BIOLOGICAL ASSESSMENT AND HABITAT MANAGEMENT PLAN
EVERETT RIVERFRONT REDEVELOPMENT
EVERETT, WASHINGTON

NOVEMBER 19, 2007

FOR
OLIVERMCMILLAN EVERETT, LLC

GeoEngineers

File No. 06191-002-01

Biological Assessment and Habitat Management Plan
Everett Riverfront Redevelopment
Everett, Washington
File No. 06191-002-01

November 19, 2007

Prepared for:

OliverMcMillan Everett, LLC
733 8th Avenue
San Diego, California 92101

Attention: Robert Mueller

Prepared by:

GeoEngineers, Inc.
2924 Colby Avenue
Everett, Washington 98201
(425) 252-4565

GeoEngineers, Inc.

Kelly A. Brock
Environmental Scientist

Daniel L. Irick
Environmental Scientist

Joseph O. Callaghan
Senior Biologist

Wayne S. Wright, PWS
Principal

JOC:JEP:WSW:jl:mlh
Boise:0619100201R_BA-HMP.doc

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

Page No.

TABLE OF CONTENTS (CONTINUED)

Page No.

TABLE OF CONTENTS (CONTINUED)

Page No.

List of Tables

List of Figures

APPENDICES

BIOLOGICAL ASSESSMENT AND HABITAT MANAGEMENT PLAN
EVERETT RIVERFRONT REDEVELOPMENT
EVERETT, WASHINGTON
FOR
OLIVERMCMILLAN EVERETT, LLC

INTRODUCTION

This report represents the Biological Assessment (BA) and Habitat Management Plan (HMP) for the Everett Riverfront Redevelopment (ERR) project by OliverMcMillan Everett, LLC (OliverMcMillan). The ERR project, as currently proposed, will include; construction of mixed use commercial space, hotel space, single- and multi-family residential units, a kayak/small boat dock and launch, and shoreline/habitat restoration (Determination of Significance on October 16, 2006) on the approximately 221-acre site. In addition to these improvements, the City of Everett (the City) is in the initial planning stages of wetland and stream habitat enhancement and restoration throughout the site. Once the City planning and design element is complete subsequent environmental review will be conducted to evaluate impacts of the City plans. This report has been completed to assess potential impacts of the project on species and critical habitats listed or proposed for listing under the Endangered Species Act (ESA). This report also addresses wetland impacts and the mitigation sequencing process followed for this project including avoidance and minimization measures that will be in-place during construction and occupation of the development.

Listed species use of the project area is described, and the potential effect that this project may have on each species and their habitat is evaluated. This report has also been completed to address and analyze habitat management opportunities in conjunction with potential impacts to fish and wildlife habitat conservation areas within the project boundaries and affected species resultant of the "Preferred Alternative" (Alternative 1) for the proposed ERR project. Fish and wildlife conservation areas and affected species within the project area is described, and the potential effect the project may have on each conservation area and affected species is evaluated. In addition, several conservation and mitigation measures, such as low impact stormwater Best Management Practices (BMPs), are identified to reduce and compensate for planned and potential impacts to fish and wildlife conservation areas and each affected species. This BA/HMP report addresses the responsibilities of OliverMcMillan set forth in the City's Shoreline Master Program (SMP), Salmon Overlay to the Snohomish Estuary Wetland Integration Plan (SEWIP), City of Everett Municipal Code, Title 19, Chapter 33D Shoreline Overlay District, (EMC 19.33D) and is part of the informal consultation process that OliverMcMillan is expected to consult with the U.S. Army Corps of Engineers (USACE) and the Services (U.S. Fish and Wildlife Service [USFWS] and National Oceanic and Atmospheric Administration [NOAA] Fisheries).

PURPOSE OF PROJECT

For more than a decade, the City has been working on the cleanup, environmental conservation, public shoreline access and redevelopment planning for several properties located along segments of the Snohomish River within the City's urban growth boundaries. The area includes sites commonly known as the former Everett Landfill/Tire Fire site, Eclipse Mill, Stuchell/Newland site and the former Simpson site (riverfront properties). These sites and their associated landscapes, over the past 100 years, have been manipulated, heavily developed from historical conditions and continually utilized for various industrial purposes (GeoEngineers 2007a). The City's most desirable option for these riverfront properties would be a re-development action by one entity based on a Planned Development Overlay Master Plan (Master Development Plan) reviewed through the City's public land use process. The City has entered into an

agreement to sell the majority of these riverfront properties to OliverMcMillan, a private developer, who will redevelop the site in accordance with the City's regulations and vision and provide a Master Development Plan in partnership with the City. The City is developing plans for public amenities and environmental restoration within the project area that is not included in this evaluation. Additional environmental review to permit those amenities will be completed when design details are developed more fully over time.

Located in Sections 29 and 32 of Township 29 North, Range 5 East of the Willamette Meridian east of Interstate 5, south of Pacific Avenue and north of Lowell Snohomish River Road in Everett, Washington (Figure 1 – Vicinity Map), the proposed project is adjacent to the western shoreline of the Snohomish River within the tidally influenced lower section of the river. The project area includes five distinct zones, generally identified with the following site descriptions (Figure 2 – Site Boundary/Layout) which are based on their historical use:

1. **Tire Fire/Landfill Site:** This area is bordered on the north by 36th Street, on the west by the Burlington Northern Santa Fe (BNSF) mainline/right-of-way and on the east and south by the diagonal created by the former Milwaukee Road railroad right-of-way. This parcel is a fully loaded and properly closed municipal waste landfill
2. **Simpson Pad:** This area is generally south and west of the area described below as the Simpson Category I Wetland and Riparian corridor, and the north of the area described below as the South Simpson Site. This area is identified in the Everett General Plan and related documents as the "Developable Portion of Simpson Site." This parcel supported a large timber mill for decades.
3. **Simpson Category 1 Wetlands and Riparian Corridor:** This area lies between the Tire Fire/Landfill site, the BNSF Mainline on the east and between the Snohomish River and the upland area known as the Simpson Pad or the "Developable Portion of the Simpson Site." This area is composed entirely of areas that are or will be aquatic or riparian habitat and public access. The wetland areas are associated with Bigelow Creek and portions of the Snohomish River.
4. **South Simpson Site:** This area lies between the BNSF Mainline on the west, the Snohomish River on the east, the Washington State Department of Transportation (WSDOT) water treatment property on the south and the Simpson Pad on the north. The South Simpson Site includes features identified in this report as South Simpson Wetland Areas and is composed entirely of areas that are or will be aquatic or riparian habitat and public access.
5. **Eclipse Mill/Port of Everett Site:** This area lies north of the easterly extension of 36th Street, east of the BNSF 'C'-line track and right-of-way, west of the Snohomish River and south of Pacific Avenue. The Port of Everett also owns properties in this area that are proposed to be included in the proposed redevelopment. The Eclipse Mill was closed within the past four years and the site was inspected for contamination and underwent a cleanup action.
6. **Stuchell/Newland:** These properties are located north of the portion of the Eclipse property being transmitted by the City to OliverMcMillan extending to a property line about 400 feet south of Pacific Avenue and lying east of the BNSF tracks and Eclipse Mill Road to roughly the Snohomish River. These parcels are currently active with light industrial uses and will be transferred and incorporated into the redevelopment plans focusing on commercial and residential uses.

LISTED SPECIES

Information on species listed under Section 7(c) of the ESA that are potentially present in the ERR project area was obtained from the USFWS (Appendix A – December 20, 2005 for Snohomish County), NOAA listing for Western Washington (Appendix A – June 26, 2007 for marine mammals and June 15, 2007 for salmon), the Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) maps and database (WDFW 2007a) and SalmonScape interactive mapper (WDFW 2007b). A Washington Department of Natural Resources (DNR) search of their online Natural Heritage Program database revealed no records of any listed plants, high quality ecosystems or other significant natural features within a 1-mile radius of the project area (DNR 2007).

The USFWS list, the NOAA list and the WDFW database indicate the presence of Puget Sound chinook salmon (*Oncorhynchus tshawytscha*), bull trout (*Salvelinus confluentus*) and Puget Sound steelhead (*Oncorhynchus mykiss*) in the project vicinity. There is also a possibility that marbled murrelets (*Brachyramphus marmoratus)* and Steller sea lions (*Eumetopias jubatus)* could be present in the project vicinity. On July 9, 2007, bald eagles (*Haliaeetus leucocephalus*) were delisted and officially removed from the list of Endangered and Threatened species (Federal Register: 72 FR 37345 37372). However, the USFWS list for Snohomish County (included in Appendix A) has not been updated since December 20, 2005 and still have bald eagles listed as Threatened. Two bald eagle nests are located along the waterfront in Everett more than 1.5 miles west of the ERR project area (WDFW 2007a). Since bald eagles are no longer a federally listed species they are not included in this BA. Table 1 summarizes the species that are either currently listed or proposed for listing under the ESA and may occur in the vicinity of ERR project.

Table 1. Protected Species Potentially Occurring Within the Project Vicinity and Designated Critical Habitat within the Project Vicinity

Common Name	Scientific Name	Federal Status	Critical Habitat Designated?
Bull trout	*Salvelinus confluentis*	Threatened	No
Marbled murrelet	*Brachyramphus marmoratus*	Threatened	No
Puget Sound chinook salmon	*Oncorhynchus tshawytscha*	Threatened	Yes
Puget Sound steelhead salmon	*Oncorhynchus mykiss*	Threatened	Under development
Steller sea lion	*Eumetopias jubatus*	Threatened	No

Other ESA-listed species occurring in Snohomish County which are not expected to be found in the ERR project area are listed and summarized below:

- **Canada lynx (*Lynx Canadensis*) –** There are no known Canada lynx inhabiting the ERR vicinity. The likelihood of a lynx entering the project vicinity is minimal to none.
- **Gray wolf (*Canis lupus*) –** There are no known gray wolves inhabiting the ERR vicinity. The likelihood of a gray wolf entering the project vicinity is minimal to none.
- **Grizzly bears (*Ursus arctos*) –** There are no known grizzly bears inhabiting the ERR vicinity. The likelihood of a grizzly bear entering the project vicinity is minimal to none.

- **Northern spotted owls (*Strix occidentalis caurina*) –** Northern spotted owl habitat is designated in Snohomish County. The habitat nearest to the project site is within the Cascade Mountains of Snohomish County, which is more than 15 miles away. The project vicinity is far outside of the designated habitat therefore northern spotted owls are not expected to occur in the project vicinity.
- **Southern Resident killer whale (*Orcinus orca*) –** There are no known killer whales inhabiting the ERR vicinity. The likelihood of a whale entering the project vicinity is minimal to none.
- **Humpback whale (*Megaptera novaeangliae*) –** There are no known humpback whales inhabiting the ERR vicinity. The likelihood of a whale entering the project vicinity is minimal to none.

PROJECT DESCRIPTION

OLIVERMCMILLAN ACTIONS

The initial development concept and proposed ERR project description are included in the Master Plan Development shown in Appendix B. The proposed ERR project will rehabilitate former industrial sites and includes the construction of up to 900,000 square feet of mixed commercial use; 200,000 square feet of hotel space; and up to 1,400 single-family and multi-family residential units. The project may be amended over time in response to market demand for the proposed uses so that the ultimate mix of uses constructed will be determined by market demand and the land use capacity of the site (type, location, and size of uses and structures and infrastructure capacity). For example, as the amount of retail/office use increases, the total number of residential units decreases. The types of uses in the description of "commercial" include retail, hotel/motel, restaurant, theater and office use. Shoreline and habitat restoration will also be constructed along with any required mitigation actions to offset unavoidable impacts to natural resources.

There are 67.2 acres of wetland and 19,929 linear feet of stream (Bigelow Creek and Snohomish River shoreline) within the project boundaries. The preliminary re-development design for the site has been developed to maximize use of previously developed land and minimize impact of critical areas. The project designers have tried to avoid impacts to aquatic resources as much as possible but impacts will result from creation of access roads, construction of a small boat facility for public use and relocation of the landfill leachate collection system.

The proposed project will result in a total of 1.20 acres (52,403 square feet) of wetland fill (Wetlands J, L, M, W and X) and fill of 927 linear feet of ditched drainage associated with the lower portion of Bigelow Creek to accommodate the proposed project footprint. Wetlands J and M will be impacted due to construction of a road that is required to provide adequate access to the northern portion of the development from Pacific Avenue. Impacts proposed to Wetlands L and X will be necessary for construction of shoreline access and small public boat facility. A segment of Wetland W will also be impacted in relation to construction of shoreline access and public amenities. Additional impacts to Wetland W and ditched drainage associated with the lower portion of Bigelow Creek will be required to accommodate relocation of the leachate collection system and strategic placement of engineered fill material on the Landfill Parcel to compact the soils and underlying refuse material ("surcharge"). The purpose of the surcharge is to provide a more stable base for construction of buildings, roads and infrastructure, and to increase the depth of the landfill cap. With the surcharge in place, it will be necessary to place fill material on the eastern side of the landfill site to create an appropriate grade from the higher landfill site down to the lower levels towards the river. Fill on top of the leachate collection system could damage the system, so relocation of the collection system is proposed along the eastern edge

of the surcharge fill. To relocate the leachate collection system and establish appropriate grades, it is necessary to partially fill Wetland W and ditched drainage associated Bigelow Creek.

In addition to proposed wetland and ditch/stream fill activities, buffer impacts to Wetlands D and N are anticipated to accommodate a required emergency access road along the southern edge of Wetland D and western edge of Wetland N. No other wetland or stream buffer, or wetland or stream impacts are proposed in development plans for the site at the time this report was prepared. The total buffer impact resulting from this project is 65,166 square feet (1.50 acres). A conceptual wetland and stream mitigation plan has been prepared and is presented in the Mitigation Plan section of this report.

The proposed development will be designed and constructed using sustainable building practices such as those embodied in the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED system. Sustainable practices like those included in the LEED system are intended to "transform the way buildings and communities are designed, built and operated, enabling an environmentally and socially responsible, healthy, and prosperous environment that improves the quality of life" (US Green Building Council, 2006, LEED for New Construction Version 2.2 Reference Guide). The project includes innovative stormwater design that utilizes pervious surfaces, treatment and infiltration of stormwater runoff. Stormwater impacts will be further reduced with the enhancement of critical area buffers utilizing native vegetation and establishment of rain gardens along the outer edge of the buffer.

A Consent Decree between the City of Everett and Washington Department of Ecology (Ecology) for the Tire Fire/Landfill Site includes a detailed Cleanup Action Plan (CAP) that specifies requirements for existing, undeveloped conditions and for potential future developed conditions. These requirements address all environmental exposure pathways of concern (landfill gas, groundwater, surface water and direct contact) and include both design/performance standards and review/approval procedures (City of Everett & Federal Highway Administration [FHWA] 2004). The landfill leachate collection system and project design will be rebuilt and upgraded by the City, then maintained and managed in accordance with the existing CAP.

Public amenities that are included in the proposed development are wetland and shoreline enhancements and restorations, trail extensions, multi-use public spaces for indoor and outdoor gathering, park spaces on the Tire Fire/Landfill Site and Simpson Pad, and a multi-purpose water dependent use facility to include, a boat dock (capacity estimated at 12 to 15 boats ranging in size from 12 to 45 feet) with launch access for kayaks/small boats (including crew shells). Public access improvements would include extension of the riverfront trail to the north, as well as additional trails associated with habitat enhancements/restoration. These improvements are intended to provide pedestrian and bicycle trails and access along the waterfront, and linkages to adjacent retail, commercial, wetland interpretive areas and open space.

Mitigation Actions

Mitigation efforts begin with attempting to avoid impacts if possible and defined methods and measures to reduce and minimize aquatic habitat and buffer impact as much as possible. This project has accomplished the mitigation sequencing that has resulted in a minimized impact scenario and proposed mitigation measures are reasonable and effective toward restoring already or existing damaged habitats and providing increased functions for fish and wildlife.

Mitigation for wetland, stream and buffer impacts will consist of the creation and enhancement of Category I, and III wetlands, establishment of vegetated buffer zones and restoration of stream habitat. Conceptual mitigation plans proposed include:

- Create a total of 1.38 acres (60,134 square feet) of forested and scrub/shrub wetlands to compensate for the reduction of 1.20 acres (52,403 square feet) of wetland;
- Create 970 linear feet of stream channel and enhance 1,568 linear feet of existing Bigelow Creek, to compensate for a loss of 927 linear feet of a ditched drainage.
- Enhance 2.50 acres (152,453 square feet) of Snohomish River shoreline buffer
- Enhance 20.67 acres (900,426 square feet) of wetland buffer.

A Conceptual Wetland and Stream Mitigation plan has been prepared and is located in the Mitigation Plan section of this report.

CITY OF EVERETT ACTIONS

Public Amenities, Trail System and Shoreline Restoration

City of Everett proposes construction of an approximately 3 acre waterfront park located near 36th Street to provide enhanced public access to the Snohomish River shoreline and provide a nexus where the public can access the proposed riverfront trail system. The park site was previously used as a mill and is currently cleared and undeveloped. The park program and alignment and type of trail crossings will be finalized later during the design process and may require additional environmental review. Facilities associated with this park area may include a public boat dock, restrooms, open play areas, trails, and enhanced riparian shoreline areas. The waterfront park will be designed to be consistent with the SMP.

Avoidance and minimization of wetland impacts will be a primary emphasis of the final design. Wetland K is located in an area set aside for a City park and public use purposes. Any wetland impacts will be restored or mitigated elsewhere within the property boundary in a manner consistent with the SMP. It is anticipated that for the park area that all areas of temporary wetland and buffer impacts will be restored to provide equal (for Category 1 impacts) or higher (for other wetland classes) habitat value and function. Additional environmental review to permit those amenities will be completed when design details are developed more fully over time. It is currently anticipated that additional SEPA analysis and permit applications for a portion of the work will be completed in April 2008.

Surcharging of Tire Fire/Landfill Site

In order for any redevelopment to occur on the Tire Fire/Landfill, the City of Everett must complete the final closure procedure that allows the public and others to use the landfill area. This activity must be completed regardless of the actions proposed by OliverMcMillan. The City intends to proceed with surcharge and site preparation immediately upon acceptance of the Final Environmental Impact Statement and approval by the City. This work will include upgrade and relocation of the leachate collection system, placement of surcharge and final site leveling to prepare for any future development.

Wetland and Stream Restoration

The City also proposes wetland and stream restoration on the adjacent properties. Restoration may include wetland rehabilitation and enhancement through removal of invasive species and installation of native shrub and forest species, placement of Large Woody Debris (LWD), stream channel reconfiguration, establishment of functioning buffers, and restoring River connections. Design details of the City's trail system and proposed wetland and stream restoration are not available at this time and

therefore impacts have not been identified and will not be addressed in this HMP. The City of Everett is committed to completing the public trail and wetland restoration. Additional environmental review to permit the restoration work will be completed when design details are developed more fully over time. (It is currently anticipated that additional SEPA analysis and permit applications for a portion of the work will be completed in April 2008.)

CONSTRUCTION TIMING

The ERR project is a phased project with construction spanning multiple years. The full build out is expected to take up to ten years. At this time, upland site base grading and preparation as well as the proposed kayak/small boat docks and launches, and dike and levee repairs, and upgrades are expected to occur first in the late fall and/or winter of 2008/2009, with construction of those facilities ending approximately two years after the commencement. Once the upland areas are prepared for construction and segregated, systematic, phased construction will occur for residential communities and commercial buildings.

A preliminary estimate of phased project construction includes:

Table 2. Everett Riverfront Milestone Schedule

• City reviews, revises and issues Final EIS	Feb/2008
• Landfill/Tire Fire Site, Building permits	Aug/2008
• Landfill/Tire Fire Site, Zoning Approvals Complete	May/2008
• Landfill/Tire Fire Site, Shoreline permits complete	May/2008
• Simpson Pad, Grading permit	Aug/2009
• Simpson Pad, receive building permit	Mar/2010
• Eclipse Mill/Drywall, Permit for Road	Mar/2009
• Landfill/Tire Fire Site, Grading permit	Sept/2009
• Landfill/Tire Fire Site, receive building permit	Feb/2010
• Begin roundabout and bridge to Simpson site	Mar/2008
• Begin work on landfill grading, fill and surcharge	Feb/2008
• Begin utility installation at landfill site	Mar/2009
• Begin Landfill Gas System Installation	May/2009
• Begin Building Construction on Landfill/Tire Fire Site	Mar/2009
• Begin Site Work on Landfill/Tire Fire Site	May/2009
• Occupancy on Landfill/Tire Fire Site	Sept/2010
• Begin Grading at Simpson Pad	Oct/2009
• Begin Construction at Simpson Pad	Mar/2010
• Occupancy on Simpson Pad	May/2011
• Eclipse Mill/Drywall Grading	May/2009
• Eclipse Mill/Drywall Road	Dec/2009
• Begin Construction at Eclipse Mill/Drywall	Mar/2010
• Occupancy on Eclipse Mill/Drywall	May/2011
• Construct dock below gather place	May/2010
• City Wetland Enhancement and Trail Extension	July/2010
• City Park at 36th Street	July/2010

Construction Work Windows

The approved construction work window for in-water work in Snohomish River is from **June 1st – October 31st** to avoid impacts to listed chinook salmon and listed bull trout. There is currently no approved construction work window for steelhead. However, due to the general similarities in life history to Pacific salmon, they will be placed in the same construction work window as Pacific salmon. The approved work window for bald eagle nesting is from August 16th to December 31st of any year. A complete summary of construction work windows for listed species documented for the project area are listed below in Table 3.

Table 3. Designated Work Windows for Construction

Species	Construction Work Windows
Bull trout[a]	In-water June 1 – October 31
Puget Sound chinook salmon[a]	In-water June 1 – October 31
Puget Sound steelhead[b]	In-water June 1 – October 31

Notes:
[a] All fish species work windows were documented as follows: Approved Work Windows for Fish Protection in all freshwaters excluding waters within national park boundaries, Columbia River, Snake River and lakes. (USACE 2006b).
[b] There is currently no approved construction work window for steelhead. However, due to the similarities in life history to Pacific salmon, they will be placed in the same construction work window as Pacific salmon.

CONSTRUCTION EQUIPMENT AND MATERIALS

Construction materials will be brought to the site on an as needed basis in an effort to limit unnecessary stockpiling. Staging of new materials as well as parking and project operations building will be located within designated areas outside of wetlands and wetland buffers. All construction-related waste materials will be sorted with respect to recycling categories and disposed of off-site in accordance with applicable regulations.

Anticipated construction materials to be used in building the ERR project include:

- Concrete,
- Framing, roofing and siding materials,
- Building insulation,
- Steel beams,
- Concrete and/or steel pilings,
- Riprap and Quarry spalls
- Clean fill for preload and flood proofing,
- Asphalt,
- Gravel filter and drain material, and
- Pipes, wiring and conduit for utilities and stormwater conveyance.

Anticipated construction equipment includes:

- Earth moving equipment (grade and fill),
- Heavy machinery (bulldozers, excavators, front end loaders and trenchers, etc.),
- Cranes,
- Barges,
- Pavers and rollers,
- Pile drivers (land and water based vibratory and impact hammers),
- Diesel or gas-powered generators,
- Dewatering pumps,
- Concrete trucks (concrete will be imported and pumped), and
- Lattice boom crawler crane.

CONSTRUCTION SEQUENCE

The project sequence may be amended over time in response to market demand for the proposed uses and the land use capacity of the site (type, location, and size of uses and structures and infrastructure capacity). However, the anticipated sequence of construction-related activities is to begin with residential development at the Simpson Pad followed by the Tire Fire/Landfill Site. Work at both sites is anticipated to begin along the shoreline (including any in-water work) and then progress inland or west towards Everett. In-water and out-of-water sequencing is as follows:

In-Water Work

- Mobilize to the site,
- Provide source control stabilization measures,
- Construct and maintain temporary/permanent erosion and sedimentation control facilities for water quality protection,
- Install, commence and maintain any earthfill cofferdams or diversion pipes, dewatering pumps will be installed at this time as needed,
- Cut and fill in areas where the structures, repairs and/or upgrades will be located,
- Install and/or remove pilings (impact hammer use may require wood block and bubble curtain),
- Construct or upgrade structures,
- Install new utilities (power, communications, etc.),
- Restore natural water flow of Bigelow Creek and remove cofferdams and/or diversion pipes,
- Remove temporary erosion and sediment control devices,
- Site clean-up, and
- De-mobilize from the site.

Out-Of-Water Work

- Mobilization to the site,
- Install necessary traffic controls and/or detours,
- Construct stabilized construction entrance(s),
- Install temporary/permanent erosion control measures throughout the construction zone and along staging and stockpiles areas,
- Clear and grade the minimum site area required for construction,
- Construct buildings and structures,
- Install new utilities (power, communications, etc.),
- Site clean-up, and
- De-mobilize from the site.

Project Completion

- Clean up and restore staging and stock piling areas,
- Install landscaping and vegetative enhancements along with public lighting,
- Remove necessary traffic controls and/or detours, and
- Complete all construction as-built drawings for permit compliance.

CONSERVATION MEASURES

A variety of conservation measures and BMPs will be utilized to minimize impacts to federally protected species and the surrounding habitat during the construction. They are as follows:

General Conservation Measures

The following general conservation measures will be taken to ensure that impacts to terrestrial and aquatic species and their habitat are minimized throughout the duration of the project:

- Disturbance will be limited to the smallest area feasible for each phase of the project and element under construction and will stay within the limits of clearing identified on site plans and demarcated in the field with temporary exclusion fencing,
- Regulated wetlands and shoreline buffers will be isolated in the field with temporary exclusion fencing to prevent construction crews from inadvertently disturbing these areas,
- Waste materials will be collected and sorted with respect to recycling categories and disposed of off-site and in accordance with applicable regulations,
- Entrance rumble areas will be installed to remove soil from truck traffic,
- Truck wash areas for equipment and deliveries (on and off-site) will be provided,
- Stockpile and staging locations will be identified and approved,

- Active stockpile areas will be contained within a soil berm and equipped with erosion control measures,
- Approved stormwater and sediment erosion control plans will be implemented, inspected daily and maintained properly throughout construction,
- Fueling areas will be distinctly identified and established within the construction areas. These locations will be equipped with spill prevention and control devices,
- Adequate materials and procedures will be on site to respond to unanticipated weather conditions or accidental releases of materials (sediment, concrete or fuel),
- Concrete piles for in-water construction elements will be used versus steel piles and all concrete will be fully cured prior to arrival at the site,
- Floating silt curtains may be necessary for shoreline restoration work to contain sediment released from shoreline setback activities, and
- Use of a bubble curtain and a 6-inch-thick piece of wood between the impact hammer and the pile during in-water pile driving activities will be in place to attenuate underwater sound pressures.

Spill Prevention

A Spill Prevention, Control and Countermeasures (SPCC) plan will be available for this project. No pollutants are expected to be discharged during construction. However, any potential spills will be handled and disposed of in a manner that does not contaminate the surrounding area. The SPCC will include the following elements:

- Site and project-specific information,
- Specific operating and construction procedures for work on and above the landfill site,
- Spill prevention, control and containment methods,
- Response protocols and reporting procedures for construction-related leaks or spills,
- Contingency plan and provisions,
- Waste disposal methods and locations, and
- Proper management of oil, gasoline and solvents used in the operation and maintenance of construction equipment.

The SPCC will ensure that equipment will be free of external petroleum-based products prior to entering the work area, during the work and for making any necessary repairs prior to returning the equipment to operation in the work area. This SPCC will be consistent with the City's Comprehensive Emergency Plan and the State of Washington Oil Spill Contingency Plan.

OPERATIONS AND MAINTENANCE

Following the completion of the construction phase of this project, monitoring and maintenance associated with mitigation and replanting of the ERR project area will occur. Road maintenance may be needed at some time in the future. Periodic cleaning and other routine maintenance operations of the stormwater system and facilities are also anticipated.

ACTION AREA

The action area includes the geographic extent of physical, biological and chemical impacts of a project and is defined as the maximum area of potential impacts associated with the project's direct and indirect effects as well as effects from interrelated and interdependent activities, taking into consideration the impact minimization measures that will be implemented.

The action area for the project was determined based on the project features and activities described above. Most of the project impacts are expected to occur in the immediate vicinity of the construction "footprint" -- i.e., the actual area of ground disturbance associated with materials stockpiling, site preparation, grading and filling, wetland and stream fill, building construction and surface paving -- as well as areas beyond the footprint that are directly or indirectly affected during construction. The ERR project includes water dependent uses, such as kayak/small boat dock and launch, that would increase human disturbance and pose potential water quality related issues within the Snohomish River. The project would also facilitate an increase in traffic and economic development within the project vicinity. These interrelated or interdependent activities would have physical, biological or chemical impacts that could influence the extent of the action area.

The footprint of the development has been described above and is shown in the design drawings presented in Appendix B. Of the construction activities described above, the associated impacts that typically carry beyond the footprint are noise, water quality, air quality (smoke and dust), and quantity and human disturbance. Each zone of impact is addressed below. These elements are briefly discussed below in order to help define the Action Area for this evaluation.

NOISE

In-Water

Construction related pile driving activities associated with the construction of kayak/small boat docks and launches would temporarily increase in-water noise levels. The level of underwater noise generated from pile driving varies with different types and diameters of piles, type of hammers, and by different types of substrates. Each configuration can produce different sound levels and waveform characteristics. The proposed project is currently designed so that concrete piles will be used due to their inert non-corrosive qualities. Standard concrete piles vary in diameter (12-inch up to a 24-inch square or octagonal) depending on the project requirements and can be installed by either driving them into the ground or drilling a shaft and filling it with concrete. Since specific design elements have not been finalized a used worst-case scenario (24 inch diameter concrete piles installed with an impact hammer) has been used to evaluate project impacts and determine the action area.

The water surface elevation of the Snohomish River within the project area is controlled by tides and raises and lowers with the flow and ebb of the tides. However, salt-sensitive plant species characterize the area adjacent to ordinary high water mark (OHWM), indicating that salt concentrations in this portion of the river are low. The areas below OHWM are mostly void of vegetation and consist of sandy silts (mud). The mean high higher water (MHHW) for this area is 11.1 feet with mean range of 7.5 feet and mean tide of 6.5 feet, according to the USACE tidal datum. These on-site tide shifts significantly reduce the depth of water immediately along the shoreline and allows for a reduction in the number of piles that will be installed within the river margins by timing construction during low tides. Another undecided design element is the use of cofferdams and floating silt fences which would isolate the areas where piles are to be installed. Current and other variables must be more fully evaluated to discern the effectiveness of these features. Shallower water (e.g., water less than 3 feet deep) does not propagate sound energy

effectively (Urick 1983 in WSDOT 2006) therefore; project impacts to be analyzed from pile driving may be less than described in this analysis of worst-case scenario.

Standard noise reduction and minimization strategies will be used to attenuate underwater sound pressures during in-water pile driving activities such as working within the fish work windows and the use of a bubble-curtain and a 6-inch-thick piece of wood if impact hammers are utilized. No baseline underwater ambient noise information was found specific to the project area. Feist et al. (1992) measured ambient levels at Everett Home Port approximately fifteen years ago to be between 80 and 90 dB, however did not specify if these were peak or rms values which would be used in calculations for underwater noise attenuation. Since more recent studies measured ambient underwater noise levels in the Puget Sound and Duwamish River to be 130 dB_{peak}, (WSDOT 2006) 90 dB_{peak} or 90 dB_{rms} is a conservative estimate that can be used in our worst-case scenario analysis. Underwater noise levels 10 meters (33 feet) from pile driving activities associated with 24 inch diameter concrete piles is expected to be 188 dB_{peak} or 173 dB_{rms} with a 15 dB reduction in peak and rms values with use of a bubble curtain (WSDOT 2006). Using the Nedwell model in a freshwater system under worst-case scenarios underwater noise associated with pile driving activities would dissipate at 1,186 meters or 0.73 miles. The Practical Spreading Loss model (in use by the National Marine Fisheries Service [NMFS] and USFWS) would generate distances much further. However, sound pressure travels in a linear direction away from the source; when the sound intersects land, it is assumed that it attenuates to background levels; it should not travel through the land or reflect off the land or through the bends in the Snohomish River. Consequently, the action area determined for underwater noise impacts for this project as the in-water area within straight-line distance from the project area, approximately 0.5 miles south of the Simpson Pad and 0.5 miles north of the Newland site as shown in Figure 3 – Action Area Map.

Terrestrial (airborne emissions)

A potential impact associated with this project was identified from airborne noise disturbance through use of construction equipment and heavy trucks. Ambient background noise in an urban area adjacent to freeway traffic (Interstate 5 for the ERR project) is expected to be 88 dBA (Cavanaugh and Tocci 1998 in WSDOT 2006). The construction equipment (listed above) was reviewed for purposes of establishing the action area for the project. The WSDOT (WSDOT 2006) rules for decibel addition for common construction equipment noise were used to determine at what distance noise impacts from the project area would attenuate to background (ambient) noise levels (88 dBA).

The impact area was determined by assuming a worst-case scenario that general construction equipment was representative of point source noise with a maximum noise level of 100 dBA while any vehicular (truck) noise disruptions associated with the construction activity would be represented of line-source noise at a maximum noise level of 96 dBA. Noise studies take into account the existing conditions at a site based on vegetated or developed state. Soft-site conditions are described by heavily vegetated conditions and hard site conditions are described as lacking vegetation, paved and fully developed. If the topography surrounding the project area is considered soft-site conditions (heavily vegetated), construction noise levels (point source) would attenuate at a rate of 7.5 dBA per doubling of distance while the traffic noise levels (line source) would attenuate at a rate of 4.5 dBA. This would result in background noise levels being reached within 200 feet of the project. If the topography surrounding the project area is considered hard-site conditions (developed, void of vegetation), construction noise levels (point source) would attenuate at a rate of 6 dBA per doubling of distance while the traffic noise levels (line source) would attenuate at a rate of 3 dBA. This would result in background noise levels being reached within 400 feet of the project.

Noise impacts will vary across the site. While the riparian corridor along the Snohomish River, on-site wetlands (especially the Simpson Category 1 Wetlands and Riparian Corridor) and some of the area east of the Snohomish River would be considered soft site conditions much of the remaining project area and surrounding area lacks trees and would be considered hard site conditions. Assuming hard-site conditions as a worst-case scenario, any general construction ambient noise created by the project is expected to be attenuated to background (ambient) levels within 400 feet of the project. Consequently, the action area for general construction ambient noise impacts for this project is the area within a 400-foot or 0.08 mile radius from the project area as shown in Figure 3.

This project may require some pile driving to install or proof piles for building foundations. Occasional pile driving activities will produce sound in the range of 81 to 115 dBA (using 115 dBA as worst case scenario). If the topography surrounding the subject site is considered soft-site conditions, construction noise levels (point source) would attenuate at a rate of 7.5 dBA per doubling of distance. This would result in background noise levels being reached within 800 feet of the project. If the topography surrounding the subject site is considered hard-site conditions, construction noise levels (point source) would attenuate at a rate of 6 dBA per doubling of distance. Assuming hard-site conditions as a worst-case scenario, any maximum construction ambient noise created by the project is expected to be attenuated to background (ambient) levels within 1,600 feet of the project. Consequently, the action area for maximum construction ambient noise impacts for this project is the area within a 1,600-foot or 0.30 mile radius from the project area as shown in Figure 3.

In summary, most of the temporary terrestrial noise impacts would come from general construction noise that would extend up to 400 feet or 0.08 mile radius from the work areas. However, during the use of impact hammers for pile driving the maximum construction noise impact would be higher than background levels up to 1,600 feet or 0.30 mile radius of the project. Operational noise would be significantly less than construction noise.

WATER QUALITY AND QUANTITY

Activities associated with project construction, operation and maintenance has the potential to alter water quantity (base flow, peak flow and duration) and the quality of water through potential increase in the release of containments and sediment loads. For example: the increase in new impervious surface (e.g., rooftops, roads and parking lots) could generate runoff during rainfall events that would otherwise infiltrate into the ground which in turn could affect water quality, activities associated with in-water recreation (boat launch and moorage and boat traffic) could increase pollutants, temporary diversion of water and in-water construction could increase sediment loads and increase in human and vehicle traffic volumes could increase pollutant loads. Conservation measures to minimize impacts, including stormwater and drainage system designed with innovative BMPs and vegetation enhancement and site-specific conditions, will be maximized to the extent possible. All environmental exposure pathways of concern (landfill gas, groundwater, surface water and direct contact) will be included both in design/performance standards and review/approval procedures according to the Consent Decree and CAP for the Tire Fire/Landfill Site that specifies requirements for potential future developed conditions.

The greatest water quality impact is expected from a temporary increase in fine sediments that would be suspended during in-water construction and restoration/enhancement activities. In 2001 NMFS issued a Biological Opinion (NMFS Tracking No. 2001/00533) in response to the 41st Street Overcrossing Freight Mobility Project and Railroad Track Removal and Upgrade Project which was located within and adjacent to the ERR project area and addressed a conceptual development plan of the ERR project area as part of a cumulative effects analysis. In 2004 NMFS reinitiated the BO (NMFS Tracking No. 2003/00337). In the 2004 BO, NMFS defined the action area for water quality impacts to include the

mainstem Snohomish River downstream from the southeastern boundary of the project at River Mile (RM) 7.0 to the confluence with the Snohomish estuary. Additionally, to accommodate the conservative estimate of RM 8.0 as the maximum upstream extent before tides reverse and carry the water back downstream, the action area was expanded to include the mainstem Snohomish River channel from bank to bank up to RM 8.0. The same action area for water quality impacts for this project is the same as that determined by NMFS for the 41st Street Overcrossing Freight Mobility Project and Railroad Track Removal and Upgrade Project (Figure 3).

HUMAN DISTURBANCE

Increased human activity and traffic would increase within the project area as a result of the proposed project. Projected increases in the economy could increase the need for more public services, public transportation, stores, restaurants, recreational facilities and residential and commercial development outside of that proposed within the project area. Higher levels of human activity during construction and operational activities will increase noise, waste generation (garbage), use of herbicides and chemicals, mowing, tree trimming, and use of winter road treatments such as salting and sanding. Increased emissions (smoke, light, dust, automobile emissions) may result from the project. Construction could generate dust and other emissions. These emissions could be carried beyond the project area during construction in the summer when earth has been exposed, the atmosphere is dry and winds are sufficient to mobilize surface particles if conservation measures are not adhered to effectively. With proper construction practices and management, these impacts should remain largely contained to the immediate project area. Wind and climate will influence emissions. For this reason, airborne emissions have the same action area as noise.

The action area determined for noise and water quality and quantity is inclusive to that of the greatest extent of human disturbance that can be readily quantified. Impacts associated with cumulative economic development are somewhat harder to predict, quantify and locate. Since the Snohomish River borders the east side of the project and the northern and western sides are extensively developed the most likely area for increased human disturbance from economic growth is south of the project area. At this time the action area will not include cumulative economic increase because there are currently no plans to develop this area that is contingent on the ERR project. Cumulative economic impacts will be discussed in the impact analysis of this document.

WETLANDS AND STREAMS

Physical impacts to wetlands and stream will result from the project. Wetland impacts have been minimized to a proposed wetland fill of 1.20 acres (52,403 square feet) as a result of the preferred alternative. In addition, the proposed project would result in fill of 927 linear feet of a ditched drainage that currently is associated with the lower portion of Bigelow Creek. Direct impacts will be mitigated by creation and rehabilitation of onsite wetlands and streams. Indirect impacts to adjacent wetlands and streams from increased stormwater will be reduced by removing invasive species and creating native vegetation buffers.

SUMMARY

The impacts with the largest associated area for this project are ambient terrestrial noise disturbance, water quality and quantity and human disturbance. Consequently, an action area of 0.5 miles surrounding the site and the Snohomish River downstream to the estuary has been defined as the Action Area for this project and is depicted in Figure 3.

BASELINE ENVIRONMENTAL CONDITIONS

As previously discussed, the intention of this project is redevelopment of the project area to include commercial and residential uses. The term redevelopment inherently implies the natural landscape of the site has been previously manipulated, developed and utilized for commercial, industrial or residential purposes. For well over 100 years, the project area has sustained intensive heavy and light industrial uses. Previous consultants, as well as GeoEngineers, have conducted site investigations to observe, document and determine the extent of remaining on-site fish and wildlife habitat conservation areas, specifically streams and wetlands. Aquatic, terrestrial and wetland resources discussed in the following sections describe on-site ecological features, which are the focal point of this BA/HMP. Site photographs are presented in Appendix C and document existing conditions of aquatic, terrestrial and wetland features within the project area.

Research associated with this report included a detailed review of available historical aerial photography of the project area to document landscape alterations and their respective occurrences (GeoEngineers 2007b). Aerial photography, dating back to 1947, confirms intensive industrial use within the project area and associated anthropogenic alteration of the surrounding landscape. The photography indicates and reveals the extent of historical land use within the project area dates as far back as 1947. A majority of the current wetland and stream boundaries are either; resultant of excavation activities associated with the installation of railroad grades, or became established after industrial structures were removed from the site. Bigelow Creek was altered prior to 1947 and the natural stream course prior to the development of the site remains undetermined. A stream channel is evident in photography from 1947 to 1985 that depicts the stream passing through or adjacent to the West Wetland Complex and through the North Wetland Complex before discharging into the Snohomish River. Sometime between 1985 and 1993 human disturbance, grading and filling activities, associated with the removal of a railroad crossover line, altered and redirected the flow of Bigelow Creek so that the railroad track facilitated an additional confluence with the Snohomish River through an existing culvert immediately north of North Wetland Complex.

Local regulatory jurisdiction and buffer width determination is guided by conditions of two legal settlements against the City of Everett Shoreline Master Plan, a 2003 settlement agreement between the City of Everett and the Tulalip Tribes of Washington (informally referred to as the Tulalip Agreement), and a 2004 settlement agreement between the City of Everett and the Pilchuck Audubon Society and the Public Employees for Environmental Responsibility (informally referred to as the Pilchuck Agreement) (EIS Appendix 3.3C). As part of the settlements the City of Everett would continue use of the old "Environmentally Sensitive Areas Ordinance" (which pre-dated the current Title 19 Critical Areas Ordinance) for all areas within shoreline jurisdiction. That action has been codified and is included in Title 19, Chapter 33D Shoreline Overlay District (Everett Municipal Code19.33D). The areas within the project area that are regulated under EMC 19.33D are included in the Shoreline and Shorelands Jurisdiction Map – Figure 4. All onsite wetlands and streams are within shoreline jurisdiction and therefore regulated pursuant to EMC 19.33D.

AQUATIC HABITAT

Snohomish Estuary

The portion of the river near the subject site is described in the SMP and is included in Ecological Management Unit (EMU) 1. As described in the City of Everett's Snohomish Estuary Wetland Integration Plan (1997), EMU 1 generally includes freshwater wetlands in the southern portion of the Snohomish watershed. The majority of the wetlands within this unit are diked and in agricultural

production. River and slough banks are typically steep, consisting of sands with rock riprap and occasional pilings. A narrow shoreline of sandy silts (mud) is present throughout. Prior to diking, the area was a mosaic of tidal marshes, forested wetlands, sloughs and mudflats that were flooded daily. Agriculture has been the primary land use in the unit. However, much of the lower estuary and watershed has been developed for industrial and commercial uses (Port of Everett and Everett).

The Snohomish Estuary includes parts of Possession Sound, Port Gardiner Bay and the mouth of the Snohomish River; and is a major source of fresh water for the Puget Sound (Gustafson et al. 2000). This estuary is productive, supporting many species of estuarine and near-shore marine plant and animal species. The estuary provides essential ecological functions for anadromous salmonids, including feeding (rearing), migration, predator avoidance, and saltwater/freshwater or more regulatory adaptation (City of Everett and Pentec Environmental 2001).

Snohomish River

The mainstem Snohomish River is below the confluence of the Snoqualmie and Skykomish Rivers, and enters Puget Sound near the City of Everett at Port Gardiner Bay. The project area is bordered on the east by the Snohomish River from north of RM 5 (approximately RM 5.5) to RM 7 (Figure 5, 5a and 5b – Stream Delineation and Buffer Maps). Uses along the river within the project area include heavy equipment storage, aggregate storage, solid waste landfills, railroads and Rotary Park with pedestrian paths at the south end of the site. The river currently consists of steeply diked banks with areas of riprap protection and occasional pilings. These extensive man-made earthen dikes have been in place since the mid-1930s and confine the limits and influence of the river (Haring 2002). The water surface elevation of the Snohomish River within the project area is controlled by tides and raises and lowers with the flow and ebb of the tides. However, due to a weak salt wedge influence, there are no salt-tolerant plant species in the area immediately adjacent to the river. The riparian vegetation consists primarily of Himalayan blackberry (*Rubus armeniacus*), Sitka willow (*Salix sitchensis*), Pacific willow (*Salix lasiandra*), salmonberry (*Rubus spectabilis*), red alder (*Alnus rubra*), cottonwood (*Populus trichocarpa*) and big-leaf maple (*Acer macrophyllum*) and few coniferous trees.

Lack of riparian vegetation and species diversity, in conjunction with extensive diking, results in limited recruitment of LWD that is large enough to function as cover or influence channel morphology (Haring 2002). In addition to production losses experienced to date, future production potential for salmonids (parr and pre-smolt) in the river could decrease if existing LWD continues to decay and is not replenished through new recruitment (Haas and Collins 2001).

Bigelow Creek

Bigelow Creek is located on the project area and enters the west bank of the Snohomish River at RM 5.8 north of Simpson Pad. The creek flows through the partially filled Simpson Category 1 Wetlands and Riparian corridor prior to entering the Snohomish River (Figure 5, 5a and 5b). Extensive fill was placed in historic wetlands, and the creek was ditched, channelized and piped through the mill site and along the railroad (Haring 2002). Some of the channel characteristics have been restored where the creek flows along the railroad tracks, including open wetlands in the denser vegetated areas (Haring 2002). A tide gate through the dike at the mouth of Bigelow Creek previously impaired access into the creek, but has been removed (Haring 2002). Since the removal of the tide gate, the creek experiences tidal influence from the Snohomish River. The existing wetland and stream habitat and buffers of Bigelow Creek and the West Ditch have been impacted by the construction and maintenance of the adjacent rail-lines for decades. The channels have been constructed as linear, low gradient drainages (ditches) with little to no

channel complexity, receive untreated runoff, and exhibit no riparian conditions. Natural LWD is lacking and pool or riffle segments are absent. Invasive hydrophytic vegetation dominates this area.

Haring (2002) rates the overall riparian condition of Bigelow Creek as poor to fair in the anadromous zone of the watershed, but recognizes the potential to improve as riparian vegetation matures. Juvenile salmonid use has been documented by the Tulalip Tribes (Loch 1999), and is also documented in Haring (2002). The creek has a large and extensive network of beaver (*Castor canadensis*) dams which has influenced adjacent wetland by contributing hydrology. This increase in wetland complexity and hydrology is used in turn by other animal species.

Bigelow Creek Water Quality

Much of the Bigelow Creek watershed is fully developed. Urban runoff constitutes much of the flow in the system. Water quality, as well as sediments is impaired in Bigelow Creek which includes the project area. According to information obtained from the Environmental Health Technical Data Summary Report, dated February 8, 2007, prepared by GeoEngineers (2007c), Bigelow Creek sediment may contain total petroleum hydrocarbons, benzene, toluene, ethylbenzene, and xylenes, metals and polychlorinated biphenyls (Floyd and Snider 1999). Residual contamination and/or materials and conditions not encountered during earlier investigations may be present and encountered during future site development. If contaminants are discovered during the redevelopment process, appropriate precautions will be taken to ensure the health and safety and to prevent additional contamination. More specifically, restrictions on stream alterations are contained in the Ecology Final Consent Decree and CAP dated April 2, 2001 for the site.

Additional Streams

Additional stream features identified on-site, by ESA Adolfson (2007), include; Streams AA, BB, and CC, and West Ditch Drainage. Figures 5, 5a and 5b, depict the location of these drainages and their relative buffers within the project area. Classification, rating and required buffer widths of each of these features is described in the GeoEngineers (2007d) report entitled *"Wetland and Stream Compilation and Review, Everett Riverfront Redevelopment"*.

Wetland Habitat

There are approximately 67 acres of wetlands surrounding the project area. Most of the wetlands are concentrated on the southern portion of the site, which comprises various portions of the Simpson Site. It has been estimated that approximately 25 acres of wetlands have been filled on-site over the last 25 years (GeoEngineers 2007a). Approximately 10 acres of wetlands were filled in connection with the railroad track construction on the western portion of the site, and approximately 15 acres of wetlands located on the southern portion of the site were also filled.

Wetland features within the project vicinity and their respective associated community types (Cowardin classification) are identified by the USFWS (National Wetland Inventory maps) and the WDFW (PHS data). Wetland community types within the project area are; palustrine emergent (PEM), palustrine scrub/shrub (PSS), palustrine forest (PFO) and riverine tidal. The location of wetland community types within the project area and adjacent parcels are shown in Figure 6 – Habitat Types and Plant Communities Map.

Wetlands within the project area have been delineated and described several times over the past 10 years. Pentec Environmental, Inc. (1994), City of Everett and Pentec Environmental (2001), Associated Earth Sciences, Inc. (2003), and The Watershed Company (2005 and 2006) all present detail investigations of

the wetlands involved with this Project,. The most recent wetland delineation and classification was performed by ESA Adolfson, who was retained by the City of Everett in 2007 as part of this impact evaluation. Wetland rating forms have been prepared and were provided for reference, but the final report to the City will not be completed before the publication of the EIS (GeoEngineers 2007d).

Aforementioned reports prepared for the project area provide extensive discussion and description of the wetland features within the project area. Although the advantages of having multiple site investigations and reports, encompassing nearly 15 years, are numerous, labeling of on-site features has remained inconsistent. All wetland features within the project area and their respective boundaries have been determined by previous consultants. For the purposes of this BA/HMP, information relative to each wetland area as detailed in the GeoEngineers (2007d) report entitled *"Wetland and Stream Compilation and Review, Everett Riverfront Redevelopment"* has been reviewed.

A compilation of delineations conducted during 2006 to 2007, is presented with this report (Figure 7, 7a and 7b – Wetland Delineation and Buffer Maps) and stands as the most recent comprehensive delineation of onsite wetland features. These figures also show the required buffer widths per applicable City code for each wetland feature within the project area.

TERRESTRIAL HABITAT

Although terrestrial habitat is not regulated as strictly as aquatic or wetland habitat, it is considered to be an important component of the natural environment. A 2002 aerial photograph was used to identify land cover and wildlife habitat types within the project vicinity (see Figure 6). The following four land cover types depict the amount of upland vegetation (or lack thereof) within the project vicinity:

- **Forested upland** – Areas containing trees, conifer stands and mixed stands of conifers and hardwoods.
- **Agricultural/cleared/herbaceous** – Areas containing shrubs, grasses, or herbaceous vegetation or all three. This also includes areas of agriculture and areas that have been cleared or deforested.
- **Urban** – Developed areas with little to no natural vegetation or that have been extensively developed with buildings, roads or houses.
- **Wetlands (fringed upland habitat associated with the wetlands)** – Most wetlands have been regulated such that a protective buffer is established around the perimeter and usually contains upland habitat. Because the wetlands are classified by USFWS using the Cowardin system and characterized by vegetation life forms, this information can be used to extrapolate information concerning the upland buffer areas.

Existing Buffer Conditions

An evaluation of existing habitat within shoreline and wetland buffers on-site was conducted. In general, historical and on-going commercial and industrial activities have resulted in extensive degradation of habitat within the buffer of aquatic and wetland features on-site and upland habitat adjacent to these features is of extremely low value.

Shoreline

Habitat along the shoreline of the Snohomish River from the northern edge of Wetland C to the most northern extent of the Stuchell/Newland Site has been altered and width of vegetated buffer varies. Disturbance of natural shoreline habitat has provided opportunity for nonnative invasive species to

become established and currently dominates the area. A list of vegetative species present within the shoreline buffer in this area and each species respective noxious weed status is provided in Table 4 (Washington State Noxious Weed Control Board 2007).

Table 4. Shoreline Vegetation – Species List and Noxious Weed Status

Species	Noxious Weed Status[1]
Birdsfoot trefoil (*Lotus corniculatus*)	NA
Canada Thistle (*Cirsium arvense* L.)	Class C[2]
Common tansy (*Tanacetum vulgare)*	Class C
Himalayan blackberry (*Rubus ameniacus*)	NA
Japanese Knotweed (*Polygonum cuspidatum*)	Class B[3]
Purple Loosestrife (*Lythrum salicaria*	Class B
Red alder (*Alnus Rubra*)	NA
Scot's broom (*Cytisus scoparius*)	Class B

Notes:
[1] Washington State Noxious Weed Control Board
[2] Class C noxious weeds are either already widespread in Washington or are of special interest to the agricultural industry. (WSNCB 2007)
[3] Class B noxious weeds are non-native species whose distribution is limited to portions of Washington State.

Presently, buffer habitat associated with the Snohomish River shoreline along the Stuchell/Newland and Eclipse Mill sites range from 0 to 50 feet in width. Variations in buffer width correlate to landscape alterations such as, commercial and industrial structures and on-going activities (e.g. stockpiles of soil, concrete and various construction related debris). The existing buffer is this area has been heavily encroached by invasive species and has limited functions. Approximately 200 feet of shoreline, immediately north of the edge of Wetland C, is stabilized by riprap and is void of vegetation. The former Milwaukee Road railroad tracks are directly adjacent to the shoreline in this area and no upland habitat is currently present. The historical and current uses have centered on the timber and water trade routes and have resulted in the past development in close proximity to the River. The existing location of these uses poses a limit to the available buffer recovery that may be achieved in the northern zone of the Project. For these reasons, the shoreline buffer along the Landfill and northern portion of the Project is proposed to be an enhanced 50 buffer to recover some buffer function, maintain shoreline access, and promote the historical maritime setting of the site.

Wetlands C, D, T, U, V and W

In general, the buffer habitat within Wetland C, D, T, U, V and W is low value due to disturbance associated with railroad activities along the western edge of Wetlands C and D and on both the east and west margins of Wetlands T, U, V and W. Wetland buffers in the vicinity of these features, overlap to the extent that the buffer extending from the west bank of Wetlands T and V (Bigelow Creek stream channel) establishes the western edge of the cumulative buffers. Buffer habitat is limited to; up to 15 feet of vegetated upland from the western edge of Wetland C and D to the former Milwaukee Road railroad tracks, slight areas associated with the steep banks of Bigelow Creek and Wetlands U and W (West Ditch Drainage), and the eastern boundary of the Tire Fire/Landfill Site. The Tire Fire/Landfill Site can be characterized as monotypic, early-successional native plant communities that co-dominate with non-native, invasive plant communities because of the amount of disturbance (Watershed Company 2005). Many species identified in Table 3 are established within the buffers of Wetland C, D, and wetlands associated with both the West Ditch Drainage and Bigelow Creek.

Simpson Development Pad

The Simpson Development Pad is bound by Wetland C to the north, Wetland D to the west and south and Wetlands E through I to the east. Each wetland's respective buffer encroaches onto the development pad. Buffer vegetation adjacent to Simpson Development Pad may be characterized as scrub/shrub or forested. However, because of the extensive amount of historical wetland fill projects completed before regulations were in place, upland buffer quality within the project area should not be considered pristine nor is it considered high quality habitat.

Four locations around the perimeter of the development pad were selected where distance measurements, general observations, and plant species presence was documented along a transect. Transects were located at the northwest corner (T1), northeast corner (T2), southeast corner (T3) and along the western edge of the development pad. Figures 8, 8a – 8d illustrate the location of each transect and Table 5 presents data collected along each transect.

Table 5. Simpson Development Pad Transect Data

Transect	Adjacent Wetland	Buffer Width	Transect length (feet)	Undisturbed Zone width (feet)	Disturbed Zone (feet)	Trail Width (feet)
T1	C	75	79	25	54	12
T1	I	50	91	14	77	7
T2	F	50	73	13	60	11
T3	D	50	47	10	37	8

Table 6 presents vegetation observed within buffers adjacent to the development pad.

Table 6. Simpson Development Pad Existing Vegetation

Black Cottonwood (*Populus balsamifera spp. trichocarpa*)	Observed and Abundant	Only Saplings Observed
Black Hawthorn (*Crataegus douglasii*)	Observed	
Common Plantain (*Plantago major*)		Observed and Abundant
Common Tansy (*Tanacetum vulgare*)		Observed and abundant
Himalayan Blackberry (*Rubus ameniacus*)	Observed	Observed and Abundant
Indian Plum (*Oemleria cerasiformis*)	Observed	
Pacific Willow (*Salix lasiandra*)	Observed	
Red Alder (*Alnus rubra*)	Observed and abundant	
Red-osier Dogwood (*Cornus stolonifera*)	observed	
Scot's Broom (*Cytisus scoparius*)		Observed and Abundant
Scouler's Willow (*Salix scouleriana*)	Observed	
Sitka Willow (*Salix sitchensis*)	Observed	
Sword Fern (*Polystichum munitum*)	Observed	
Trailing Blackberry (*Rubus laciniatus*)	Observed	observed
Fescue (*Festuca sp.*)		Observed
Velvet Grass (*Holcus sp.*)		Observed

Wildlife Corridors

Physical removal of vegetation and subsequent habitat loss, resulting from human development activities within the vicinity of the project has been extensive and of long duration. The construction of levees and

dikes separated the Snohomish River from the historical floodplain and onsite wetlands. In addition, residential development, buildings, railroads, local streets, stormwater facilities, outfalls, and highways have fragmented formerly continuous forests, thus eliminating and/or restricting habitat use to animals. There is no sizable amount of intact habitat remaining in the vicinity of the project site compared to historical standards (Haring 2002).

The existing remains of wildlife habitats, as well as potential barriers to movement within the project vicinity, have been identified. Habitat (by type) and potential corridors are limited within the vicinity of the project site are presented in Figure 9 – Wildlife Corridor and Species Use Map. Figure 9, illustrates that the project area is essentially isolated from other habitats by I-5, the existing railroad tracks, the parking lot northwest of Rotary Park, and Lenora Street and Lowell Snohomish River Road.

SPECIES AND HABITAT INFORMATION

The status, habitat requirements and life histories of the listed species previously summarized in Table 1 are described in detail in Appendix D of this report. Species utilization and potential for occurrence in the action area are discussed below.

SPECIES UTILIZATION

Information on ESA species presence in the ERR project area was reviewed from the USFWS (website at http://www.usfws.gov), NOAA Fisheries (website at http://www.nwr.noaa.gov), Washington DNR Natural Heritage Program (website at http://www.dnr.wa.gov/nhp/contact/selfservicesys.html) and WDFW PHS database (January 05, 2007). Note that USFWS identifies species potentially present anywhere in Snohomish County and defers to the WDFW PHS database for site-specific information. OliverMcMillan has prepared this BA/HMP to specifically avoid or minimize adverse impacts to habitats of primary association of federally listed fish and wildlife species as a result of the proposed ERR project. The information contained in this report encompasses local critical area requirements for the assessment of aquatic and terrestrial species and habitat.

Occurrence of ESA Listed Species

Bull Trout

The proposed project is located in designated coastal Puget Sound critical habitat for bull trout. Bull trout can potentially swim into the project area both as juveniles and as adults during certain times of the year. There are no documented occurrences of bull trout/dolly varden in Bigelow Creek but occurrences have been documented in the Snohomish River (WDFW 2007a). The extent of known bull trout/dolly varden spawning areas in the Snohomish River is very limited. However, these species require very specialized water temperatures (cold), stream attributes and other habitat conditions within clear, cold running streams for spawning and early rearing. These special requirements for spawning do not exist in the project action area within the Snohomish River or in Bigelow Creek due to its disturbed nature, the primarily silty mud substrate and numerous beaver dams which stagnant the creek. Juvenile bull trout in the Snohomish River system migrate downstream to Puget Sound each spring where they spend the summer feeding in the estuarine system near the confluence. It is believed that sub-adults return to the lower Snohomish River each fall to overwinter. Adults migrate upstream to spawning habitat in the upper Skykomish River and tributaries beginning in early summer and continuing through early fall. Terrestrial organisms of riparian origin, aquatic macroinvertebrates and fish species for bull trout foraging are located in the immediate vicinity of the project and within the action area. Bull trout could forage in the general vicinity of the project and would be expected to be found along the project area shoreline of Snohomish River and in the lower confluence of Bigelow Creek.

Marbled Murrelets

Marbled murrelet nests are associated with old growth forests; there are no old growth forests in the vicinity of the project area. The nesting habitat nearest to the project site is located within the Cascade Mountains in East Snohomish County more than 15 miles away. While no marbled murrelets have been identified in the vicinity of the project and PHS data does not indicate records of marbled murrelets in the project vicinity, marbled murrelets have been documented as using Port Gardner Bay and Possession Sound for foraging (City of Everett 1997). The project vicinity is located inland from any marine foraging habitat and far away from nesting habitat however; marbled murrelets may migrate along the Snohomish River from foraging to nesting habitat.

Puget Sound Chinook

Chinook have been documented within the freshwater and estuarine waters of the action area including Bigelow Creek. The project area includes critical habitat for Puget Sound chinook along the Snohomish River. Special habitat protection consideration is warranted in these areas to ensure that necessary habitat conditions are maintained. A description of the potential impacts on these critical habitats is addressed in the Essential Fish Habitat (EFH) Assessment section of this report.

PHS data documents the presence of chinook within Bigelow Creek and City of Everett & FHWA 2004 cited personal communications which documented chinook presence in an on-site off channel portion of Bigelow Creek. A single chinook salmon, a 45-millimeter juvenile, was found within a ditched outlet from on-site wetlands to the Snohomish River. While Bigelow Creek (at least the lower confluence) is accessible to adult salmon, there are no observations of adult chinook in the creek and it is doubtful that the Bigelow Creek system would be valuable spawning habitat because the substrate is primarily silty mud and degraded habitat resulting from the lack of riparian vegetation and artificial banks. Bigelow Creek provides some limited rearing/foraging habitat for juvenile chinook and other salmonids.

Chinook use of the Snohomish River near the project area is limited mainly to upstream and downstream migration and some year-round rearing activity, but most rearing is expected to occur between February and July in the project area (Williams *et al*. 1975). Chinook adults pass through the area each year on their way upstream to spawn. Peak migration periods are from May through October. Spawning habitat for the summer/fall run of chinook starts near the City of Snohomish and continues upstream, thus approximately 6 miles upstream of the action area. Spawning occurs from August through November, with peak activity in September and October. Terrestrial organisms of riparian origin and aquatic macroinvertebrates and fish species for chinook foraging are located in the immediate vicinity of the project. Chinook could forage in the general vicinity of the project and would be expected to be found along the project area shoreline of Snohomish River.

Puget Sound Steelhead

Steelhead have been documented within the freshwater and estuarine waters of the action area including Bigelow Creek. While PHS data from WDFW does not list steelhead in Bigelow Creek, one 17.78-centimeter juvenile steelhead was documented by an aquatic ecologist with the Tulalip Tribes during a field investigation of fish usage in Bigelow Creek (Loch 1999). PHS data does indicate that both summer- and winter-run steelhead have been identified within the Snohomish River. In 2002, SaSSI characterized three distinct stocks of winter steelhead (Snohomish/Skykomish, Pilchuck, and Snoqualmie) and three distinct stocks of summer steelhead (North Fork Skykomish, South Fork Skykomish and Tolt) that inhabit or migrate through the action area. Steelhead use of the Snohomish River near the project area includes upstream and downstream migration and year-round rearing activity but does not include spawning. Steelhead pass through the area on their way upstream to spawn, spawning migrations occur throughout the year, with seasonal peaks of activity. Peak spawning periods for winter stocks are from March through June and February through April for summer stocks. The

spawning season for one summer stock is unknown however; the spawning period is probably similar to other summer stocks (Salmon and Steelhead Stock Inventory 2002). The closest spawning habitat near the ERR action area is on the Pilchuck River, the closest spawning habitat in the mainstem Snohomish River is near the confluence of the Skykomish River, thus the closest spawning habitat is more than eight miles upstream of the action area. Terrestrial organisms of riparian origin and aquatic macroinvertebrates and fish species for steelhead foraging are located in the immediate vicinity of the project. Steelhead could forage in the general vicinity of the project and would be expected to be found along the project area shoreline of Snohomish River and in the lower confluence of Bigelow Creek. Juveniles would tend to stay relatively close to shore and use woody debris and other riparian habitat features for refuge. Both adults and juveniles of this species are expected to be present in the project vicinity all times of year.

Steller Sea Lion

There are no known Steller sea lions in the Snohomish River or the action area and there is no critical habitat designated for them in the action area (WDFW 2007a). The Steller sea lion uses haulout sites primarily along the outer coast from the Columbia River to Cape Flattery, as well as occasionally on navigation buoys in Puget Sound. Steller sea lion numbers vary seasonally in Washington with peak counts on the outer coast of 1,000 animals present during the fall and winter months (Jeffries *et al.* 2000). There are around 600 to 700 individuals from Cape Flattery to La Push on the outer coast and there may be 1 to 2 individuals in inland Puget Sound at any time (Gearin 2002). Due to slight similarities in behavior, foraging habits and prey species between Steller sea lions and the more common California sea lions, if Steller sea lion individuals happen to be in the Puget Sound it is possible that they would be found in areas where California sea lions are found. There is a documented California sea lion haulout site in Port Gardiner Bay, within the Snohomish estuary, just outside of the defined action area (WDFW 2007a). While no records of California sea lions in the Snohomish River or within the project area exist, foraging may occur in the lower Snohomish River confluence as these animals and other marine mammals (harbor seals) range to find optimal foraging conditions. If California sea lions could potentially be in the action area then it is possible for Steller sea lions to be in the action area. Presence of a Steller sea lion entering the action area would be expected to occur on an extremely rare occasion and would be for foraging purposes only.

NON-LISTED SPECIES

There is no confirmed, documented or suspected record of ESA listed invertebrates, amphibians or reptiles. However, non-ESA species are present within the project area and possibly provide food for documented ESA listed fish and bird species. Comprehensive information concerning wildlife species within the action area and western Snohomish County has been documented in the report entitled, "*Plants and Animals Technical Data Summary, Everett Riverfront Redevelopment Everett, Washington*" (GeoEngomeers 2007e). Species documented within the project area and PHS data obtained January 05, 2007 from WDFW indicated the following species in the ERR project vicinity:

- **Bald Eagle (*Haliaeetus leucocephalus*):** reside in and migrate through Snohomish County, using forested areas in the vicinity of the ERR project as nesting areas. Bald eagles typically perch, roost, and build nests in mature trees near water bodies and available prey. Most nesting occurs within 250 feet of open water. According to the WDFW PHS database, there are two bald eagle nests located in the vicinity of the ERR project area. The two nests are located along the waterfront in Everett more than 1.5 miles west of the ERR project area and outside of the defined action area identified in the Biological Assessment completed for the project (WDFW 2007a). The PHS database identifies no eagle winter foraging areas in the vicinity of the project area. There has been no designation of critical habitat for bald eagles in Washington State. Bald eagles

were recently de-listed from the ESA, but were included in our assessment of impacts to ensure their continued success.

- **Bullfrog (*Rana catesbeiana*):** vocalizations documented by Pentec Environmental, Inc. (1994).
- **Osprey (*Pandion haliaetus*):** documented within the project area by Pentec Environmental, Inc. (1994), no nests were observed. A documented nest is located in a log storage yard at the confluence of the Snohomish River (WDFW 2007a); their presence within the action area is expected to occur on an opportunistic foraging basis.
- **Great blue heron (*Ardea herodias*):** documented within the project area but no rookeries were observed (personal observation), their presence is expected to occur on an opportunistic foraging basis.
- **Priority waterfowl concentrations:** occur on the eastern side of the action area on the eastern bank of the Snohomish River (WDFW 2007a), their presence within the action area is expected to occur on an opportunistic foraging basis.
- **Peregrine falcon (*Falco peregrinus*):** nest documented at the confluence of the Snohomish River (WDFW 2007a), their presence within the action area is expected to occur on an opportunistic foraging basis.
- **Purple martin (*Progne subis*):** documented at the confluence of the Snohomish River (WDFW 2007a), their presence within the action area is expected to occur on an opportunistic foraging basis.
- **Artic tern (*Sterna paradisaea*):** breeding documented on a gravel construction site on a U.S. Naval Base northwest of and outside the action area (as defined) (WDFW 2007a), their presence is not expected to occur in the project area and may only occur just within the northern portion of the project vicinity at the confluence of the Snohomish River on an opportunistic foraging basis.
- **California sea lion (*Zalophus californianus*):** haul out site located outside of the action area (as defined) within the Snohomish Estuary (WDFW 2007a), their presence within the action area is expected to occur on an opportunistic foraging basis within the Snohomish Estuary.
- **Harbor seal (*Phoca vitulina*):** expected to occur within or near California sea lion haul out sites within the Snohomish Estuary. Seal presence within the action area is expected to occur on an opportunistic foraging basis within the Snohomish Estuary.
- **Non-priority mammalian species; cottontail rabbit (*Sylvilagus floridanus*), beaver (*Castor canadensis*), weasel (*Mustela sp.*), Coyote (*Canis latrans*) and rat (*Rattus sp.*):** observed on the subject site through personal observations or as indicated by Pentec Environmental, Inc. (1994).
- **Non-ESA fish species listed in Table 7:** documented by WDFW 2007a, an aquatic ecologist with the Tulalip Tribes during a field investigation in Bigelow Creek (Loch 1999) and as reported by The City of Everett Department of Public Works and the FHWA which cited personal communications of reported fish species within Bigelow Creek (City of Everett & FHWA 2004).
- **Bird species listed in Table 8**: observed within the proposed project area through personal observations or as indicated by Pentec Environmental, Inc. (1994).

Table 7. Non-ESA Listed Species Documented within the Project Area

Common Name	Scientific Name	Reference	Documented Location
Brown Bullhead	*Ameirus nebulosus*	City of Everett & FHWA 2004	Bigelow Creek
Chum Salmon (fall)	*O. keta*	WDFW 2007a/ City of Everett & FHWA 2004	Bigelow Creek/Snohomish River
Coho Salmon	*O. kisutch*	City of Everett & FHWA 2004/Loch 1999	Bigelow Creek
Lamprey	*Lampetra sp.*	City of Everett & FHWA 2004	Bigelow Creek
Largemouth Bass	*Micropterus salmoides*	WDFW 2007a	Snohomish River
Longnose Dace	*Rhinchthys cataractae*	City of Everett & FHWA 2004	Bigelow Creek
Peamouth	*Mylocheilus caurinus*	City of Everett & FHWA 2004/Loch 1999	Bigelow Creek
Pink Salmon	*O. gorbuscha*	WDFW 2007a	Bigelow Creek/Snohomish River
Resident Cutthroat Trout	*O. clarki*	WDFW 2007a/Loch 1999	Bigelow Creek/Snohomish River
Scuplin	*Cottus sp.*	City of Everett & FHWA 2004/Loch 1999	Bigelow Creek
Three-spine Stickleback	*Gasterosteus aculeatus*	City of Everett & FHWA 2004/Loch 1999	Bigelow Creek
Sockeye Salmon	*O. nerka*	WDFW 2007a	Snohomish River

Table 8. Bird Species Documented within the Project Area

Common Name	Scientific Name	Common Name	Scientific Name
Barn Swallow	*Hirundo rustica*	Towhee	*Pipilo maculates*
American Robin	*Turdus migratorius*	American Goldfinch	*Carduelis tristis*
Song Sparrow	*Melospiza melodia*	Flycatcher sp.	*Empidonax sp.*
Townsend's Solitaire	*Myadestes townsendi*	European Starling	*Sturnus vulgaris*
Hairy Woodpecker	*Picoides villosus*	Black-capped Chickadee	*Parus atricapillus*
Common Yellowthroat	*Geothlypis trichas*	Rock Pigeon	*Columba livia*
California Quail	*Callipepla californica*	Great Blue Heron	*Ardea herodias*
Redwing Blackbird	*Agelaius phoeniceus*	Kingfisher	*Ceryle alcyon*
Northern Harrier	*Circus cyaneus*	Osprey	*Pandion haliaetus*
Night-hawk	*Caprimulgus Americanus*	Various waterfowl	

ANALYSIS OF EFFECTS

This section describes anticipated direct, indirect, interdependent and interrelated, and cumulative effects of the project. To begin, it is important to note that measures were taken to avoid, reduce, and minimize impacts associated with this project. Given the highly disturbed nature o the site, ditched streams, railroad presence (with removal options), and previous City of Everett decisions to maximize redevelopment potential for the property, some impact to wetlands and stream/ditches became unavoidable at an early stage of the project. Impact minimization and reduction was practiced to the

extent possible. Where impacts have been identified, a compensatory mitigation concept has been proposed that meets the joint wetland mitigation guidelines established between the US Army Corps of Engineers and Washington State Department of Ecology (2004).

DIRECT EFFECTS

Direct effects include all impacts directly associated with project implementation and construction activities as well as any disturbances that would occur very close to the time of construction. The potential direct effects likely to result from the project are listed here and discussed in the following paragraphs:

1. Construction noise,
2. Construction related traffic,
3. Loss/alteration of habitat,
4. Increased turbidity and sedimentation,
5. Increase human activity,
6. Stormwater
7. Potential release of contaminants, and
8. Shoreline/wetlands enhancement and restoration.

Construction Noise

There will be a temporary increase in noise as a result of the operation of construction equipment at the ERR construction site and increased vehicle traffic to and from the ERR project and staging areas. Background or ambient noise levels within the vicinity of the project area come from existing vehicle (car and truck) traffic associated with Interstate 5 and normal operations within an urban and industrial area. Daytime ambient noise levels were assumed to be in the range of 88 dBA based on typical traffic noise levels adjacent to a freeway (WSDOT 2006). All construction equipment and vehicles used at the ERR project will meet Washington State noise emission standards. Noise levels generated by general construction equipment and truck traffic may result in a temporary (worst-case scenario) increase of levels above daytime ambient (88 dBA) up to a 0.08 mile radius from the ERR project area (Figure 3 – Action Area Map). This increase in noise levels is not expected to be continuous and will occur primarily during daylight hours. Maximum construction terrestrial noise impacts associated with pile driving activities will extend up to a 0.30 mile radius from the ERR project area and maximum construction in-water noise impacts associated with pile driving will extend 0.73 miles upstream and downstream of the in-water construction site unless absorbed by land before reaching the 0.73 miles (Figure 3).

Marbled murrelets are the only listed species that could potentially be affected by terrestrial noise impacts. It is important to note that there is no specific limitation of available habitat in the vicinity of the project. Some foraging is possible but the available habitat is less than optimum for this species. Marbled murrelets are not known to acclimate to human activity and typically avoid areas of strong human activity. The land and water dependent uses in the action area that are in addition to the proposed project would limit marbled murrelet use. The presence of migrating marbled murrelets is highly unlikely but if they did happen to be in the area during the increase in construction related noise, they could easily avoid any area of disturbance. Their migration from foraging to nesting habitat would not be physically impeded.

Listed fish species and Steller sea lions could potentially be affected by in-water construction noise impacts. The presence of foraging Steller sea lions is highly unlikely but if they did happen to be in the area during the increase in in-water noise, they could easily swim outside of any area of disturbance. Noise impacts to adult chinook and bull trout would be minimized because in-water work would occur within the approved USACE fish work windows when adults are less likely to occur in the action area. However, adult steelhead could potentially be present in the action area at all times of the year due to their life history characteristics. Steelhead (adults and juveniles), juvenile chinook, and bull trout could be in the action area during in-water construction activities.

Another factor that will limit aquatic noise impacts is the existing channel morphology. While the action area is defined as the greatest extent that impacts could occur, actual pile driving activities will be localized with sound attenuation occurring in a radius from the pile. Because sound pressure travels in a linear direction away from the source; when the sound intersects land, it is assumed that it attenuates to background levels; therefore sound pressure above background levels are not expected to travel through the bends in the Snohomish River.

Construction Related Traffic

There will be an increase in construction related traffic traveling to and from the project. Construction-related traffic will be limited to existing arterial streets and highways, and improved roads within the ERR project area. Vehicle traffic on nearby arterials may be temporarily interrupted or congested during some phases of the project. Dump trucks with pup trailers will haul dirt off-site and will truck new material to the project in addition to the necessary construction related tasks to mobilize to the area. All equipment and vehicles will meet Washington State noise emission standards. This increase in traffic will be temporary and will not affect listed species.

Loss/Alteration of Habitat

With respect to listed species, there will be a minor direct loss of some herbaceous and scrub shrub upland habitat and wetland and wetland buffer habitat as a result of the construction of the ERR project. Access to and between the development sites will require the widening and improvement of existing roads and removal of vegetation which includes mostly shrub habitat and roadside grasses and emergent plants. Existing gravel or dirt access roads within the project area will be improved with asphalt which will increase the amount of new impervious surface and decrease the amount of vegetation. Impacts to wetlands have been minimized to the greatest extent possible.

Wetland, stream, and buffer impacts will occur to: 1) gain access between the development sites by crossing ditched wetlands located between the BNSF railroad tracks and providing access from the north via Pacific Ave., 2) accommodate leachate system relocation and preload along the West ditch for the development footprint, 3) provide trails for pedestrian access 4) realign an existing gravel trail to allow adequate emergency access to the Simpson Pad from the south and 4) provide shoreline access including a small public boat facility. The planned physical aquatic habitat impacts have been estimated to be 1.20 acres of wetlands and 927 linear feet of ditch drainage associated with Bigelow Creek. Locations proposed for the dock structures in the Snohomish River will be altered by excavating upland along the shoreline to create backwater areas for the dock facilities, which will increase aquatic habitat, provide better riverbank stability, remove selected bank armoring, and improve river access.

The development of buildings, roads and infrastructure associated with the proposed redevelopment project will require partial filling (927 linear feet) of the "West Ditch" which is associated with Bigelow Creek where it flows between the two railroad tracks and into the Snohomish River. The impact (filling)

to West Ditch is associated with the relocation of the leachate system and redevelopment of the Landfill Parcel and will require mitigation. The impacts from this effort will be short term loss of aquatic habitat, but construction of the new stream channel and edge habitat, via removal of BNSF track sections, will result in a net gain in aquatic habitat and function. Local, state and federal regulatory controls at the site would direct development of buildings and infrastructure to existing development pads at the site. However, proposed habitat restoration and enhancement in and around Bigelow Creek as well as associated drainage ditches would require direct in-water work. Fish will be excluded from the project area by netting both ends of the ditch and crowding any trapped fish toward the outlets to remove them from the area to be filled. Actions to improve habitat would result in temporary negative effects on habitat and habitat use, but such work would be done to provide long-term enhancement of habitat functions. The habitat would change from a relatively stagnant ditch/wetland to a higher velocity riverine feature. Similarly, the available aquatic food web is expected to shift from emergent vegetation and benthic forage species to attached and drift forage species (benthic algae, mayflies, caddisflies, etc.).

The majority of the area proposed for development and where trails would be located will result in the removal of immature shrubs and grasses including invasive reed canary grass and Himalayan blackberry. Removal of reed canary grass and Himalayan blackberry and re-vegetation with native shrub species is a beneficial effect of the project. Tree species that would be removed within the project area are not large mature trees. Planting plans incorporate a mix of coniferous and deciduous native tree species that, over time, will provide physical macro- and micro- habitat for a wide variety of species.

Overall, the loss of habitat is limited and is compensated by enhancement and restoration activities summarized above and more fully described in the Mitigation Plan section of this report. The development sites are highly disturbed and maintained (mowed), and would benefit from enhancement activities minimizing habitat loss or alteration.

Increased Turbidity and Sedimentation

There may be a low incidence of turbidity and sedimentation resulting from on-site erosion and stormwater runoff during the construction of the ERR project. To minimize off-site flow of runoff and associated sediment and/or pollutants, an approved stormwater and sediment erosion control plan will be followed during construction. This plan will provide details for BMPs such as installing silt fences and mulch berms around the construction sites and staging area to prevent site derived silt from moving off-site as well as how stockpiled soils will be covered when they are not in use or during wet weather. With proper implementation of this plan and routine maintenance of the BMPs most impacts from construction related turbidity and sedimentation are expected to be minor and inconsequential.

Construction and enhancement/restoration activities within and along Snohomish River, Bigelow Creek and wetlands could potentially allow an increase in sediment to be carried downstream and upstream (during an incoming high tide) within the Snohomish River. It is difficult to estimate the volumes and locations to which the various sized particles that make up the sediment would be redistributed downstream. A majority of sediment generated by the project construction will be trapped and contained by erosion control measures. Work within the river and along the river banks pose the highest probability of fugitive erosion associated with this project. The largest sediment particles will be contained in the immediate vicinity of the in-water construction area. Sediment with the very finest silts and clays could be carried as suspended sediment downstream through the mainstem of the river and ultimately in the Snohomish estuary but it is most likely most of the fine sediments would be deposited along the Snohomish River before reaching the estuary. It is expected that the initial suspended sediment load would decline within a few days/weeks following activity. However, as the disturbed area equilibrates

during periods of high flow or seasonal variation in water flow, the suspended sediment concentration would increase again.

Potential mobilization of sediments during the initial construction period may result in Total Suspended Solids (TSS) concentrations that could affect listed fish species. For example, the increased turbidity can adversely affect both primary food production (i.e., phytoplankton and attached benthic algae growth) and fish feeding efficiency. In addition, depending on the magnitude of the TSS concentrations, impairments to other biological functions such as respiration (i.e., gill clogging) and reproduction is possible. While the river bottom is mostly void of vegetation, the redeposited sediment would likely cover large areas of benthic habitat, which could cause a short-term localized disruption in the primary productivity and food supply for salmonids. However, timing of the work windows is set to minimize the overlap of active foraging and out migration of anadromous species in the vicinity of the project. Most anadromous species will have migrated out to the Puget Sound by the time this work commences. With the exception of steelhead, which may reside in the mainstem Snohomish River longer than other species, impacts should be short term and minimal. Primary production in aquatic systems occurs in blooms and coincides closely with out-migration timing so newly arriving smolts receive abundance food supply. In-water work windows were specifically developed to avoid and minimize impacts to primary production and food supply for fish.

In the long-term, an improvement in river bank conditions will result from the shoreline treatments proposed along with enhanced buffers and proposed instream habitat features. These shoreline treatments could ultimately increase the water quality in the downstream Snohomish River and estuary by buffering the effects of river flooding on adjacent uplands and by increasing the areas ability to reduce nutrient and sediment loading from upstream urban sources.

Increased Human Activity

There will be an increase in traffic and human disturbance during the construction of the ERR project. Construction-related increases in human activity will be limited to existing arterial streets, highways and improved roads and development pads within the ERR project area. A variety of conservation measures and BMPs will be utilized to minimize impacts to federally protected species and the surrounding habitat during construction. Disturbance will be limited to the smallest area feasible for each phase of the project and element under construction and will stay within the limits of clearing identified on site plans and demarcated in the field with temporary exclusion fencing. Regulated wetlands and shoreline buffers will be demarcated in the field with temporary exclusion fencing to prevent construction crews from inadvertently disturbing these areas. Waste materials will be collected and sorted with respect to recycling categories and disposed of off-site and in accordance with applicable regulations. Approved stormwater and sediment erosion control plans will be implemented and adequate materials and procedures will be on site to respond to unanticipated weather conditions or accidental releases of materials (sediment, concrete or fuel). This increase in construction-related human activity will be temporary and will not affect listed species. In the long term, human activity (residential, commercial) will increase above current levels will increase. Past actions on the project site were heavy industrial and pollutant generating actions. Future conditions will be more constant activity with less pollutant generation. Given the project upland area offers minimal habitat to species, long term impact from human activity will not be significant. Wetland and shoreline improvements will allow human access to the River and associated wetlands, however, the long term benefits of enhanced habitat outweigh the impacts of human presence along the proposed trails and access points.

Stormwater

The project will minimize impacts to the Snohomish River, Bigelow Creek, and surrounding wetlands by implementing several additional stormwater control measures during construction. The control measures will include implementing an approved and effective erosion and sediment control plan and installing and maintaining temporary erosion control such as construction scheduling, silt fence, temporary catch basin inlet protection, compost berms, and vegetated buffers. Storm treatment BMPs such as gravity settling, filtration, biological uptake, and soil adsorption will be used to remove contaminants that may leach into stormwater. Impacts from impervious surfaces and concentrated flows will be mitigated for by installing permanent energy dissipation devices at outfalls such as stabilized pipe outfalls or dispersion areas.

The Snohomish River is listed as a basic treatment receiving water and is exempt from flow control. There is no flow control exemption for Bigelow Creek which discharges to the Snohomish River at the location of the existing Bigelow Creek outfall (Perteet 2007). Enhanced water treatment standards apply and will be implemented to portions of the project that discharge to Bigelow Creek and wetlands. Bio-infiltration swales such as rain gardens and filter berms will be implemented along the outer edge of buffer areas. Rain gardens and filter berms can reduce stormwater runoff, sediment, vehicle fluids, equipment waste, and other pollutants. The swales will be vegetated with native plant species, which can reduce site maintenance and create habitat for wildlife. Rain gardens will be integrated into buffer areas and will provide habitat complexity as well as water quality functions. The adjacent wetland buffers have been heavily impacted by removal of vegetation and human alteration and currently provide little habitat or water quality function. The project will create critical area buffers enhanced with native vegetation that will slow stormwater runoff, reducing erosion and sedimentation, increase biological uptake. Infiltration methods will not be implemented on the Tire/Fire Landfill site due to its historical use and possible adverse water quality impacts.

By properly implementing a combination of these measures, sediment will be reduced and impacts to the waterways will be minimized and are expected to be minor and inconsequential.

Potential Release of Contaminants

The ERR project could result in accidental release of contaminants such as fuel or grease from on-site construction equipment and refueling activities that may be conducted within the project or staging areas. The potential for this type of impact is low. Spill cleanup materials will be kept on-site so that in the event of a spill, it can quickly be cleaned up or contained to decrease any potential environmental impact.

INDIRECT EFFECTS

Indirect effects are those that could result from the project, but occur later in time such as during the use or maintenance of the project. The potential indirect effects likely to result from the project are or are related to the listed items and discussed in the following paragraphs:

1. Operational impacts,
2. Shoreline development, and
3. Impacts to prey and food sources for listed species.

Operational Impacts

There will be an increase in traffic, human disturbance, development and land use beyond what currently exists in the area as result of the ERR project.

- Additional pedestrian and automobile traffic,
- Increased boat traffic in the Snohomish River,
- Increased waste generation – garbage, debris, emissions (smoke, light, dust, automobile),
- Increased contaminates including run off from lawns and washing cars, and in-water contaminants from boats,
- Increase noise throughout the project area, and
- Increased human presence along the shoreline and wetland areas after the development of trail and interpretive centers.

While operational impacts related to human activity are hard to strictly enforce, there are educational opportunities and regulatory restrictions that can help minimize impacts. During the occupational phase of the project, residents and business owners should be made aware of the responsibility associated with activities in close proximity to a wetland and shoreline environment. Permanent posting of wetland and critical/sensitive area signs will serve as a reminder and will designate areas for protection. Planting mature dense native vegetation will provide buffer areas from human activity. Pedestrian traffic should be confined to trails lined with shrubs or on walkways. Residential areas and the operation of commercial businesses should include a covenant limiting the use of pesticides or chemicals in a way that it may enter stormwater and prohibiting dumping of soil or yard waste, paints, chemicals or fuels into or in a way that it may enter waterways.

Any future landscaping features should be compatible and blend with the native buffer and native wildlife. WDFW Backyard Wildlife Sanctuary Program and The National Wildlife Federation sponsor certification and recognition programs designed for those that plan and voluntarily implement a wildlife habitat plan. Future homeowners should be made aware of this information and encouraged to participate in the program.

Educational materials should be posted at the boat facility to inform patrons of ways to minimize their impact to natural resources. Sufficient garbage receptacles and collection tubes for monofilament should be placed at access areas. Access points should be clearly designated and designed to allow use of the shoreline without a gradual expansion of the access trails, pathways or travel lanes into nearby riparian vegetation caused by foot, vehicle or boat traffic. This can be accomplished by planting larger, more mature native vegetation along the edges to clearly delineate the access point.

Shoreline Development

In-direct effects of shoreline development (dock and launch) and their associated uses (boat impacts) could be of concern for juvenile salmonids. Areas targeted for these developments have minimal riparian habitat due to the proximity of the active BNSF railroad tracks. Historical riparian clearing and development have simplified the nearshore habitat and reduce structural diversity, forcing juvenile salmonids to migrate in areas with little or no cover. In addition, shading from in-water structures associated with docks and launches could provide habitat and attract predators that prey on juvenile

salmonids. LWD features constructed as mitigation or enhancements associated with the shoreline development similarly could attract predators of salmonid species. The conceptual drawings of the proposed in-water structures have been designed to reduce adverse impacts from shoreline development and provide a diverse nearshore habitat to reduce predation on juvenile salmonids.

Conservation measures for overwater structure design have been established by various agencies and include; grating features, plank spacing and/or the use of prisms to reduce shade impacts use of inert durable and non-toxic materials, walkways will be as narrow as possible, skirting will be eliminated, pilings will be concrete and will not contain creosote and the number and size of pilings will be minimized and the distance between pilings will be maximized. Agencies also promote habitat integration with shoreline developments. Since much of the nearshore habitat in the northern extent of the project area and adjacent to the most probable locations for the docks and launches is essentially devoid of extensive vegetative cover and habitat, a vegetative buffer will be planted adjacent to the docks and launches to provide overhanging shading and LWD will be anchored under and adjacent to the docks in the nearshore areas to provide habitat.

Impacts to Prey and Food Sources for Listed Species

A decrease in small mammal prey availability from the development of the existing herbaceous upland habitat and the loss of potential foraging habitat during the short-term avoidance of the shoreline area would be an indirect effect to raptor such as bald eagles, osprey and hawks. In the long term, large trees would be expected to become prominent features along the restored shoreline areas, which would be expected to substantially improve nearshore aquatic refugia and foraging habitat suitability for raptors on fish in the Snohomish River.

A decrease in prey availability (macroinvertebrates) and the loss of potential foraging habitat during the short-term avoidance of the shoreline area would be an indirect effect to listed fish species. However, in the long-term habitat enhancements would improve conditions for listed fish species inhabiting the lower Snohomish River, by providing shoreline shade, LWD recruitment, increased rearing habitat and improved food production.

EFFECTS OF INTERRELATED AND INTERDEPENDENT ACTIONS/ACTIVITIES

An interrelated activity depends on the larger action for its justification (such as slash burning and replanting which will occur after a timber sale and harvest has been completed). An interdependent activity is one that has no independent utility apart from the proposed action (such as construction of a road needed to access the site of a timber sale and harvest).

Projected increases in the economy could increase the need for more public services, public transportation, stores, restaurants, recreational facilities and residential and commercial development outside of that proposed within the project area. Effects of interdependent actions resulting from the project include widening, grading and use of existing roads during the ERR construction and the maintenance of these roads after the project has been completed.

Additional effects of interrelated activities resulting from the ERR project include mitigating for lost/altered habitat within the construction areas and replanting impacted areas with native vegetation. Replanting specifications are provided in a mitigation plan and include associated monitoring and maintenance activities.

CUMULATIVE EFFECTS

Cumulative effects are defined as the effects of future state, local or private actions (but not federal actions) that are reasonably certain to occur within the action area. Cumulative effects analyses are required by the ESA only for those projects undergoing formal consultation. Given that the proposed project is a re-development, cumulative effects are viewed as a balance from past actions and proposed actions. Overall, past action impacts such as intense shoreline activity and pollution have been removed and contained, future actions will generate less pollution that those past actions on this location. Light, noise, and human activity will also be a general balance with overall less activity in the Snohomish River since log shipment, rafting and handling are not be part of this proposal. Economic growth of Everett and the surrounding area is expected to occur as a result of this project. However, Everett, in the vicinity of this project is fully developed and new development is not anticipated unless it occurs in the form of redevelopment similar to this project. Major roads and highways have already been expanded or are currently permitted for construction. This project constitutes one of the last large development opportunities in the City of Everett limits and is occurring on currently zoned light industrial land that has been planned and designated for residential/commercial development for years.

EFFECT DETERMINATIONS

BULL TROUT

The proposed project is located in designated critical habitat for bull trout. Bull trout can potentially swim into the project area both as juveniles and as adults during certain times of the year. There are no documented occurrences of bull trout/dolly varden in Bigelow Creek but occurrences have been documented in the Snohomish River.

Considering the information referenced in this report and project information provided in the project design plans, the ERR project **may affect** bull trout in the following ways:

- Terrestrial organisms of riparian origin, aquatic macroinvertebrates and fish species for bull trout foraging are located in the immediate vicinity of the project and within the action area.
- Bull trout could forage in the general vicinity of the project and would be expected to be found along the project area shoreline of Snohomish River and in the lower confluence of Bigelow Creek.
- Juvenile bull trout may be in the action area and encounter in-water construction work.
- Disturbance from the construction of the proposed project will increase sedimentation and in-water noise levels above the existing levels.
- Shoreline development could indirectly reduce nearshore habitat for juvenile bull trout and increase predators that prey on juvenile bull trout.

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

- The nearest suitable spawning grounds for bull trout are much farther upstream than the action area.
- Any effects would not preclude adults from completing the migration route.
- Fish will be excluded from wetland, shoreline and stream segments during in-water construction.

- In-water construction will be scheduled within the USACE approved work windows.
- The probability of bull trout occurring in the project area during in-water construction can be considered low.
- It is not believed that increased levels of noise and sediments will have a deleterious effect on bull trout continued existence. Any effects would be discountable since the likelihood of bull trout encountering construction impacts is low and the effects will have a temporary duration and return to pre-project conditions after the completion of the project.
- A temporary shift in sediment could reduce the availability of prey, but not likely to be significant due to the BMPs and will be short-term.
- The amount of impacted foraging habitat in the action area will be minimized since most of the potential habitat is located along the shoreline and within wetlands which are protected under the local Critical Areas Ordinance.
- Long-term habitat enhancements would improve conditions for bull trout inhabiting the lower Snohomish River, by providing access to off-channel refugia, rearing habitat and improved food production.
- The conceptual plan for the proposed in-water structures has been designed to reduce adverse impacts from shoreline development and provide a diverse nearshore habitat to reduce predation on juvenile bull trout.

MARBLED MURRELET

The proposed project will likely have no adverse impact to the marbled murrelet or its associated habitats. USFWS has identified that marbled murrelets can be adversely affected by impacts to their nesting habitat, marine foraging habitat, and food supply, as well as direct mortality. Marbled murrelet nests are associated with old growth forests, there are no old growth forests in the vicinity of the project area and no marbled murrelet nests have been identified in the vicinity of the project. While PHS data does not indicate records of marbled murrelets in the project vicinity, it is possible for marbled murrelets to utilize the marine water of Port Gardiner Bay area for foraging. However, the project is expected to have no impact on nearshore shoreline environments. Another possibility is that marbled murrelets will migrate along the Snohomish River from foraging to nesting habitat. If individuals happen to occur in the project area during construction, they could easily fly outside of any area of disturbance.

The project is anticipated to have **No Effect** on the marbled murrelet or their critical habitat.

PUGET SOUND CHINOOK

The proposed project is located in designated critical habitat for chinook. Juvenile and young chinook utilize Bigelow Creek and the edge habitat of the mainstem Snohomish River for feeding, rearing and refuge and adult chinook migrate through the Snohomish River and thus have some potential to be affected by the ERR project.

Considering the information referenced in this report and project information provided in the project design plans, the ERR project **may affect** chinook because:

- Terrestrial organisms of riparian origin, aquatic macroinvertebrates and fish species for chinook foraging are located in the immediate vicinity of the project and within the action area.

- Chinook could forage in the general vicinity of the project and would be expected to be found along the project area shoreline of Snohomish River and in Bigelow Creek.
- Juvenile chinook may be in the action area and encounter in-water construction work.
- Disturbance from the construction of the proposed project will increase sedimentation and in-water noise levels above the existing levels.
- Shoreline development could indirectly reduce nearshore habitat for juvenile chinook and increase predators that prey on juvenile chinook.

The ERR project is **not likely to adversely affect** chinook because:

- The nearest suitable spawning grounds for chinook are much farther upstream than the action area.
- Any effects would not preclude adults from completing the migration route.
- In-water construction will be scheduled within the USACE approved work windows.
- Fish will be excluded from wetland, shoreline and stream segments during in-water construction.
- The probability of chinook occurring in the project area during in-water construction can be considered low.
- It is not believed that increased levels of noise and sediments will have a deleterious effect on chinook continued existence. Any effects would be discountable since the likelihood of chinook encountering construction impacts is low and the effects will have a temporary duration and return to pre-project conditions after the completion of the project.
- A temporary shift in sediment could reduce the availability of prey, but not likely to be significant due to the BMPs and will be short-term.
- The amount of impacted foraging habitat in the action area will be minimized since most of the potential habitat is located along the shoreline and within wetlands which are protected under the local Critical Areas Ordinance.
- Long-term habitat enhancements would improve conditions for chinook inhabiting the lower Snohomish River, by providing access to off-channel refugia, rearing habitat and improved food production.
- The conceptual plan for of the proposed in-water structures has been designed to reduce adverse impacts from shoreline development and provide a diverse nearshore habitat to reduce predation on juvenile chinook.

PUGET SOUND STEELHEAD

There is currently no designated critical habitat for steelhead. Steelhead have been documented within the freshwater and estuarine waters of the action area including Bigelow Creek. Both adults and juveniles of this species are expected to be present in the project vicinity all times of year and thus have potential to be affected by the ERR project.

Considering the information referenced in this report and project information provided in the project design plans, the ERR project merits an effect determination of **may affect** steelhead because:

- Terrestrial organisms of riparian origin, aquatic macroinvertebrates and fish species for steelhead foraging are located in the immediate vicinity of the project and within the action area.
- Steelhead could forage in the general vicinity of the project and would be expected to be found along the project area shoreline of Snohomish River and in Bigelow Creek.
- Adult and juvenile steelhead may be in the action area and encounter in-water construction work.
- Disturbance from the construction of the proposed project will increase sedimentation and in-water noise levels above the existing levels.
- Shoreline development could indirectly reduce nearshore habitat for juvenile steelhead and increase predators that prey on juvenile steelhead.

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

- The nearest suitable spawning grounds for steelhead are much farther upstream than the action area.
- Any effects would not preclude adults from completing the migration route.
- Fish will be excluded from wetland, shoreline and stream segments during in-water construction.
- In-water construction will be scheduled within the USACE approved work windows.
- The probability of steelhead occurring in the project area during in-water construction can be considered low.
- It is not believed that increased levels of noise and sediments will have a deleterious effect on steelhead continued existence. Any effects would be discountable since the likelihood of steelhead encountering construction impacts is low and the effects will have a temporary duration and return to pre-project conditions after the completion of the project.
- A temporary shift in sediment could reduce the availability of prey, but not likely to be significant due to the BMPs and will be short-term.
- The amount of impacted foraging habitat in the action area will be minimized since most of the potential habitat is located along the shoreline and within wetlands which are protected under the local Critical Areas Ordinance.
- Long-term habitat enhancements would improve conditions for steelhead inhabiting the lower Snohomish River, by providing access to off-channel refugia, rearing habitat and improved food production.
- The conceptual plan for the proposed in-water structures has been designed to reduce adverse impacts from shoreline development and provide a diverse nearshore habitat to reduce predation on juvenile steelhead.

STELLER SEA LION

The ERR project would not affect the Steller sea lion due to their small population size in the project vicinity and action area and even smaller possibility of individuals in the project area, only one or two Steller sea lions would be expected in Puget Sound at any time. Steller sea lions are much more common on the outer coast of Washington and in the Strait of Juan de Fuca. The closest California sea lion haulout station identified by WDFW is located in Port Gardiner Bay. Foraging may occur in the lower

Snohomish River confluence as these animals and other marine mammals (California sea lions and harbor seals) range to find the optimal foraging conditions. Their presence would be even less likely during the summer months that are approved for work if Steller sea lions happen to occur in the project area during construction, they could easily swim outside any area of disturbance.

Therefore the project is expected to have **No Effect** on the Steller sea lion or its habitat.

BA SUMMARY

The environmental baseline in the proposed ERR action area will be slightly altered by:

- Short-term increase in turbidity in the Snohomish River and Bigelow Creek,
- Short-term increase (above daytime ambient) in terrestrial and in-water noise levels,
- Increased operational noise, lighting and air emissions,
- Increased human activity, and
- Habitat alteration.

However, because of the number of environmental controls that will be placed on construction operations to limit the overall impacts to the physical and biological environment and the level of beneficial effects that have been integrated into the project design, the environmental baseline in the proposed action area will be maintained. The following BMPs, environmental conservation measures and restoration and enhancement activities will be implemented:

- Working under an approved sediment erosion and stormwater control plan,
- Limiting the hours of construction to daylight working hours and maintaining all equipment with Washington State standard emissions and noise control requirements,
- Limiting the number and size of trees in the Snohomish River riparian zone to be removed during construction,
- Conducting in-water work within USACE approved fish work windows,
- Excluding fish wetland, shoreline and stream segments during in-water construction.
- Installing concrete pilings with augers if possible and using appropriate noise-dampening devices on pile drivers,
- Designing and constructing the project to meet, at a minimum, a certification level of Silver from the U.S. Green Building Council's LEED Green Building Rating System.
- Implementing the habitat restoration plan developed for the City of Everett with the guidance of the city, the Tulalip Tribes and a Citizen Advisory Board including members of the Pilchuck Audubon Society, the Everett neighborhoods, Public Employees for Environmental Responsibility and the Everett Area Chamber of Commerce.

Table 9 below summarizes the determination of effects for listed species possibly occurring within the project action area.

Table 9. Determination of Effect for Listed Species Occurring Within the Action Area

Common Name	Effect Determination
Bull Trout	May affect, not likely to adversely affect
Marbled Murrelets	No Effect
Puget Sound Chinook	May affect, not likely to adversely affect
Puget Sound Steelhead	May affect, not likely to adversely affect
Steller Sea Lion	No Effect

In summary, based on field work and literature review, this proposed project will have no effect on marbled murrelets or Steller sea lions and may affect, but is not likely to adversely affect bull trout, chinook or steelhead, their habitat, and prey base, provided that the above BMPs, environmental conservation measures and restoration and enhancement activities are implemented for the project.

If significant changes occur to the scope or design of the ERR project, the OliverMcMillan should contact GeoEngineers for additional evaluation.

EFH ASSESSMENT

The objective of this EFH assessment is to determine whether or not the proposed ERR project "may adversely affect" designated EFH for relevant commercially, federally-managed fisheries species within the proposed action area. This report provides a description and assessment of EFH in the project area; a description of the project and its potential impacts on these habitats; and describes conservation and mitigation measures proposed to avoid, minimize, or otherwise offset potential adverse effects to designated EFH resulting from the proposed action.

EFH BACKGROUND

The Sustainable Fisheries Act of 1996 amended the Magnuson-Stevens Fishery Conservation and Management Act (now called the Magnuson-Stevens Act) to require federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH. The EFH guidelines (50 CFR 600.05-600.930) outline the process for federal agencies, NOAA Fisheries, and the Fishery Management Councils to satisfy the EFH consultation requirement under Section 305(b(2)-(4)) of the Magnuson-Stevens Act. As part of the EFH consultation process, the guidelines require federal action agencies to prepare a written EFH Assessment describing the effects of that action on EFH (50 CFR 600.920(e)(1)). This document has been prepared to satisfy that requirement.

EFH is defined as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity". For the purpose of interpreting this definition of EFH: "*waters*" include aquatic areas (marine waters, intertidal habitats, and freshwater streams) and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "*substrate*" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; *necessary* means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "*spawning, breeding, feeding, or growth to maturity*" covers a species' full life cycle (50 CFR 600.10); "*adverse effect*" means any impact that reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions" (50 CFR 600.810). The Magnuson-Stevens Act promotes the protection of these habitats through review, assessment, and

mitigation of activities that may adversely affect these habitats. The significance of small-scale projects lies in the cumulative and synergistic effects resulting from a large number of these activities occurring in a single watershed.

The EFH mandate applies to all species managed under a Fishery Management Plan (FMP). In Washington, Oregon, and California, there are three FMPs covering groundfish, coastal pelagic species, and Pacific salmon. Federal agencies must consider the impact of a proposed action on all three types of EFH.

IDENTIFICATION OF EFH IN THE PROJECT ACTION AREA

Identification of EFH in the project action area was based on Biological Opinions issued on May 11, 2001 and February 13, 2004 by NMFS (NMFS Tracking No. 2001/00533 and 2003/00337, respectively) for the City of Everett 41st Street Overcrossing Project and Railroad Track Removal and Upgrade Project, which analyzed the effects of a conceptual riverfront development as an interdependent action and has an identical action area as defined for the ERR project.

The ERR project is located along the Snohomish River with a defined action area that reaches the confluence of the river with Port Gardiner Bay. The marine influence and possible saltwater intrusion within the action area requires that marine species of fishes and their associated life history stages with designated EFH will need to be addressed.

The majority of the action area is identified as Pacific salmon EFH for the Pacific Coast Salmon FMP. This includes all streams, lakes, ponds, wetlands, and other water bodies currently and historically utilized by Pacific salmon. Excluded are some areas upstream of certain impassable man-made barriers (e.g., dams as identified by the Pacific Fishery Management Council in Appendix A of Amendment 14 to the Pacific Coast Salmon Plan), and longstanding, naturally-impassable barriers (*e.g.*, natural waterfalls in existence for several hundred years) (Pacific Fishery Management Council 1999).

Based on the available life history information, important elements of salmon EFH are (1) estuarine rearing, (2) early ocean rearing, and (3) juvenile and adult migration and feeding (Roni et al. 1999). Important features of the habitat include (1) adequate water quality, (2) adequate temperature, (3) adequate prey species and forage base (food), and (4) adequate depth, cover, and marine vegetation in estuarine and nearshore habitats (Roni *et al.* 1999). Potential threats to these habitat features and life history components include (1) direct (hydrologic modifications); (2) indirect (loss of prey or reduction of species diversity); (3) site-specific; or (4) habitat-wide impacts that are chemical, biological, and physical in nature and may result in individual, cumulative, or synergistic consequences (Wilbur and Pentony 1999).

The action area is designated EFH for chinook, coho and pink salmon and the species listed below in Table 10. In addition to Pacific salmon species, groundfish and coastal pelagic species have designated EFH in the Puget Sound. Table 9 lists the species of fishes and life-history stages with designated EFH in the Puget Sound that may occur in the action area as determined by Biological Opinions issued by NMFS.

Table 10. Species of Fishes and Life-History Stages with Designated EFH in the Action Area

Species	Scientific Name	Adult	Spawn/ mate	Juvenile	Larvae	Eggs/ parturition
Groundfish Species						
Spiny Dogfish	*Squalus acanthias*	X	X	X		X
California Skate	*R. inornata*	X				
Ratfish	*Hydrolagus colliei*	X				X
Lingcod	*Ophiodon elongatus*	X	X	X	X	X
Cabezon	*Scorpaenichthys marmoratus*	X	X	X	?	X
Kelp Greenling	*Hexagrammos decagrammus*	X	X	X	X	X
Pacific Cod	*Gadus macrocephalus*	X	X	X	X	X
Pacific Whiting (Hake)	*Merluccius productus*	X		X		
Sablefish	*Anoplopoma fimbria*	X		X		
Bocaccio	*S. paucispinis*	X	?	X	X	
Brown Rockfish	*S. auriculatus*	X	?	?	X	
Copper Rockfish	*S. caurinus*	X		X	?	
Quillback Rockfish	*S. malinger*	X		X	?	
English Sole	*Parophrys vetulus*	X	X	X	X	X
Pacific Sanddab	*Citharichthys sordidus*	X		X	X	X
Rex Sole	*Glyptocephalus zachirus*	X	X	X		X
Starry Flounder	*Platichthys stellatus*	X	X	X	X	X
Pacific Salmon Species						
Chinook Salmon	*Oncorhynchus tshawytscha*	X		X		
Coho Salmon	*Oncorhynchus kisutch*	X		X		
Pink Salmon	*Oncorhynchus gorbuscha*	X		X		
Coastal Pelagic Species						
Northern Anchovy	*Engraulis mordax*	X	X	X	X	X
Pacific Sardine	*Sardinops sagax*	X				
Pacific Mackerel	*Scomber japonicus*	X				
Market Squid	*Loligo opalescens*	X				

POTENTIAL ADVERSE EFFECTS OF THE PROPOSED PROJECT ON EFH

The definition of "adverse effect" is "any impact that reduces quality and/or quantity of EFH, including direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions" (50 CFR 600.810). For this project, most of the effects of the action have already been discussed in the ESA effects analysis section of this report and would apply to EFH. These adverse effects are:

- Short-term degradation of habitat because of in-water construction activities, including sediment impacts and noise impacts associated with construction and pile driving;

- Long-term degradation of habitat because of increased human disturbance and shoreline development;
- Short-term loss of foraging species and habitat.

Thus, the project may **adversely affect** EFH for a short duration for chinook, coho and pink salmon as well as steelhead trout (although not listed in the table above).

However, the main effects of the project upon EFH in the project area will be beneficial because it is designed to improve many of the important elements of salmon *freshwater* EFH. Long-term habitat enhancements would improve conditions for chinook, coho and pink salmon inhabiting the lower Snohomish River, by providing access to off-channel refugia, rearing habitat and improved food production. The project proposes enhancements to available riparian habitat will improve sediment transport in the system, will remove fish passage barriers for migratory fish, and it will increase the riparian vegetation and LWD upon which many of species depend.

MITIGATION PLAN

MITIGATION APPROACH

As noted earlier in this document, mitigation sequencing was practiced for this project and avoidance of impacts was the first order of action once impacts were identified. However, past actions, locations and practices of the railroad within the site (and railroad removal actions to be completed jointly with this project), and City of Everett decisions to maximize potential redevelopment of this property have identified several unavoidable impacts to aquatic habitat. Where possible, these impacts have been limited to already degraded areas where compensatory mitigation can bring a net benefit and improved environmental condition. Current regulatory policies accentuate the importance of providing mitigation for loss of wetland function resulting from development. Typically, mitigation consists of preserving, restoring, creating, and enhancing wetland areas either onsite, offsite, in-kind or out-of-kind, wetland banking or any combination of these.

The general approach is to redevelop the ERR project in accordance with the City's SMP, Salmon Overlay to the SEWIP, SEWIP and EMC 19.33D. Development will mainly occur on manipulated, heavily developed industrial areas and mitigation for development impacts will be conducted through a combination of on-site wetland preservation, restoration, creation, enhancement, stream restoration and buffer creation and enhancement. The proposed mitigation area will focus on the rehabilitation, expansion and enhancement of Wetlands U, V, and W, and Bigelow Creek. For the purposes of this mitigation plan, these terms are defined in accordance with the USACE Regulatory Guidance Letter (USACE 2002), as follows:

- **Preservation** (called Protection/Maintenance in the guidance letter): The removal of a threat to, or preventing the decline of, wetland conditions by an action in or near a wetland. This term includes the purchase of land or easements, repairing water control structures or fences, or structural protection. Preservation does not result in a gain of wetland acres but may result in a gain in functions over the long term.
- **Restoration**: The manipulation of the physical, chemical, or biological characteristics of a property with the goal of returning natural or historic functions to a former or degraded wetland. For the purpose of tracking net gains in wetland acres, restoration is divided into:

- **Re-establishment**: The manipulation of the physical, chemical, or biological characteristics of a property with the goal of returning natural or historic functions to a former wetland. Re-establishment results in rebuilding a former wetland and results in a gain in wetland acres and/or functions. Activities could include removing fill, plugging ditches, breaking drain tiles, etc. Compensatory mitigation is not evaluated until appropriate and practicable *avoidance* and *minimization* has been accomplished.
- **Rehabilitation**: The manipulation of the physical, chemical, or biological characteristics of a property with the goal of repairing natural or historic functions (and processes) of a degraded wetland. Rehabilitation results in a gain in wetland function but does not result in a gain in wetland acres. Activities could involve breaching a dike to reconnect wetlands to a floodplain, returning tidal influence to a wetland, etc.

- **Creation** (called "Establishment" in the guidance letter): The manipulation of the physical, chemical, or biological characteristics present to develop a wetland on an upland or deepwater property, where a wetland did not previously exist. Establishment results in a gain in wetland acreage and function. A typical action is the excavation of upland soils to elevations that will produce a wetland hydroperiod and hydric soils, and support the growth of hydrophytic plant species.
- **Enhancement**: The manipulation of the physical, chemical, or biological characteristics of a wetland to heighten, intensify or improve specific function(s) or to change the growth stage or composition of the vegetation present. Enhancement is undertaken for specified purposes such as water quality improvement, flood water retention, or wildlife habitat. Enhancement results in a change in wetland function(s) and can lead to a decline in other wetland functions, but does not result in a gain in wetland acres. Examples are planting vegetation, controlling non-native or invasive species, and modifying property elevations to alter hydroperiods.

Table 10 below outlines the wetland replacement ratios established in the SEWIP and Salmon Overlay to the SEWIP, which will be utilized for this project. Acreage impacted and planned for creation, restoration and enhancement are based on compensation ratios established in the City's SEWIP and the Salmon Overlay to the SEWIP and are included below. Ecology's wetland replacement ratios (taken from publication #06-06-11a) are embedded in the table in comparison to the City's impact replacement ratios.

The SEWIP and Salmon Overlay to the SEWIP have established calculations recommended for determining compensatory mitigation ratios for wetland and shoreline impacts within the Snohomish River Estuary. These calculations are provided as guidance and are based on functional assessments of existing conditions at a location of proposed impact and estimated potential function of a proposed restoration site. Functional assessments are conducted by use of the Tidal Habitat Model. The model requires completion of a data sheet consisting of a series of site specific questions regarding functional parameters. Each answer is scored relative to function provided and cumulative scores are used to evaluate indicator value assessment (IVA) scores. The equation below was used to estimate compensatory ratios for impacts to Wetland W presented in Table 10. An example Tidal Habitat Model data sheet is included in Appendix E.

$$\frac{\text{IVA Score per Acre Function Lost}}{\text{IVA Score per Acre Function Gained}^{*}} \times 1.3 \times \text{Acres Lost} = \text{Acres of Compensation}$$

[*] IVA Score is an estimate of function gained at the time of impact.

An IVA worksheet has been developed for this mitigation project. According to the analysis, it is anticipated that the function gained will be larger than functions lost and therefore the compensation ratio will be less than 1:1 creation to impact. Per policy P.3 of the Salmon Overlay to the SEWIP, a minimum compensation ratio of 1:1 is required for impacts to riverine wetlands as well as isolated palustrine wetlands. Therefore the required SEWIP mitigation ratio for the ERR project will be 1:1 for all impacted wetlands. Table 11 below outlines the proposed impacts to each wetland and the proposed compensation in created square feet.

Table 11. Wetland Impact Summary and Replacement Ratios

Wetland	Habitat Classification[1]		Ecology Wetland Rating	Ecology Restoration/Creation and Rehabilitation Ratios (ft2 restored/created:ft2 impacted and ft2 rehabilitated: ft2 impacted)	SEWIP Restoration/Creation Ratios (ft2 Restored/Created: ft2 impacted	Area Impacted (ft2)	Proposed Area created (ft2)
	System	Class					
C	Palustrine	Aquatic Bed	I	(1:1 R/C and 6:1 RH)	1:1 R/C	N/A	
		Emergent		(1:1 R/C and 6:1 RH)			
		Forested		(1:1 R/C and 10:1 RH)			
		Scrub-Shrub		(1:1 R/C and 6:1 RH)			
D	Palustrine	Aquatic Bed	II	(1:1 R/C and 4:1 RH)	1:1 R/C	N/A	
		Emergent		(1:1 R/C and 4:1 RH)	1:1 R/C		
		Scrub-Shrub		(1:1 R/C and 4:1 RH)	1:1 R/C		
E	Palustrine	Forested	III	(1:1 R/C and 2:1 RH)	1:1 R/C	N/A	
F	Palustrine	Forested	III	(1:1 R/C and 2:1 RH)	1:1 R/C	**N/A**	
G	Palustrine	Forested	III	(1:1 R/C and 2:1 RH)	1:1 R/C	**N/A**	
H	Palustrine	Forested	III	(1:1 R/C and 2:1 RH)	1:1 R/C	**N/A**	
I	Palustrine	Forested	II	(1:1 R/C and 4:1 RH)	1:1 R/C	**N/A**	
J	Palustrine	Scrub-Shrub	III	(1:1 R/C and 2:1 RH)	1:1 R/C	**2,192**	**2,520**
K	Palustrine	Scrub-Shrub	III	(1:1 R/C and 2:1 RH)	1:1 R/C	N/A	
L[1]	Palustrine	Forested	III	(1:1 R/C and 10:1 RH)	1:1 R/C	**12,185**	**14,012**
		Scrub-Shrub		(1:1 R/C and 2:1 RH)			
M	Palustrine	Emergent	III	(1:1 R/C and 6:1 RH)	1:1 R/C	**679**	**780**
N	Palustrine	Emergent	I	(1:1 R/C and 6:1 RH)	1:1 R/C	N/A	
		Forested		(1:1 R/C and 10:1 RH)	1:1 R/C		
		Scrub-Shrub		(1:1 R/C and 2:1 RH)	1:1 R/C		
O[1]	Riverine	Emergent	III	(1:1 R/C and 4:1 RH)	1:1 R/C	N/A	N/A
P[1]	Palustrine	Emergent	III	(1:1 R/C and 6:1 RH)	1:1 R/C	N/A	N/A

Table 11. Wetland Impact Summary and Replacement Ratios (Continued)

Wetland	Habitat Classification[1]		Ecology Wetland Rating	Ecology Restoration/Creation and Rehabilitation Ratios (ft2 restored/created:ft2 impacted and ft2 rehabilitated: ft2 impacted)	SEWIP Restoration/Creation Ratios (ft2 Restored/Created: ft2 impacted	Area Impacted (ft2)	Proposed Area created (ft2)
Q[1]	Palustrine	Forested	III	(1:1 R/C and 10:1 RH)	1:1 R/C	N/A	N/A
R[1]	Palustrine	Forested	III	(1:1 R/C and 10:1 RH)	1:1 R/C	N/A	N/A
S	Riverine	Emergent	III	(1:1 R/C and 6:1 RH	1:1 R/C	N/A	N/A
T	Riverine	Emergent	III	(1:1 R/C and 6:1 RH	1:1 R/C	N/A	N/A
U	Riverine	Emergent	III	(1:1 R/C and 6:1 RH	1:1 R/C	N/A	N/A
V[1]	Riverine	Emergent	III	(1:1 R/C and 6:1 RH	1:1 R/C	N/A	N/A
W1	Riverine	Emergent	III	(1:1 R/C and 6:1 RH	1:1 R/C	**24,572**	**28,258**
X	Palustrine	Emergent	III	(1:1 R/C and 2:1 RH)	1:1 R/C	**12,775**	**14,691**
Y	Riverine	Forested	II	(1:1 R/C and 4:1 RH)	1:1 R/C	N/A	N/A
Z	Riverine	Emergent	III	(1:1 R/C and 6:1 RH	1:1 R/C	N/A	N/A

Note:
[1] Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al 1979).

COMPENSATORY PLAN

Mitigation for wetland, stream and buffer impacts will consist of the creation and enhancement of Category III wetlands, establishment of vegetated buffer zones and restoration of stream habitat. This mitigation plan proposes a wetland creation ratio of 1.15:1 for isolated palustrine wetland habitat, and 1.15:1 for riverine/tidal wetland habitat, which is greater than the 1:1 required mitigation ratio as defined in the SEWIP Salmon Overlay. The proposed mitigation also includes an increase of 970 linear feet of stream channel and enhancement of 1,568 linear feet of Bigelow Creek, by increasing channel sinuosity, installing Large Woody Debris (LWD) and creating floodplain wetlands.

Mitigation efforts are proposed to expand and enhance several habitat features identified as components of high-quality wetland and stream habitat. These features include:

- High structural diversity, especially emergent, shrub and forested canopy layers,
- Increased hydrologic continuity and functions,
- Enhanced wetland and shoreline buffers to install and protect native plants and to provide key components of habitat,
- Placement of LWD at select locations within on-site wetlands,
- Increase the potential long term recruitment of LWD into wetland, stream and river habitats,
- Undisturbed corridors between rivers, streams, wetland systems, intact upland habitats and other natural areas,
- Rehabilitate and increase diversity of stream channel habitat,

- High diversity or abundance of native plants and animals, and

Many of the above components are planned for incorporation into this mitigation plan. High structural diversity can be achieved by the proposed removal of invasive species and planting of three canopy layers. Native plants will be planted and desirable native volunteers will be permitted.

MITIGATION OBJECTIVES

The objectives of this mitigation plan are outlined in this section and discussed in further detail below. Specific mitigation objectives include:

- Provide no-net-loss in wetland acreage and function.
- Provide in-kind, onsite compensatory mitigation.
- Create a total of 1.38 acres (60,134 square feet) of riverine/tidal wetland to compensate for the reduction of 1.20 acres (52,403 square feet) of riverine/tidal and palustrine wetland habitat.
- Create 970 linear feet of stream channel and enhance 1,568 linear feet of existing Bigelow Creek, to compensate for a loss of 927 linear feet of a ditched drainage.
- Improve stream channel alignment and in-stream habitat.
- Maintain or enhance hydrologic patterns similar to current conditions.
- Provide a natural plant community within the enhanced/created wetland area that will surpass the diversity and structural complexity currently found at the mitigation site.
- Vegetate the area using only native plant species that are known to occur in the project vicinity.
- Vegetate wetland and buffer areas with species that will provide a broad food base for wildlife or that are high in cover value.
- Vegetate wetland, stream and river buffers with coniferous tree species to increase potential long term recruitment of Large Woody Debris (LWD).
- Use hydric soils from the impact area in the creation area.
- Utilize mulch from onsite sources.
- Conserve trees of significant value within created wetland areas.
- Remove shoreline pilings.
- Use BMPs during construction to protect water quality in adjacent wetland areas.

MITIGATION SITE PLANS/DESIGN

BUFFER AND WETLAND REHABILITATION AND CREATION PLAN

The ability of existing wetland buffers to provide habitat functions will be increased relative to the existing conditions on site which have been described in detail above and documented in various figures attached to this report. Benefits of buffers include improved water quality and increased habitat complexity and greater wildlife opportunities both in macro- (physical trees, shrubs and LWD) and micro- (shade and three-dimensional structure) habitat. The enhancement of the existing buffer will

increase potential utilization of the site by a greater number of species and provide a variety of habitats adjacent to the onsite wetland, stream and river features.

Buffers surrounding the wetlands will be preserved and enhanced to protect wetlands, streams and shoreline areas and their functions from potential impacts from the proposed development. Buffer enhancement is proposed to occur along the Snohomish River shoreline from the area north of Wetland C to the north edge of the Newland Construction property, along the northwest of boundaries of Wetlands C and D, and along the perimeter of the Simpson pad. Where existing structures are located on the shoreline, buffers will not be enhanced and existing uses and activities will continue. Some proposed enhancements outlined in the conceptual habitat restoration plan developed for the project area by The Watershed Company (2005) was incorporated into this conceptual mitigation plan.

Shoreline Buffers

Existing Buffer Habitat

The habitat along the shoreline from the north edge of Wetland K along the Eclipse mill site to the northern edge near Pacific Avenue was characterized to identify areas with high and low-quality buffer areas. Present buffer widths were found to be 0 to 50 feet along the Eclipse mill site Stuchell and the Newland properties. This shoreline area has been altered from its natural state because of the on-going industrial and commercial activities such as material stockpiles and material loading facilities. Several areas support no vegetation with buildings and facilities abutting the shoreline. Miscellaneous stockpiles of soil, concrete, and debris lie west along the Eclipse mill site.

The shoreline buffer area is dominated by invasive species. Common tansy (*Tanacetum vulgare*), Himalayan blackberry (*Rubus discolor*), Scot's broom (*Cytisus scoparius*), Canadian thistle (*Cirsium arvense)*, Japanese knotweed (*Polygonum cuspidatum*), birdsfoot trefoil (*Lotus corniculatus*), nightshade (*Solanum spp.*), and purple loosestrife (*Lythrum salicaria*) were some of the prevalent species identified along the shoreline buffer. Alder (*Alnus rubra.*) saplings and other deciduous trees and shrubs were also dispersed along the buffer area.

Given the degraded nature of the shoreline buffer and existing structures located along the river bank in several locations, the proposal incorporates a 50 foot enhanced shoreline buffer to gain important vegetation along the river bank and improve the overall shoreline habitat condition. The 50-foot enhanced shoreline buffer is a large improvement over the past site conditions. Buffers will not be enhanced where existing activities are occurring along the shoreline. When those existing activities cease, buffer enhancement options will be evaluated and installed as appropriate to the future use at those locations.

Proposed Buffer Habitat Enhancement

Buffer enhancement is proposed along the shoreline buffer zone of the Snohomish River adjacent to the project, from the northern outfall of Bigelow Creek and extending north to approximately Pacific Avenue, including the Eclipse Mill site. That portion of the shoreline that falls within the 3-acre City Park set-aside will be enhanced by the City as part of the Park plan and is not included in this evaluation at this time. Figure 10 – Proposed Buffer Enhancement - identifies the proposed shoreline buffer enhancement area. Figure 11- Proposed Buffer Enhancement Eclipse Mill Site - presents a transect of proposed buffer enhancement activities.

The northern Bigelow Creek outfall is located slightly south of the proposed water dependent use (dock area) where the railroad tracks are visible and parallel to the river. The shoreline along the tracks is stabilized with large rip rap within the proposed dock area and vegetation is currently non-existent.

Railroad tracks in this area are scheduled to be removed in 2008. From the northern Bigelow Creek outfall, continuing north to the end of the large rip rap stabilizing the shoreline (approximately 950 feet), the following potential habitat enhancement and creation opportunities were identified, which include but are not limited to;

- removal of the adjacent railroad tracks,
- enhancement of native vegetative buffer,
- establishment of a native vegetative buffer in areas where no buffer presently exists,
- establishment of coniferous tree species for long term LWD recruitment,
- removal of the culvert under the railroad tracks,
- removal of existing creosote treated pilings along the shoreline and in the river adjacent to the project,
- construction of a small bridge for foot traffic for a trail planned along the river,
- placement of a log jam at the southern edge of the large rip rap along the railroad tracks for protection and habitat enhancement

From the edge of the large rip rap stabilizing the shoreline along the railroad tracks, north along the Eclipse Mill site to the southern boundary of the Newland Construction property (approximately 200 linear feet), evidence of previous and continued commercial and industrial operations was observed. The following potential habitat enhancement and creation and buffer zone enhancement and establishment opportunities were identified in that zone, which include but are not limited to;

- removal of invasive vegetative species,
- enhancement of existing buffers,
- establishment of a native vegetative buffer in areas where no buffer presently exists,
- establishment of coniferous tree species for long term LWD recruitment,
- removal of miscellaneous 1900's rubble and debris,
- removal of concrete rubble, and
- removal of two culverts and reconfigure and design of each outfall.

Shoreline buffer enhancement proposed for this Project will entail removal of non-native vegetation and planting of native vegetation within a 50-foot wide buffer. Soil augmentation may be necessary and will be determined at the time of plant installation. Table 11 identifies potential native buffer species that will be utilized for buffer enhancement. Native vegetation will also be established along areas where the buffer is currently absent. Planting of native plants not only increases habitat complexity, but can increase soil stabilization, water attenuation and infiltration, potential LWD recruitment and improve water quality by reducing sedimentation and contaminants.

Removal of concrete rubble, debris, large rip rap, sheet piling, and miscellaneous waste along the shoreline and within the buffer boundary is also proposed at select locations (where shoreline integrity can withstand the alteration) will help to restore the buffer to a more natural state.

The impacts from these improvements may include temporary water quality degradation. As much of the area is currently used for industrial uses, construction noise and related traffic is not expected to increase significantly in the short term, but will be reduced long term. The long-term benefits of enhancing the buffer and area are expected to outweigh the short-term effects.

Wetland C and D Buffers

Existing Buffers

The buffers along the western edge of Wetland C and D have been impacted by historical landuse in the area including construction and maintenance of the adjacent rail-lines. Vegetation cover is limited in these areas and is dominated by invasive species. The existing buffer along the west side of Wetlands C and D ranged from 0 to 15 feet and terminates at the railroad track edge. The vegetative composition of this area consists of alder (*Alnus spp.*) and black cottonwood (*Populus balsamifera spp. trichocarpa)* canopy with an understory of Himalayan blackberry (*Rubus discolor*), horsetail (*Equisetum spp.*), Canadian thistle (*Cirsium arvense),* bull thistle (*Cirsium vulgare*), and reed canary grass (*Phalaris arundinacea*).

Proposed Buffer Habitat Enhancement

Created and enhanced buffer area will occur on the northwest boundary of Wetlands C and D, beginning from the southern tip of the Tire/Fire Landfill site to the northern tip of Wetland C. The buffer width has been established at 100 feet along the northwest boundary of Wetlands C and D, due to their rating as Category I wetlands (EMC 33D.450) while Middle Ditch/Bigelow Creek and West Ditch has a 50-foot buffer associated with its Category III wetland rating (EMC 33D.450). The actual buffer width will vary in some areas to accommodate proposed buffer reduction, proposed trails and stormwater facilities. Figure 10 depicts areas selected for proposed buffer enhancement along wetland areas.

Wetland C and D are confined to the west by the existing BNSF railroad grade. Two sets of railroad tracks and associated railroad grade adjacent to the west edge of Wetland C and D are scheduled to be removed in 2008, prior to construction of the project. A retaining wall is proposed along the western edge of Bigelow Creek to accommodate fill required for the proposed project. The wall will create a planting platform for native vegetation that will be utilized to create buffer where there is currently none. The railroad bed between Bigelow Creek and Wetland C will be converted into trail which will connect with the existing trail at the northwest corner of the Simpson pad and continue north along the River.

Buffer enhancement will entail removal of non-native vegetation and the planting of native vegetation. Native vegetation will also be established along areas where the buffer is currently absent. Planting of native plants not only increases habitat complexity, but can increase soil stabilization, water attenuation and infiltration, potential LWD recruitment and improve water quality by reducing sedimentation and contaminants.

Impacts from these buffer habitat enhancement improvements include additional construction noise, decreased water quality, potential release of contaminants, and increased human activity. These impacts are temporary, and will mainly occur during the environmental clean up and construction stages. The proposed buffer enhancements will provide a net benefit to shoreline habitat and will mitigate for proposed impacts to wetland and shoreline buffers.

Wetland N Buffers

Existing Buffer

The buffer along the northern and western edge of Wetland N has been impacted by historical and present land use in the area. Vegetative cover along the western edge of the wetland is limited and consists primarily of various grasses and invasive species. The existing buffer along the west side of Wetland N ranged from 10 to 185 feet and terminates along an existing gravel access road. The access road that borders the wetland begins at the southern boundary of the site and runs parallel to the BNSF railroad corridor in a northerly direction before turning east and bisecting Wetlands N and D (Figure 10c. – Proposed Buffer Enhancement). The vegetative composition of the existing buffer consists of Himalayan blackberry (*Rubus armeniacus*), willow (*Salix* spp.), red alder (*Alnus rubra*) and a mixture of grasses. The buffer along the northern edge of Wetland N overlaps the buffer along the southern edge Wetland D. These wetlands are separated by the previously elevated gravel road, which is approximately 16 feet wide and extends the length of the northern edge of Wetland N and southern edge of Wetland D. Vegetative cover in this area consists of overlapping overstory canopy of Wetlands D and N. There is no established vegetation on the gravel road.

Proposed Buffer Habitat Enhancement

Enhancement activities planned for this buffer area include potential realignment of the existing gravel trail and upgrade of the trail for use as emergency access to the Simpson Pad. Figure 10c – Proposed Buffer Enhancement presents the alignment of the existing gravel road and potential alignment of the required fire access. The proposed alignment will consist of approximately 990 linear feet of access road through the existing, low-quality buffer along the western edge of Wetland N. The remaining segments, to the south and east, will be improvements to the existing gravel road. Approximately 700 linear feet of existing road will need to be widened to accommodate emergency vehicles. Proposed widening would be up to four feet and the exact dimensions will be determined during final design of the access road. To avoid, wetland impacts as a result of widening the access road vertical retaining walls will be placed outside of the wetland boundary and backfilled to created adequate driving surface. Since this road is planned to provide emergency access to the Simpson Pad it will not be expected to be utilized by vehicular traffic on a regular basis, nor be subject to vehicle emission build-up. The road will have a gravel surface and it will be expected that the primary use of road will be by pedestrian foot traffic and bicycles. The adjacent buffer area that would be impacted by the proposed relocation of the fire access road will be enhanced by revegetation with native plant species.

Simpson Pad

Existing Buffers

A 75-foot enhanced buffer will lie along the north side of the Simpson site while a 50-foot buffer enhancement will surround the south, east, and west sides. This buffer width was negotiated and agreed upon by the City of Everett, therefore wetland ratings and buffers outlined in the Chapter 33D of the Everett code do not pertain to this area. Vegetation observed in this area included but was not limited to black cottonwood (*Populus balsamifera* spp. *trichocarpa*), red alder (*Alnus rubra*) Himalayan blackberry (*Rubus dicolor*), trailing blackberry (*Rubus laciniatus*), Pacific willow (*Salix lasiandra*), Scouler's willow (*Salix scouleriana*), Sitka willow (*Salix sitchensis*), Scot's broom (*Cytisus scoparius*), and velvet grass (*Holcus* spp.).

Proposed Buffer Habitat Enhancement

Enhancement for this buffer area include a public access pedestrian and bike trail, rain garden and/or filter berm areas along the buffer perimeter, and revegetation of native plant species. Bench seating will be

placed adjacent to the shoreline and provide access views of the riverfront. Low impact stormwater solutions will be implemented into the design of the wetlands and project area.

Upland buffers next to wetland habitat increases habitat heterogeneity by providing multiple niches for more species. The range of studies consistently demonstrates the positive relationship between habitat diversity and species richness (Azous and Horner 2001). The use of native plants within the buffer will provide wildlife habitat opportunities similar to seasonal wetland habitat. The trail identified along the edge of the buffer will be constructed with materials that will reduce surface runoff. The proposed buffer enhancement includes a variety of native species known to grow well in the Puget Sound lowlands and includes coniferous trees that will contribute to LWD recruitment in the wetlands these buffers help protect. Figure 10c provides a schematic of the typical buffer enhancement planting plan associated with the Simpson Pad mitigation.

A linear rain garden (bioswale/filter/infiltration berm) will be established along the buffer perimeter of the Simpson site to allow for rain infiltration. The rain garden or filter berm will be created along ten feet of the outer buffer area (EMC 33D.090) and will improve water quality for stormwater runoff. Figures 12 & 12a – Proposed Buffer Enhancement – Simpson Development Pad, provide a cross sectional view and illustrates the implementation of the rain garden and filter berm along the site. The proposed stormwater and buffer improvements will include retention of existing native vegetation and creation of a planting berm between the existing buffer vegetation or wetland edge and the rain garden. The rain garden will include native herbaceous wetland species identified in Table 11 and will provide several functions that wetlands buffers typically perform. The rain garden will remove pollutants and sediment from runoff entering the buffer as well as infiltrate water subsurface providing hydrology for vegetation and metering inflow of water into the wetland.

The proposed wetland mitigation will provide improved wetland functions over much of the project site. To develop the mitigation approach, the existing wetland conditions were compared to the SEWIP and other mitigation planning documents to generate the most advantageous and appropriate mitigation concepts. Water quality, hydrologic retention, and available wildlife habitat was considered in the planning process and is expected to increase as a result of the greater wetland area and added complexity to the habitat. The Category III wetland will be replaced with Category I wetland which will result in a higher level of wetland functions for a variety of fish and wildlife species.

The Everett codes call for enhancements that focus on establishing opportunities for LWD to become established through planned plantings and recruitment. In addition, the mitigation plan includes specific additions of downed LWD at selected locations along the wetland margins and buffer interfaces. Buffer preservation and enhancement surrounding the mitigation wetland will ensure that wetland functions remain intact and are sufficiently isolated from surrounding development. The planned wetland buffer enhancements have focused on LWD production and shading along the wetland margins where currently there is minimal or only deciduous species of vegetation. Many of the buffers are damaged from past practices on the site and have developed patchwork vegetation that is less effective as wildlife habitat, water quality improvement, and shade areas to the adjacent wetlands. Vegetated wetland buffer widths are also quite variable on the site and range from 0 to 50 feet in most cases. There are a few areas that have some wider buffer zones but in general, buffers offer little effectiveness. The proposed 75-foot buffer surrounding the Simpson Pad will provide a continuous wildlife corridor, LWD production, increased shade, and better water quality treatment as compared to current conditions. The installation of stormwater rain gardens along the development margins of the buffer will also provide hydrology to the buffer to water plants and also to the wetland to support wetland hydrology over time.

The proposed 75-foot buffer on the north face of the Simpson Pad is the most efficient buffer width for the project site based on landscape position, past land disturbances and proposed project stormwater treatment and control. The site is isolated from other contiguous wildlife habitats, surrounded by major roads and highways, includes significant human built environments railroad and urban development) that preclude large mammal use or connection to significant habitats. The proposed buffer widths attempt to provide continuity for small mammals, birds, adequate protection for aquatic species, and are also of sufficient width to provide a barrier or separation between human and natural environment.

The SMP provides allowances for public access improvements in buffers, but states that they should be designed to mitigate any significant impacts to environmentally sensitive areas. The alignment and type of trail crossings will be determined during final design. Avoidance and minimization of wetland impacts will be a primary emphasis of trail construction; however, because of extensive size and location of wetlands on the site, construction of trails is anticipated to result in both temporary and permanent impacts to wetlands, streams, and buffers. Impacts from trails will be determined once the trail design has been completed.

Bigelow Creek and West Ditch Drainage

Existing Habitat

The existing wetland and stream habitat and buffers of Bigelow Creek and the West Ditch have been impacted by the construction and maintenance of the adjacent rail-lines for decades. The channels have been constructed as linear, low gradient drainages with little to no channel complexity, receive untreated runoff, and exhibit no riparian conditions. Natural LWD and pool or riffle segments are absent. Invasive aquatic vegetation including watercress (*Nasturtium microphyllum)* has been identified throughout both drainages and the heavily disturbed wetland vegetation and along the edges of these ditches is dominated by cattails (*Typha latifolia*), hardhack (*Spiraea douglasii*), purple loosestrife (*Lythrum salicaria*), reed canary grass (*Phalaris arundinacea*), slough sedge (*Carex obnupta*), and small-fruited bulrush (*Scirpus validus*).

Buffer width and vegetation is limited along both drainages and is dominated by invasive species. The edge of the rail tracks abuts the top of the bank along both Middle and West Ditch. The vegetative composition of this area consists of Himalayan blackberry (*Rubus discolor*), horsetail (*Equisetum spp.*), Canadian thistle (*Cirsium arvense)*, bull thistle (*Cirsium vulgare*), and reed canary grass (*Phalaris arundinacea*).

Proposed Habitat Enhancement

Connectivity of Bigelow Creek to the Snohomish River and the adjacent wetlands (Wetlands C and D) is extremely critical as it provides fish habitat and hydrologic functions and allows for the exchange of water, nutrients, and wildlife. Enhancements to Bigelow Creek are proposed along the west edge of Wetland C from the culvert at the south end of Wetland C to the confluence with the Snohomish River. The existing culverts at Wetland C and the confluence with the Snohomish River will be removed at these locations to provide open channel restoration. The existing rail lines will be removed and the rail grade will be excavated. A new sinuous channel will be excavated and floodplain with associated wetlands will be created (Figure 15). Channel complexity will be increased with the creation of pools and riffles and the addition of LWD within the newly created channel.

The proposed mitigation has been planned based on the SEWIP, Everett Critical Areas Ordinance, Ecology and USACE guidance documents. The proposed conceptual mitigation measures have been planned to meet the minimum replacement ratios from the various guidance documents and the SEWIP analysis resulted in a minimum 1:1 ratio for replacement for the identified impacts (Please see the

BA/HMP Appendix for the detailed analysis of the regulatory overlay and mitigation ratio analysis). The proposed mitigation is to replace impacted aquatic habitat at a ratio of 1.15:1 created to impacted area. Hydrology from the Bigelow Creek watershed and the backwater condition from the Snohomish River at high tide will make the proposed concept functional and effective. The proposed sinuosity is initially set to meet the impact to the linear ditch. The conceptual plan may be altered as necessary to meet overall mitigation goals for this project. The proposed trail position may be altered or adjusted as necessary.

Buffer enhancement along Bigelow Creek will consist of installation of native buffer vegetation along the western edge of the creek and face of the development fill slope. The proposed enhancements of the buffer areas will create habitat where none currently exists. The existing buffers are impacted by the rail lines and fill associated with the Tire fire landfill site. The proposed fill slope will provide a planting platform that will allow for the establishment of native shrubs and trees. Conifers planted in the buffers will increase the long term recruitment of LWD into adjacent wetlands and streams. Buffer Enhancement species will consist of species identified in Table 11. Areas selected for proposed buffer enhancement are shown in Figure 10. The proposed mitigation for wetland and stream impacts will include creation of 970 linear feet of riverine/tidal wetlands and enhancement of 1,568 linear feet of stream channel.

Water Dependent Uses

A number of water dependent uses are proposed along the shoreline from the outfall of Bigelow Creek to the north terminus of the project. A small public-access boat facility is proposed along the shoreline between the outfall of Bigelow Creek and the southern edge of Wetland L. The public boat dock near the outfall of Bigelow Creek will be established for hand-carried boat and day-use tie-ups for small powerboats (no long term moorage or launch facilities are proposed). The facility will benefit the public by allowing access to the shoreline for recreational activities and will enhance the public experience by providing direct contact and views of the river. Conservation measures will also be utilized to reduce potential impacts such as; durable, non-toxic materials will be used to build the marina and dock and pilings and walkways will be minimize in number and width.

Proposed Enhancement

To mitigate for impacts related to water dependent uses, creosote pilings will be removed along the shoreline from Bigelow Creek to the Newland property. The proposed boat facility is anticipated to require approximately 25 new piles. To offset this, up to 50 creosote piles will be pulled from this shoreline area. Up to 300 piles are available for removal. Removal of creosote pilings will reduce the amount of contaminants leaching into the River, decrease dangerous isolated obstacles in the water, and create a more aesthetically pleasing view of the river. Additional mitigation for the proposed boat facility areas will include creation of pocket beaches, installation of log jams and establishment of a native vegetation buffer zone along the River. Although temporary impacts such as decreased water quality from sediment and construction activities are anticipated with the excavation for the marina and boat dock and during piling removal, the proposed habitat improvements will have a net increase of and benefit for shoreline habitat.

The proposal includes excavation of uplands along the shoreline bank to create the area needed to establish the boat facility. By using this construction method, the aquatic area of the Snohomish River is increased and the footprint of the proposed facility will lie completely within what is currently upland. This results in no impact to the active river transportation and reduces the risk of facility impact by floating debris, etc. This proposal will also increase the amount of available shoreline habitat by providing pocket beach habitat and increasing the overall square footage of River shoreline. The existing shoreline slope will be excavated and a new, more gradual slope will be created. This gradual slope will allow for installation of habitat features such as LWD and provide planting areas for native shoreline

vegetation. It has been assumed that these areas are not contaminated and therefore are available for the proposed facility development. Prior to excavation, the necessary level of site investigation to determine soil contamination status is anticipated.

The establishment of a series of log jams is also proposed along the shoreline. The log jams will be strategically placed to the north of the shore at the outfall of Bigelow Creek. These log jams will provide in river habitat, be sited outside of the transit lanes of the river and protect the proposed marina areas from elevated river flows and floating debris.

The water dependent use area will also include an enhanced buffer area. The buffer surrounding the facilities will be planted with native vegetation, including coniferous trees for longterm LWD recruitment and LWD will be placed along the shoreline edge to provide immediate habitat for fish and wildlife. Figures 14 and 14a illustrate the proposed small boat facility.

WETLAND MITIGATION

The subject property contains wetlands that range from Category I to IV. Many of these wetland areas will not be directly impacted by the proposed project or restoration activities, but some wetlands and their buffers will be impacted by the proposed development and restoration activities. Wetland impacts will include fill of Wetlands L, M, J and X and partial fill of Wetland W (Figure 12 – Wetland Resources Impact Map). The proposed wetland fill will total approximately 52,403 square feet (1.20 acres) and will include fill and removal of approximately 927 linear feet of stream habitat.

Impacted Wetlands

Wetlands J and M

These wetlands were not previously identified or delineated during previous investigations prior to 2007. Wetland J is 0.05 acres (2,192 square feet) and Wetland M is 0.16 acres (679 square feet). These wetlands are isolated by railroad grade and tracks, diked berms or human disturbance. Most of the wetland edges are steeply sloped due to the ditch characteristic and the adjacent railroad grade. Vegetation in these wetlands were described by Adolfson as scrub-shrub and/ or emergent and consisting of less than five species. These wetlands will be filled to accommodate a road tying development on the landfill site to Pacific Avenue.

ESA/Adolfson rated Wetland J and M as Category III depressional wetlands according to Ecology's rating system for Western Washington (Hruby 2004). The wetlands scored moderately on water quality because of the ability to store some stormwater before entering the Snohomish River. Since the wetlands are isolated and do not have diverse vegetation structures the wetlands scored low on hydrologic and habitat functions. The buffers associated with these wetlands are highly disturbed and essentially non-existent due to the railroad grades and human disturbance.

Wetland L

Wetland L was not previously identified or delineated during previous investigations prior to 2007. Based on approximated wetland boundaries Wetland L is 0.28 acres (12,185 square feet) and is adjacent to the Snohomish River. The entire wetland has been proposed to be filled to accommodate the proposed shoreline access areas. Wetland L is isolated by railroad grade and tracks along the west boundary and by diked berms along the eastern boundary. A dike separates the wetland from the river and prevents a permanent surface water connection between the wetland and the Snohomish River, unless under extreme flooding events. Himalayan blackberry borders much of the wetland and dominates most of the northern section. Red-osier dogwood dominates the shrub layer within the wetland. The wetland edge followed a

defined topographic and vegetative transition. Other species observed within the wetland include pacific ninebark (*Physocarpus capitatus)*, salmonberry, pacific willow and skunk cabbage.

Wetland L has been rated as a Category III depressional wetland (Adolfson 2007) following Ecology's rating system for Western Washington (Hruby 2004 [ESA Adolfson 2007]). The wetland performs minor function on water quality, hydrologic and habitat functions, because the depression is shallow and is isolated by railroad tracks and dikes that severely restrict the use of the wetland by fish and wildlife species. While a portion of these wetlands are disturbed by railroad grades and tracks, both wetlands have a forested vegetation structure which could provide creation and enhancement mitigation opportunities.

Wetland W

This ditched and channelized wetland is resultant of activities associated with construction of the adjacent railroad grade to the east and the Tire Fire/Landfill site to the west. Wetland W has been rated as Category III depressional wetlands according to Ecology's rating system for Western Washington (Hruby 2004 [GeoEngineers 2007d]). The wetland is similar in shape and community structure to wetlands associated with Bigelow Creek (Wetlands T, V and Z). The wetland has a direct association with the Snohomish River. Remedial activities, consisting of potential contaminated soil removal, have been conducted within the ditch. Based on approximated wetland boundaries, Wetland W is 0.86 acres (37,473 square feet), of which 0.56 acres (24,572 square feet) have been proposed to be filled to accommodate the required development pad. Vegetative species observed within the wetland and adjacent margins, includes but is not limited to: common cattail, hardhack, purple loosestrife, reed canary grass, slough sedge, small-fruited bulrush (*Scirpus validus*), water plantain and western dock (*Rumex occidentalis*). The wetland edges are steeply sloped due to the ditch characteristic of the stream channel and associated wetland. Vegetative species observed along the wetland margins, include but are not limited to, bittersweet nightshade (*Salanum dulcamara*), clover (*Trifolium sp.*), cutleaf blackberry (*Rubus laciniatus*), Himalayan blackberry, Japanese knotweed (*Polygonum cuspidatum*), morning glory (*Convolulus sp.*), Nootka rose (*Rosa nutkana*), salmonberry and Scot's broom.

Wetland buffer conditions and functions are very low and are in effect non-existent due to the railroad grades, tracks and lack of native vegetation. The hydrologic connection to the Snohomish River through culverts allows for access by listed priority species. However, habitat value for listed species is very low and the overall riparian condition is poor in the anadromous zone of the watershed. These wetlands provide excellent mitigation opportunities (rehabilitation, enhancements or creation) due to the current linear ditch configuration, presence of invasive species, poor habitat function and current lack of a vegetative buffer.

Wetland X

Wetland X is 0.29 acres (12,775 square feet) in size. The entire wetland has been proposed to be filled to accommodate the proposed shoreline access areas. It is isolated by railroad grade and tracks, berms and human disturbance. Most of the wetland edges are steeply sloped due to the ditch characteristic and the adjacent railroad grade. Vegetation in the wetland is described as emergent, scrub-shrub and forested, and has been rated as a Category III depressional wetland according to Ecology's rating system for Western Washington (Hruby 2004 [GeoEngineers 2007d]).

Wetland buffer conditions and functions are very low and are in effect non-existent due to the railroad grades, tracks and lack of native vegetation. This wetland provides excellent mitigation opportunities due to the linear ditch configuration and current lack of vegetative buffer.

Description of Proposed Mitigation Site Plan/Design

A total proposed fill of 52,403 (1.20 acres) and a proposed wetland creation of 60,134 square feet (1.38 acres) of wetland is proposed. In addition, 970 linear feet of stream creation and 1,568 linear feet of stream enhancement is proposed to occur adjacent to the existing Bigelow Creek channel to compensate for impacts to Wetlands J, M, L, W and X (Figure 13 – Proposed Wetland Creation). Some proposed enhancements outlined in the conceptual habitat restoration plan developed for the project area by The Watershed Company (2005) was incorporated into this conceptual mitigation plan.

Large Woody Debris (LWD) will be added into the restored channel and wetlands to increase habitat complexity, restore beneficial and productive edge habitat, and to armor erosive bank areas. Large woody debris is important for the ecosystem as it contributes to stream and channel morphology, slowing water velocities and creating natural meanders. Increased sediment capacity and settling and increased channel stability can result from the naturally deposited wood debris.

Invasive non-native vegetation will be removed and native vegetation suited for the soils and hydrology will be chosen and planted in this wetland. Conifers and associated riparian and fringe vegetation plantings will add habitat diversity and improve wetland functions and value. Tree species planted along the edge of wetland areas will provide potential long term recruitment of LWD into streams, Snohomish River and wetlands.

PLANTING/LANDSCAPE PLANS

Buffers will be enhanced by restoring natural riparian processes and by improving wetland functions from existing conditions.

One objective of this mitigation plan is to use native vegetation that has been documented or typically occurs in the vicinity of the project area. The vegetation proposed for planting includes species documented at the site and typically found in nearby areas. Plant selection is based upon their hydrologic requirements, their attributes, such as being able to support wildlife and their ability to improve water quality. Vegetation is a major factor in the distribution of wildlife. Plants provide food, shelter against predators and weather, and areas for nesting, resting, perching and breeding (Leedy *et al*. 1978). Other areas with existing vegetation that are valuable to wildlife will be maintained within the designed buffer.

LWD Recruitment

LWD deposited into streams and wetlands has been shown to be beneficial for fish and wildlife in the Pacific Northwest. Valuable habitat such as pools, refugia, spawning grounds are created for fish by the addition of woody debris and, it can also provide substrate for aquatic invertebrate prey. The wood can also enhance and create fish passage areas. Birds and other wildlife benefit from increased perching and basking sites from the downed wood. LWD can enhance primary productivity of a stream by adding organic matter and nutrients (Fischenich and Morrow, 2000).

Coniferous forest and associated vegetation is proposed for improvements to the shoreline buffer, wetland buffers, and along Bigelow Creek to assist with natural recruitment of large woody debris (LWD) into the ecosystem. Everett Municipal Code identifies the importance of LWD recruitment potential in buffer enhancement projects. Establishment of tree species – especially coniferous species - adjacent to wetland and stream habitat, will eventually mature, die (or be subject to windthrow) and potentially fall into wetland or stream areas providing LWD into these habitats. Once the forest has matured, continual native

recruitment of coniferous tree species is anticipated, which will provide long-term recruitment of LWD into aquatic habitats within and adjacent to the site.

Proposed Plant List

Table 12 outlines the vegetative species proposed for planting as well as zones for each species. Appendix E discusses the attributes of the various plants selected for use at the mitigation areas.

Table 12. Proposed Vegetation for Mitigation Planting

Common Name	Scientific Name	Indicator Status	Class	Zones
Buffer Vegetation				
Douglas fir	*Pseudotsuga*	FACU	Tree	Forested
Western red cedar	*Thuja plicata*	FAC	Tree	Forested
Western hemlock	*Tsuga heterophylla*	FACU-	Tree	Forested
Big leaf maple	*Acer macrophyllum*	FACU	Tree	Forested
Black cottonwood	*Populus trichocarpa*	FAC	Tree	Forested
Red Alder	*Alnus Rubra*	FAC	Tree	Forested
Western swordfern	*Polystichum*	FACU	Herb	Scrub/Shrub
Vine maple	*Acer circinatum*	FAC-	Shrub	Forested,
Salal	*Gaultheria shallon*	FACU	Shrub	Forested
Red huckleberry	*Vaccinium*	FACU	Shrub	Forested,
Evergreen	*Vaccinium ovatum*		Shrub	Forested,
salmonberry	*Rubus spectabilis*	FAC+	Shrub	Scrub/Shrub
Wetland Vegetation				
Pacific willow	*Salix lasiandra*	FACW+	Shrub	Scrub/Shrub
Red Osier Dogwood	*Cornus sericea*	FACW	Shrub	Scrub/shrub
Pacific Ninebark	*Physocarpus*	FACW-	Shrub	Scrub/shrub
Nootka rose	*Rosa nutkana*	FAC	Shrub	Scrub/shrub
Slough sedge	*Carex obnupta*	OBL	Herb	Emergent
Small fruited bulrush	*Scirpus microcarpus*	OBL	Herb	Emergent

MONITORING PLAN

A detailed Habitat Restoration Plan and Wetland and Stream Mitigation report will be prepared during final design and will coordinate all proposed restoration and mitigation activities on the site. The final restoration and mitigation plans will include a detailed list of success standards and performance measures that will served as benchmarks for a formal monitoring and maintenance program that will be initiated following construction. The habitat monitoring and maintenance program will be initiated following completion of construction and shall occur as stated in the environmental permit conditions pertaining to these activities or for a period of at least 5 years, whichever is greater.

A specific set of performance standards corresponding to the stated mitigation goals has been established. The goals listed in the previous section are implemented below. These standards will be used to judge the results of this project. The success of this mitigation is dependent upon the components specified in this plan.

Monitoring will occur for a minimum of three years. The first observation event will occur following completion of the installation of the vegetative species. This event will document that the created wetland appears to meet the construction plans. Items to be noted will include: plants were installed as specified and that the wetland appears to be receiving hydrology as planned. At this time, the wetland specialist will aid in the production of the "as-built drawings." The monitoring report prepared subsequent to this first observation will include the as-built drawing.

Whether the second monitoring event will occur in the spring or in the fall depends on the time of year during which the planting of the created wetland has occurred. The second- and third-year monitoring events will occur at approximately 6-month intervals following the second monitoring event. The primary focus of the annual spring monitoring event will be on hydrologic functions with the fall monitoring event focusing on vegetative diversity, cover and mortality. A brief monitoring report will be prepared subsequent to each monitoring visit and will be submitted to the appropriate agencies. Following third-year monitoring, staff from the City of Everett will be notified and a visit to the mitigation site will be scheduled for concurrence on the success of the mitigation area.

METHODS

Making a photographic log of pre-construction and post-construction environmental conditions will be a primary method of monitoring the success of the mitigation. Observations to be recorded include plant survival and growth rates, hydrologic factors, and wildlife occurrences. Photographs will also be taken at each monitoring event of the monitoring stations to document the evolution of the mitigation site over the monitoring period. Photographs will be taken in all four cardinal directions, from the same point, height, and focused in the same direction.

- Permanent monitoring stations will be established in the mitigation area. Each monitoring station will consist of circle with an 11.8-foot radius (0.01 acres) with a reinforcing bar embedded in the center.
- Monitoring of each station will be accomplished by determining the survival rate of the planting by counting both dead and live plants of each species respectively within the station. Each species will be recorded by name along with its coverage. Also, the general condition of each plant, such as observations of new growth and signs of stress or disease, will be noted.
- Monitoring of aerial coverage of the vegetation within the wetland creation area will be accomplished by estimating the percentage of the ground covered within the monitoring station, by planted and volunteer species. Estimating will occur immediately after planting and during each monitoring event. Trees, shrubs and herbaceous species will be included in the estimate of coverage. Desirable native volunteer species will be identified and documented; and undesirable non-native species such as reed canarygrass (*P. arundinacea*), Himalayan blackberry (*R. armeniacus*), cutleaf blackberry *(R. laciniatus)* and Scot's broom (*C. scoparius*) will be identified, counted and their percentage of aerial coverage will be estimated and compared to performance standards listed below. Upon completion of this documentation, the undesirable species will be removed.
- Hydrology and presence of hydric soil will be verified by tracking soil saturation or ponding water within the created and enhanced wetland areas during the spring monitoring events. Thriving obligate plant species will be documented as indicators of a successful hydrologic regime.

- Wildlife recordings are to be made as general notes by the monitoring biologist during the monitoring events. Observations may include sighting of individual species, nests, burrows, droppings, or other indicators. The results will be recorded, including date and time of day, and included in the report for the monitoring event.
- Maintenance requirements such as trash removal and vandalism repair will also be noted. These observations, along with mitigation site photographs and a brief report will be submitted to the City of Everett after the annual monitoring event is completed.
- It is understood that in order for monitoring to occur, the biologist will be required to cross the existing wetland and associated buffer in order to enter the mitigation area. Access will be restricted to only authorized personnel, who will be aware of the sensitivity of the existing and created wetland. The landscape contractor will also be made aware of this, and should be careful not to disturb desirable vegetation when removing non-native species. In both instances, trained professionals who will be able to determine a path of minimal disturbance to the existing wetland should be hired.

PERFORMANCE STANDARDS

- Invasive, exotic and undesirable species shall be represented by less than 10 percent coverage in the created wetland area after the 10-year monitoring period as determined by observations made within the monitoring areas.
- There shall be a minimum of 80 percent survival of all planted materials throughout the monitoring period. Survival of the enhancement plantings will be determined by counting and documenting the numbers of dead versus live plants within the enhanced area. Species, quantities, general conditions and sizes of enhancement plants will be described and recorded.
- Acceptable cover standards for the wetland trees and shrubs:
  - end of year 1: minimum of 20 percent
  - end of year 3: minimum of 30 percent
  - end of year 5: minimum of 50 percent
- Acceptable cover standards for the wetland herbaceous species will be at least 80 percent end of year 5 monitoring.

MAINTENANCE

Plant maintenance of the wetland creation areas will be conducted throughout the monitoring years. Maintenance during the first two years will include periodic watering (irrigation) and control of undesirable species. Maintenance during the subsequent years will be focused on weeding (invasive plant removal). Also, if crowding of newly planted vegetation by grass species is determined to affect plant survival during the monitoring events, the maintenance company will return to trim grasses from around the drip lines of the planted vegetation.

Irrigation of the wetland creation area may be required for the first 2 years after installation of native plants. A temporary irrigation system may be utilized or a regular watering schedule established if onsite water is not available. Watering during the plant establishment period is crucial for plant survival. During the dry months, usually June through September, it may be necessary to add up to 3 gallons of water per plant per week. Extremely warm weeks may necessitate watering on a more frequent basis. An

irregular watering interval will encourage the development of deep root systems, which in time will reduce the need for any future watering.

Control of undesirable species will be maintained by periodic weeding of the mitigation area. Species to be removed primarily include exotic invasive species such as: reed canarygrass, Himalayan blackberry, cutleaf blackberry and Scot's broom. Only desirable native volunteer species in addition to those planned for the area will be encouraged to grow. Wetland buffer slopes will be reseeded with grasses if deemed necessary due to erosion or sedimentation into the newly created wetland areas. Some of the other maintenance responsibilities such as trash removal and vandalism repair will be performed on an as-needed basis.

CONTINGENCY PLAN

If the project fails to meet the standards discussed above, implementation of a contingency plan will be required by Ecology (1998). The proposed mitigation plan can fail if certain unfavorable factors occur. Human activity, fire, erosion, settling and disease may have a negative effect on newly planted vegetation. Plants obtained for this project may be diseased or become diseased over time and result in poor survival. Monitoring notes should include observations regarding these and other possible problems that may be occurring over the monitoring period. As problems are recorded, suggestions and possible solutions should be forwarded to the City of Everett as a component of the monitoring reports.

If more than 20 percent mortality of plantings occurs within any of the monitoring years, the problem areas will be replanted, preferable in the dormant season and provided with better maintenance to ensure higher plant survival. If, in the judgment of the monitoring biologist, alternative plant species are needed to improve survival, the selection of alternative species will be made.

The photographic record and monitoring data shall determine the need for contingency plan activation. The success of the mitigation plan is dependent upon creating one wetland with the component characteristics described in the plan. The monitoring period may be extended if survival has not stabilized by the end of monitoring year three. The applicant is responsible for all costs associated with replanting and plant maintenance.

CONCLUSION

This BA/HMP and conceptual mitigation plan addresses conceptual buffer enhancement, creation, rehabilitation, and creation and enhancement of wetlands and streams. Highlights of this plan included:

- Maintaining required and creating buffer on all sides of preserved, restored, and created wetlands on the property and enhancing buffer functions.
- Preserving and limiting impacts to onsite wetlands and making significant improvements to existing wetland functions.
- Compensating for the loss of 52,403 square feet of regulated Category III (City of Everett) wetlands through the creation and enhancement of 60,134 square feet of wetlands associated with Bigelow Creek.
- Creation of 970 linear feet and enhancement of 1,568 linear feet of Bigelow Creek Stream channel to compensate for fill associated with Wetland W.
- Re-establishing native plants, increasing habitat diversity, potential LWD recruitment and improving overall wetland and stream functions throughout the site.

LIMITATIONS

GeoEngineers has prepared this report in general accordance with the scope and limitations of our proposal. Within the limitations of scope, schedule and budget, our services have been executed in accordance with the generally accepted practices for biological assessments in this area at the time this report was prepared. No warranty or other conditions express or implied should be understood.

This report has been prepared for the exclusive use of OliverMcMillan and their authorized agents and regulatory agencies, following the described methods and information available at the time of the work. No other party may rely on the product of our services unless GeoEngineers agrees in advance to such reliance in writing. The information contained herein should not be applied for any purpose or project except the one originally contemplated.

REFERENCES

Azous, A. L. R. R. and Horner, editors. 2001. Wetlands and Urbanization, Implications for the Future. Lewis Publishers, New York.

Cavanaugh, W.J. and G.C. Tocci. 1998. Environmental Noise. Published in E.S.C., USC Journal of Public Affairs, Vol. 1, No. 1. Los Angeles, California.

City of Everett, Department of Planning & Community Development. 1997. Snohomish Estuary Wetlands Integration Plan.

City of Everett and Pentec Environmental. 2001. Salmon overlay to the Snohomish estuary wetland integration plan, for the City of Everett.

City of Everett, Department of Public Works, and Federal Highway Administration. February 11, 2004. Environmental Assessment: 41st Street Freight Mobility and Railroad Track Removal and Upgrade Projects.

Feist, B.E., J.J. Anderson, and R. Mayaamoto. 1992. Potential Impacts of Pile Driving on Juvenile Pink (*Oncorhynchus borbusha*) and Chum (*O. keta*) Salmon Behavior and Distribution. FRI-UW-9603. University of Washington, School of Fisheries, Fisheries Research Instituite.

Floyd and Snider, Inc. May 19, 1999. "Technical Memorandum, Summary of Existing Condition, Riverfront Redevelopment Pilot Project, Everett, Washington."

GeoEngineers, Inc. 2007a. Earth and Groundwater Technical Data Summary, Everett Riverfront Redevelopment, Everett, Washington. Dated February 12, 2007.

GeoEngineers, Inc. 2007b. Historical Aerial Photograph Analysis Report, Everett Riverfront Redevelopment Everett, Washington. Prepared for OliverMcMillan Everett, LLC. Dated September 25, 2007

GeoEngineers, Inc. 2007c. Ordinary High Water Mark Delineation, Everett Riverfront Redevelopment Everett, Washington. Prepared for OliverMcMillan Everett, LLC. Dated September 25, 2007

GeoEngineers, Inc. 2007d. Plants and Animals Technical Data Summary, Everett Riverfront Redevelopment Everett, Washington. Prepared for OliverMcMillan Everett, LLC. Dated June 2007.

GeoEngineers, Inc. 2007e. Wetland and Stream Compliation Review, Everett Riverfront Redevelopment Everett, Washington. Prepared for OliverMcMillan Everettt LLC. Dated September 2007.

Gustafson R.G., W.H. Lenarz, B.B. McCain, C.C. Schmitt, W.S. Grant, T.L. Builder, and R.D. Methot. 2000. Status review of Pacific Hake, Pacific Cod, and Walleye Pollock from Puget Sound, Washington. National Oceanic and Atmospheric Administration Technical Memorandum. NMFS-NWFSC-44
http://www.nwfsc.noaa.gov/publications/techmemos/tm44/environment.htm.

Haas, A., and Collins, B. 2001. A historical analysis of habitat alterations in the Snohomish River Valley, Washington, since the mid-19th century: implications for Chinook and Coho Salmon, prepared for the Tulalip Tribes and Snohomish County, Everett, Washington. http://www.co.snohomish.wa.us/publicwk/swm/Publications/2001-02SnoHabAlertations/+Index.htm
(Accessed January 2007)

Haring, D. 2002. Salmonid Habitat Limiting Factors Anaylsis Snohomish River Watershed Water Resources Inventory Area 7 Final Report. Washington State Conservation Commission.

Loch, A., Tulalip Indian Tribe. November 11, 1999. Letter to Michelle Hoverter, City of Everett.

National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2007. "Species Protected Under the Endangered Species Act".
http://www.nmfs.noaa.gov/pr/species/esa_species.htm
(Accessed January 2007)

National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2004. Biological Opinion on the 41st Street Overcrossing Freight Mobility Project and Railroad Track Removal and Upgrade Project. Reference number 2003/00337. Issued February 13, 2004.

National Marine Fisheries Service, National Oceanic and Atmospheric Administration. 2001. Biological Opinion on the 41st Street Overcrossing Freight Mobility Project. Reference number 2001/00533. Issued May 11, 2001.

Pacific Fishery Management Council. 1999. Amendment 14 to the Pacific Coast Salmon Plan. Appendix A: Description and Identification of Essential Fish Habitat, Adverse Impacts, and Recommended Conservation Measures for Salmon. Pacific Fishery Management Council. August 1999.

Pentec Environmental, Inc. 1994. Wetland Delineation, City of Everett, Tire Fire Property, Snohomish County, Washington. December 14, 1994.

United States Army Corp of Engineers. 2006a. Prohibited Work Times for Bald Eagle Protection.
http://www.nws.usace.army.mil/publicmenu/DOCUMENTS/WORK_WINDOW_Bald_Eagles.pdf
Updated June 7, 2006. (Accessed May 7, 2007)

United States Army Corp of Engineers. 2006b. Work Windows for Fish Protection in all freshwaters *excluding* waters within national park boundaries, Columbia River, Snake River and lakes.
http://www.nws.usace.army.mil/publicmenu/DOCUMENTS/REG/work_windows_-

_all_fresh_waters.pdf
Updated June 7, 2006. (Accessed May 7, 2007)

United States Fish and Wildlife Service. 2005. Listed and Proposed Endangered and Threatened Species and Critical Habitat; Candidate Species; and Species of Concern in Western Washington as Prepared by the U.S. Fish and Wildlife Service Western Washington Fish and Wildlife Office. Snohomish County. Revised December 20, 2005.
http://www.fws.gov/westwafwo/ se/SE_List/SNOHOMISH.htm
(Accessed January 2007)

Urick, R.J. 1983. Principles of Underwater Sound. Chapter 7 In: *The Noise Background of the Sea*. Peninsula Publishing, Los Altos, California.

Washington Department of Fish and Wildlife. 2007. Priority Habitats and Species Map in the Vicinity of T29R05E Sections 29 and 32. January 05, 2007.

Washington Department of Fish and Wildlife. 2007b. SalmonScape. [Online]
http://wdfw.wa.gov/mapping/salmonscape/htm.
(Accessed May 2007)

Washington Department of Fish and Wildlife. 2002. Washington State Salmon and Steelhead Stock Inventory. Washington Department of Fisheries and Wildlife and Western Washington Treaty Indian Tribes. Accessed on-line at
http://wdfw.wa.gov/fish/sasi/
(Accessed May 2007)

Washington Department of Natural Resources. 2007. Natural Heritage Program, Working List and On-Line Reference Desk
http://www.dnr.wa.gov/nhp/refdesk/index.html
(Accessed January 2007)

Washington Department of Transportation. 2006. Biological Assessment Preparation for Transportation Projects, Advanced Training Manual. Environmental Affairs Office, Olympia, Washington. May 2006.

Watershed Company. July 2005. Snohomish Riverfront Properties at Bigelow Creek: Conceptual Enhancement Program. Prepared for the City of Everett.

Williams R.F., Laramie R.M., and Ames J.J. 1975. A Catalog of Washington Streams and salmon utilization volume 1 Puget Sound Region. Washington Department of Fisheries, Olympia, Washington.

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps, Street Maps 2005

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

Vicinity Map

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 1

Map Revised: December 4, 2007
Path: P:\6\6191002\01\GIS\MXD\6191002001Figure1.mxd
Office: BOIS

Legend

Site Boundary

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

Data Sources:
Aerial photo obtained from NAIP Imagery 2006.

W S N E

370 0 370
Feet

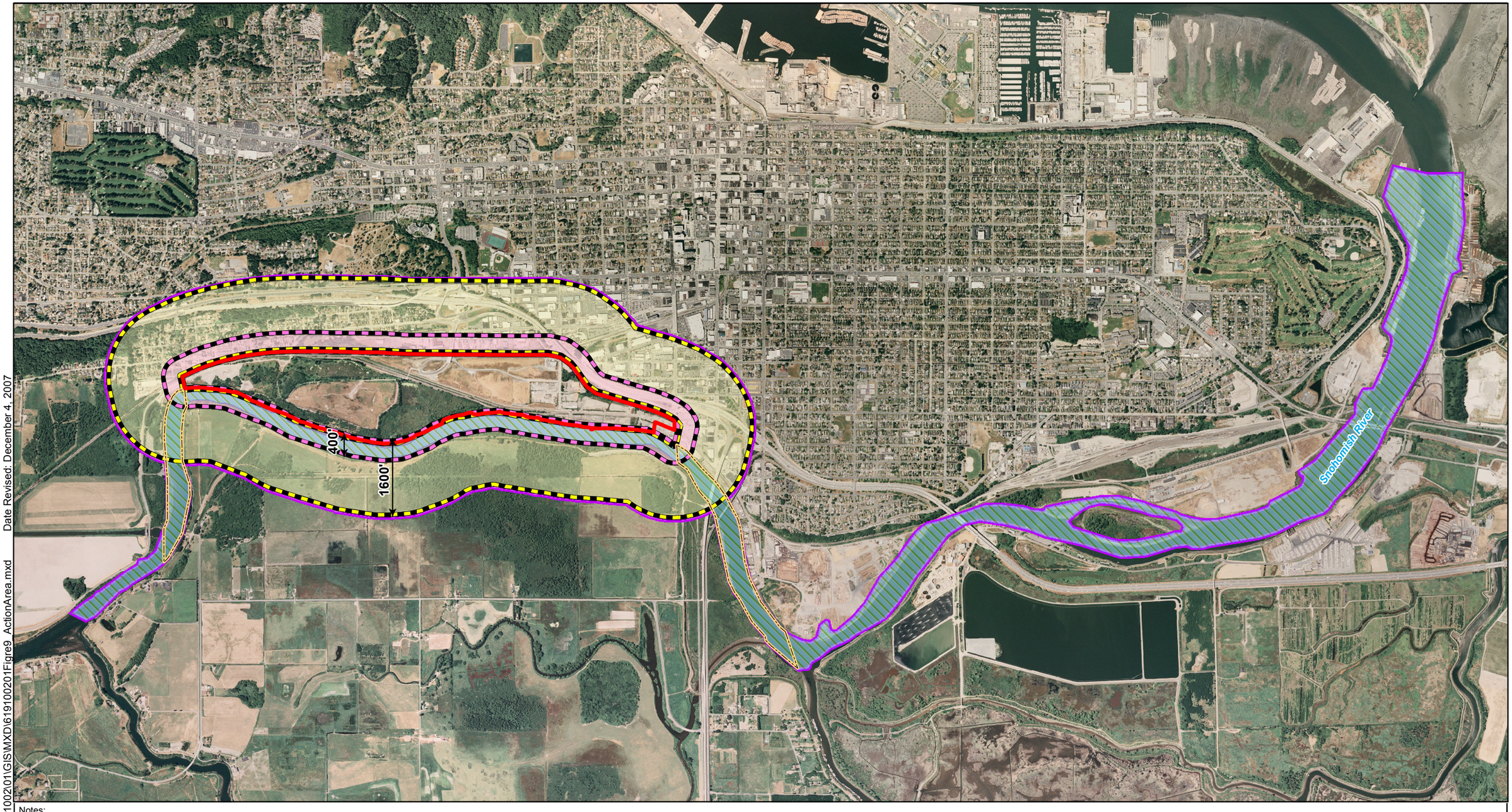
Site Boundary / Layout

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 2

BOISE\P:\6191002\01\CAD\61910020I.dwg JEP:BMK 11/20/07



Date Revised: December 4, 2007
Path: P:\06\061910021\GIS\MXD\61910021Figre9_ActionArea.mxd
Office: BOIS

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources:
NAIP imagery from US Department of Agriculture, July 2006.
Universal Transverse Mercator, Zone 10, North American Datum 1983

Explanation

- Site_boundary10042007
- Approximate In Water Noise Impact Area
- Sediment Impact Area
- General Construction Terrestrial Noise Impact Area
- Maximum Construction Terrestrial Noise Impact Area
- Approximate Action Area

2,000 0 2,000
Feet

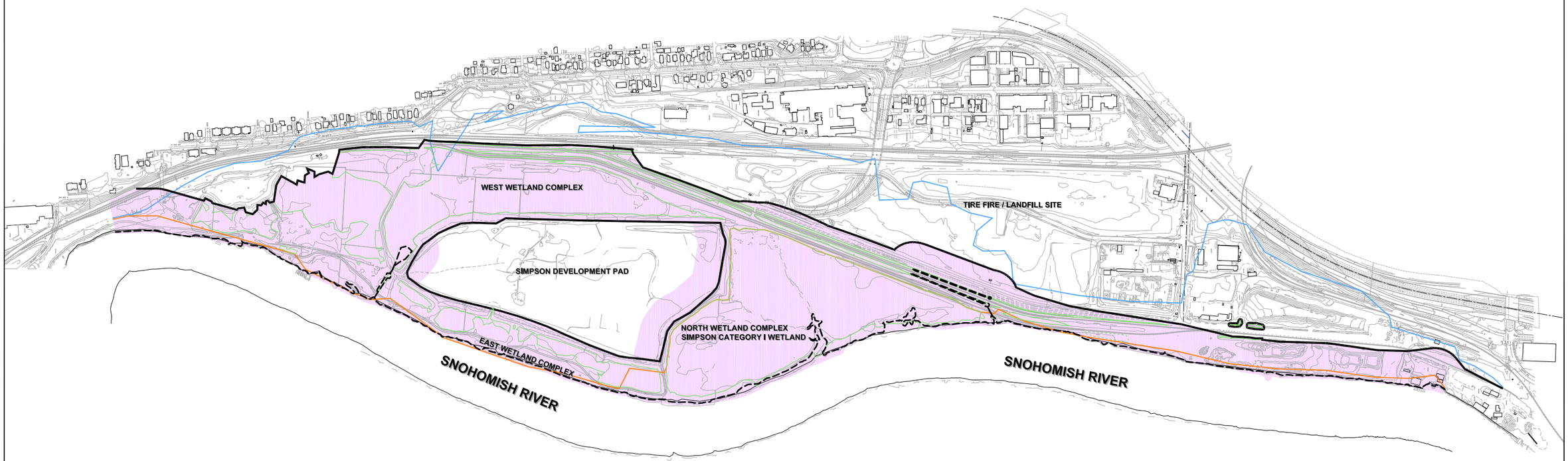
W N S E

Action Area

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 3



Legend

- Shoreline and Shoreland Jurisdiction Line
- Shoreline and Shoreland Jurisdiction
- Wetlands
- FEMA - 100 Year Flood Plain
- FEMA - Floodway
- Snohomish River OHWM
- Estimated Wetland Boundary not Surveyed

370 0 370
Feet

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

Reference: Base drawing provided by Perteet, Inc.

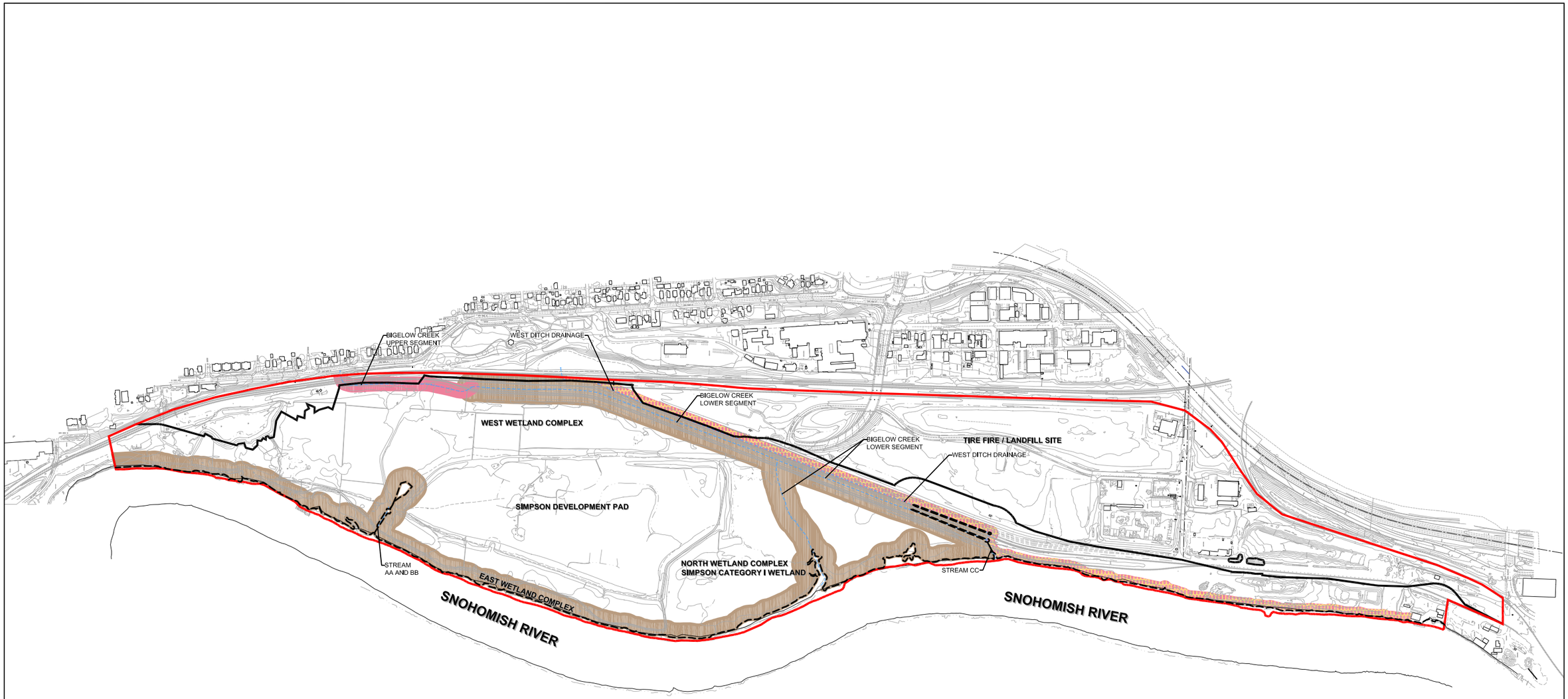
Shoreline and Shoreland Jurisdiction with FEMA Floodway

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 4

BOISE\P:\619100201\CAD\619100201.dwg JEP:BMK 12/12/07



Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. This map represents shoreline jurisdictional information from the City of Everett and centerline approximations of stream channels based on interpretations from information provided by ESA Adolfson.

Reference: Base drawing provided by Perteet, Inc.

Legend

- Site Boundary
- Stream
- Snohomish River OHWM
- Shoreline and Shoreland Jurisdiction Line
- 100 Foot Stream Buffer
- 50 Foot Stream Buffer
- 50 Foot Stream Buffer (reduced)

W S N E

370 0 370
Feet

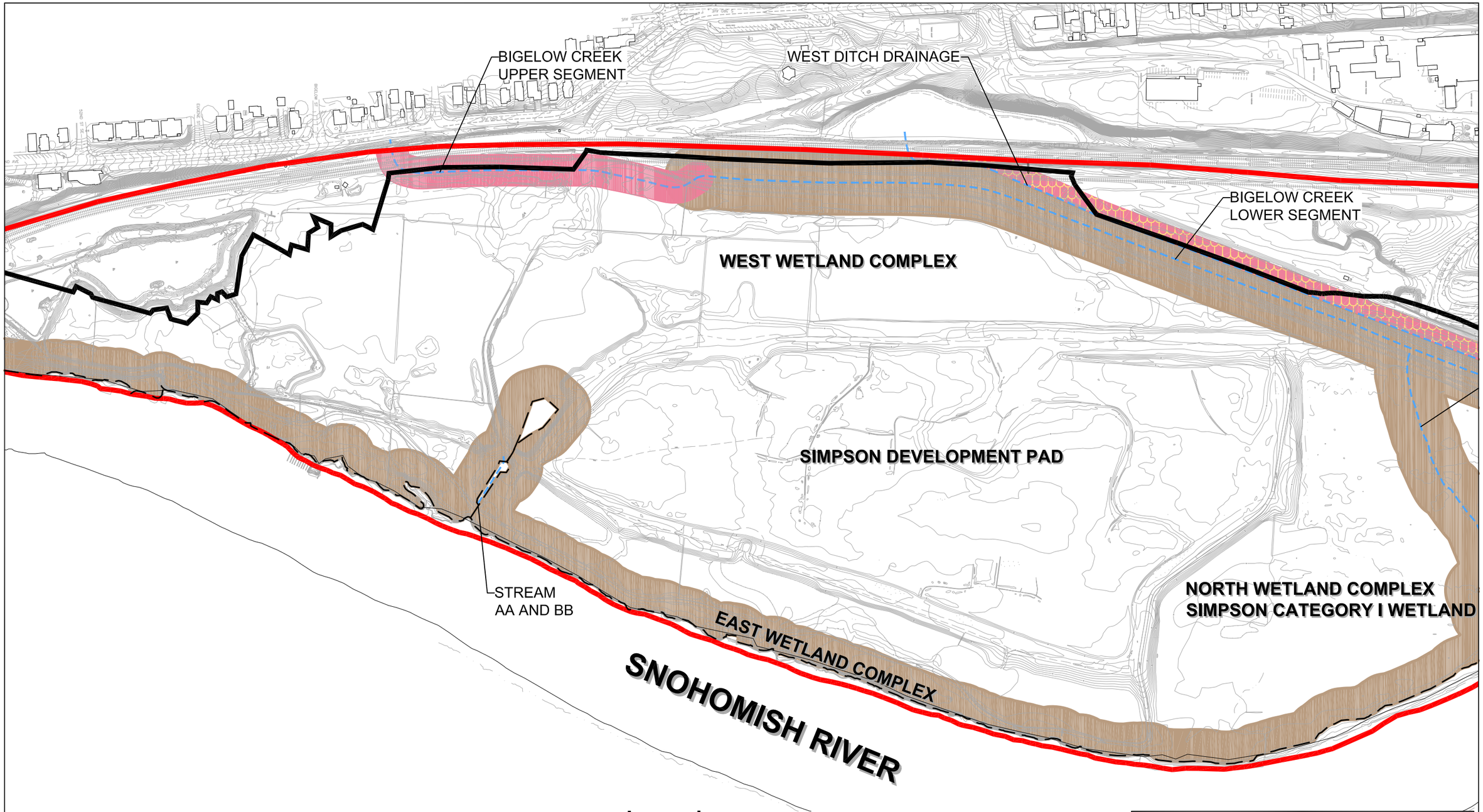
Stream Delineation and Buffer Map

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 5

BOISE\P:\6191002\01\CAD\619100201.dwg JEP:BMK 12/06/07



Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. This map represents shoreline jurisdictional information from the City of Everett and centerline approximations of stream channels based on interpretations from information provided by ESA Adolfson.

Reference: Base drawing provided by Perteet, Inc.

Legend

- Site Boundary
- Stream
- Snohomish River OHWM
- Shoreline and Shoreland Jurisdiction Line
- 100 Foot Stream Buffer
- 50 Foot Stream Buffer
- 50 Foot Stream Buffer (reduced)

W S N E

150 0 150
Feet

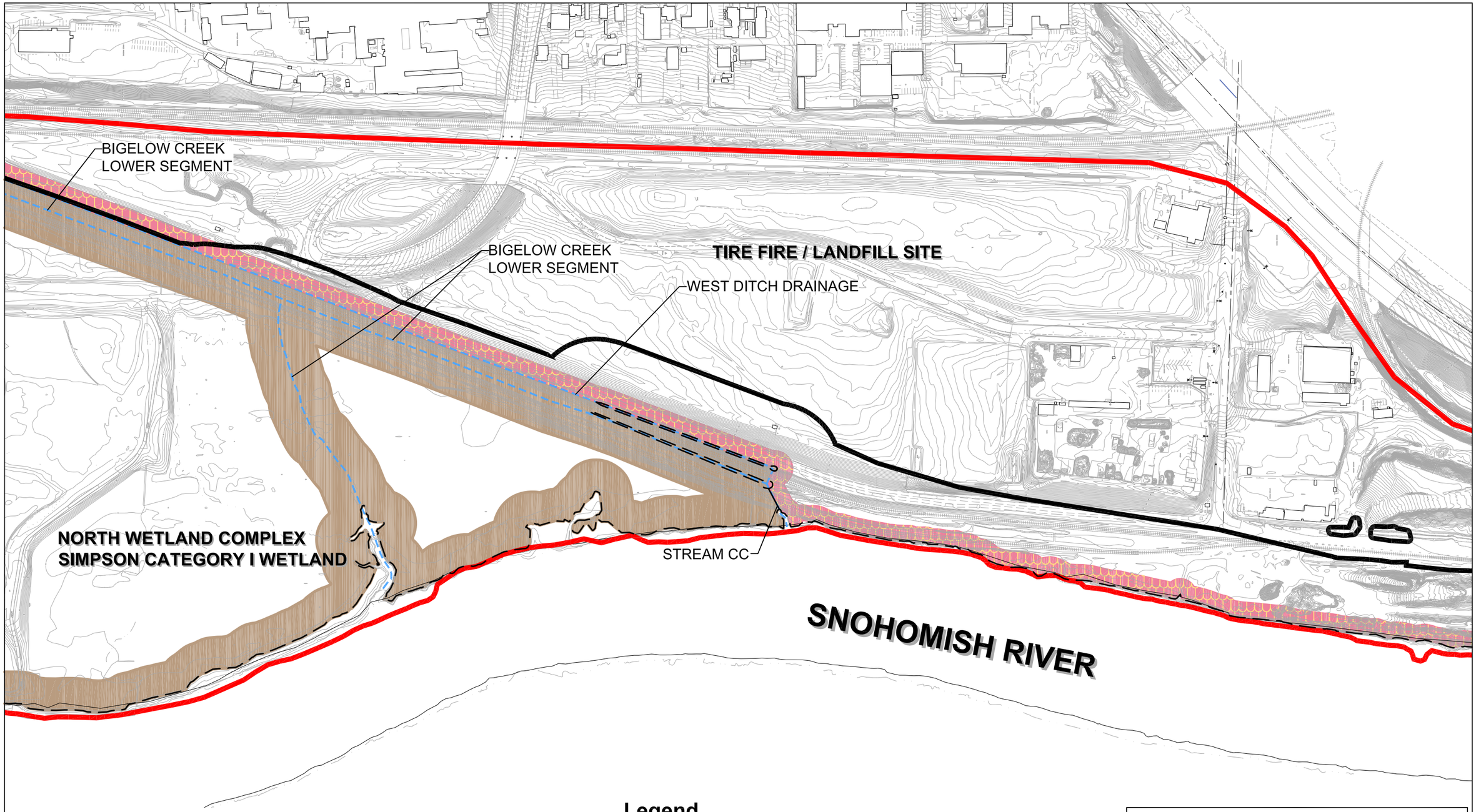
Stream Delineation and Buffer Map

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 5a

BOISE\P:\6191002\01\CAD\619100201.dwg JEP:BMK 12/06/07



BOISE\P:\6191002\01\CAD\6191002O1.dwg JEP:BMK 12/06/07

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. This map represents shoreline jurisdictional information from the City of Everett and centerline approximations of stream channels based on interpretations from information provided by ESA Adolfson.

Reference: Base drawing provided by Perteet, Inc.

Legend

- Site Boundary
- Stream
- Snohomish River OHWM
- Shoreline and Shoreland Jurisdiction Line
- 100 Foot Stream Buffer
- 50 Foot Stream Buffer
- 50 Foot Stream Buffer (reduced)

W S N E

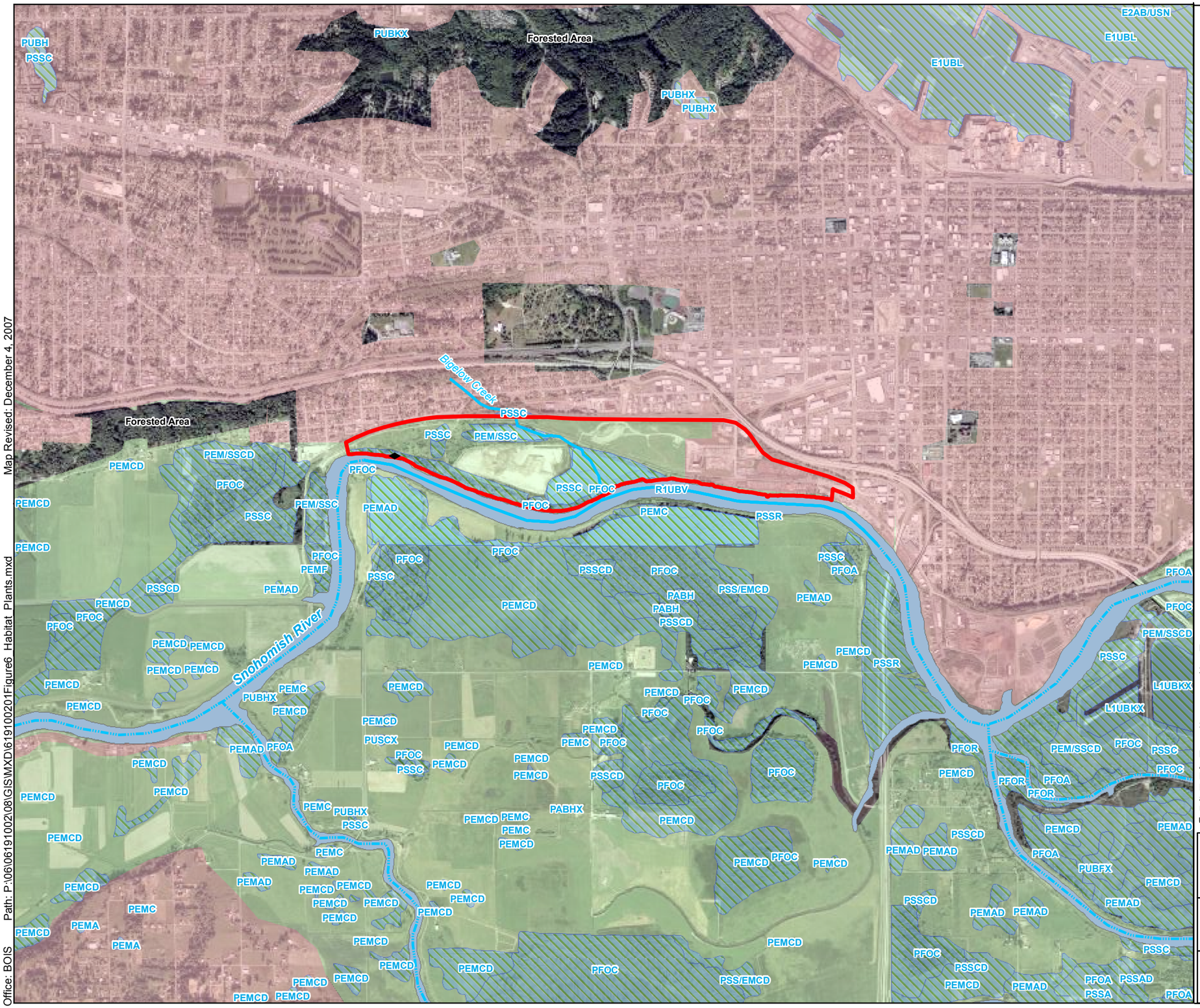
150 0 150
Feet

Stream Delineation and Buffer Map

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 5b



Map Revised: December 4, 2007

Path: P:\06\06191002\08\GIS\MXD\61910020 1Figure6 Habitat Plants.mxd

Office: BOIS

Explanation

- Site_boundary10042007
- <all other values>
- Urban
- Agiculture/Herbaceous Area

E1U - Estuarine, Subtidal, Unconsolidated Bottom
L1UB - Lacustrine, Limnetic, Unconsolidated Bottom
PAB - Palustrine, Aquatic Bed
PEM/SS - Palustrine, Emergent / Scrub-Shrub
PEM - Palustrine, Emergent
PFO - Palustrine, Forested
PSS/EM - Palustrine, Scrub-Shrub / Emergent
PSS - Palustrine,Scrub-Shrub
PUB - Palustrine, Unconsolidated Bottom
PUS - Palustrine, Unconsolidated Shore
R1UB - Riverine, Tidal, Unconsolidated Bottom

W N S E

2,000 0 2,000

Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

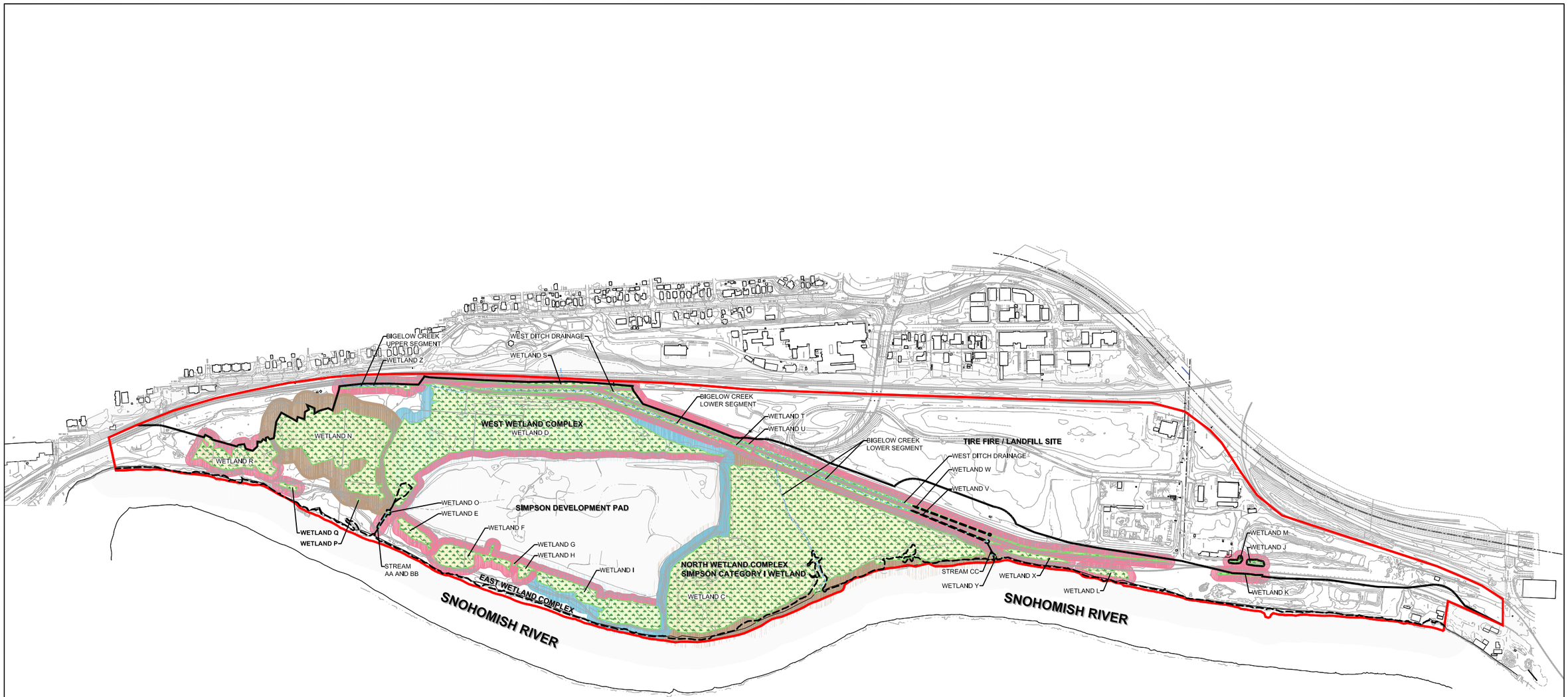
Data Sources:
Aerial image obtained from TerraServer dated Thursday, June 13, 2002.
Habitat and Species data from Washington Department of Fish and Wildlife. Wetland data from NWI data from National Fish and Wildlife (obtained April 2006) & staff delineation.
Urban, wildlife corridor and forested areadelineated from field staff.
Universal Transverse Mercator, Zone 10, North American Datum 1983

Habitat Types and Plant Communities within Project Vicinity

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 6



Legend

- Site Boundary
- Wetlands
- Snohomish River OHWM
- Stream
- Shoreline and Shoreland Jurisdictional Line
- 100 Foot Wetland Buffer
- 75 Foot Wetland Buffer
- 50 Foot Wetland Buffer
- Estimated Wetland Boundary not Surveyed

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. This map represents a compilation of delineations conducted between 2006 and 2007 by The Watershed Company and ESA Adolfson which were provided by the City of Everett for this report.
4. Shoreline jurisdiction was provided by Perteet.

Reference: Base drawing provided by Perteet, Inc.

370 0 370
Feet

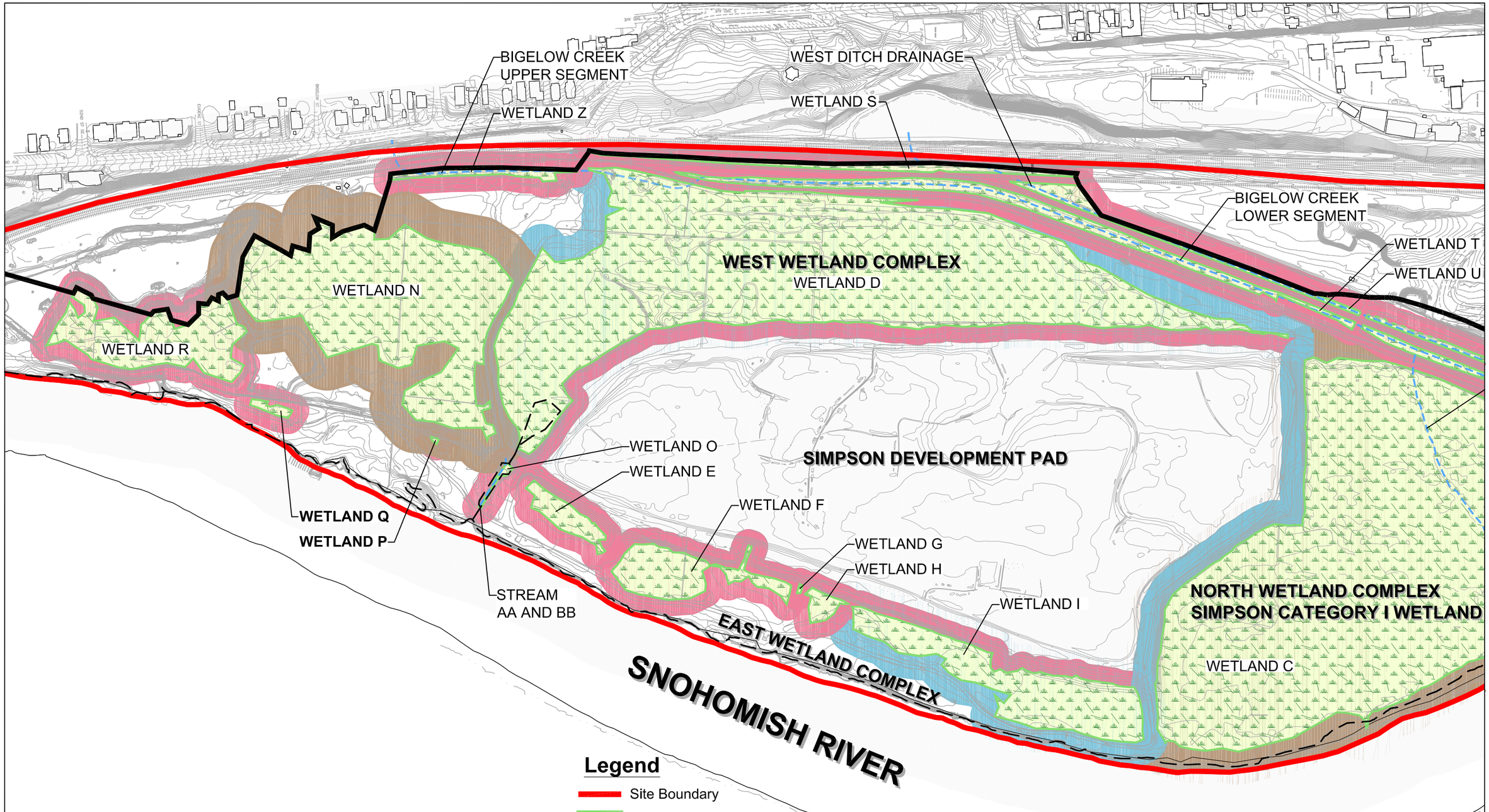
Wetland Delineation and Buffer Map

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 7

BOISE\P:\619100201\01\CAD\619100201.dwg 11/20/07 JEP:BMK



Legend

- Site Boundary
- Wetlands
- Snohomish River OHWM
- Stream
- Shoreline and Shoreland Jurisdictional Line
- 100 Foot Wetland Buffer
- 75 Foot Wetland Buffer
- 50 Foot Wetland Buffer
- Estimated Wetland Boundary not Surveyed

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. This map represents a compilation of delineations conducted between 2006 and 2007 by The Watershed Company and ESA Adolfson which were provided by the City of Everett for this report.
4. Shoreline jurisdiction was provided by Perteet.

Reference: Base drawing provided by Perteet, Inc.

150 0 150
Feet

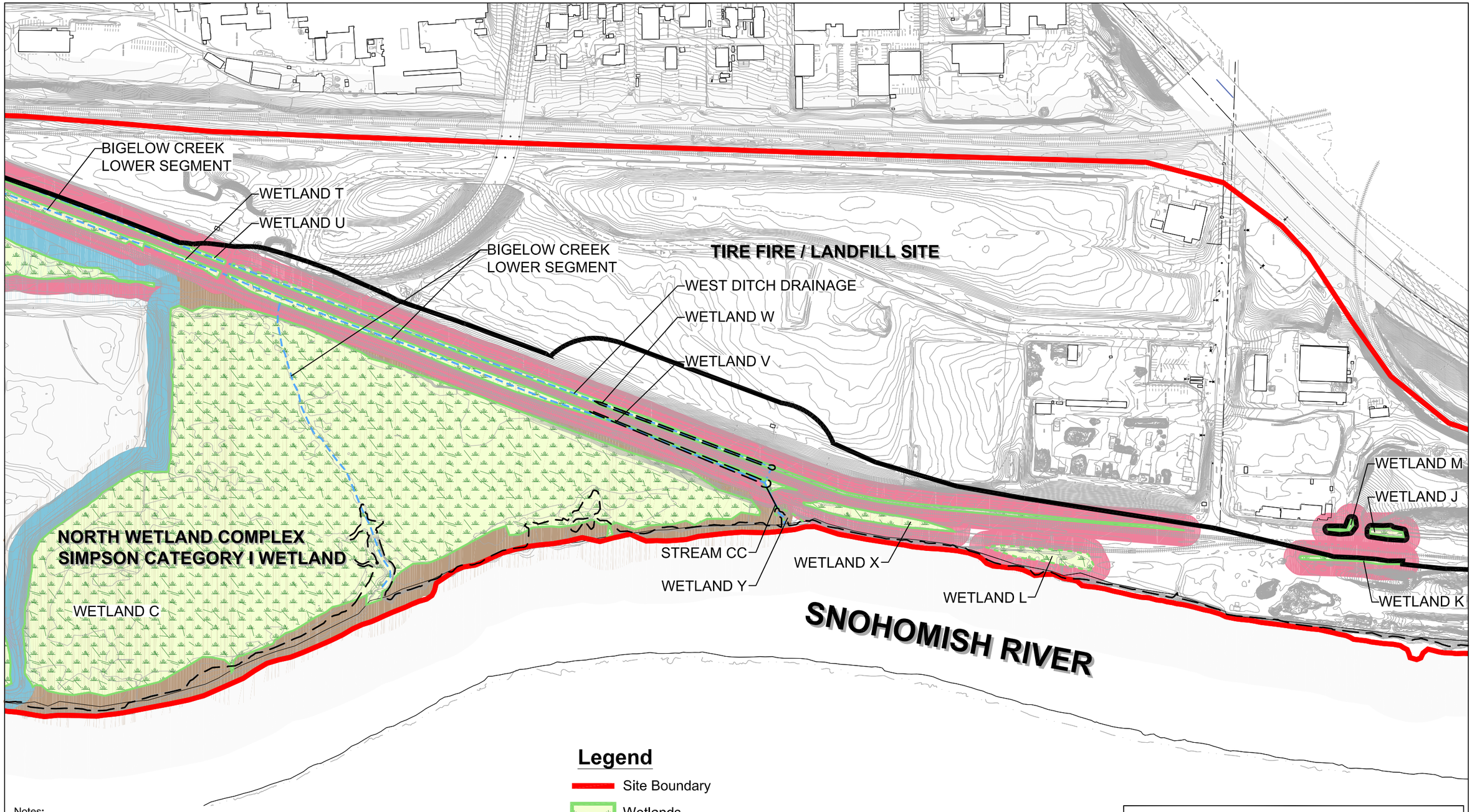
Wetland Delineation and Buffer Map

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 7a

BOISE\P:\6191002\01\CAD\619100201.dwg JEP:BMK 11/20/07



BOISE\P:\6191002\01\CAD\619100201.dwg 11/20/07 JEP:BMK

Legend

- Site Boundary
- Wetlands
- Snohomish River OHWM
- Stream
- Shoreline and Shoreland Jurisdictional Line
- 100 Foot Wetland Buffer
- 75 Foot Wetland Buffer
- 50 Foot Wetland Buffer
- Estimated Wetland Boundary not Surveyed

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. This map represents a compilation of delineations conducted between 2006 and 2007 by The Watershed Company and ESA Adolfson which were provided by the City of Everett for this report.
4. Shoreline jurisdiction was provided by Perteet.

Reference: Base drawing provided by Perteet, Inc.

W N S E

150 0 150
Feet

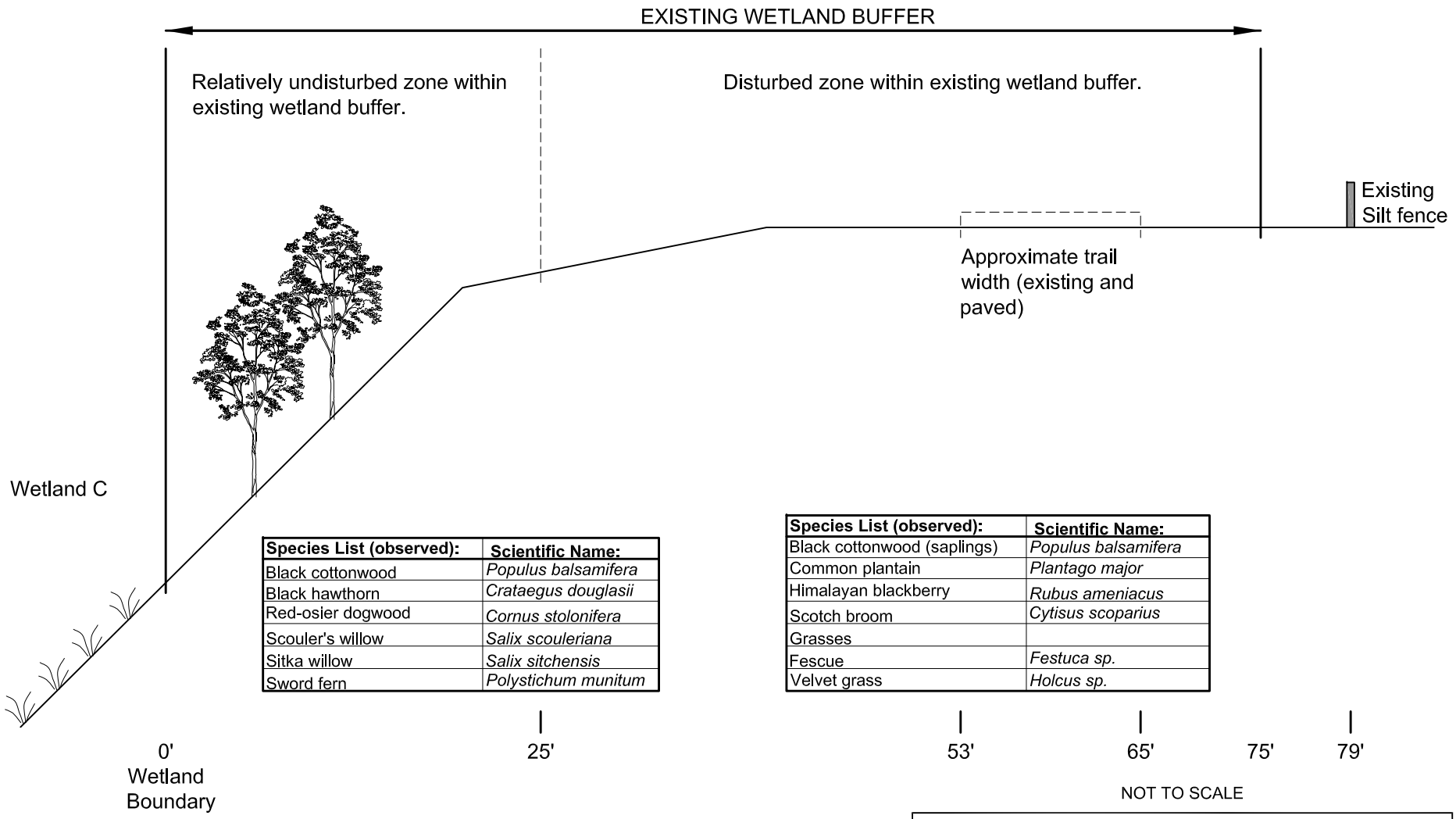
Wetland Delineation and Buffer Map

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 7b

BOISE\P:\6191002\01\CAD\619100201F8a-F8d.dwg JEP:BMK 11/19/07



Species List (observed):	Scientific Name:
Black cottonwood	*Populus balsamifera*
Black hawthorn	*Crataegus douglasii*
Red-osier dogwood	*Cornus stolonifera*
Scouler's willow	*Salix scouleriana*
Sitka willow	*Salix sitchensis*
Sword fern	*Polystichum munitum*

Species List (observed):	Scientific Name:
Black cottonwood (saplings)	*Populus balsamifera*
Common plantain	*Plantago major*
Himalayan blackberry	*Rubus ameniacus*
Scotch broom	*Cytisus scoparius*
Grasses	
Fescue	*Festuca sp.*
Velvet grass	*Holcus sp.*

NOT TO SCALE

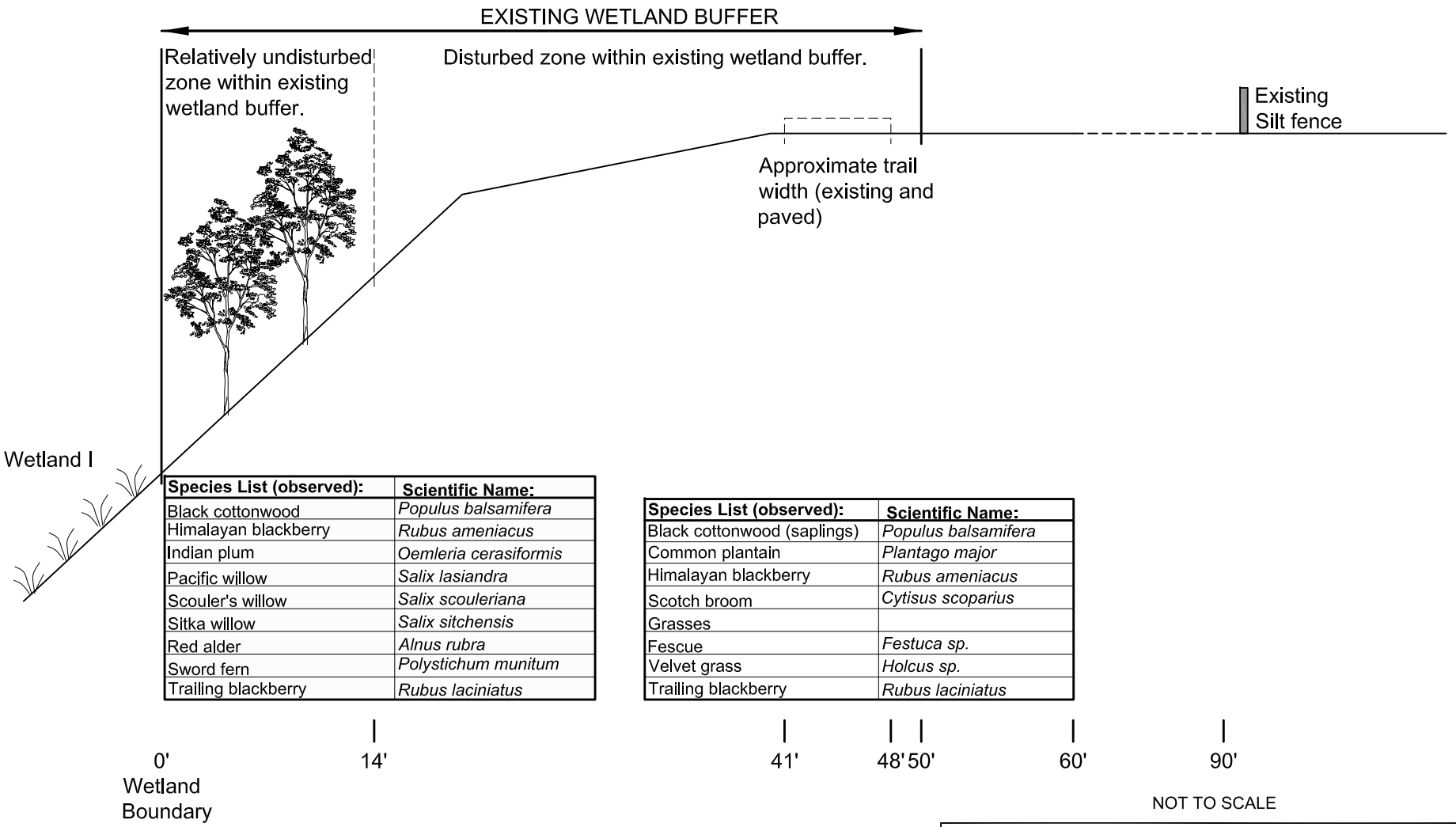
Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers,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

Existing Buffer Conditions - Simpson Development Pad Transect T1

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 8a



Species List (observed):	Scientific Name:
Black cottonwood	*Populus balsamifera*
Himalayan blackberry	*Rubus ameniacus*
Indian plum	*Oemleria cerasiformis*
Pacific willow	*Salix lasiandra*
Scouler's willow	*Salix scouleriana*
Sitka willow	*Salix sitchensis*
Red alder	*Alnus rubra*
Sword fern	*Polystichum munitum*
Trailing blackberry	*Rubus laciniatus*

Species List (observed):	Scientific Name:
Black cottonwood (saplings)	*Populus balsamifera*
Common plantain	*Plantago major*
Himalayan blackberry	*Rubus ameniacus*
Scotch broom	*Cytisus scoparius*
Grasses	
Fescue	*Festuca sp.*
Velvet grass	*Holcus sp.*
Trailing blackberry	*Rubus laciniatus*

NOT TO SCALE

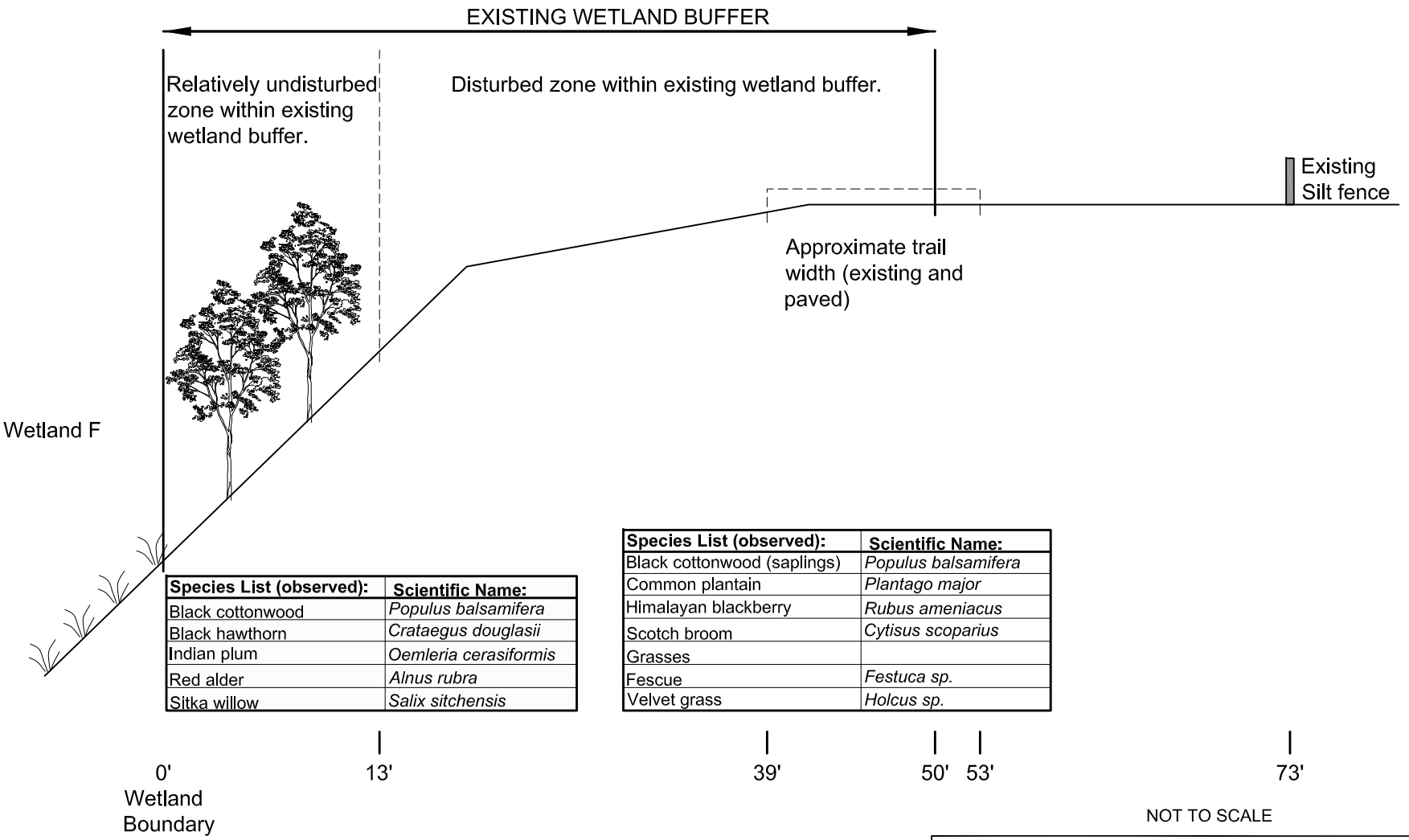
Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers,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

Existing Buffer Conditions - Simpson Development Pad Transect T2

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 8b



Species List (observed):	Scientific Name:
Black cottonwood	*Populus balsamifera*
Black hawthorn	*Crataegus douglasii*
Indian plum	*Oemleria cerasiformis*
Red alder	*Alnus rubra*
Sitka willow	*Salix sitchensis*

Species List (observed):	Scientific Name:
Black cottonwood (saplings)	*Populus balsamifera*
Common plantain	*Plantago major*
Himalayan blackberry	*Rubus ameniacus*
Scotch broom	*Cytisus scoparius*
Grasses	
Fescue	*Festuca sp.*
Velvet grass	*Holcus sp.*

NOT TO SCALE

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

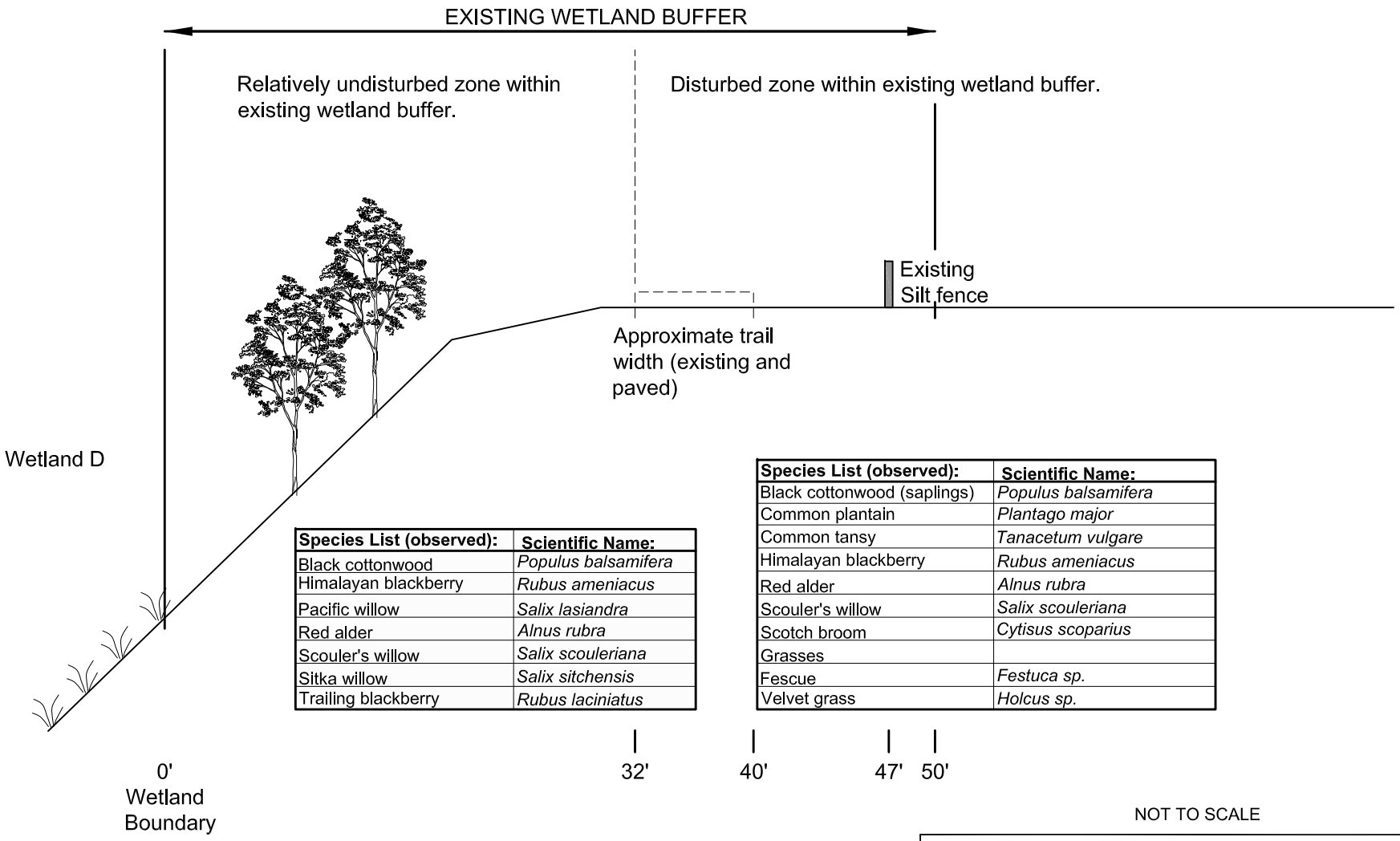
Existing Buffer Conditions - Simpson Development Pad Transect T3

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 8c

BOISE\P:\6191002\01\CAD\619100201F8a-F8d.dwg JEP:BMK 11/19/07



Species List (observed):	Scientific Name:
Black cottonwood	*Populus balsamifera*
Himalayan blackberry	*Rubus ameniacus*
Pacific willow	*Salix lasiandra*
Red alder	*Alnus rubra*
Scouler's willow	*Salix scouleriana*
Sitka willow	*Salix sitchensis*
Trailing blackberry	*Rubus laciniatus*

Species List (observed):	Scientific Name:
Black cottonwood (saplings)	*Populus balsamifera*
Common plantain	*Plantago major*
Common tansy	*Tanacetum vulgare*
Himalayan blackberry	*Rubus ameniacus*
Red alder	*Alnus rubra*
Scouler's willow	*Salix scouleriana*
Scotch broom	*Cytisus scoparius*
Grasses	
Fescue	*Festuca sp.*
Velvet grass	*Holcus sp.*

NOT TO SCALE

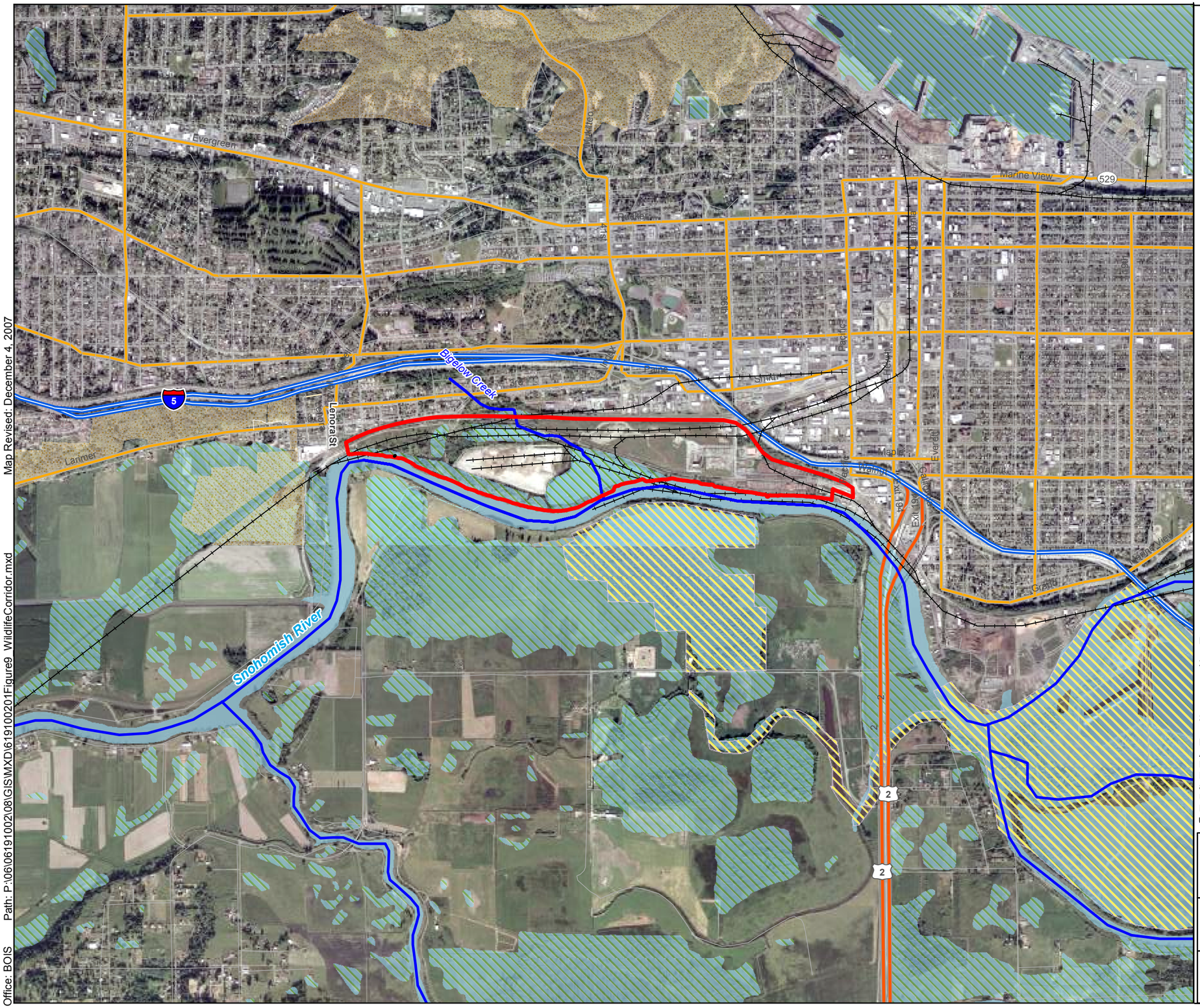
Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers,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

Existing Buffer Conditions - Simpson Development Pad Transect T4

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 8d



Explanation

- Project Area
- Anadromous and Resident Fish Presence
- Streams / Rivers
- Wildlife Corridor
- Waterfowl Concentrations
- Wetlands

N W E S

2,000 0 2,000

Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources:
Aerial image obtained from TerraServer dated Thursday, June 13, 2002.
Habitat and Species data from Washington Department of Fish and Wildlife. Wetland data from NWI data from National Fish and Wildlife (obtained April 2006) & staff delineation.
Urban areas and wildlife corridor delineated from field staff.
Road data provided from ESRI Data & Maps, Street Maps 2005.
Universal Transverse Mercator, Zone 10, North American Datum 1983

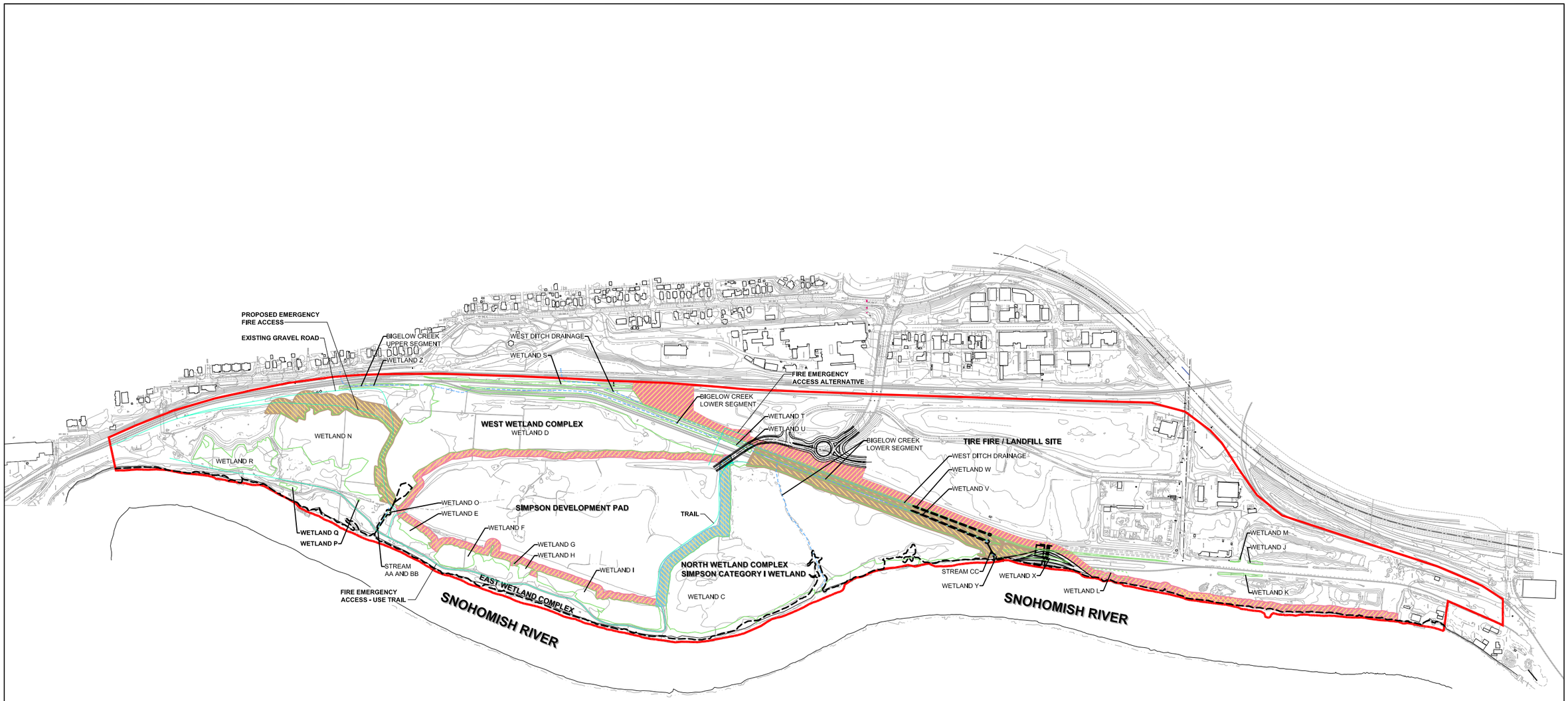
Wildlife Corridor and Species Use Map

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 9

Map Revised: December 4, 2007
Path: P:\06\06191002\08\GIS\MXD\61910020 1Figure9_WildlifeCorridor.mxd
Office: BOIS



Legend

- Site Boundary
- Stream
- Snohomish River OHWM
- 100 Foot Proposed Buffer Enhancement by OliverMcMillan
- 75 Foot Proposed Buffer Enhancement by OliverMcMillan
- 50 Foot Proposed Buffer Enhancement by OliverMcMillan
- 50 Foot Proposed Buffer Enhancement by the City of Everett
- Estimated Wetland Boundary not Surveyed
- Proposed Fire Access Road

370 0 370
Feet

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

Reference: Base drawing provided by Perteet, Inc.

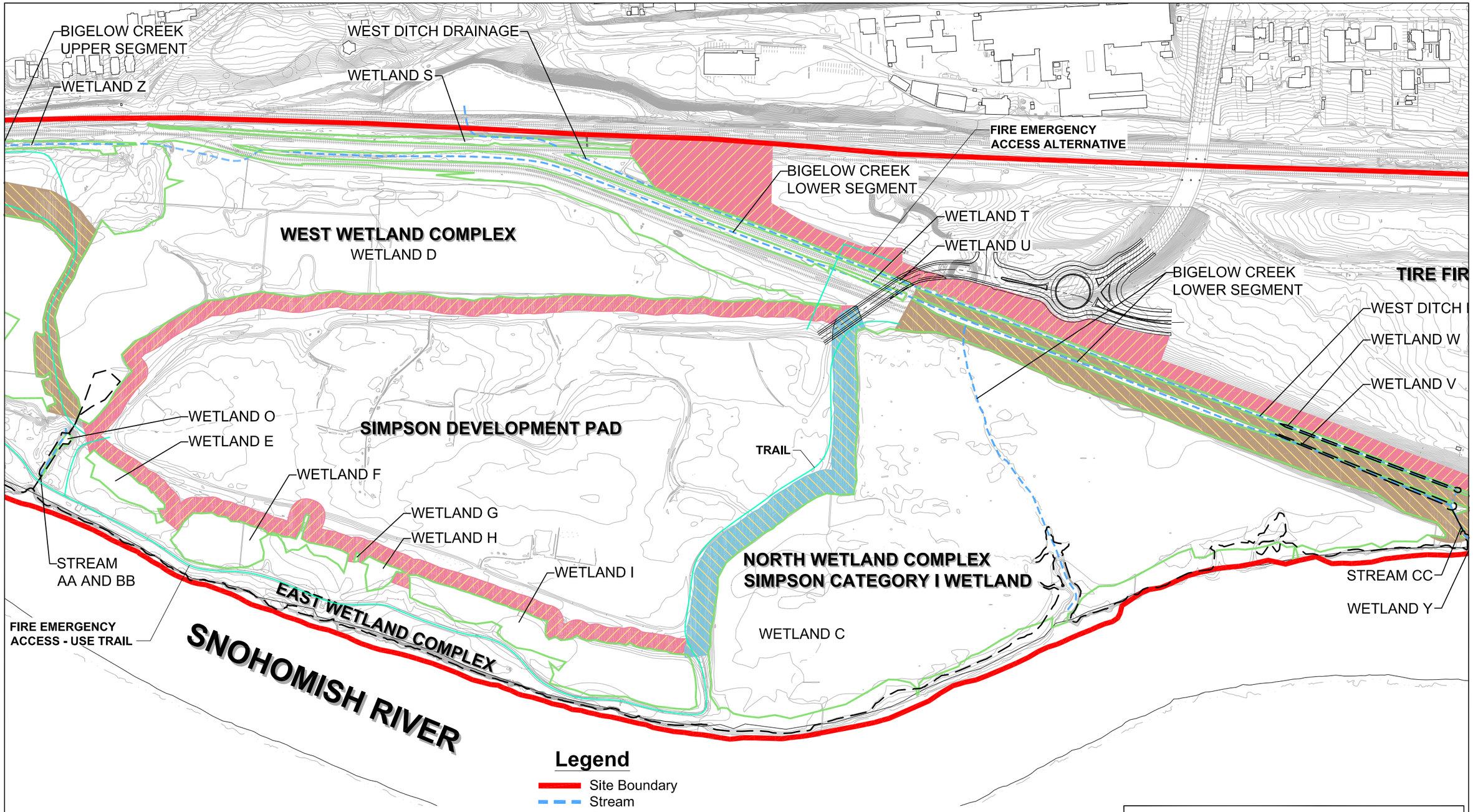
Proposed Buffer Enhancement

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 10

BOISE\P:\6191002\01\CAD\61910020I.dwg JEP:BMK 12/06/07



Legend

- Site Boundary
- Stream
- Snohomish River OHWM
- 100 Foot Proposed Buffer Enhancement by OliverMcMillan
- 75 Foot Proposed Buffer Enhancement by OliverMcMillan
- 50 Foot Proposed Buffer Enhancement by OliverMcMillan
- 50 Foot Proposed Buffer Enhancement by the City of Everett
- Estimated Wetland Boundary not Surveyed
- Proposed Fire Access Road

W S N E

150 0 150
Feet

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

Reference: Base drawing provided by Perteet, Inc.

Proposed Buffer Enhancement

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 10a

BOISE\P:\619002\01\CAD\619100201.dwg 12/06/07 JEP:BMK

ELOW CREEK
WER SEGMENT

TIRE FIRE / LANDFILL SITE

WEST DITCH DRAINAGE

WETLAND W

WETLAND V

STREAM CC

WETLAND Y

WETLAND X

WETLAND L

WETLAND M

WETLAND J

WETLAND K

SNOHOMISH RIVER

Legend

- Site Boundary
- Stream
- Snohomish River OHWM
- 100 Foot Proposed Buffer Enhancement by OliverMcMillan
- 75 Foot Proposed Buffer Enhancement by OliverMcMillan
- 50 Foot Proposed Buffer Enhancement by OliverMcMillan
- 50 Foot Proposed Buffer Enhancement by the City of Everett
- Estimated Wetland Boundary not Surveyed
- Proposed Fire Access Road

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

Reference: Drawing provided by Perteet, Inc.

150 0 150
Feet

Proposed Buffer Enhancement

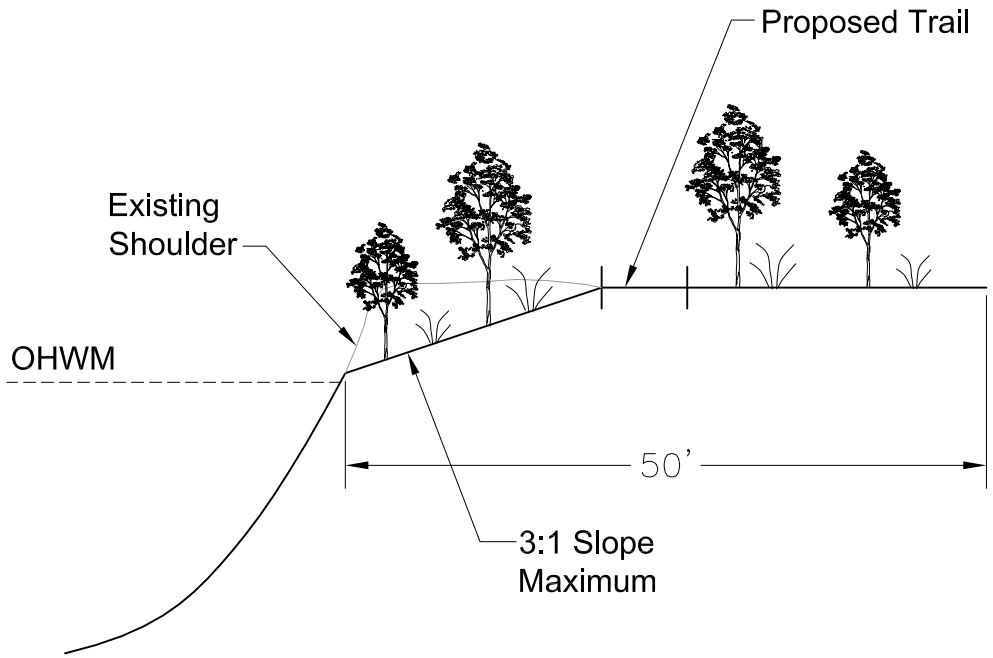
Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 10b

BOISE\P:\6191002\01\CAD\619100201.dwg JEP:BMK 11/19/07

BOISE\P:\6191002\01\CAD\619100201F11.dwg JEP:BMK 11/19/07



NOT TO SCALE

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

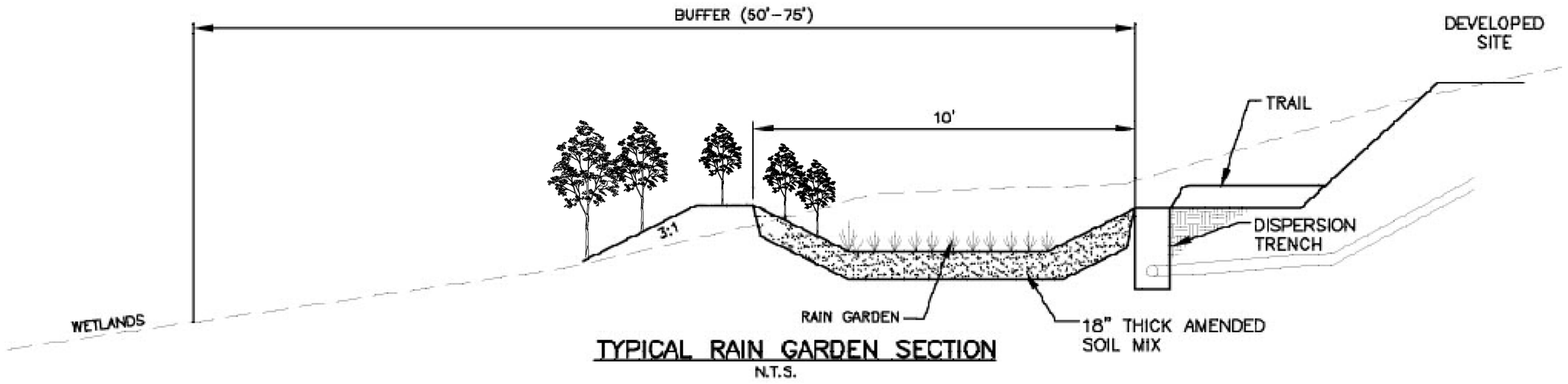
Reference: Drawing provided by GeoEngineers.

Buffer Enhancement - Shoreline Eclipse Mill

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 11



TYPICAL RAIN GARDEN SECTION
N.T.S.

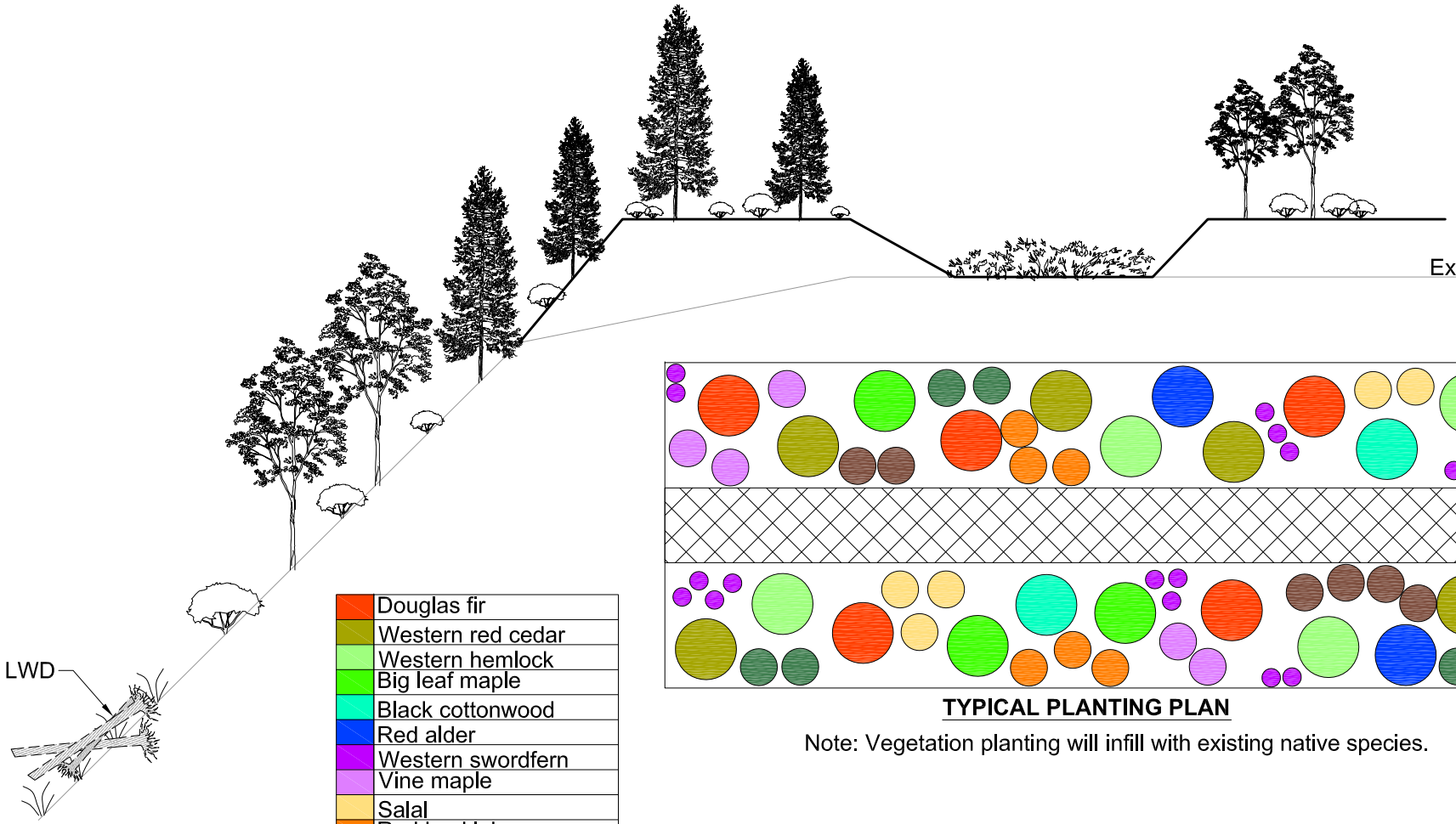
Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers,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

Reference: Drawing provided by Perteet, Inc.

Proposed Buffer Enhancement - Simpson Development Pad	
Everett Riverfront Redevelopment Everett, Washington	
GeoEngineers	Figure 12

BOISE\P:\619100201\01\CAD\619100201F12.dwg JEP:BMK 11/19/07

BOISE\P:\6191002\01\CAD\619100201F12a.dwg JEP:BMK 11/20/07



TYPICAL PLANTING PLAN

Note: Vegetation planting will infill with existing native species.

NOT TO SCALE

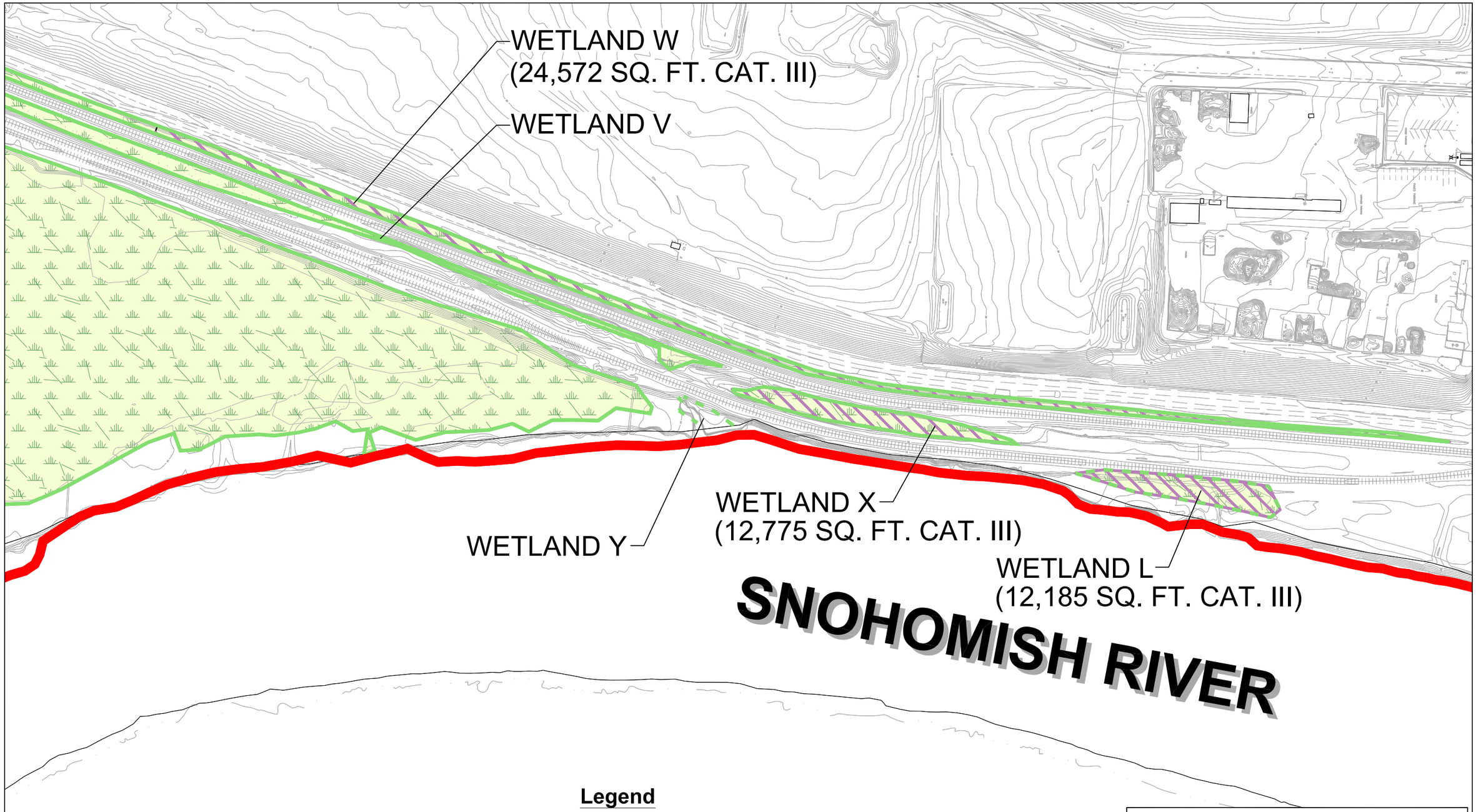
Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers,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

Proposed Buffer Conditions - Simpson Development Pad

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 12a



BOISE\P:\6191002\01\CAD\619100201.dwg JEP:BMK 11/20/07

Legend

- Site Boundary
- Wetlands
- Proposed Wetland Fill (49,532 sq. ft.)
- Estimated Wetland Boundary not Surveyed

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

Reference: Base drawing provided by Perteet, Inc.

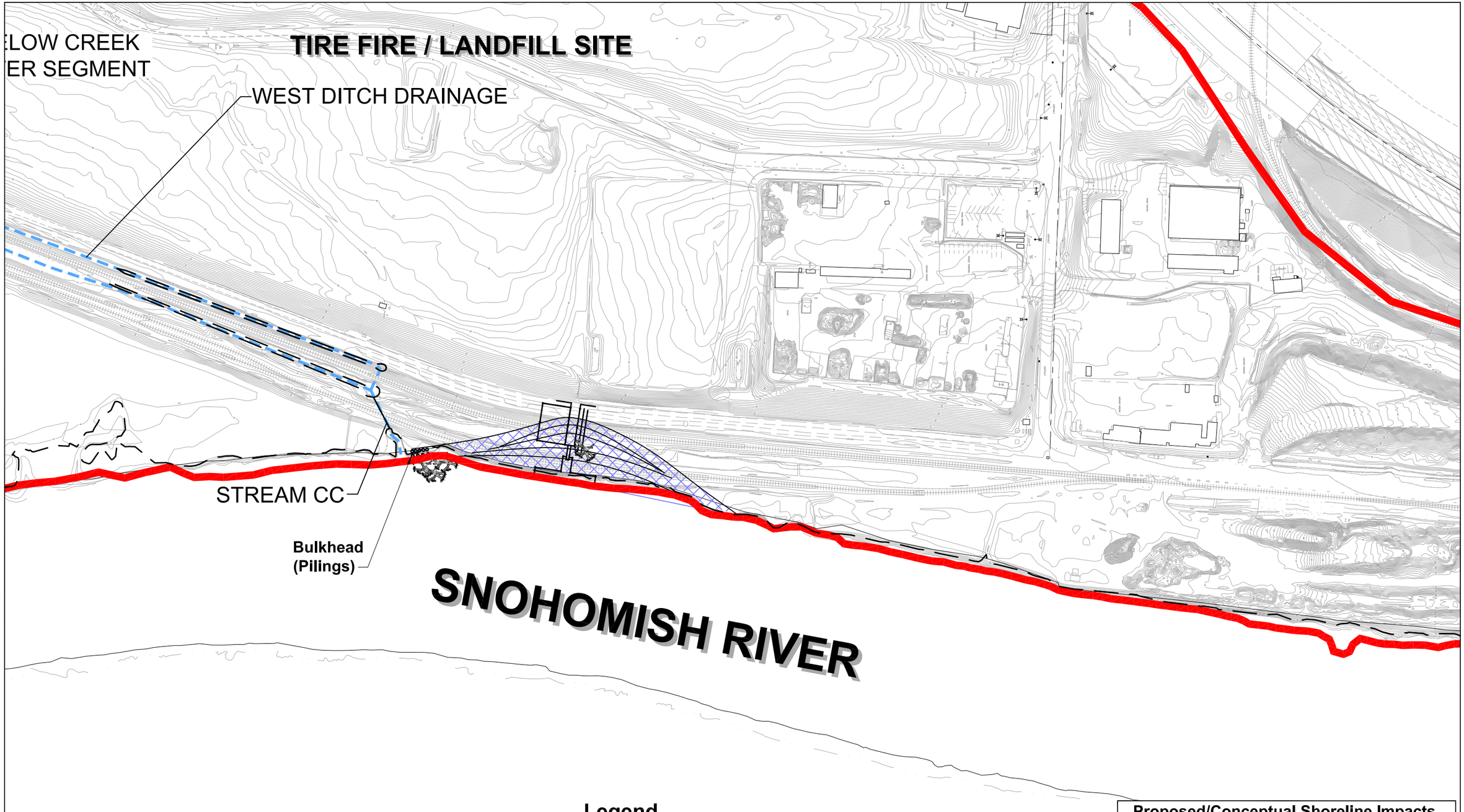
80 0 80
Feet

Wetland Resources Impact Map

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 13



BOISE\P:\619002\01\CAD\619100201.dwg 11/20/07 JEP:BMK

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

Reference: Base drawing provided by Perteet, Inc.

Legend

- Snohomish River OHWM
- Shorline Habitat Mitigation

W S N E

100 0 100
Feet

Proposed/Conceptual Shoreline Impacts, Mitigation and Aquatic Access

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 14

REMOVE CULVERTS

WETLAND W

WETLAND V (BIGELOW CREEK)

PROPOSED RETENTION WALL

PROPOSED FILL

SEE F4.5-4A

PROPOSED HABITAT POOL

PROPOSED STREAM CHANNEL RESTORATION

LWD

WETLAND CREATION

PROPOSED TRAIL

EXISTING RAIL LINE TO BE REMOVED

REMOVE CULVERT

PROPOSED HABITAT POOL

BOISE\P:\6191002\01\CAD\619100201.dwg JEP:BMK 12/11/07

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. This map represents delineations conducted in 2007 by ESA Adolfson which were provided by the City of Everett for this report.

Reference: Base drawing provided by Perteet, Inc.

Legend

- Site Boundary
- Snohomish River OHWM
- Stream
- Proposed Wetland Fill
- Proposed Creation (60,134 sq. ft.)
- Estimated Wetland Boundary not Surveyed

W N E S

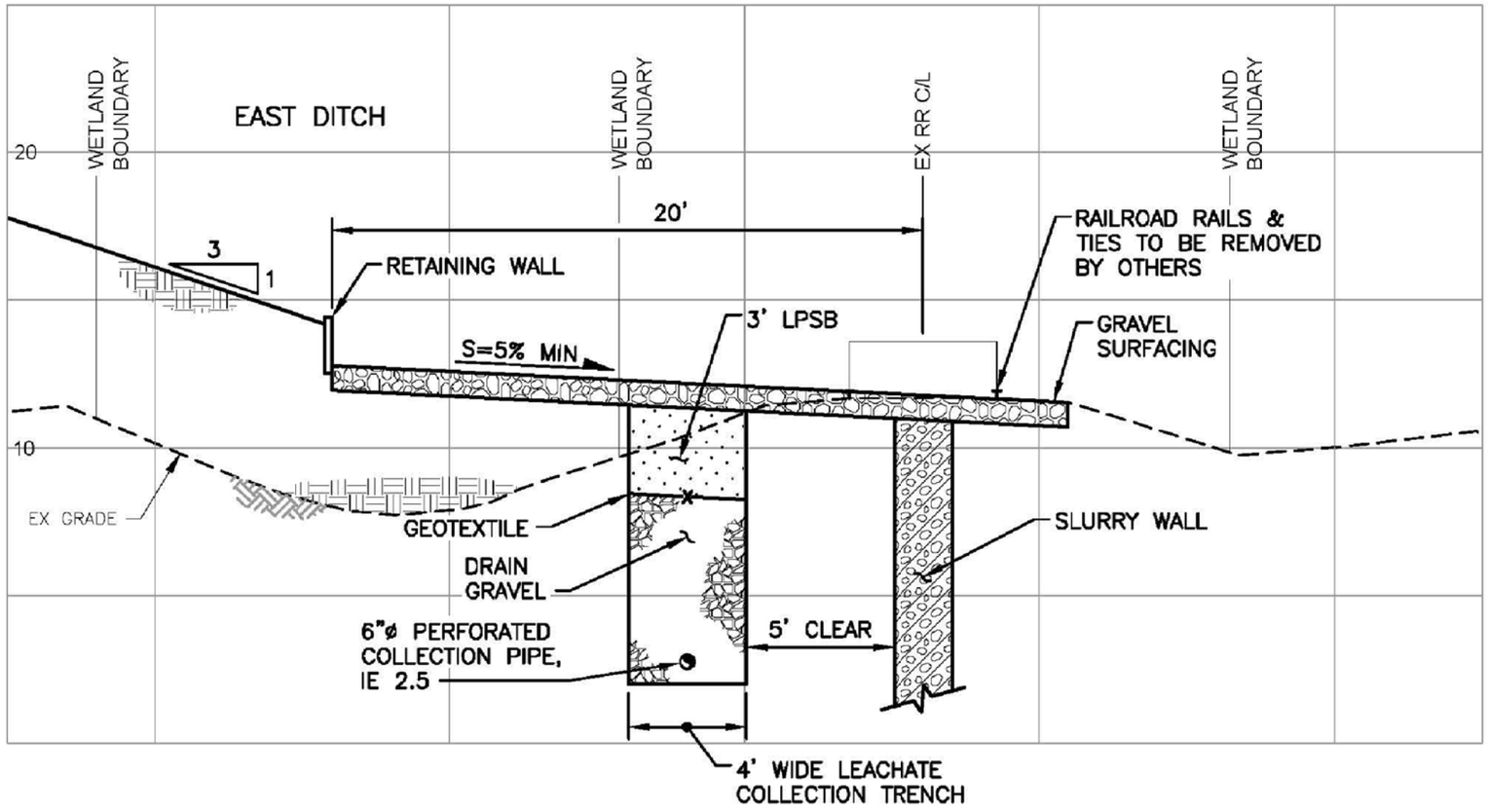
60 0 60
Feet

Conceptual Bigelow Creek Wetland and Channel Restoration

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 15



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

Reference: Drawing provided by BHC Consultants, LLC.

5 0 5
Feet

Conceptual Bigelow Creek Wetland and Channel Restoration - Cross Section

Everett Riverfront Redevelopment
Everett, Washington

GeoEngineers

Figure 15a

BOISE\P:\6191002\01\CAD\619100201F15a.dwg JEP:BMK 12/12/07

GeoEngineers

APPENDIX A
ESA SPECIES LIST

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CRITICAL HABITAT; CANDIDATE SPECIES; AND SPECIES OF CONCERN IN WESTERN WASHINGTON AS PREPARED BY THE U.S. FISH AND WILDLIFE SERVICE WESTERN WASHINGTON FISH AND WILDLIFE OFFICE

(Revised December 20, 2005)

SNOHOMISH COUNTY

LISTED

Wintering bald eagles (*Haliaeetus leucocephalus*) occur in the county from about October 31 through March 31.

There are 11 bald eagle communal winter night roosts located in the county.

There are three bald eagle wintering concentrations located in the county along the Skykomish River and Sauk River.

There are 42 bald eagle nesting territories located in the county. Nesting activities occur from about January 1 through August 15.

Bull trout (*Salvelinus confluentus*) occur in the county.

Canada lynx (*Lynx canadensis*) may occur in the county.

Gray wolves (*Canis lupus*) may occur in the county.

Grizzly bears (*Ursus arctos* = *U. a. horribilis*) may occur in the county.

Marbled murrelets (*Brachyramphus marmoratus*) occur in the county. Nesting murrelets occur from April 1 through September 15.

Northern spotted owls (*Strix occidentalis caurina*) occur in the county throughout the year.

Major concerns that should be addressed in your Biological Assessment of project impacts to listed species include:

1. Level of use of the project area by listed species.

2. Effect of the project on listed species' primary food stocks, prey species, and foraging areas in all areas influenced by the project.

3. Impacts from project activities and implementation (e.g., increased noise levels, increased human activity and/or access, loss or degradation of habitat) that may result in disturbance to listed species and/or their avoidance of the project area.

DESIGNATED

Critical habitat for the northern spotted owl has been designated in Snohomish County.

Critical habitat for the marbled murrelet has been designated in Snohomish County.

Critical habitat for the bull trout has been designated in Snohomish County.

PROPOSED

None

CANDIDATE

Fisher (*Martes pennanti*) (West Coast distinct population segment)
Oregon spotted frog (*Rana pretiosa*)
Yellow-billed cuckoo (*Coccyzus americanus*)

SPECIES OF CONCERN

Beller's ground beetle (*Agonum belleri*)
California wolverine (*Gulo gulo luteus*)
Cascades frog (*Rana cascadae*)
Long-eared myotis (*Myotis evotis*)
Long-legged myotis (*Myotis volans*)
Northern goshawk (*Accipiter gentilis*)
Olive-sided flycatcher (*Contopus cooperi*)
Pacific lamprey (*Lampetra tridentata*)
Pacific Townsend's big-eared bat (*Corynorhinus townsendii townsendii*)
Peregrine falcon (*Falco peregrinus*)
River lamprey (*Lampetra ayresi*)
Tailed frog (*Ascaphus truei*)
Western toad (*Bufo boreas*)
Botrychium pedunculosum (stalked moonwort)

ESA-Listed Marine Mammals

Under the jurisdiction of NOAA Fisheries Service that may occur off Washington & Oregon:

- Southern Resident Killer Whale (E), *Orcinus orca*
- Humpback Whale (E), *Megaptera novaeangliae*
- Blue Whale (E), *Balaenoptera musculus*
- Fin Whale (E), *Balaenoptera physalus*
- Sei Whale (E), *Balaenoptera borealis*
- Sperm Whale (E), *Physeter macrocephalus*
- Steller Sea Lion (T), *Eumetopias jubatus*

Under the jurisdiction of NOAA Fisheries Service that may occur in Puget Sound:

- Southern Resident Killer Whale (E), *Orcinus orca*
- Humpback Whale (E), *Megaptera novaeangliae*
- Steller Sea Lion (T), *Eumetopias jubatus*

(E) = Endangered
(T) = Threatened

Regional Administrator: Bob Lohn
7600 Sand Point Way NE, Seattle, WA 98115-0070
206-526-6150
Email: Webmaster or Content Manager

Page last updated: June 26, 2007

Endangered Species Act Status of West Coast Salmon & Steelhead

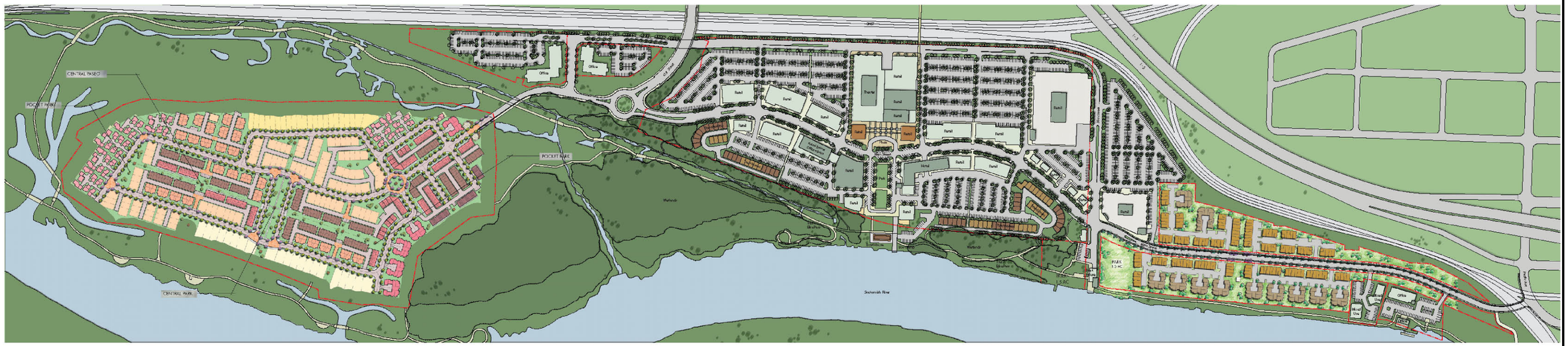
(Updated June 15, 2007)

Species[1]			Current Endangered Species Act Listing Status[2]	ESA Listing Actions Under Review
Sockeye Salmon (*Oncorhynchus nerka*)	1	Snake River	Endangered	
	2	Ozette Lake	Threatened	
	3	Baker River	Not Warranted	
	4	Okanogan River	Not Warranted	
	5	Lake Wenatchee	Not Warranted	
	6	Quinalt Lake	Not Warranted	
	7	Lake Pleasant	Not Warranted	
Chinook Salmon (*O. tshawytscha*)	8	Sacramento River Winter-run	Endangered	
	9	Upper Columbia River Spring-run	Endangered	
	10	Snake River Spring/Summer-run	Threatened	
	11	Snake River Fall-run	Threatened	
	12	Puget Sound	Threatened	
	13	Lower Columbia River	Threatened	
	14	Upper Willamette River	Threatened	
	15	Central Valley Spring-run	Threatened	
	16	California Coastal	Threatened	
	17	Central Valley Fall and Late Fall-run	Species of Concern	
	18	Upper Klamath-Trinity Rivers	Not Warranted	
	19	Oregon Coast	Not Warranted	
	20	Washington Coast	Not Warranted	
	21	Middle Columbia River spring-run	Not Warranted	
	22	Upper Columbia River summer/fall-run	Not Warranted	
	23	Southern Oregon and Northern California Coast	Not Warranted	
	24	Deschutes River summer/fall-run	Not Warranted	
Coho Salmon (*O. kisutch*)	25	Central California Coast	Endangered	
	26	Southern Oregon/Northern California	Threatened	
	27	Lower Columbia River	Threatened	• Critical habitat
	28	Oregon Coast	Not Warranted	
	29	Southwest Washington	Undetermined	
	30	Puget Sound/Strait of Georgia	Species of Concern	
	31	Olympic Peninsula	Not Warranted	
Chum Salmon (*O. keta*)	32	Hood Canal Summer-run	Threatened	
	33	Columbia River	Threatened	
	34	Puget Sound/Strait of Georgia	Not Warranted	
	35	Pacific Coast	Not Warranted	
Steelhead (*O. mykiss*)	36	Southern California	Endangered	
	37	Upper Columbia River	Endangered	
	38	Central California Coast	Threatened	
	39	South Central California Coast	Threatened	
	40	Snake River Basin	Threatened	
	41	Lower Columbia River	Threatened	
	42	California Central Valley	Threatened	
	43	Upper Willamette River	Threatened	
	44	Middle Columbia River	Threatened	
	45	Northern California	Threatened	
	46	Oregon Coast	Species of Concern	
	47	Southwest Washington	Not Warranted	
	48	Olympic Peninsula	Not Warranted	
	49	Puget Sound	Threatened	• Critical habitat • Protective regulations
	50	Klamath Mountains Province	Not Warranted	
Pink Salmon (*O. gorbuscha*)	51	Even-year	Not Warranted	
	52	Odd-year	Not Warranted	

1 The ESA defines a "species" to include any distinct population segment of any species of vertebrate fish or wildlife. For Pacific salmon, NOAA Fisheries Service considers an evolutionarily significant unit, or "ESU," a "species" under the ESA. For Pacific steelhead, NOAA Fisheries Service has delineated distinct population segments (DPSs) for consideration as "species" under the ESA.

GeoEngineers

APPENDIX B
MASTER DEVELOPMENT PLAN



EVERETT RIVERFRONT

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources:
Preferred Alternate map provided by OliverMcMillan.
Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

Preferred Alternative (Alternative 1) Proposed Site Layout

Everett Riverfront Redevelopment
Everett, Washington

Appendix B

Map Revised: June 26, 2007
Path: P:\6\619100200\GIS\MXD\619100201Pref_Alternate2.3_1.mxd
Office: BOIS

GeoEngineers

APPENDIX C
SITE PHOTOGRAPHS

Photograph 1.
Culvert where Bigelow Creek enters the site, looking west.

Photograph 2.
Bigelow Creek entrance to the site, looking north from culvert.

Photograph 3.
Stormwater catch basin, west of the BNSF mainline, in Bigelow Creek connected to culvert where the creek enters the site.

Photograph 4.
Bigelow creek, as channelized surface flow, in the Lowell neighborhood across 2nd Avenue.

Photograph 5.
Bigelow Creek along the southwest margin of the project area, looking south. Arrow indicates location of the culvert Bigelow Creek flows through prior to discharging into Wetland D.

Photograph 6.
Southwest corner of Wetland D, looking northeast. Bigelow Creek discharges into the wetland.

Photograph 7.
Bigelow Creek, expressed as surface sheet flow across railroad grade, looking north. Arrows indicate areas on surface. Western margin of Wetland D on the right.

Photograph 8.
Partially submerged culvert between Bigelow Creek and West Ditch Drainage.

Photograph 9.
Culvert along West Ditch Drainage, looking south where active and former railroad tracks converge.

Photograph 10.
West Ditch Drainage near Intersection of former railroad alignments, looking west toward culvert visible in Photograph 13

Photograph 11.
Bigelow Creek existing conditions, looking south.

Photograph 12.
Wetland U vegetation.

Photograph 13.
Creosote coated railroad timbers and debris in West Ditch Drainage, looking north.

Photograph 14.
Existing conditions and vegetation within West Ditch Drainage, looking south.

Photograph 15.
Culvert connecting Bigelow Creek to Wetland C, looking north. Bigelow Creek is in the foreground and portions of Wetland C are visible in the background.

Photograph 16.
Northern segment of Bigleow Creek, looking south.

Photograph 17.
West Ditch Drainage looking north

Photograph 18.
Culvert conveying water between West Ditch Drainage and Bigelow Creek. Arrow indicates approximate culvert location.

Photograph 19.
Culvert under the former Milwaukee railroad line, looking east. Bigelow Creek, in the foreground, flows this culvert and discharges into the Snohomish River.

Photograph 20.
Bigelow Creek outfall into Snohomish River, looking east.

Photograph 21.
Proposed location of shoreline and river habitat enhancement, looking south.

Photograph 22.
Western margin of Wetland L, looking north.

Photograph 23.
Existing conditions north of site, looking south. Large pile of debris, up to 50 feet tall, are present on this portion of the former Eclipse Mill site.

Photograph 24.
Existing conditions north of the site along railroad and access road.

Photograph 25.
Fire road access to Simpson Pad, looking east. Boundary of Wetland D on the left and South Simpson Wetlands on the right.

Photograph 26
Wetland D adjacent to above fire road, looking northwest.

Photograph 27.
Southeastern corner of the Simpson Pad, looking northwest.

Photograph 28.
Present buffer conditions, looking south along the western margins of the south Simpson pad.

Photograph 29.
Looking west into Wetland D from the path around the Simpson Development Pad.

Photograph 30.
Path south along western portion of the Simpson Development Pad.

Photograph 31.
Northwestern corner of the Simpson Pad looking south.

Photograph 32.
Existing buffer conditions along the Simpson Development Pad, looking north into Wetland C.

Photograph 33.
Trail towards shoreline at northeastern corner of the Simpson pad.

Photograph 34.
"Finger" wetland, which extends west onto the Simpson Development Pad along the eastern edge of the Development Pad.

Photograph 35.
Wetland D looking south.

Photograph 36.
Evidence of beaver activity along the western edge of Wetland D.

Photograph 37.
Western shoreline adjacent to the Rotary Park parking lot. Southern extent of the Everett Riverside Development project area.

Photograph 38.
Shoreline from eastern bank, looking west.

Photograph 39.
North Bigelow Creek outfall.

Photograph 40.
Western shoreline, north of the proposed marina location. Two culverts which could potentially be removed and each outfall reconstructed. Also, invasive vegetative species and debris which could be potentially removed visible along the shoreline.

Photograph 41.
Newlands Construction property, southern boundary looking north along the shoreline.

Photograph 42.
Western Shoreline north of the Newlands Construction property, looking west. Arrow above the riprap indicates the approximate northern extent of shoreline within the project area.

GeoEngineers

APPENDIX D
LISTED SPECIES LIFE HISTORIES

APPENDIX D
LISTED SPECIES LIFE HISTORIES

SPECIES OF FISH

Bull Trout (Salvelinus Confluentus)

ESA Listing and Stock Status

United States Fish and Wildlife Service (USFWS) identified five Distinct Population Segments (DPS) of bull trout in the western states and, in 1999 listed bull trout in the Coastal-Puget Sound DPS as threatened. The coastal bull trout DPS is composed of 34 sub-populations, including the only anadromous bull trout runs within the contiguous United States (70 FR 56212). The more common life history forms presently recognized for bull trout are resident and fluvial, neither of which use marine waters.

Bull trout have a wide, but very patchy, distribution across their range (Reiman and McIntyre 1993). Bull trout have been extirpated from many of the large rivers within their historic range and exist primarily in isolated headwater populations. The decline of bull trout has been attributed to habitat degradation, blocking of migratory corridors, poor water quality, introduction of non-native species and the effects of past fisheries management practices.

Life History

Bull trout are char native to the Pacific Northwest and western Canada. Bull trout exhibit resident and migratory life history strategies through much of the current range (Rieman and McIntyre 1993). Migratory bull trout spawn in tributary streams where juvenile fish rear from one to four years before migrating to either a lake (adfluvial), river (fluvial), or in certain coastal areas, to saltwater (anadromous), where maturity is reached in one of the three habitats. Resident and migratory forms may be found together and it is suspected that bull trout give rise to offspring exhibiting either resident or migratory behavior (Rieman and McIntyre 1993).

Bull trout have more specific habitat requirements compared to other salmonids (Rieman and McIntyre 1993). Habitat components that appear to influence bull trout distribution and abundance include water temperature, cover, channel form and stability, valley form, spawning and rearing substrates, and migratory corridors. Bull trout typically spawn from August to November during periods of decreasing water temperatures. However migratory bull trout frequently begin spawning migrations as early as April. Bull trout require spawning substrate consisting of loose, clean gravel relatively free of fine sediments. Depending on water temperature, incubation is normally 100 to 145 days, and after hatching, juveniles remain in the substrate. Time from egg deposition to emergence may surpass 200 days. Fry normally emerge from early April through May depending upon water temperatures and increasing stream flows. Bull trout are opportunistic feeders with food habits primarily a function of size and life history strategy. Resident and juvenile migratory bull trout prey on terrestrial and aquatic insects, macro zooplankton and small fish. Adult migratory bull trout are primarily piscivorous, know to feed on various fish species (Rieman and McIntyre 1993).

Puget Sound Chinook Salmon (Oncorhynchus Tshawytscha)

ESA Listing and Stock Status

As a result of the National Marine Fisheries Service's status review of chinook salmon populations in Washington, Oregon, Idaho and California, five Evolutionary Significant Units (ESUs) were defined. The Puget Sound ESU, composed of all naturally spawning spring, summer and fall runs of chinook

salmon populations from the Elwha River to the Nooksack River, was listed as threatened under the Environmental Species Act (ESA) in March 1999 (64 FR 14308-14328) as well as artificial propagation programs (including the Wallace River Hatchery) in 2005 (70 FR 37160-37204). Critical habitat was designated for Puget Sound chinook in published rules issued in 2005 and became effective on January 2, 2006 (70 FR 52630-52853).

Overall abundance of chinook in the Puget Sound ESU has declined substantially from historic levels, and there has been concern over the effects of a high degree of hatchery supplementation on the genetic fitness of wild stocks. Additional factors leading to declines in the ESU include habitat degradation and high harvest rates, which in recent years have exceeded 90 percent (Myers et al. 1998).

There are two distinct stocks of chinook in the Snohomish listing area in the north Puget Sound (Snoqualmie and Skykomish stocks) (Washington State Salmon and Steelhead Stock Inventory (SaSSI) 2002). The Snoqualmie stock, composed of fish that spawn in the Snoqualmie river and its tributaries, are native stock with wild production. The Skykomish stock, composed of the Snohomish-summer, Wallace-summer, Bridal Veil Creek-fall and a portion of the Snohomish-fall chinook populations, are native stock with composite production (the Wallace River chinook are released from the Wallace River Hatchery). The SaSSI characterize both stocks as "depressed" due primarily to low productivity.

Life History

Chinook salmon are anadromous. Adults migrate from marine environments and spawn in freshwater, while juveniles rear in freshwater for varying periods of time before migrating out to saltwater where they mature. Chinook use a wide variety of freshwater habitats from headwaters to the estuary, but are typically found in low-gradient streams dominated by gravel and cobble (Scott and Crossman 1973). They require clean gravel for spawning. Juvenile chinook are typically associated with low gradient, meandering, unconstrained stream reaches (Lee et al. 1996) and require abundant habitat complexity such as that associated with accumulations of large woody debris and overhanging vegetation (United States Department of the Interior 1996). Juvenile chinook often move into side channels, beaver ponds and sloughs for over-wintering habitat.

Most juvenile summer/fall chinook salmon in Puget Sound river systems migrate to the marine environment as smolts during their first year although their early life history patterns vary. Some migrate downstream almost immediately after emerging from the gravel. Others migrate downstream and enter side-channels where they may rear for several weeks before migrating to marine waters. A third life history strategy involves a more extended rearing time (up to 2 years) in the river before migrating to salt water.

Juvenile chinook salmon reside for a period of time in shallow intertidal areas before migrating to the sea. The availability of rearing habitat that includes an abundance of food items and security from predation during this early marine phase is critical to their growth and survival.

As smolts mature into juveniles, they move into Puget Sound and the North Pacific to feed and mature into adults. As juveniles, their diet consists usually of either small crustaceans or insects in fresh water and small crustaceans in the sea; as they mature their diet includes a greater proportion of small fish (Royce 1972). As juvenile salmon shift their prey preference to fish species such as juvenile herring and sandlance, they become dependent on these prey species as a forage base and are more likely to be found in shoreline zones containing eelgrass and other habitat features that support their prey.

Puget Sound Steelhead (Oncorhynchus Mykiss)

ESA Listing and Stock Status

On May 11, 2007, National Oceanic and Atmospheric Administration (NOAA) Fisheries issued a final determination to list the distinct population segment (DPS) of steelhead (*Oncorhynchus mykiss*) in Puget Sound, Washington, as a threatened species under the ESA. The effective date of this rule was June 11, 2007 (72 FR 26722-26735. 2007. 50 CFR 223). Final protective regulations and proposed critical habitat for this DPS are expected to be issued in a separate rulemaking. This listing action includes only the anadromous form of *Oncorhynchus mykiss* (71 FR 15666-15680) and was based on wide spread declines in abundance and productivity over the past nine years, particularly for two populations identified as strongholds in a 1996 review.

There are three distinct stocks of winter steelhead (Snohomish/Skykomish, Pilchuck, and Snoqualmie) and three distinct stocks of summer steelhead (North Fork Skykomish, South Fork Skykomish and Tolt) in the Snohomish River sub-basin listing area in the north Puget Sound. In 2002, SaSSI characterized all stocks of the winter steelhead as "depressed", the South Fork Skykomish and the Tolt summer stocks as "healthy" and the North Fork Skykomish summer stock as "unknown" due to inconsistent data collection. All of the winter stocks are native with wild production. The origin of summer stocks vary with no certainty of a truly native origin because the level of non-native hatchery-origin summer steelhead spawning in the wild is unknown and there may be low levels of interaction with nonnative hatchery-origin summer steelhead (SaSSI 2002).

Life History

Steelhead is the name commonly applied to the anadromous (sea-going) form of the biological species *Oncorhynchus mykiss*. Steelhead exhibit perhaps the most complex suite of life-history traits of any species of Pacific salmonid. *Oncorhynchus mykiss* can be anadromous (''steelhead''), or freshwater residents (''rainbow or redband trout''), and under some circumstances yield offspring of the opposite life-history form. Those that are anadromous can spend up to 7 years in freshwater prior to smoltification (the physiological and behavioral changes required for the transition to salt water), and then spend up to 3 years in salt water prior to first spawning. Steelhead are also iteroparous (meaning individuals may spawn more than once), whereas the Pacific salmon species are principally semelparous (meaning individuals generally spawn once and die). Within the range of West Coast steelhead, spawning migrations occur throughout the year, with seasonal peaks of activity. In a given river basin there may be one or more peaks in migration activity; since these ''runs'' are usually named for the season in which the peak occurs, some rivers may have runs known as winter, spring, summer, or fall steelhead (71 FR 15666-15680).

Steelhead in the Snohomish River can be divided into two basic reproductive ecotypes, based on the state of sexual maturity at the time of river entry and duration of spawning migration. The summer or ''stream-maturing'' type enters fresh water in a sexually immature condition between May and October, and requires several months to mature and spawn. The winter or ''ocean-maturing'' type enters fresh water between November and April with well-developed gonads and spawns shortly thereafter (March through June for the Snohomish River). In basins with both summer and winter steelhead runs, the summer run generally occurs where habitat is not fully utilized by the winter run, or where an ephemeral hydrologic barrier separates them, such as a seasonal velocity barrier at a waterfall. Summer steelhead usually spawn farther upstream than winter steelhead (71 FR 15666-15680).

SPECIES OF WILDLIFE

Marbled Murrelet (Brachyramphus marmoratus marmoratus)

ESA Listing and Stock Status

The marbled murrelet is listed as Federally Threatened by the USFWS (61 FR 26256-26320). Final critical habitat for the marbled murrelet was designated on May 24, 1996 (61 FR 26256-26320). Since 1996 the USFWS has completed a 5-year status review of the marbled murrelet (McShane *et al*. 2004). Based upon this report the USFWS has proposed a new Critical Habitat Rule (71 FR 53838-53886) that would reduce designated critical habitat for the marbled murrelet in Washington, Oregon and California by approximately 3,666,108 acres. Additionally is has been proposed that the scientific name of the marbled murrelet be changed from *Brachyramphus marmoratus marmoratus* to *Brachyramphus marmoratus* to reflect recent taxonomic information (71 FR 53838-53886).

Elements essential to provide and support suitable nesting habitat for successful reproduction of the marbled murrelet as identified by USFWS include: individual trees with potential nesting platforms; and forested areas within 0.5 miles of individual trees with potential nesting platforms and with a canopy height of at least one-half the site-potential tree height (61 FR 26256-26320).

Life History

The marbled murrelet is a small dove-sized diving seabird that inhabits the coastal forests and nearshore marine environment along the Pacific coast of the United States from southern California to southern Alaska and the Aleutian Islands (Carter and Morrison 1992, Ralph *et al*. 1995, Nelson 1997).

Marbled murrelets forage in inland saltwater and the ocean within 1.2 miles of shore ranging from the Aleutian Islands to central California. Marbled murrelets require mature and old-growth forest stands for nesting and roosting. In Washington, marbled murrelets have been located in the Coast range, Olympic Peninsula and in the foothills of the western slope of the Cascade Mountains (WDFW 1991).

Nests are built on the ground and on high mossy branches of conifers and generally within 37 miles of the coast. However, birds in Washington tend to commute longer distances than those in other areas (McShane *et al*. 2004). Occupied murrelet habitat has been documented 52 miles from the Washington coast; and a grounded murrelet was found 62 miles from the ocean, the maximum inland distance within the listed range (Hamer and Nelson 1995). Though most murrelets migrate away from nesting grounds after breeding to overwinter elsewhere, substantial portions of murrelet populations have been known to remain inland near nesting year-round in Washington (Cross 1992). In Washington nesting and breeding behavior takes places from late April to early September (Hamer and Nelson 1995)

Steller Sea Lion

ESA Listing and Stock Status

On November 26, 1990, the Steller sea lion was listed as threatened under the ESA. In 1997, the species was split into two separate stocks on the basis of demographic and genetic dissimilarities; the status of the western stock (west of 144° longitude) was changed to endangered, and the status of the eastern stock (east of 144° longitude) was left unchanged (Bickam *et al*. 1996, Loughlin 1997). The proposed rule for establishment of critical habitat for the Steller sea lion was published on April 1, 1993, and the final rule was published on August 27, 1993. Species found along the Washington coast are from the eastern stock and are listed as threatened.

Life History

The Steller sea lion is distributed around the North Pacific rim from the Channel Islands off southern California to northern Hokkaido, Japan. The species distribution extends northward into the Bering Sea and along the eastern shore of the Kamchatka Peninsula. The center of the distribution has been considered to be in the Gulf of Alaska and the Aleutian Islands. Within this distribution, land sites used by Steller sea lions are referred to as rookeries and haulout sites. Rookeries are used during the reproductive season (late May to early July) for mating, pupping, and nursing. Haulout sites are found on jetties, offshore rocks, and coastal islands. Extensive declines of the Steller sea lion population have occurred within the Alaskan and the Russian portions of their range over the last 30 years. Counts in southeast Alaska, British Columbia, and Oregon have remained stable over the same period, and numbers in California have declined.

The areas designated as critical habitat for the Steller sea lion were determined on the basis of the available information on life history pattern of the species, with particular attention paid to land sites where animals haul out to rest, pup, nurse their pups, mate, and molt, and to marine sites considered to be essential foraging areas. The foraging areas were determined on the basis of sightings of sea lions at sea, incidental catch data, and foraging studies using satellite-linked tracking systems. Rookeries in California and Oregon are considered critical habitat, but in Washington there are no breeding rookeries or critical habitat area designations. The nearest rookeries are in southern Oregon and West Vancouver Island. Haulout sites in Washington, Oregon, or California have not been identified as critical habitat. However, prevention of contamination and conservation of prey resources and foraging areas appears essential to the recovery of the Steller sea lion population.

REFERENCES

61 FR 26256-26320. 50 CFR Part 17. Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Marbled Murrelet; Final Rule. Federal Register, Vol. 61, No. 102.

64 FR 14308-14328. 1999. 50 CFR Parts 223 and 224 National Oceanic and Atmospheric Administration. Endangered and Threatened Species: Threatened Status for Three Chinook Salmon Evolutionarily Significant Units in Washington and Oregon, and Endangered Status of One Chinook Salmon ESU in Washington; Final Rule. Federal Register Vol. 64. No. 56.

70 FR 37160-37204. 2005. 50 CFR Parts 223 and 224. National Oceanic and Atmospheric Administration. Endangered and Threatened Species: Final Listing Determinations for 16 ESUs of West Coast Salmon, and Final 4(d) Protective Regulations for Threatened Salmonid ESUs. Federal Register Vol. 70, No. 123.

70 FR 56212-56311. 2005. 50 CFR Part 17. United States Fish and Wildlife Service. Endangered and Threatenend and Wildlife and Plants; Designation of Critical Habitat for Bull Trout. Federal Register, Vol. 70, No. 185.

70 FR 52630-52858. 2005. 50 CFR 226. National Oceanic and Atmospheric Administration. Endangered and Threatened Species: Designation of Critical Habitat for 12 Evolutionarily Significant Units of West Coast Salmon and Steelhead in Washington, Oregon, and Idaho. Federal Register, Vol. 70, No. 170.

71 FR 53838-53886. 2006. 50 CFR Part 17. Endangered and Threatened Wildlife and Plants; Descignation of Critical Habitat for the Marbled Murrelet; Proposed Rule. Federal Register, Vol. 71, No. 176.

71 FR 15666-15680. 2006. 50 CFR Part 223. National Oceanic and Atmospheric Administration. Listing Endangered and Threatened Species and Designating Critical Habitat: 12-Month Finding on Petition to List Puget Sound Steelhead as an Endangered or Threatened Species under the Endangered Species Act. Federal Register, Vol. 71, No. 60.

72 FR 26722-26735. 2007. 50 CFR 223. National Oceanic and Atmospheric Administration. Endangered and Threatened Species: Final Listing Determination for Puget Sound Steelhead. Federal Register, Vol. 72, No. 91.

Bickam, J.W., J.C. Patton, and T.R. Loughlin. 1996. High variability for control-region sequences in a marine mammal: implications for conservation and biogeography of Steller sea lions (*Eumetopias jubatus*). Journal of Mammalogy 77(1): 95-108.

Carter, H.R., and M.L. Morrison. 1992. Status and conservation of the marbled murrelet in North America. Proceedings of an International Symposium of the Pacific Seabird Group, Pacific Grove, California, December 1987. Published October 1992 In: Proceedings of the Western Foundation of Vertebrate Soology, Volume 5, Number 1.

Cross, J.A.. 1992. Over winter surveys for the marbled murrelet east of Verlot, Washington, 1990-1991 and 1991-1992. Unpublished report, Washington Department of Wildlife, Olympia, Washington.

Gearin, P. 2002. National Marine Fisheries Service. Personal Communication with Andrea Balla-Holden, URS Corporation Fisheries Biologist on June 12, 2002.

Jefferies, S.J., P.J. Gearin, H.R. Huber, D.L. Saul, and D.A. Pruett. 2000. Atlas of Seal and Sea Lion Haulout Sites in Washington. Washington Department of Fish and Wildlife, Washington Science Division, Olympia, WA. 150 pp.

Lee, D.C., J.R. Sedell, B.E. Rieman, R.F. Thurow, J.E Williams [and others]. 1996. Broadscale Assessment of Aquatic Species and Habitats. in T.M. Quigley and S.J Arbelbide, editors. An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins. Gen. Tech. Rpt. Portland, Oregon: United States Department of Agriculture Forest Service, Pacific Northwest Research Station.

Loughlin, T.R. 1997. Using the phylogeographic method to identify Steller sea lion stocks, p. 159-171.

McShane, C., T. Hamer, H. Carter, G. Swartzman, V. Friesen, D. Ainley, R. Tressler, K. Nelson, A. Burger, L. Spear, T. Mohagen, R. Martin, L. Henkel, K. Prindle, C. Strong, and J. Keany. 2004. Evaluation report for the 5-year status review of the marbled murrelet in Washington, Oregon, and California. Unpublished report. EDAW, Inc. Seattle, Washington. Prepared for the U.S. Fish and Wildlife Service, Region 1. Portland, Oregon.

Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Mainwright, W.S. Grant, F.K. Waknkitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California. U.S. Department of Commerce, National

Oceanic and Atmospheric Administration Technical Memorandum. National Marine Fisheries Service-NWFSC-35.

Ralph, C.J., G.L. Hunt, Jr., M.G. Raphael, and J.F. Piatt. 1995. Ecology and conservatino of the marbled murrelet in North America: an overview, Pp3-22 In: Ecology and Conservation of the marbled murrelet. General Technical Report PSW-GTR-152. Forest Service, Albany, California.

Rieman, B.E. and J.D. McIntyre. 1993. Demographic and Habitat Requirements for Conservation of Bull Trout. General Technical Report. U.S. Forest Service Intermountain Research Station, Ogden, Utah.

Roni, P., Weitkmap, L.A., and Scording, J. 1999. Identification of Essential Fish Habitat for Salmon in the Pacific Northwest: Initial Efforts, Information Needs, and Future Direction. Pages 98-107 *in* L. Benaka, editor. Fish Habitat: Essential Fish Habitat and Rehabilitation. American Fisheries Society, Symposium 22, Bethesda, Maryland.

Royce, W.F. 1972. Introduction to Fishery Science. New York. Academic Press.

Scott, W.B. and E.J. Crossman. 1973. Freshwater Fishes of Canada. Bulletin 184, Fisheries Research Board of Canada. Ottawa.

Washington Department of Fish and Wildlife. 2002. Washington State Salmon and Steelhead Stock Inventory. Washington Department of Fisheries and Wildlife and Western Washington Treaty Indian Tribes. Accessed on-line at http://wdfw.wa.gov/fish/sassi/ (Accessed May 2007)

Washington Department of Fish and Wildlife. 2001. Washington Department of Fish and Wildlife Priority Habitats and Species. Priority Habitats Management Recommendations. Volume IV: Birds; Bald Eagle.

Washington Department of Fish and Wildlife. 1991. Management Recommendations of Washington Priority Habitats and Species. Roderick, E. and R. Milner, eds. 1991. Washington Department of Wildlife, Olympia, Washington.

Wilbur, A.R. and M.W. Pentony. 1999. Human-Induced Nonfishing Threats to Essential Fish Habitat in the New England Region. Pages 299-321 *in* L. Benaka, editor. Fish Habitat: Essential Fish Habitat and Rehabilitation. American Fisheries Society, Symposium 22, Bethesda, Maryland.

GeoEngineers

APPENDIX E
EXAMPLE SEWIP DATA SHEET

SEWIP IVA for Estuarine or Marine Habitat (This model assumes source of water is tidal fresh, brackish, or marine) Date Surveyors On Site or Off Site? Circle AU # Supplement w/Aerials? Date and Type?	Y/N	CH*	CO/BT*	Functions Addressed*	Comments
* BT-bull trout, CH-chinook, CO-coho, F-feeding, H-health/toxicity, M-migration, O-osmoregulatory, P-predator avoidance					
Hydrology				F, M, O	
1 AU has vernal or perennial freshwater stream or spring		3	3	F, O	
2a AU is depositional (slow currents, low wave action) over 25% of littoral area		2	2	F	
2b AU is depositional (slow currents, low wave action) over 50% of littoral area		3	3	F	
3 AU has refuge from high velocities (e.g., during max. ebb)		3	3	M, P	
4a AU contains a natural tidal channel wetted at MLLW		X1.5	X1.3	F, P	
4b AU contains tidal channel wetted at MSL (i.e., shallow drainage)		2	2	F, P	
5 Tidal channel is dendritic or highly sinuous		3	3	F, P	
Water Quality					
6a Fresh water only (salinity <0.5 ppt)		1	3	F	
6b Oligohaline to Mesohaline (sal. variable: often 0.5 to 5 ppt, but can range to 18 ppt)		3	3	F, O	
6c Polyhaline (sal. typically 18 to 30 ppt)		1	1	F, O	
7a Temp/DO meet criteria for salmonid health during major use periods		2	2	H	
7b Temp/DO meet criteria for salmonid health at all times		3	3	H	
Physical Features					
Vascular plant/mud (or sand) flat boundary (vegetated/unvegetated boundary)					
Shoreline complexity					
8a Ratio of length of MHHW boundary to width at MLLW >3 (include islands)		3	3	F, P	
8b Ratio of length of MHHW boundary to width at MLLW 1.2 to 3 (include islands)		2	2	F, P	
8c Ratio of length of MHHW boundary to width at MLLW <1.2 (include islands)		1	1	F, P	
Exposure					
9 AU is sheltered from waves		2	2	F	
Slope					
10a Slope of substrate in littoral zone >10h:1v (i.e., low gradient)		3	3	F, P	
10b Slope of substrate in littoral zone <10h:1v but >5h:1v (i.e., moderate)		2	2	F, P	
10c Slope of substrate in littoral zone <5h:1v but >2h:1v (i.e., steeper)		1	1	F, P	

Appendix B SEWIP Salmon Overlay Field Inventory Sheet.

AU # Date Surveyors	Y/N	CH	CO/BT	Address	Comments
Range of Depths					
11a >10% of AU is littoral (MHHW to -10 ft; use OHW if marsh veg. above MHHW)		1	1	F, P	
11b >25% of AU is littoral (MHHW to -10 ft; use OHW where vegetation indicates)		2	2	F, P	
11c >50% of AU is littoral (MHHW to -10 ft; use OHW where vegetation indicates)		3	3	F, P	
Sediments (surficial only)					
12 Substrate in littoral zone - silty sand >25% of area		1	1	F	
13 Substrate in littoral zone - mud or mixed fine 25 - 50% of area		2	2	F	
14 Substrate in littoral zone - mud or mixed fine >50% of area		3	3	F	
15 Upper intertidal zone contains potential forage fish spawning habitat		3	3	F	
Vegetated Edge					
Below OHW					
16a Buffer: marsh edge >10 ft wide over 50% of shoreline		3	3	F, P	
16b Marsh edge >5 ft wide over 50% of shoreline; or >10 ft wide over 25-50% of shoreline		2	2	F, P	
16c Marsh edge exists but <5 ft wide, or less than 25% (but >5%) of shoreline		1	1	F, P	
16d Marsh of native species occupies more than 25% of total AU		X 2	X 2	F	
Above OHW (riparian zone)					
17a Riparian scrub-shrub and/or forested >25 ft wide over 10 to 24% of shoreline		1	1	F, P	
17b Riparian scrub-shrub and/or forested >25 ft wide over 25 to 50% of shoreline		2	2	F, P	
17c Riparian scrub-shrub and/or forested >25 ft over 50% of shoreline		3	3	F, P	
18 Riparian vegetation is dominated by native species		1	1	F	
19 Riparian zone provides significant source of LWD recruitment		X1.5	X1.5	F, P	
Landscape					
20a AU has low- to moderate-gradient intertidal continuity with adjacent AU (one side)		1	1	M, P	
20b AU has low- to moderate-gradient intertidal continuity with adjacent AUs (both sides)		3	3	M, P	
Special Habitat Features					
LWD Density (LWD must be in the IT zone below MHHW)					
21a 1.0 piece/channel width, /30 m of shoreline, or /100 m^2 of AU whichever is greater		3	3	P	
21b 0.5 piece/channel width, /30 m of shoreline, or /100 m^2 of AU whichever is greater		2	2	P	
21c 0.2 piece/channel width, /30 m of shoreline, or /100 m^2 of AU whichever is greater		1	1	P	

Appendix B SEWIP Salmon Overlay Field Inventory Sheet.

AU # Date Surveyors	Y/N	CH	CO/BT	Address	Comments
Submerged Vegetation (note provisions with regard to impacts to macrovegetation)					
22 Algal cover over 10% of littoral area (during springtime)		1	1	F, P	
23a Eelgrass or kelp (laminarians) is present along 5 - 10% of low tide line of AU		1	1	F, P	
23b Eelgrass or kelp (laminarians) is present along 10 - 25% of low tide line of AU		2	2	F, P	
23c Eelgrass is or kelp (laminarians) present along more than 25% of low tide line of AU		3	3	F, P	
23d Eelgrass or kelp (laminarians) occupies more than 25% of total area of AU		X 2	X 2	F, P	
24 Do functioning feeder bluffs provide a significant source of sediment to the AU?		X 2	X 2	F	
Stressors					
25a Immigration/emigration restricted 25 to 50% of the time		X 0.8	X 0.8	M	
25b Immigration/emigration restricted 50 to 75% of the time		X 0.5	X 0.5	M	
25c Immigration/emigration restricted 75 to 90% of the time		X 0.3	X 0.3	M	
26a Wood debris present on the bottom 25% to 75% cover over AU		X 0.7	X 0.7	F	
26b Wood debris present on the bottom >75% over AU		X 0.5	X 0.5	F	
27a Log rafting affects 10 - 50% of AU on a recurring basis		X 0.7	X 0.7	F	
27b Log rafting affects over 50% of AU on a recurring basis		X 0.5	X 0.5	F	
28a Water col. conditions exceed salmonid thresholds during periods of high abundance		X 0.3	X 0.3	H	
28b Water col. conditions exceed salmonid thresholds during periods of low abundance		X 0.7	X 0.7	H	
29a Sediment chemical contam. present (>SQS over more than 25% of AU)		X 0.8	X 0.8	F, H	
29b Sediment chemical contam. present (>CSL over more than 25% of AU)		X 0.6	X 0.6	F, H	
30a Riprap or vertical bulkheads extend below MHHW for 10 - 50% of shore		X 0.8	X 0.9	P,M,F	
30b Riprap or vertical bulkheads extend below MHHW along >50% of shore		X 0.7	X 0.8	P,M,F	
31 Majority of riprapped or bulkheaded shoreline extends below MSL (+6 ft MLLW)		X 0.8	X 0.9	P,M,F	
32a Finger pier or dock >8 ft wide		X 0.9	–	P	
32b Two or more finger piers or docks >8 ft wide; or single pier or dock >25 ft wide		X 0.8	X 0.9	P	
33a Overwater structures cover 10 to 30% of littoral area in AU		X 0.8	X 0.9	P,M,F	
33b Overwater structures cover 30 to 50% of littoral area in AU		X 0.7	X 0.8	P,M,F	
33c Overwater structures cover 50 to 75% of littoral area in AU		X 0.5	X 0.7	P,M,F	
33d Overwater structures cover >75% of littoral area in AU		X 0.4	X 0.5	P,M,F	
34 Littoral benthic habitat routinely disturbed by prop wash, chronic oil spills, or dredging		X 0.9	X 0.9	H, F	

00253\002\au_sewip_iva_field.xls

GeoEngineers

APPENDIX F
PLANT DESCRIPTIONS

Douglas Fir (*Pseudotsuga menziesii*): This familiar tree grows well in various soil types, especially in sunny areas. It has flat needles that are sharp-pointed but not prickly, and many medium-sized cones that drop to the ground each fall. The ridged Douglas Fir bark on older trees is fire-resistant because of its thickness. An uncrowded tree has pyramidal crown with dense foliage. Deer and rodents browse on the seedlings, and small birds and mammals eat the seeds. Needs well drained soil and full sun (Thurston County Conservation District 2005). From extremely dry, low elevation sites to moist mountain sites; on the outer south coast it is replaced by western hemlock except on dry, rocky sites or in areas influenced by fire (Pojar and MacKinnon 1994).

Western Red Cedar (*Thuja plicata*): This is a sweet-smelling, coniferous evergreen tree that likes moist soil but can also survive in drier habitats. It grows slowly, but it can grow to heights of between sixty and two hundred feet. As it grows, its crown becomes open and its lower branches droop. Clusters of small brown cones grow at the ends of the branches (Thurston County Conservation District 2005). Instead of needle leaves, it has tiny scales set snugly on the branches and it is resistant to rot and fungus (Polar and MacKinnion et al. 1994). It provides protective and nesting cover for wildlife; it also provides twigs and foliage for browsers. Its bluish-black, berry-like fruit is important to many large and small birds and mammals (Martin et al. 1961).

Western Hemlock (*Tsuga heterophylla*): These tall, graceful trees, characterized by drooping tree tips and branches, thrive in wet shady areas. Western Hemlock has strong furrowed bark and flat, soft needles of varying lengths. Small, papery seed cones ripen during fall and drop during winter. Western Hemlock provides winter cover for mammals and birds, and nesting areas for several bird species. The seeds are eaten by various rodents (Thurston County Conservation District 2005). Fairly dry to wet sites; well adapted to grow on humus and decaying wood, also found on mineral soil; shade tolerant; very common from low to middle elevations (Pojar and MacKinnon 1994).

Bigleaf Maple (*Acer macrophylla*): This tall tree has a massive, squat main trunk and soaring, huge vertical limbs. In the open, it forms a round, spreading crown, while in a dense stand it becomes a tall straight tree. It has long clusters of yellow flowers in the spring, and very large, lobbed leaves which turn yellow in the fall. Various birds eat its two-winged "helicopter" fruits, and the leaves provide foliage for deer and elk. Young trees grow rapidly in the spring (Thurston County Conservation District 2005). Dry to moist sites, often with Douglas-fir, often on sites disturbed by fire, clearing or logging; at low to middle elevations (Pojar and MacKinnon 1994).

Balsam Poplar/Black Cottonwood (*Populus balsamlfera*): 80 to 120 ft. tall deciduous tree; fast-growing 4-5 ft a year in rich, moist, mineral soil is not uncommon. Tolerates seasonal flooding and typically grows along rivers and streams and in floodplain areas. Common associates include Western Red Cedar, Western Hemlock, Red Alder, Salmonberry, Red Osier, Dogwood, and Lady Fern. Important nest tree for great blue heron, nest and roost tree for bald eagle, osprey, other raptors, and nesting birds. Poplars and willows typically have relatively short life spans and are susceptible to various heart rots. After these trees die, woodpeckers often excavate nest cavities in the soft interior; chickadees use old woodpecker holes as nest sites. (Department of Ecology 1993). On low to medium elevation, moist to wet sites; forms extensive stands on islands and flood plains along major rivers and on disturbed upland sites (Pojar and MacKinnon 1994).

Red Alder (*Alnus rubra*): Fast growing 60 to 100 ft tall deciduous tree, usually single-stemmed; forms pure stands or intermixes with Western Red Cedar and Western Hemlock; shade intolerant. Will grow in nitrogen-deficient soils due to its ability to fix atmospheric nitrogen; often seeds prolifically on bare soil areas. Provides food for grouse, pine siskin, black-capped chickadee, kinglet, and beaver; common nest tree for great blue heron. (Department of Ecology 1993). Moist woods, streambanks, floodplains, slide tracks, and recently cleared land, often in pure stands; at low elevations (Pojar and MacKinnon 1994).

Black Hawthorn (*Crataegus douglasii*): A erect scrub or small tree with thick, pale green, oval leaves, sharp pines along the crooked twigs, and dirty gray, rough, scaly bark. After abundant clusters of white flowers appear in late spring, black fruit appears which soon withers, but persists through the winter, providing food for many birds and mammals. This plant grows individually or forms thickets; its dense foliage provides cover for nesting songbirds and other animals (Thurston County Conservation District 2005). Moist, open places; forest edges, thickets, shorelines, streamside areas, roadsides, coastal bluffs; at low to middle elevations (Pojar and MacKinnon 1994).

Vine Maple (*Acer Circinatum*): Vine maple may either stand immediately erect or creep along the ground in pursuit of sunlight before turning upward. It has excellent soil binding characteristics, is tolerant of shade, and provides good forage for wildlife. Birds and small mammals use its twigs, leaves and seedsfor food and cover (Thurston County Conservation District). This small tree or shrub has great aesthetic value with its bright red leaves and petite white flower.

Salal *(Gaultheria shallon*): A common plant, it is a robust, evergreen shrub which often forms dense thickets. It has lustrous, dark green leaves, showy pink flower clusters, and purplish-black berries that are eaten by birds, rodents, and people. Salal can be damaged by the strawberry root weevil (Thurston County Conservation District 2005). Occurs in coniferous forests, rocky bluffs, to the seashore; low to medium elevations (Pojar and MacKinnon 1994).

Red Huckleberry (*Vaccinium parvifolium*): An erect bush with spreading, green, angular branches. It has bright green leaves and stems and bright red berries (Thurston County Conservation District 2005). Coniferous forest, often at forest edges or under canopy openings, in soils rich in decaying wood, often on stumps or logs; at low to middle elevations (Pojar and MacKinnon 1994).

Evergreen Huckleberry (*Vaccinium ovatum*): Has glossy, dark green leaves on many erect, hairy branches which start at the base of the plant. It produces purplish-black fruits. New shoots are bronzy red, and mature foliage is often reddish purple (Thurston County Conservation District 2005). Coniferous forests (especially edges and openings) at low elevations, often on the beach fringe in the salt spray zone, usually close to tidewater (Pojar and MacKinnon 1994).

Salmonberry (*Rubus spectabilis*): FAC+. Grows 1-3 m high with shredding, light- or golden-brown bark; weak, woody, sparsely-thorned stems; and zigzag twigs. Leaves are deciduous, alternate, and contain three leaflets which are 1-3 inches long, dark green, pointed, sharply toothed, and often wrinkled. Flowers are large (about 1½ inches across), borne singly, and are pink to dark or purplish-red. Large raspberry-like fruits appear in late spring, ripening over a fairly long period to become yellow to red or deep purple (United States Army Corps of Engineers 2005). Grows in moist to wet places, often abundant along stream edges, avalanche tracks and in wet logged areas; at low to sub-alpine elevations. Full sun to full shade. (Pojar and MacKinnon 1994).

Pacific Willow (*Salix scouleriana*): A small tree with one or more leaning, crooked trunks and an upright to rounded form. 20 to 40 ft tall deciduous shrub or tree; grows in coastal dune wetland communities along the outer coast and coastal freshwater swamps around Puget Sound. (Department of Ecology 1993). Tall, slender shrub or tree, to 12m tall; branches brown, twigs glossy, with yellow, duckbill-shaped buds, usually hairless, brittle at base; bark fissured yellowish-brown on older trees. Riverbanks, floodplains, lakeshores, and wet meadows; often standing in quiet, shallow river backwaters; sea levels to middle elevations (Pojar and MacKinnion 1994).

Red Osier Dogwood (*Cornus stolonifera*): Deciduous shrub to 20 ft tall. Often forms thickets along streams and in openings in forested swamps. Also grows as an understory shrub in coniferous and coniferous/deciduous swamps. Widely planted due to its easy availability, wildlife value, erosion control value, aesthetic value, and suitability in many several wetland communities (Department of Ecology 1993). Moist soil, typically in swamps and streamside forest and scrub, but also in open upland forest and thickets and rocky shorelines, bog forest edges and disturbed sites; valley bottoms to middle elevations (Pojar MacKinnon 1994).

Pacific Ninebark (*Physocarpus capitatus*): Deciduous shrub to about 15 ft tall. Limited to western Washington and northern Idaho with occurrences in between. Typically grows in moist but well-drained soils along streams, in full sun to part shade (Department of Ecology 1993). Wet, somewhat open spaces (streamside thickets, edges of moist woods, coastal marshes, meadows, margins of lakes and streams), occasionally on drier, shrubby sites; at low to middle elevations (Pojar and MacKinnon 1994).

Nootka Rose *(Rosa nutkana):* Has large, solitary, pink flowers that produce big purplish pear-shaped rosehips (Thurston County Conservation District 2005). Spindly, to 3 m tall, with a pair of large prickles at the base of each leaf, other prickles usually absent except on some new growth. In a variety of generally open habitats (shorelines, meadows, thickets, streamside areas, roadsides, clearings), at low to middle elevations (Pojar and MacKinnon 1994).

Western Sword Fern (*Polystichum munitum*): Western sword fern is a large evergreen fern with long fronds that can grow 1.5 to 6 feet long. It grows along the Pacific Coast, from southeastern Alaska to california and eastward into northwest Montana and frequents moist forest habitat. Western sword fern is found with black cottonwood an d Douglas fir and indicates high quality site for these species. The fern can contain high levels of potassium, nitrogen, calcium, phosphorus and magnesium when assoicated with red alder. Elk, deer, and black bear will forage on this plant (Crane 1989).

Slough sledge *(Carex obnupta):* 1 to 3 ft tall, spreads by rhizomes to form monotypic stands. Limited to western Washington. Tolerates deep shade or full sun and commonly grows in red alder-dominated swamps in association with skunk cabbage, water parsley, and salmonberry. Tolerates pH of 5.5 to 8.0 (Department of Ecology 1993). Marshes, swamps, bogs, stream-banks, lakeshores, wet forest openings, meadows, clearings; common at low elevations (Pojar and MacKinnon 1994).

Small-fruited bulrush *(Scirpus microcarpus):* 2 to 4 ft tall deciduous perennial herb; spreads by rhizomes to form monotypic stands in saturated soils and shallow seasonal standing water. Common along streams and in freshwater marshes. (Department of Ecology 1993). Stems usually clustered, from a sturdy rhizome, stout, triangular, leafy, to 1.5 m tall. Swamps, sloughs, streambanks, wet ditches and clearings; common at low to middle elevations (Pojar and (MacKinnon 1994).

REFERENCES

Cooke et al. 1997. A Field Guide to the Common Wetland Plants of Western Washington & Northwestern Oregon. Seattle Audubon Society. Seattle, Washington.

Crane, M. F. 1989. *Polystichum munitum.* In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory.
http://www.fs.fed.us/database/feis/
(Accessed September 13, 2007)

Hitchcock, C.L. and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press. Seattle, Washington.

Martin, Alexander D., Herbert S. Zim and Arnold L. Nelson. 1961. American Wildlife and Plants: A Guide to Wildlife Food Habits. Dover Publications, Inc. New York.

Pojar, J. ans A. MacKinnon. 1994. Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia and Alaska. B. C. Ministry of Forests and Lone Pine Publishing, Vancouver, British Columbia.

Washington Department of Ecology. 1993. "Controlling Erosion Using Vegetation: Plant Selection Guide."
http://www.ecy.wa.gov/programs/sea/pubs/93-30/index.html
(Accessed September 13, 2007)