

31 View of Point Wells from northern beach.

32 Ditch outlet to Puget Sound.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix D

DAVID EVANS AND ASSOCIATES INC.

Gx1973

PHOTO 33

PHOTO 34

33 On-site ditch that conveys runoff from the bluff to Puget Sound.

34 Ditch along east side of railroad tracks that collects runoff prior to being discharged to project site (see Photo 33)

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix D

DAVID EVANS AND ASSOCIATES INC.

Gx1973

PHOTO 35

PHOTO 36

35 On-site Retention Pond on Chevron Creek.

36 Chevron Creek immediately upstream of Retention Pond in Photo 35.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix D

DAVID EVANS AND ASSOCIATES INC.

Gx1973

APPENDIX E

WETLAND A FORMS

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WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Paramount Petroleum - Point Wells City/County: Snohomish Sampling Date: 11-23-09

Applicant/Owner: Paramount Petroleum State: WA Sampling Point: DP 1

Investigator(s): Scott Swarts and Jim Shannon Section, Township, Range: S35, T27N, R3E

Landform (hillslope, terrace, etc.): Hill Slope in old road cut Local relief (concave, convex, none): Slope Slope (%): 1 - 5

Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Alderwood-Everett gravelly sandy loam. NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra* (red alder)	50	Yes	FAC
2.			
3.			
4.			
	50 = Total Cover		
Sapling/Shrub Stratum (Plot size: 10 ft radius)			
1. *Rubus spectabilis* (salmonberry)	50	Yes	FAC
2.			
3.			
4.			
5.			
	50 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. *Tolmiea menziesii* (piggy-back plant)	60	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks:

SOIL

Sampling Point: DP 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2						silty loam	with some sand
16 +	5Y 5/1	60	7.5YR 5/6	40	C	M	clay	mottles

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): NA
Water Table Present?	Yes ☒	No ☐	Depth (inches): four
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): one

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Paramount Petroleum – Point Wells City/County: Snohomish Sampling Date: 11-23-09

Applicant/Owner: Paramount Petroleum State: WA Sampling Point: DP 2

Investigator(s): Scott Swarts and Jim Shannon Section, Township, Range: S35, T27N, R3E

Landform (hillslope, terrace, etc.): Hill slope in old road cut Local relief (concave, convex, none): Slope Slope (%): 1 - 5

Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Alderwood-Everett gravelly sandy loam NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒	
Wetland Hydrology Present?	Yes ☐ No ☒	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra* (red alder)	75	Yes	FAC
2.			
3.			
4.			
	75 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. *Rubus spectabilis* (salmonberry)	75	Yes	FAC
2.			
3.			
4.			
5.			
	75 = Total Cover		
Herb Stratum (Plot size: _____)			
1. *Polystichum munitum* (sword fern)	20	Yes	FACU
2. *Tolmiea menziesii* (piggy-back plant)	5	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	25 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks:

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 3/2	100					silty loam	
8 – 16+	10YR 4/2	100					silty loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX F

SOUND EXPOSURE LEVEL CALCULATOR

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Sound Exposure Level Calculator for Marbled Murrelet and Bull Trout

This spreadsheet was developed as an in-house tool for USFWS staff to use when assessing the effects to marbled murrelets (MAMU) and/or bull trout from impact pile driving. The USFWS makes this spreadsheet available to other users, and assumes no responsibility for errors when this tool is used by non-USFWS staff. Use this spreadsheet to calculate the distance to various thresholds for both MAMU and bull trout. The calculations incorporate the concept of effective quiet (EQ) wherein we assume that the energy from pile strikes below a certain SEL does not accumulate to cause injury.

Please contact the following USFWS staff member to report errors or submit questions:
Lindsy Wright, USFWS, Washington Fish and Wildlife Office, Lacey, WA, 360-753-6037, lindsy_wright@fws.gov

Green cells = input. Input expected sound levels, distance, attenuation, and pile strikes
Blue cells = results. Results shown are based on the information in the green and yellow cells. DO NOT CHANGE
Yellow cells = threshold values and transmission loss constant. DO NOT CHANGE

	Peak	SEL	RMS	Single Strike SEL for Effective Quiet	Attenuation
Unattenuated single strike (dB)	198	170	182	150	11
Attenuated single strike (dB)	187	159	171		
Distance (m)	22	22	22		
Piles per day	4				
Estimated maximum # strikes per pile	300				
Estimated maximum # strikes per day	1200				
Cum SEL at measured distance	189.8	>>----------->>>	62	34	42
Transmission loss constant	15				

	Distance (m) to Bull Trout thresholds (SEL)		Distance (m) to MAMU thresholds				
	Fish ≤ 2g	Fish > 2g	Masking Zone Piles <36-inch	Masking Zone Piles ≥ 36-inch	Auditory Injury (SEL)	Barotrauma (SEL)	Distance to EQ
	183	187	202	208			
	168	3	1	88			

	Behavior
	dBrms
Potential Behavioral Response Zone	150
Distance (m)	553

*** Note:** If you have a project with different sized piles, you will run this analysis for each size of pile, and use the greater distance of the two to determine the distance to murrelet auditory injury threshold.

Version 3/3/14 L.Wright

Key:

Distance (m) [B12-D12]	This is the distance that the sound pressure levels you are entering were measured at. The hydrophones were placed at this distance from pile driving locations during sound measurements. This distance can vary, so be sure to verify the distance that the measurements were taken from.
Piles per day [B3]	Enter the maximum number of piles that would be installed in a day.
Attenuation [F10]	Enter the amount of attenuation that will be verified by hydroacoustic monitoring. If hydroacoustic monitoring would not occur, enter zero.
Masking Zone; piles <36-inch [F16]	For projects that entail impact-pile-driving steel piles that is more than intermittent proofing and the pile sizes are less than 36-inch diameter. Monitoring for marbled murrelets in the masking zone should only occur from land-based locations.
Masking Zone; piles ≥ 36-inch [G16]	For projects that entail impact-pile-driving steel piles that is more than intermittent proofing and pile sizes are 36-inch-diameter or larger. Monitoring for marbled murrelets in the masking zone should only occur from land-based locations.
Area of effect Auditory Injury (m) [H16]	This value represents the radius of the "area of effect" where we would anticipate auditory injury could occur. Monitoring for marbled murrelets in the area of auditory injury can be done from boats or land (see USFWS Marbled Murrelet Monitoring Protocol).
Distance to EQ [J16]	This is the distance with which the energy from pile driving would no longer be accumulating and harmful to fish. It is not ambient.
Distance (m) Potential Behavioral Response Zone [B22]	This is the distance that sound would travel underwater until the sound pressure levels drop below 150 dB RMS. This is only a guideline for when we would no longer expect potential behavioral effects to salmonids. We use it for bull trout and marbled murrelets. This is not the distance that sound would travel until attenuating to ambient conditions or when it would be undetectable (background is the sound in an area in the absence of your project noise).

Model last updated January 26, 2009

Project Title	
Pile information (size, type, number, pile strikes, etc.)	

Fill in green cells: estimated sound levels and distances at which they were measured, estimated number of pile strikes per day, and transmision loss constant.

	Acoustic Metric			
	Peak	SEL	RMS	Effective Quiet
Measured single strike level (dB)	**187**	**159**	**171**	**150**
Distance (m)	**22**	**22**	**22**	

Estimated number of strikes	**1200**

Cumulative SEL at measured distance
190

	Distance (m) to threshold			
	Onset of Physical Injury			Behavior
	Peak	Cumulative SEL dB**		RMS
	dB	Fish ≥ 2 g	Fish < 2 g	dB
Transmission loss constant (15 if unknown)	206	187	183	150
15	**1**	**34**	**62**	**553**

** This calculation assumes that single strike SELs < 150 dB do not accumulate to cause injury (Effective Quiet)

Notes (source for estimates, etc.)
(This model was last updated January 26, 2009)