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Wetland Mitigation and Habitat Conservation

UMBRELLA BANK PROSPECTUS

Prepared by

Port of Seattle

ANCHOR QEA

Sponsor Contact Information

Jon Sloan
Port of Seattle
P.O. Box 1209
Seattle, Washington 98111
206-787-3675
Sloan.J@portseattle.org


Photo: Anchor QEA

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List of Acronyms and Abbreviations

Bank	Joint Umbrella Wetland Mitigation and Habitat Conservation Bank
Corps	U.S. Army Corps of Engineers
CSO	combined sewer overflow
Ecology	Washington State Department of Ecology
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FR	Federal Register
ILF	in-lieu fee
IRT	Interagency Review Team
MLLW	mean lower low water
NGVD 29	National Geodetic Vertical Datum of 1929
NOAA	National Oceanic and Atmospheric Administration
NRD	natural resources damage
PCB	polychlorinated biphenyl
Port	Port of Seattle
ppt	part per thousand
RM	river mile
SAMP	Sustainable Airport Master Plan
SAV	submerged aquatic vegetation
SDOT	Seattle Department of Transportation
STIA	Seattle-Tacoma International Airport
WAC	Washington Administrative Code
WRIA 9	Water Resource Inventory Area 9
WSDOT	Washington State Department of Transportation

Introduction

As the only river in Seattle, the Green-Duwamish River provides habitat for many of the region's valued fish and wildlife species, and is home to tribal, recreational, and commercial fisheries. The Green-Duwamish watershed also supports the core of industrial and port activity in the Seattle area.

The watershed, known as Water Resource Inventory Area 9 (WRIA 9), has been heavily developed over time, degrading estuarine, riparian, and freshwater wetland environments. The Port of Seattle (Port) is proposing to establish a Joint Umbrella Wetland Mitigation and Habitat Conservation Bank (Bank) within the watershed to rehabilitate ecological functions and restore priority habitat, while facilitating sustainable growth and development throughout the region. Upon certification by the Interagency Review Team (IRT), the proposed Bank project will provide compensatory mitigation for unavoidable impacts to wetlands and other aquatic resources, as well as provide conservation credits for impacts to special status salmonid species listed under the Endangered Species Act (ESA). The Bank project is being proposed through Washington State's Mitigation Banking System, co-chaired by the U.S. Army Corps of Engineers (Corps) and the Washington State Department of Ecology (Ecology) and will also be reviewed and proposed for certification by the National Oceanic and Atmospheric Administration (NOAA) Fisheries as a conservation bank.

The proposed Bank will include multiple sites that would serve WRIA 9, including the Lower Green River, Duwamish Estuary, and Nearshore subwatersheds (**Figure 1**). The Bank would substantially contribute to the Port's Century Agenda goals and strategies to advance commerce and promote industrial growth in an environmentally responsible way (Port of Seattle 2017).

The proposed Bank would initially include habitat creation and restoration sites in marine, estuarine, and freshwater environments (**Figure 2**). Terminal 25 South will provide substantial off-channel marsh and marine shoreline habitat at the south end of the East Waterway, where habitat is otherwise lacking. Terminal 117, located in the heart of Seattle's South Park neighborhood, will provide

Seaport operations along the East Waterway and Elliott Bay

brackish water marsh and mudflat, which is critical for Chinook salmon as they migrate through the transition zone. In Auburn, 34 acres of floodplain wetlands and buffers will be enhanced contiguous to the Port's existing 60-acre compensatory mitigation site on the banks of the Green-Duwamish River. Future sites could include restoration at Terminals 105, 107, 108, and 115 South; Pier 48; and others

Figure 1: Vicinity Map

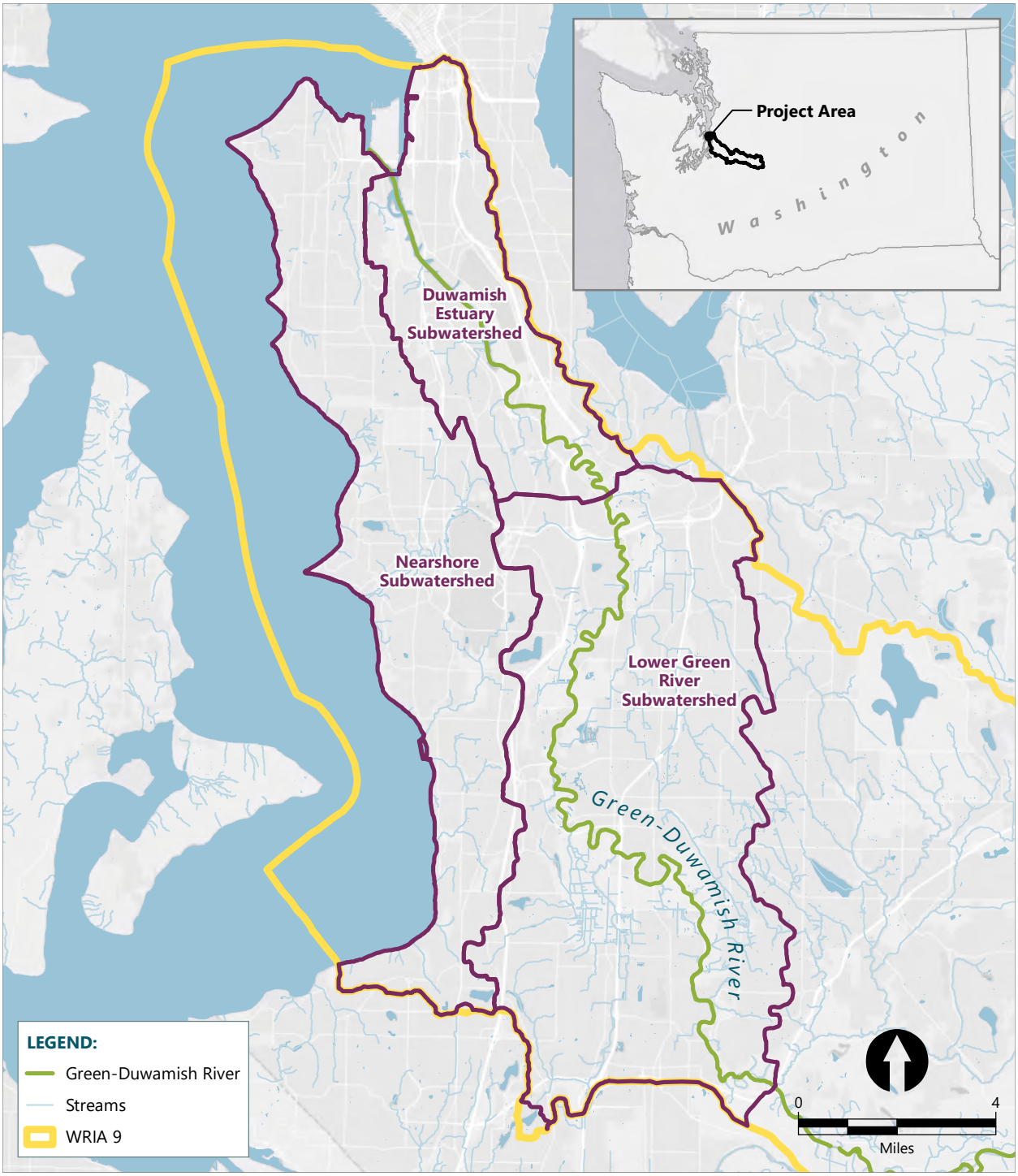

Figure 2: Proposed Initial Mitigation and Conservation Sites

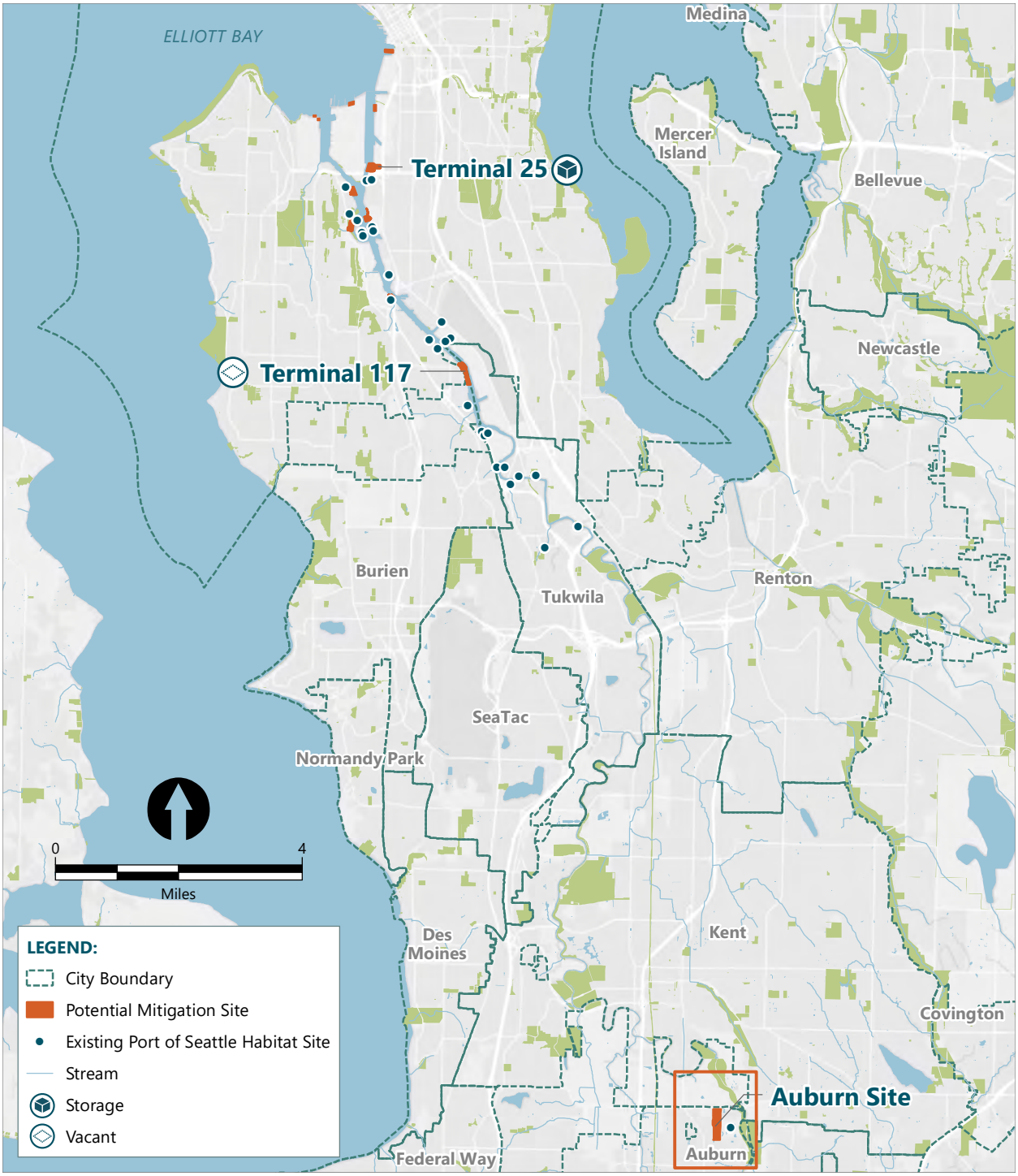

Figure 3: Proposed Mitigation and Conservation Sites

depending on availability, feasibility, market conditions, and agency approval (**Figure 3**).

Background and Overview

As a special-purpose municipal corporation, the Port serves King County and operates the Seattle seaport and Seattle-Tacoma International Airport (STIA). The Port's mission is "to create good jobs here and across the state by advancing trade and commerce, promoting manufacturing and maritime growth, and stimulating economic development" (Port of Seattle 2018a). The Port owns and manages many properties and seeks to maximize the public assets in their portfolio, with an eye toward best uses and environmental sustainability (Port of Seattle 2018a). Port organizational values include:

- We conduct business with the highest ethical standards. Our business practices reflect integrity, accountability, honesty, fairness, and respect at all levels.
- We honor our commitments and provide outstanding service and value to each other, our customers, the citizens of King County, and the region.
- We are capable, high-performing people who appreciate the privilege of public service. We practice open communication, innovation, collaboration, and transparency in all interactions.
- We embrace the richness of a diverse workplace and support employee development. We encourage healthy and diverse organization that enhances our contributions locally and globally.
- We are responsible stewards of community resources and the environment. We exercise care and wisdom in the use of both financial and natural resources.

The seaport is an approximately 1,540-acre commercial port in Seattle. Although there are active seaport operations throughout Seattle's shoreline, the port's principal marine cargo operations and industrial properties are in the lower 5 miles of the Green-Duwamish River, known as the Lower Duwamish Waterway, and in south Elliott Bay, including the East and West waterways, where the Lower Duwamish Waterway discharges to Elliott Bay. Additional port facilities and properties in east and northeast Elliott Bay operate as marine cargo facilities, marine transportation/cruise vessel terminals, marinas, and marine industrial properties.

Terminal operations at STIA

The STIA Airport Operations Area consists of 1,287 acres, which includes the terminal, runways, and airport support services, generating approximately 172,000 jobs. The Port also owns an additional 1,505 acres of aviation properties outside of the Airport Operations Area. STIA has partnered with area cities and developers to help boost local economies in Burien, Des Moines, and SeaTac. The Federal Aviation Administration's (FAA's) airport operation and compatible land use regulations guide STIA's activities. The Sustainable Airport Master Plan (SAMP) utilizes sustainability concepts to augment existing operations and land uses to accommodate projected growth. The SAMP identifies measures for the Port to satisfy growing air transportation needs while meeting sustainability goals and objectives (Port of Seattle 2018b).

Development and operations by the Port and other businesses in these areas often affect aquatic environments or sensitive areas. Federal, state, and local regulations and decision-making guidelines require that potential development projects avoid and minimize environmental impacts to the extent possible and that all unavoidable adverse impacts be offset by mitigation actions that provide compensatory natural resource values and fish and wildlife habitat functions. There are limited opportunities to complete mitigation projects in this heavily developed region. As a significant landowner and lessor in the area, the Port has the direct ability to identify, implement, and sustain offsetting habitat restoration and creation projects.

In recent years, ports and other public organizations have chosen to sponsor mitigation banks to provide predictable, cost-effective, and timely fish and wildlife and environmental functions while reducing development project review and

approval inefficiencies. A number of Washington ports are sponsoring wetland mitigation banks (Port of Vancouver), habitat conservation banks (Port of Everett), or joint wetland mitigation and habitat conservation banks (Port of Tacoma) that have been approved or are in the process of the technical review. The Bank is a unique opportunity to expand mitigation opportunities and cost effectiveness within the GreenDuwamish and Central Puget Sound watersheds, providing important natural resource values and habitat functions within the largest economic engine of the Puget Sound region.

The Port's plans to develop a joint wetland mitigation and conservation bank would require approval by the Corps, Ecology, and the rest of the IRT, as well as NOAA Fisheries. The IRT is co-chaired by the Corps and Ecology, who will certify the bank to provide compensatory mitigation for unavoidable impacts to wetlands and other aquatic resources. NOAA Fisheries will certify that the habitat bank provides conservation credits for impacts to special status salmonid species listed under the ESA. Once certified, the proposed joint bank will be a predictable compensatory mitigation tool for agency-approved natural resource impacts. Bank credits will be available to the Port, Port tenants, private developers, and government agencies. Importantly, these credits may support natural resources damage (NRD) settlements related to the Lower Duwamish Waterway, East Waterway, Harbor Island, and Lockheed West Superfund sites. The Terminal 117 site is already approved by NOAA Fisheries and the Elliott Bay Trustee Council for NRD credits. The Port will ensure proper ledgering to ensure credits are not double-counted.

Any revenues generated from sales of wetland, conservation, or NRD credits will be reinvested by the Port in habitat projects identified in this Prospectus (or as amended). Many private mitigation banks are interested in generating a profit through the sales of credits; however, the goal of the Port's joint wetland and habitat conservation bank is to create a self-sustaining habitat restoration program that results in continual improvement of wetland and habitat functions in the Lower Green-Duwamish watershed.

Geography and Terminology

WRIA 9, anchored by the Green-Duwamish River and central Puget Sound, includes three subwatersheds in the vicinity of the proposed bank sites (**Figure 1**).

- The Duwamish Estuary subwatershed extends from River Mile (RM) 0 at Elliott Bay to RM 11 at the confluence with the Black River
- The Lower Green River subwatershed includes the portion of the Green-Duwamish River from approximately RM 11, near Tukwila and the historical confluence of the Green-Duwamish River with the Black River, upstream through Renton and Kent, to RM 30 near Auburn
- The Nearshore subwatershed includes marine shorelines and other smaller drainages, such as the Elliott Bay marine shoreline, and similar small streams, such as Miller, Walker, and Des Moines creeks, that connect upland areas in SeaTac, Burien, Normandy Park, Des Moines, West Seattle, and the upland margins of northwest Elliott Bay to Puget Sound

In the Green-Duwamish River, tidal influences on river height are observed upstream to about RM 15 (City of Seattle 2003). Saltwater from Puget Sound typically extends along the dredged subtidal Lower Duwamish Waterway channel and upstream of Turning Basin Number 3, beyond the dredged channel to a natural basalt rock ledge near the Green River Trail pedestrian bridge over the Lower Duwamish Waterway, at approximately RM 8 (City of Seattle 2003). The area from RM 0 to RM 8 is generally termed "the transition zone" and represents the estuarine area where freshwater and saltwater mix, which is essential for changes in juvenile salmon osmoregulation during the transition from a freshwater to saltwater life stage and is equally important to many other migratory and resident fish and wildlife species.

Watershed Processes and Functions

The need for a Bank is supported by local salmon recovery plans, which have consistently demonstrated that restoring estuarine tidal and riparian habitat and freshwater aquatic and riparian environments is an important tool in improving impaired watershed processes (Duwamish Blueprint Working Group 2014; King County 2017, 2018; WRIA 9 Steering Committee 2005). Creating or restoring wetland and shoreline habitat and associated riparian buffers improves water quality; provides habitat connectivity for other species dependent on riparian, marsh, and other aquatic environments; and, re-establishes critical off-channel estuarine and freshwater rearing, feeding, and refuge for juvenile salmonids (Duwamish Blueprint Working Group 2014; King County 2017, 2018; WRIA 9 Steering Committee

2005). The Green-Duwamish subwatersheds are shown in **Figure 1**.

The Green-Duwamish River is considered the fourth most endangered river in the country, and providing salmon habitat and floodplain habitat is critical for restoration of the system (American Rivers 2019). The Green-Duwamish watershed provides important feeding, spawning, and migratory habitat to native fish and wildlife. Anadromous salmon found there include Chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*), chum (*O. keta*), sockeye (*O. nerka*), and pink (*O. gorbuscha*), as well as steelhead (*O. mykiss*), cutthroat (*O. clarkia*), and bull trout (*Salvelinus confluentus*; Northwest Indian Fisheries Commission and WDFW 2015). Among these, federally threatened species include Puget Sound Chinook salmon (64 Federal Register [FR] 41835, 70 FR 37160), Puget Sound steelhead (72 FR 26722), and Coastal-Puget bull trout (64 FR 58910).

Puget Sound and the Green-Duwamish River have been designated as critical habitat for Chinook salmon (70 FR 52630), steelhead trout (81 FR 9251), and bull trout (64 FR 58910). Essential Fish Habitat (EFH) is designated under the Magnuson-Stevens Fisheries Conservation and Management Act for Pacific Coast salmon, which encompasses Chinook, coho, and pink (73 FR 60987).

After the federal government listed both Puget Sound Chinook salmon and bull trout as threatened, local governments in the Green-Duwamish watershed created the *Salmon Habitat Plan – Making Our Watershed Fit for a King* (WRIA 9 Steering Committee 2005), which acts as a guide for protection and restoration actions to enhance Chinook salmon and bull trout habitat. The Salmon Habitat Plan outlines factors that have led to population decline and habitat enhancement actions that could increase Chinook salmon and bull trout populations; it identifies reduced channel complexity, lost riparian vegetation, disconnected off-channel habitat, increased stream scour due to reduced sediment supply, and decreased summer low flows and increased temperature as widespread factors motivating species decline in this watershed.

Restoration of off-channel areas along the Green-Duwamish River would provide productive rearing habitat, loss of which is currently limiting Chinook salmon recovery. Providing more productive, protected habitat for juvenile Chinook salmon would also increase the amount of available prey for endangered Southern Resident Killer Whales (*Orcinus orca*). As described in Executive Order 18-02: Southern Resident Killer Whale Recovery and Task Force (Southern Resident Orca Task Force 2018), recent studies indicate that reduced Chinook salmon runs undermine the potential for Southern Resident Killer Whales to successfully reproduce and recover. Off-channel restoration benefitting Chinook salmon will also benefit Southern Resident Killer Whales. The Port's bank will create, enhance, and restore significant freshwater rearing habitat for Chinook in Auburn, as well as highly significant transition zone habitat in the estuary and marine environment in Seattle.

Lower Green River Subwatershed (RM 11 to RM 30)

Fall-run Chinook, coho, fall-run chum, sockeye, and pink (odd-year) salmon, winter- and summer-run steelhead, and bull trout have been documented in the Lower Green River subwatershed (WDFW 2019). The specific use of different habitats along the river varies with seasonal timing, life stage, and species of salmon (Ruggerone et al. 2006). Adult salmon primarily spawn in the middle reaches of the Green-Duwamish River and its tributaries (upstream of this subwatershed). Juvenile salmonids that migrate downstream rely on naturally formed pools as well as downed wood and roots from riparian buffers for refuge from aquatic predators. Riparian buffers also reduce turbidity levels, improve water quality through stormwater filtering, and improve the foraging capacity for juvenile salmonids (Anchor 2004). These documented conditions confirm the importance of restoration and creation actions that increase habitat diversity, which provides natural resource values and functions that support multiple juvenile salmon life-history strategies, thus contributing to population resilience.

Levees and revetments have channelized the Lower Green-Duwwamish River and its tributaries and disconnected off-channel habitat, affecting many areas along the river. Protecting and restoring off-channel habitat, increasing habitat complexity (including increased riparian vegetation, feeding, and refuge areas), reconnecting sediment sources for spawning substrate, and improving fish passage would have beneficial effects for fish and wildlife populations in the subwatershed. Productive off-channel habitat is the most important factor for out-migrating juvenile salmonids in the Lower Green-Duwamish River (King County 2017).

Additionally, wetland flood storage capacity is needed in this highly developed subwatershed. Restoring freshwater wetlands near the Green-Duwamish River can increase flood storage, thereby improving water quality for salmon, in support of the goals of the Salmon Habitat Plan (WRIA 9 Steering Committee 2005).

Duwamish Estuary Subwatershed (RM 0 to RM 11)

Estuary habitat between the Green-Duwamish River and Elliott Bay is vital for juvenile salmon life cycles. Industrial and urban uses on the river have transformed the Duwamish Estuary subwatershed, resulting in channel simplification and altered hydrology (King County 2018). Due to contamination, the U.S. Environmental Protection Agency (EPA) declared the Lower Duwamish Waterway a federal Comprehensive Environmental Response, Compensation, and Liability Act (or Superfund) site. EPA published a final cleanup plan in 2014 to address approximately 400 acres of contamination (EPA 2018).

Stormwater discharging into the estuary reduces water quality and can lead to high stream flows during storms. Additionally, fragmented, low-functioning riparian habitat makes many tributaries that lead to the estuary inhospitable for salmon (King County 2018). Chinook and chum salmon and bull trout have been documented in the Duwamish Estuary. The *Re-Green the Green: Riparian Revegetation Strategy for the Green/Duwamish and Central Puget Sound Watershed (WRIA 9)* (WRIA 9 Riparian Revegetation Work Group 2016) and Salmon Habitat Plan (WRIA 9 Steering Committee 2005) summarize the planned restoration efforts for the Duwamish Estuary, which focus on increasing function and connectivity for riparian habitat and improving water quality and hydrology in tributaries that drain into the estuary. Numerous federal, state, and University of Washington evaluations of the Duwamish Estuary indicate that restoring the once abundant, and now rare, natural resource values and functions would benefit all resident and migratory fish and wildlife (in particular, juvenile salmon), reversing significant declines in estuarine habitat that is essential to diverse salmon life histories.

Elliott Bay

Elliott Bay is adjacent to the Duwamish Estuary and Nearshore subwatersheds. Elliott Bay includes approximately 13 miles of shoreline, nearly all of which has been altered by past and continuing development uses and activities. Approximately 65% of the Elliott Bay shoreline consists of overwater docks, piers, and associated structurally stabilized riprap and bulkhead shoreline. Although approximately 35% of the Elliott Bay shoreline remains exposed, or uncovered, these shoreline areas consist of exposed riprap slopes and other altered and developed shoreline conditions. Approximately 16% of the exposed, altered shoreline is fringed with down-slope sand/mud substrate, representing shoreline areas that, although truncated by artificial structures, are crucial intertidal and shallow subtidal habitat. Less than approximately 4% of the Elliott Bay shoreline could be characterized as including any sort of marine riparian vegetation. Habitat restoration and creation actions that remove overwater cover, in-water structures (especially creosote-treated wood), and other hard shoreline structures would directly benefit resident and migratory fish and wildlife in Elliott Bay.

Nearshore Subwatershed

The Nearshore subwatershed includes a portion of Elliott Bay, Puget Sound, and tributaries that drain directly into the marine waters to the west (**Figure 1**). Human development over many decades has significantly altered watershed processes and habitat availability and function in the Nearshore subwatershed. Land use in the subwatershed consists primarily of residential and industrial uses, which have degraded water quality, riparian vegetation, and sedimentation processes and nearshore habitat functions. Regional salmon populations have decreased over time, as evidenced by ESA listings of Chinook salmon, steelhead, and bull trout, which were historically present (along with other salmon) in the Duwamish and Puget Sound tributaries, including Miller, Walker, and Des Moines creeks (near where STIA is located).

Published in 2001, the comprehensive *Reconnaissance Assessment of the State of the Nearshore Ecosystem* recognized the importance of restoration and protection of critical ecosystem functions in the nearshore environment, providing recommendations that included wetland enhancement and preservation, protection of undeveloped shoreline habitat, and restoration of modified land, starting in the main Duwamish Estuary and subestuaries (Battelle Marine Sciences Laboratory et al. 2001). Shoreline armoring in the nearshore subwatershed is also an ongoing issue

for salmon habitat restoration, with more armoring built than removed through restoration between 2005 and 2014 (Higgins 2014). Habitat restoration and creation actions would be crucial to reversing historical nearshore habitat effects and generating important, sustainable, shoreline and aquatic area natural resource processes and functions. Habitat restoration and creation actions would provide substantial direct nearshore environmental benefits to resident and migratory fish and wildlife in Elliott Bay as well as species that are dependent on the Lower Duwamish Waterway as a migratory corridor.

Miller and Walker Creeks

Extensive flooding and erosion in the Miller and Walker Creeks Basin prompted an analysis of current and future conditions, as presented in the *Miller and Walker Creeks Basin Plan* (Amoto and The Resource Group Consultants 2006). Residential, commercial, and industrial development and associated impacts have increased impervious surface and reduced fish habitat in stream systems. Stream corridors lack riparian habitat, leading to high storm flows, which increases erosion and damages stream beds. Miller and Walker creeks have a high pre-spawn salmon mortality rate (Amoto and The Resource Group Consultants 2006), between 78% and 88% in 2017 (King County 2019). Stormwater discharge and low water quality in streams may be the cause of poor biological health. The Basin Plan identifies the goal of habitat protection and improvement to increase anadromous fish populations.

Des Moines Creek

In 1997, the Des Moines Creek Basin Committee developed the *Des Moines Creek Basin Plan* to address stream-related issues and make recommendations for infrastructure investments. High flows, erosion, fish passage barriers, and water quality are limiting factors for fish in this basin (Des Moines Creek Basin Committee 1997). The plan recommended improving riparian and instream habitat, such as rehabilitating riparian zones by removing invasive plants and improving riparian buffers.

Umbrella Bank Goals and Objectives

Mitigation banks are more successful compared with project applicant/development sponsor mitigation projects because they provide fully functioning, durable natural resource values and functions at critical locations to a greater extent than single, fragmented mitigation actions implemented by development sponsors lacking institutional capability and sustained resource management. Banks also provide more ecological benefits at a watershed level, reduce permit processing times, and are more likely to be protected in perpetuity.

The goal of the Port's proposed joint wetland mitigation and conservation Bank is to provide a range of high-quality, long-term habitats that can be used to offset unavoidable impacts to aquatic resources and fish habitat due to development, redevelopment, and repair/maintenance actions in the Lower Green River subwatershed, Duwamish Estuary subwatershed, Elliott Bay, and the Nearshore subwatershed. To reach this goal, the Bank must accomplish the following:

- Restore, create, or preserve wetland, riparian, and offchannel habitat for fish and wildlife. Expanding rearing habitat for juvenile Chinook salmon will also provide more primary prey for Southern Resident Killer Whales.
- Assist in reaching the habitat restoration and species recovery goals for the Green-Duwamish and Central Puget Sound watersheds as well as in Elliott Bay and the Lower Green-Duwamish River, Duwamish Estuary, and Nearshore subwatersheds
- Use economies of scale by combining required mitigation from individual smaller projects within the subwatershed area into a larger, collective mitigation approach to maximize ecological value
- Use monitoring, long-term management, and commitments for repair, maintenance, and stewardship to ensure successful establishment and long-term viability
- Employ a comprehensively designed system for restoration and enhancement actions that utilizes large sites to reduce the risk of mitigation failure
- Provide institutional protections, including conservation easements, covenants, and long-term site management
- Enable economic activity by the Port and other local jurisdictions and businesses to meet regulatory mitigation requirements by providing a cost-effective, consistent, and predictable option for mitigation in Elliott Bay and the Lower Green River, Duwamish Estuary, and Nearshore subwatersheds

This Prospectus serves as the basis for initial agency and public review of the proposed Bank under state and federal mitigation rules.

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Umbrella Bank Project Sites

Site Selection Framework

In accordance with joint regulatory agency guidance, the Bank sites were selected using a watershed approach, and each site will undergo further design development using techniques based on its watershed position. As described previously, the Lower Duwamish Waterway and Lower Green River are identified in several watershed-based restoration plans, and the degradation, fragmentation, and loss of estuarine habitat and off-channel freshwater fish-rearing habitat are cited as two primary limiting factors for Chinook salmon populations. The Bank will provide opportunities to add estuarine habitat back to the Lower Duwamish Waterway and restore critical estuarine watershed processes that have been altered and disrupted by urban development. Per restoration plans and regulatory documents, expanding off-channel fish-rearing habitat in the Lower Green River subwatershed will benefit a number of fish species, including ESA-listed Chinook salmon and steelhead. The subwatershed also lacks flood protection and high-functioning riparian and wetland habitat next to the river (Duwamish Blueprint Working Group 2014; King County 2018; WRIA 9 Steering Committee 2005; WRIA 9 Riparian Revegetation Work Group 2016; Our Green/Duwamish Watershed Advisory Group 2016). The Bank will provide expanded off-channel fish-rearing habitat, additional flood capacity, and a large area of protected wetland habitat next to the Lower Green-Duwamish River.

Potential ecological value (lift) was evaluated using the priorities and recommendations in watershed-based restoration plans for the Green-Duwamish watershed and the Duwamish Estuary subwatershed, and the guidance provided in Washington Administrative Code (WAC) 173-700-303. Specifically, the Duwamish Blueprint (Duwamish Blueprint Working Group 2014) and the Natural Resource Damage Assessment Programmatic Environmental Impact Statement (NOAA 2013) developed specific recommendations and criteria for restoration in the Duwamish Estuary subwatershed. Similar relevant ecological value and recommendations were identified for wetland establishment and re-establishment and fish and wildlife habitat restoration in the Lower Green-Duwamish River (King County 2017). The following criteria were evaluated for the selection of the initial Bank projects:

- **Size.** Watershed-based restoration plans value larger restoration projects because they are more likely to support a diverse ecosystem and be resilient and self-sustaining. Specifically, the minimum size threshold for a project to ensure this benefit is 2 acres. Accordingly, candidate Bank sites in the Lower Duwamish Waterway have higher potential ecological value if they accommodate more than 2 acres of combined intertidal habitat, wetland habitat, and/or upland riparian habitat.
- **Connectivity.** The plans recommend projects with high potential to connect to or complement existing wetlands or other habitat, to create off-channel habitat, or to reconnect a freshwater source to the Lower Duwamish Waterway. Candidate Bank sites in the Lower Duwamish Waterway and Lower Green-Duwamish River have higher potential ecological value if they are adjacent to existing habitat, could support off-channel habitat, offer enhanced floodplain area, or could reconnect a freshwater source to the river.
- **Distribution.** The plans value projects that contribute habitat to areas where it is lacking. Candidate Bank sites were therefore evaluated in the context of the distribution of existing habitat along Elliott Bay and in the Lower Green River, Duwamish Estuary, and Nearshore subwatersheds and to maximize benefits to ESA-listed fish species for multiple life stages throughout the watershed.
- **Urgency.** Both WAC 173-700-303 and watershed-based restoration plans direct restoration efforts to projects that contribute to the improvement of identified management problems in the drainage basin or watershed. Accordingly, candidate sites with the opportunity to address such problems have higher potential ecological value. The Green-Duwamish River is considered the fourth most endangered river in the country, and providing salmon habitat and floodplain habitat are critical for restoration of the system (American Rivers 2019).

Initial Sites

The three primary mitigation sites selected for initial inclusion in the Bank are presented in this section and shown in **Figure 2.** These three initial sites include Terminal 25 South, Terminal 117, and the Port's Auburn property. The Port is proposing these three sites be designed and then reviewed by the IRT and NOAA Fisheries such that they qualify as bank sites under a Joint Umbrella Mitigation and Conservation Banking Instrument. Potential future sites are presented in the following section (Future Mitigation and Conservation Sites).

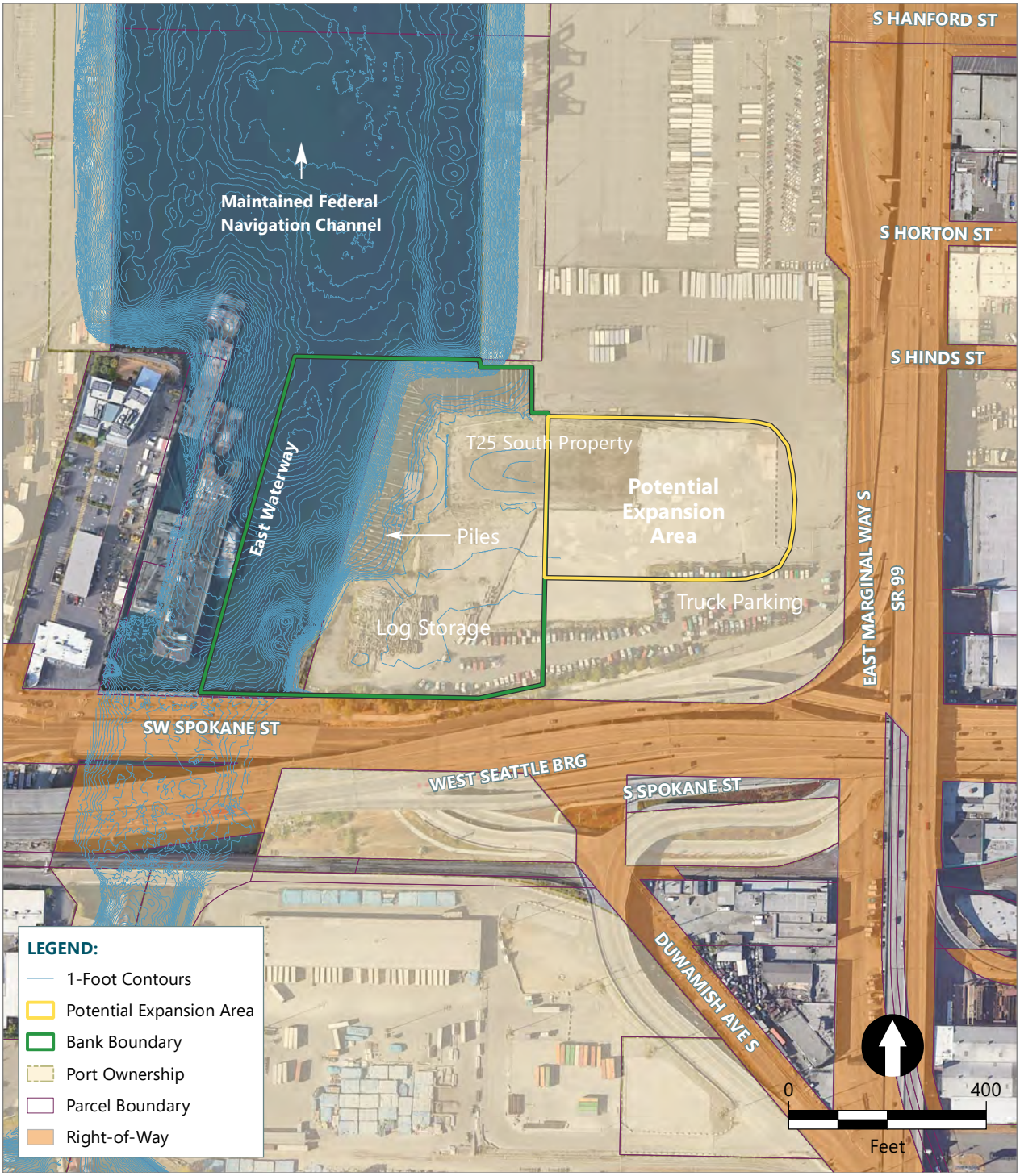
Proposed bank site at Terminal 25 South

Terminal 25 South

Terminal 25 South is on the southeast bank of the East Waterway (the segment of the Lower Duwamish Waterway east of Harbor Island), north of South Spokane Street and south of the active Terminal 25 container cargo facility, at 2917 East Marginal Way South in Seattle, Washington (**Figure 4**). The site is in the northeast quarter of Section 18 of Township 24 North, Range 4 East. This Port-owned site comprises a nearly 12-acre area in the southwest corner of Parcel No. 7666207905.

This site has the potential to restore valuable fish and wildlife habitat in a marine-freshwater transition zone. The Terminal 25 South site is expected to provide conservation credits for impacts to special status salmonid species listed under the ESA following certification by NOAA Fisheries, including credits that may support NRD settlements by the Port in the Lower

Figure 4: Terminal 25 Existing Conditions



Duwamish Waterway, East Waterway, Harbor Island, and Lockheed West Superfund sites. Any remaining credits generated by the Terminal 25 South site are proposed to be made available through the joint bank once certified by NOAA Fisheries (for conservation credits) and by the Corps, Ecology, and the IRT (for wetland and aquatic resource credits).

Site Selection

The creation of a Bank site at Terminal 25 South represents an opportunity to make progress toward several of the watershed-based restoration priorities for the Green-Duwamish watershed and the Duwamish Estuary subwatershed. The site's location in the East Waterway makes it uniquely suited for mitigation of future development impacts in the Lower Duwamish Waterway as well as in the central waterfront. Using the site selection framework described previously, key benefits of the Terminal 25 South site include the following:

- **Size.** Nearly 12 acres of habitat, including subtidal improvements, intertidal substrate, estuarine emergent vegetation, and native riparian shoreline/forested uplands, would be restored.
- **Connectivity.** Valuable off-channel habitat would be created, which would help bridge the gap in the habitat network between the mouth of the Duwamish Estuary and the off-channel habitat upstream at Terminals 105, 107, 108, 115, and 117 along this important migratory corridor.
- **Distribution.** Valuable habitat would be added to the East Waterway, which currently lacks viable fish and wildlife habitat altogether (Windward Environmental and Anchor QEA 2014). The site is located within the marine/estuarine transition zone, which contains critical salmon habitat. Juvenile salmon tend to out-migrate through the East Waterway (rather than the West Waterway), adding importance to this location.
- **Urgency.** Removal of creosote-treated piling would help address longstanding water and sediment quality concerns in an area that is crucial for migrating salmon.

Existing Conditions

In accordance with joint regulatory agency guidance (Ecology 2012), this section presents baseline conditions for the proposed site.

Land Use and Structures

The proposed site is in the western portion of the Port's Terminal 25 South property. The property is bounded by East Marginal Way to the east, Spokane Street to the south, the East Waterway to the west, and the active Terminal 25 marine cargo facility to the north. Historical uses of the property since its construction in the early 1900s include logging facilities, a mill, an electrical manufacturing facility, fumigation plant, automobile staging, and shipping operations (Anchor QEA 2012). Most recently, the site included 7 acres of cold storage and seafood processing facilities, including approximately 145,000 square feet of processing, warehouse, and shipment structures. In 2004, all facilities were removed, and the site was entirely cleared to previous building footprint grade levels. The Port currently leases the property to various tenants who use the area for construction staging and storage as well as truck parking.

The proposed site is currently vacant (used only for vehicle staging and inert material stockpiling) and contains paved and unpaved portions. No structures are present on the upland portion of the site. In 2006, the Port removed decking from a 2-acre creosote-treated wood dock from the site. Approximately 950 creosote-treated wood piling, concrete rubble, concrete bulkhead, concrete apron, and small sections of concrete decking remain in the intertidal and subtidal footprint of the former dock.

The south-central portion of the Terminal 25 South property is paved with asphalt and used as a parking area for tractor-trailer cabs. The northern portion of the property is used by a Port tenant for construction staging. Currently, these uses partially overlap the proposed Bank site. However, these uses do not require access to the waterway, and will be moved farther east on the property to accommodate the site and avoid impacts to tenant operations. Green stormwater infrastructure will be installed between the Bank site and the adjacent relocated uses.

Sound Transit is planning to extend the light rail line to West Seattle in 2030. This line would be elevated over the East Waterway and West Waterway (the segment of the Lower Duwamish Waterway west of Harbor Island). Although one previous alignment alternative passed through Terminal 25 South, Sound Transit's preferred alignment is on the south side of the West Seattle Bridge, which will not affect Terminal 25 South. The Draft Environmental Impact Statement for the preferred alignment is planned to be released in 2021.

Public view/fishing access point over the East Waterway, with West Seattle Bridge supports in the background

The southeastern corner of the property, outside of the Bank site, includes the City of Seattle right-of-way for the West Seattle Bridge, which the City uses as a paved, active construction laydown area (Anchor QEA 2012). The West Seattle Bridge is elevated above Terminal 25 South as it crosses the East Waterway. Adjacent to the West Seattle Bridge is the SW Spokane Street Bridge, which includes a bicycle and pedestrian trail with a pull-off public view/fishing access point looking north over the East Waterway. There are no other transportation or utility easements on the property.

Soils and Topography

The Terminal 25 South property was constructed in the early 1900s from intertidal sediments and upland fill materials (Anchor QEA 2012). These fill materials constitute the top 15 feet of soil on the site, and are characterized as loose, silty, fine-to-coarse sand containing gravel. Holocene alluvium sits below the fill material (Anchor QEA 2012). The site is generally flat, with a slight downward slope toward the center from the northern and southern edges of the site. Elevations on the site range from +12 to +16 feet mean lower low water (MLLW). Most of the area landward of the former dock footprint is within the preliminary 100-year floodplain (FEMA 2013). South of the former dock footprint, the property extends farther west into the East Waterway. The shoreline in this section is steep and reinforced with riprap and treated wood bulkhead structures. The areas upland of this riprapped shoreline are not included in the mapped floodplain (FEMA 2013).

Hydrology

No wetlands, streams, or other surface water features are present on the Terminal 25 South property. Stormwater is collected using catch basins and discharges to the East Waterway from the southern end of the property. The Southwest Hinds Street combined sewer overflow (CSO) outfall, controlled by the City of Seattle, is just north of the historical dock footprint (City of Seattle 2015). This CSO serves 56 acres, and between 2000 and 2009, an average of 4.2 CSO events occurred per year (Windward Environmental and Anchor QEA 2014).

Based on results from an environmental investigation in 2012, groundwater on the Terminal 25 South property likely flows from the northern and southern ends toward the center, discharging into the East Waterway. Within the proposed Bank site, groundwater is contained approximately 5 to 7 feet below ground surface. At high tide, water rises above the nearshore groundwater elevations and intrudes into the aquifer (Anchor QEA 2012). Groundwater salinity ranges from less than 2 parts per thousand (ppt) to almost 24 ppt. East Waterway salinity ranges from 15 to 28 ppt (Windward Environmental and Anchor QEA 2014).

Vegetation

Vegetation is sparse or absent throughout most of the site. Scattered bull kelp (*Nereocystis luetkeana*) occurs in the deep subtidal area adjacent to and northeast of the former Terminal 25 seafood receiving/processing dock on the East Waterway. Other than sparse bladderwrack (*Fucus gardneri*), intertidal areas are generally unvegetated, and the intertidal area is covered in riprap armoring, rubble, and industrial debris. Vegetation in the uppermost intertidal areas of the site is dominated by Puget Sound gumweed (*Grindelia integrifolia*). Upland areas are predominantly unvegetated; however, non-native, invasive Himalayan blackberry (*Rubus armeniacus*) and butterfly bush (*Buddleia davidii*) are locally dominant in places.

Fish and Wildlife Use

Several studies characterizing the benthic and fish communities of the East Waterway were completed between 1999 and 2010. The results of these studies were collated and summarized as part of the East Waterway Superfund remedial investigation in 2014 (Windward Environmental and Anchor QEA 2014).

The benthic invertebrate community in the East Waterway is generally dominated by annelids, crustaceans, and

mollusks. Larger epibenthic invertebrates identified here include crab, shrimp, sea stars, anemones, and squid. More than 20 species of fish have been documented in the East Waterway during beach seine and trawl sampling. The most prevalent species were Chinook salmon, chum salmon, shiner surf perch (*Cymatogaster aggregata*), and English sole (*Parophrys vetulus*). Fish abundance peaks in late summer to early fall and is generally lowest in winter (Windward Environmental and Anchor QEA 2014).

Relatively little East Waterway-specific information is available on bird populations. Formal studies and field observations indicate that up to 87 species of birds use the Lower Duwamish Waterway during at least part of the year to feed, rest, or reproduce. This number is likely lower in the East Waterway due to the absence of riparian, intertidal, and shallow water habitat. Birds, such as cormorants (*Phalacrocorax* spp.), that feed in open water or dive in deeper waters to feed are more likely to frequent the East Waterway under current conditions. Osprey (*Pandion haliaetus*) and bald eagles (*Haliaeetus leucocephalus*) have been observed along the East Waterway, and osprey nests are present elsewhere in the East Waterway near Terminal 25 South. Great blue heron (*Ardea herodias*) have also been observed using the East Waterway (Blomberg 2013). Waterfowl species often observed in the East Waterway include common and red breasted merganser (*Mergus serrator*), Barrow's goldeneye (*Bucephala islandica*), Canada goose (*Branta canadensis*), and bufflehead (*Bucephala albeola*). Seabirds include pelagic (*Phalacrocorax pelagicus*) and double-crested (*P. auritus*) cormorants, pigeon guillemot (*Cepphus Columba*), grebes (*Podiceps* spp.), and gulls (*Larus* spp.; Windward Environmental and Anchor QEA 2014). The proposed restoration is expected to support shorebird use in the East Waterway.

Three marine mammal species may occasionally enter the East Waterway: harbor seal (*Phoca vitulina*), California sea lion (*Zalophus californianus*), and harbor porpoise (*Phocoena*; Dexter et al. 1981). Three species of semi-aquatic terrestrial mammals are known to forage in the East Waterway, including raccoons (*Procyon lotor*), muskrats (*Ondatra zibethicus*), and river otters (*Lutra canadensis*; Windward Environmental and Anchor QEA 2014).

Landscape and Site Constraints

The Port owns and controls the entire Terminal 25 parcel, including the aquatic areas (**Figure 5**). The East Waterway navigation channel is actively maintained north of the historical dock footprint, and was last dredged by the Corps in 2006. The proposed Bank site will be designed to prevent adverse impacts from these downstream dredging activities.

The site is not subject to large vessel propeller wash; large container vessels and tugs are present at the container terminal berths in the widest part of the East Waterway to the north. The bridge is grade-level, so large vessels and tugs are not able to pass. However, skiff fishermen occasionally pass under the bridge and some smaller barges are moored on the west shoreline—both of which can result in mild propeller wash and smaller wakes. The maximum speed permitted in the East and West waterways and Lower Duwamish Waterway is 2 knots. The potential for vessel wake has been considered in the conceptual design for the intertidal habitats, including mudflat and emergent marsh.

The site is adjacent to the East Waterway Operable Unit of the Harbor Island Superfund Site. Cleanup activities for the Superfund site will address sediment contamination within the East Waterway, following the issuance of a Record of Decision by the EPA, anticipated in 2021, and preconstruction sampling and design activities, expected to span several years. The proposed habitat project will result in creation of new aquatic habitat from upland areas, which are not part of the Superfund site. Construction of the habitat project may occur in concert with or prior to sediment cleanup activities, depending on the cleanup schedule required by EPA. Habitat construction is tentatively planned to occur no sooner than 2022/2023 and will be designed and constructed in coordination with EPA in a manner to avoid disturbing previously completed sediment cleanup areas while also accommodating any remaining cleanup activities and minimizing the potential for recontamination of the site. The Port is also coordinating with Ecology regarding characterization of upland soils and will ensure that the project design achieves all necessary remedial objectives.

At the site, just north of the Spokane Street Bridge and west of the Terminal 25 shoreline, a mound of fill stabilized by rock was placed specifically for habitat restoration purposes. This mound provides shallow water and intertidal habitat. This habitat feature is not protected by a restrictive covenant or conservation easement and will be modified as part of the restoration proposal.

Figure 5: Terminal 25 Concept Design

Conceptual Site Design

The goal of the site is to restore estuarine wetland functions across the site as well as to restore and create riparian habitat and off-channel rearing and refuge habitat for salmonids and other migratory and resident fish and wildlife in the East Waterway. The project would re-establish between 9 and 10 acres of riparian, emergent marsh, mudflat, and subtidal habitat at Terminal 25 South. The design footprint may be modified to expand the project by up to 3.6 acres, as shown in **Figures 4 and 5**. The Port will decide on the base restoration option or the potentially expanded footprint during subsequent design steps after development of the Prospectus. The following section describes the base restoration option without the potential expansion area.

Habitat Elements

Habitat restoration at the proposed site will involve large-scale fill removal and bankline regrading. The restoration will create a large off-channel intertidal marsh and exposed unvegetated intertidal substrates (including mudflat, sandflat, and cobble) surrounded by a riparian buffer. Subtidal re-establishment will include substrates suitable for kelp and eelgrass. The Elliott Bay Trustee Council released a final restoration plan and environmental impact statement that stated that a 5-meter riparian buffer is sufficient to provide most functions that are important within an industrial urbanized area. Anything beyond 5 meters may not result in proportional functional benefits (i.e., diminishing returns resulting from less aquatic area created). In the highly manipulated nearshore environments, maximizing intertidal marsh area would provide the highest ecological value adjacent to the waterbody. While local and state guidelines recommend larger buffers, reducing marsh area at Terminal 25 to create larger riparian buffers would reduce overall ecological benefit, especially for fish species utilizing habitat in the heavily armored shoreline areas in the Lower Duwamish River. Riparian function in industrial nearshore areas depends primarily on overhanging vegetation directly adjacent to the restored area, which could be functionally achieved in the 5-meter width. The Port plans to coordinate with the IRT and NOAA Fisheries on optimal buffer widths.

The proposed project is designed to maximize habitat functions and values using dimensions, locations, elevations relative to MLLW, slope contours, and substrates critical to each habitat type. This approach is based on a combination of joint regulatory agency guidance (Ecology 2012) and the Habitat Equivalency Analysis methodology developed by the Elliott Bay Trustee Council (NOAA 2013).

Shallow subtidal habitat occurs within a tidal range of -4 feet to -14 feet MLLW, and deep subtidal habitat occurs below -14 feet MLLW. Slopes within the subtidal area range from 3:1 to 20:1. Fully functioning subtidal habitat depends on appropriate substrate conditions and adjacency to fully functioning intertidal habitat, as described here. The shallow subtidal slopes will be reshaped to remove debris and allow

Terminal 25 proposed concept

for terraced restoration areas with substrates suitable for kelp, eelgrass, and other native submerged aquatic vegetation (SAV). Rock riprap will support the terraced steps at lower elevations, and a bio-cement mattress infilled with SAV may be possible within the mid-subtidal elevations. While finer substrates would be ideal, slope angles and geotechnical considerations will likely require coarser material in places, such as a sand/gravel mix underlain with coarser gravel. Subtidal habitat makes up 3.1 acres of the project area.

Unvegetated intertidal habitat occurs within a tidal range of -4 feet to +6 feet MLLW. To provide desired habitat functions, unvegetated intertidal habitat would feature fine-grained sediment. Restored marsh or riparian habitat would border the intertidal area. The project design includes approximately 0.9 acres of unvegetated intertidal habitat.

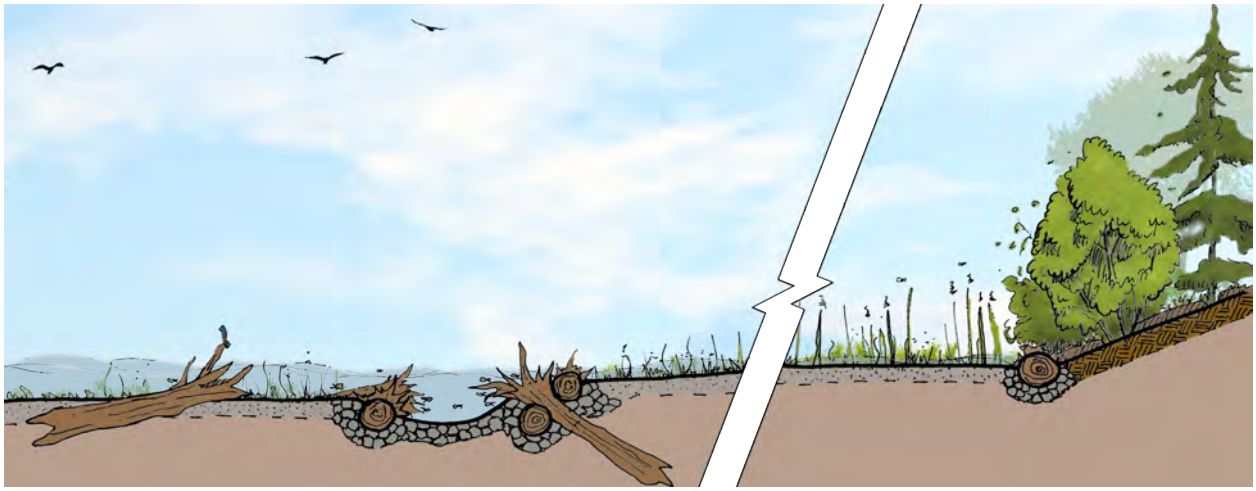
Emergent marsh habitat occurs within a tidal range of +6 feet to +12 feet MLLW. The restored marsh area would experience regular tidal inundation, and would be vegetated with native vascular plants. Riparian habitat would border the marsh area. The project design includes approximately 4.1 acres of emergent marsh. All of this will be off-channel and therefore subject to reduced currents, providing increased fish and wildlife refuge. The marsh will be designed as a Category II wetland, per the *Washington State Wetlands Rating System – Western Washington: 2014 Update* (Hruby 2014). However, due to its location in an urban industrial area, the wetland should provide moderate habitat functions. Large wood will be placed within the emergent marsh and at the edges, and potentially within the riparian habitats. Within the emergent marsh, groupings of wood with root wads will provide structural habitat diversity and contribute to microtopography over time. Large wood will also be placed along channels, with trunks largely embedded in the substrate and roots exposed. These pieces may be used to create a shallow berm or "arms" at the north and south side of the estuary, with pockets for soil and low riparian vegetation. Wood material will be secured by being partially embedded within the material substrate and anchored using large non-galvanized chain and buried anchors.

Riparian habitat occurs above a tidal elevation of +12 feet MLLW. The riparian area should be vegetated with a mixture of native trees and shrubs. To protect the restored functions of the intertidal and subtidal habitats, the riparian area will be sufficient to ensure an optimal range of habitat functions in the urban environment.

Construction Elements

To complete the work, upland and/or water-based mobilization is expected. In-water construction work would be planned to accommodate tribal fishing activities in the East Waterway and work windows for fish species, as determined by the Corps, Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and NOAA Fisheries. Construction elements include the following:

- Removal of approximately 950 creosote-treated timber piling, connecting timbers, concrete decking, and associated structures within the footprint of the former dock



Terminal 25 marsh habitat features

- Removal of approximately 235 cubic yards of in-water rubble, debris, and abandoned material within the footprint of the former dock
- Placement of approximately 710 cubic yards of substrate materials in the existing intertidal area to increase the abundance of prey organisms important to migratory fish and wildlife
- Excavation of approximately 15,496 cubic yards of upland soil to intertidal and subtidal elevations
- Planting of approximately 120,000 square feet of intertidal marsh
- Planting of approximately 50,000 square feet of native riparian buffer
- Removal of approximately 16,000 square feet of riprap along the southern shoreline of the site
- Use of anchored large wood throughout the site to provide structural complexity, shallow water refugia, and to aid in establishing long-term stable estuarine habitat areas

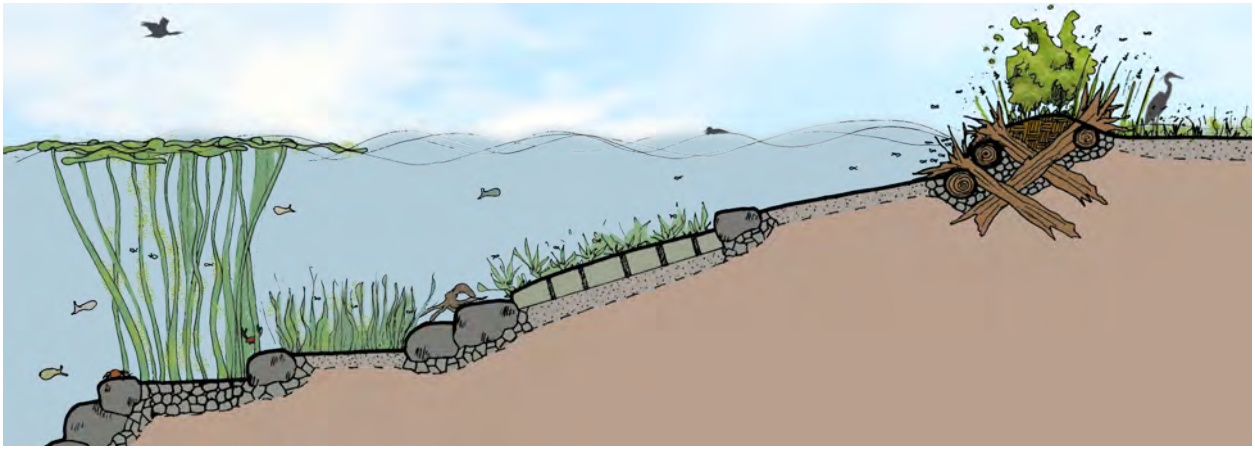
Functions to be Restored or Enhanced

The project will increase wetland functions and ecological processes in the Duwamish Estuary subwatershed by creating off-channel estuarine wetland on the East Waterway. Daily tidal fluctuations in the Duwamish Estuary will restore the historical, self-sustaining hydrologic regime at the site. Removal of existing in-water structures and riprap armoring, re-establishment of subtidal habitat, creation of intertidal channels, establishment of intertidal vegetation, and planting of riparian vegetation will greatly enhance wetland and habitat functions of the site.

Native marsh and riparian vegetation will contribute to water quality improvements through biofiltration. Stormwater from the surrounding developed area will be conveyed, treated, and stored in bioswales and raingardens, prior to infiltrating through berms around the perimeter of the mitigation site, to provide clean freshwater inputs into the habitat area.

Native marsh and riparian vegetation will also contribute organic matter to the site, and tidal export of this organic material will support the food web in the East Waterway. Re-establishment of subtidal habitats will also restore potential habitat for benthic and epibenthic invertebrate communities, which further support the aquatic food web.

The project will create high-quality estuarine habitat for a variety of resident and migratory fish and birds as well as water-associated and -dependent mammals. Locally, the site will function as a habitat hub within the Lower Duwamish Waterway for resident fish, small mammals, reptiles and amphibians, and invertebrates. Regionally, the site will provide needed habitat along the Green-Duwamish River for anadromous fish and resident birds. In particular, the mitigation site will provide the only off-channel habitat in the East Waterway, which is particularly valuable for refuge and rearing of early-migrating salmonid fry. On a larger scale, the site will function as a staging area in the Pacific Flyway for migratory birds.



Terminal 25 subtidal habitat features

Proposed Terminal 117 bank site

Terminal 117

The Terminal 117 site consists of 13.5 acres along the Lower Duwamish Waterway shoreline from RM 4.1 to 4.5. The site is bordered by the South Park Marina to the north, Dallas Avenue South to the northwest, the Boeing South Park facility to the southwest, and Lower Duwamish Waterway to the east. **Figure 6** shows the existing conditions of the site.

This site has the potential to restore valuable fish and wildlife habitat in a marine-freshwater transition zone. Cleanup actions at the site, led by the City of Seattle and Port, were completed in 2015, including the removal of contaminated

Figure 6: Terminal 117 Existing Conditions

in-water sediment and upland soils (Port of Seattle 2018c). Construction of the habitat project included in this Prospectus is being initiated in July 2020, following a lengthy design and permitting process.

The site is expected to provide conservation credits for impacts to special status salmonid species listed under the ESA following certification by NOAA Fisheries, including credits that may support NRD settlements by the Port in the Lower Duwamish Waterway, East Waterway, Harbor Island, and Lockheed West Superfund sites. Any remaining credits generated by the Terminal 117 site are proposed to be made available through the joint bank once certified by NOAA Fisheries (for conservation credits) and by the Corps, Ecology, and the IRT (for wetland and aquatic resource credits). The Port understands the need to carefully account for credits generated in the joint bank.

Site Selection

The Terminal 117 site represents an opportunity to make progress toward several of the watershed-based restoration priorities for WRIA 9 and the Duwamish Estuary subwatershed. Using the site selection framework described previously, key benefits of the site include the following:

- **Size.** Approximately 13.5 acres of habitat, including emergent marsh, mudflat, and riparian areas, and approximately 2,050 linear feet of shallow subtidal and deep subtidal habitat along the shoreline would be restored.
- **Connectivity.** Valuable off-channel habitat along the Duwamish Estuary subwatershed would be created and would support the connection of the habitat network between the mouth of the Duwamish Estuary through the marine-freshwater transition zone along this important migratory corridor.
- **Distribution.** Valuable habitat would be added to the Lower Duwamish Waterway, which is a bottleneck for salmon that require a higher functioning marinefreshwater transition zone (WRIA 9 Steering Committee 2005). By removing fill material, the Terminal 117 project will increase the bank-full width of the Lower Duwamish Waterway in this location, which is the narrowest point between RM 0 and RM 5.
- **Urgency.** Estuarine habitats that extend from mean higher high water to shallow intertidal elevations are crucially important for migrating salmon along this stretch of the river, and should be further enhanced by native riparian and marsh vegetation in an area with minimal existing vegetation and associated prey resources.

Existing Conditions

Site Land Use and Structures

Terminal 117 was owned and operated by the Duwamish Manufacturing Company from 1937 to 1978. The Malarkey Asphalt Company bought the property in 1978 and operated a shingle plant at the site until 1993, when manufacturing activities ended. Oils previously used for heating at the facility led to significant polychlorinated biphenyl (PCB) soil contamination in the surrounding upland and aquatic areas. Between 1996 and 1997, the former structures, including the asphalt plant, storage tanks, and some contaminated soils, were removed. By 1999, the Port acquired the property and performed two Time-Critical Removal Actions, the first in 1999 and the second in 2006, to remove PCB-contaminated sediments as part of an Early Action Area cleanup within the Lower Duwamish Waterway Superfund site.

The upper intertidal area at the site includes large concrete rubble and riprap shoreline, extending from approximately +10 feet MLLW to top-of-bank elevations, approximately +15 feet MLLW to +20 feet MLLW. Additional shoreline stabilization includes limited areas of creosote-treated timber crib bulkhead, extending vertically between approximately +6 feet MLLW to approximately +14 feet MLLW. Several storm drain outfalls are present along the Terminal 117 shoreline bank that are owned by the Port and discharge stormwater conveyances from the upland property.

Soils and Topography

Aquatic area conditions at Terminal 117 include shallow subtidal mud/sand substrate area, along the west margin of the Duwamish Waterway navigation channel, and moderately sloped, exposed intertidal, coarse substrate. As part of previous cleanup actions at the site, contaminated sediment and bank soil were removed to an elevation of about -0.5 to -1.5 feet MLLW. The slope was backfilled with gravel borrow and sand. Riprap was also placed for stability and erosion protection. Approximately 37,000 cubic yards of upland area was excavated and backfilled with 18,000 cubic yards of clean material to an elevation of +15 feet MLLW. Approximately 14,000 cubic yards of adjacent aquatic area

designed to support completion of the proposed habitat restoration project without disturbing the cap. Habitat construction is planned for 2020.

Site construction is being coordinated with the Lower Duwamish Waterway Superfund cleanup, which is currently undergoing cleanup design under EPA oversight. Future sediment cleanup activities will be designed in a manner to minimize the potential for recontamination of the site.

Conceptual Site Design

The goal of the site is to restore estuarine wetland functions across the site as well as to restore and create riparian habitat and off-channel rearing and refuge habitat for salmonids and other migratory and resident fish and wildlife in the Lower Duwamish Waterway. The project would restore 14 acres of riparian, emergent marsh, mudflat, and subtidal habitat at Terminal 117. **Figure 7** shows the preliminary design for the project.

Habitat Elements

Habitat restoration at the site will involve large-scale fill removal and bankline regrading. The project will create a large off-channel marsh with an on-channel riparian berm and enhance a continuous stretch of on-channel riparian slope with adjacent marsh.

The project is designed to maximize habitat functions and values using dimensions, locations, elevations relative to

Terminal 117 marsh habitat features

Terminal 117 berm and marsh habitat features

Figure 7: Terminal 117 Concept Design

was excavated, backfilled with 10,000 cubic yards of clean material, and recontoured to intertidal elevations.

Hydrology

No wetlands, streams, or other surface water features are present on the Terminal 117 property. Stormwater is collected using a temporary vegetated swale and discharges to the Lower Duwamish Waterway at a new outfall location. Groundwater is contained approximately 5 to 12 feet below ground surface (SECOR 1997; Hart Crowser 1992).

Vegetation

Little to no native vegetation is present on the site. Algal growth is limited to the lower margins of the rubble and riprap armor. Emergent vegetation is limited to isolated, hand-sized patches, approximately 5 to 10 square feet in total area. Rubble and riprap bankline elevations between approximately +13 feet MLLW and the top of the bank include non-native vegetation. There are limited native trees in several locations along the abrupt bankline.

Fish and Wildlife Use

Fish and wildlife use along Terminal 117 would be similar to Terminal 25 South, as discussed previously. Fish observed on or near the site include bull trout, Puget Sound Chinook salmon, herring, and shellfish. Observed birds include hawks, heron, eagle, and songbirds, and mammals could include deer and beaver.

Landscape and Site Constraints

The Port owns and controls the entire Terminal 117 parcel, including aquatic areas (**Figure 6**). The Lower Duwamish Waterway navigation channel is actively maintained and was last dredged in this area by the Corps in January 2020. The site will be designed to prevent adverse impacts from future maintenance dredging activities.

The site is not subject to large vessel propeller wash, because vessels are not maneuvering in this section of river (rather, they are transiting past the site at low speeds). The maximum speed permitted in the Lower Duwamish Waterway is 5 knots. The potential for vessel wake has been incorporated in the conceptual design for the intertidal habitats, including mudflat and emergent marsh.

Cleanup activities of contaminated Terminal 117 soils and aquatic sediments have been completed, which remediated approximately 5.4 acres of the project site. Following removal of contaminants, the Terminal 117 upland area was stabilized with clean fill material, bankline armoring, and a sheetpile wall. Any contamination that was not removed was capped, under EPA oversight, which was specifically

Terminal 117 proposed concept

Terminal 117 proposed concept: public access

MLLW, slope contours, and substrates critical to each habitat type. This approach is based on a combination of joint regulatory agency guidance (Ecology 2012) and the Habitat Equivalency Analysis methodology developed by the Elliott Bay Trustee Council (NOAA 2013). Habitat elements include shallow subtidal, exposed unvegetated intertidal substrates (including mudflat, sandflat, and gravel), emergent marsh, and riparian vegetation.

Shallow subtidal habitat occurs within a tidal range of -4 feet to -14 feet MLLW and deep subtidal habitat occurs below -14 feet MLLW. Slopes within the subtidal area range from 3:1 to 20:1. Fully functioning subtidal habitat depends on appropriate substrate conditions and adjacency to fully functioning intertidal habitat, as described here. The project will not directly alter subtidal substrates, but will promote secondary benefits by improving adjacent intertidal habitat. Subtidal habitat makes up 5.8 acres of the project area.

Unvegetated intertidal habitat occurs within a tidal range of -4 feet to +6 feet MLLW. To provide desired habitat functions, unvegetated intertidal habitat would feature fine-grained sediments at slopes less than 2%; however, a grade this flat is not possible and thus coarser sand to pea-sized gravel would be required. Restored marsh or riparian habitat would border the intertidal area. The project design includes approximately 3.6 acres of unvegetated intertidal habitat.

Emergent marsh habitat would be adjacent to the restored marsh or riparian habitat bordering unvegetated habitat. Emergent marsh habitat occurs within a tidal range of +6 feet to +12 feet MLLW. The restored marsh area would experience regular tidal inundation and be vegetated with native vascular plants. Riparian habitat would border the marsh area. The project design includes approximately 3.1 acres of emergent marsh. Most of this will be off-channel and therefore subject to reduced currents to provide increased fish and wildlife refuge. On-channel marsh habitat will be protected by large wood placement, which, through overlapping groupings of logs and wood materials with roots attached, will also benefit structural habitat diversity. On-channel wood that is embedded below +10 feet MLLW will be sanded/smoothed to prevent navigation channel hazards or snagging of tribal fishing nets. Large wood will also be placed within off-channel areas in groups of three to five pieces, partially embedded within the material substrate and anchored using large non-galvanized chain and buried anchors.

Riparian habitat occurs above a tidal elevation of +12 feet MLLW. The riparian area should be vegetated with a mixture of native trees and shrubs. To protect the restored functions of the intertidal and subtidal habitats, the riparian area will be 35 feet wide. Narrower riparian berm areas will provide protection to the off-channel marsh. The project design includes approximately 1.5 acres of restored riparian habitat.

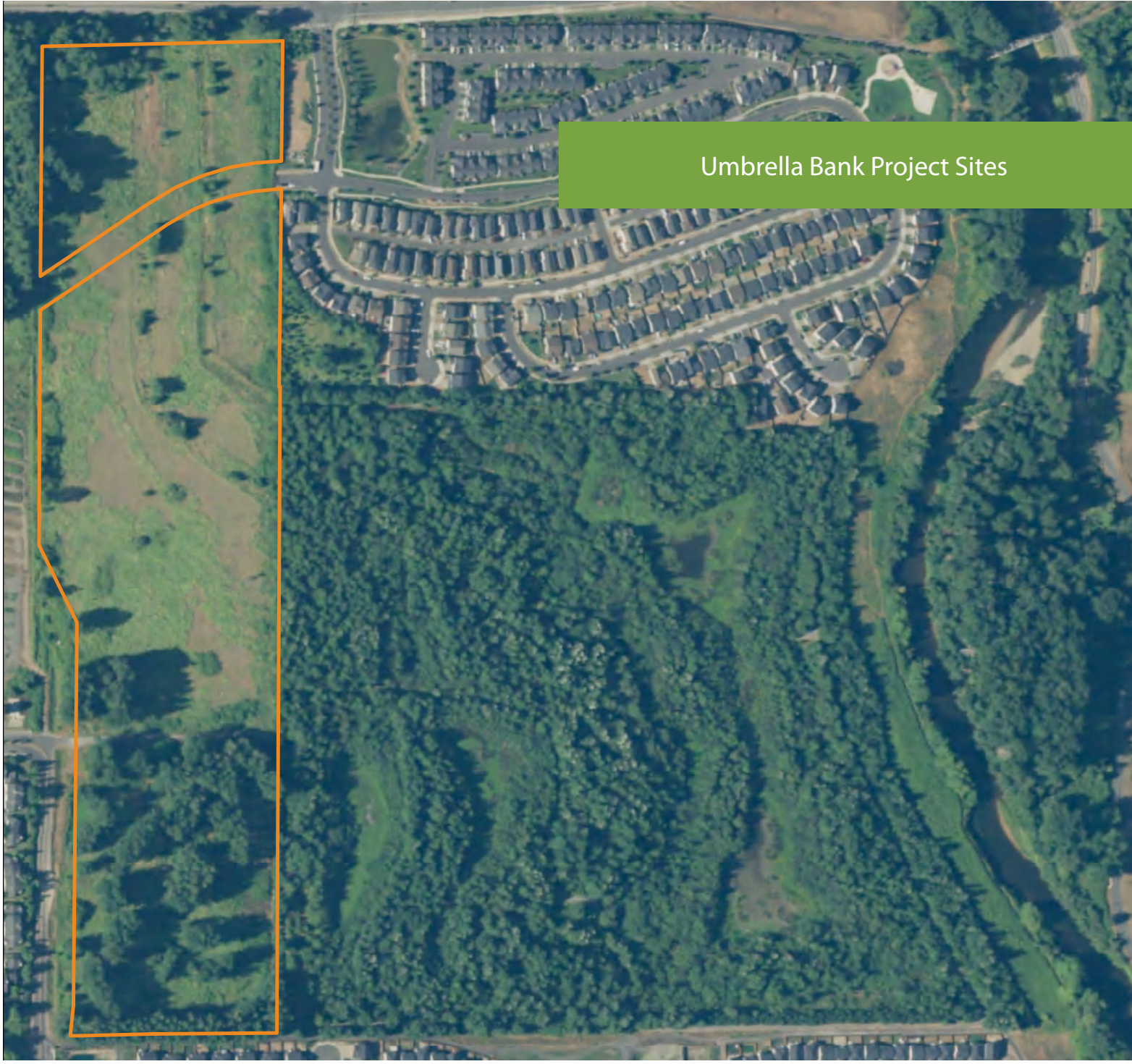
Construction Elements

To complete the work, upland and/or water-based mobilization is expected. In-water construction work would be planned to accommodate tribal fishing activities in the river and above low water levels to avoid impacts on fish during work windows approved by the Corps, Washington Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and NOAA Fisheries. Construction elements include the following:

- Regrading of approximately 1,250 linear feet of existing filled upland and rubble-filled bankline next to the Boeing facility
- Removal of approximately 30,000 cubic yards of post-remediation cleanup fill and historically placed fill materials
- Planting of approximately 135,000 square feet of intertidal marsh
- Planting of approximately 65,000 square feet of native riparian buffer
- Placement of approximately 4,100 square feet of riprap along the northern shoreline of the site
- Installation of an approximately 10,000-square-foot public access area at the northwest portion of the site, including upland seating, viewing area, viewing pier, and hand-carried boat launch. These features will provide opportunities for the public to experience the restoration project elements, but will not diminish habitat value.

Functions to be Restored or Enhanced

The restoration objectives are to increase the area and functional value of habitat for salmonids and other migratory and resident fish and wildlife by converting existing industrial uplands to aquatic area and improving degraded intertidal substrate to higher-function habitat. Analysis and evaluation of multiple habitat restoration sites in the Lower Duwamish Waterway indicates water depth and inundation time are significant determining factors in the benefits to and frequency of use by juvenile salmon. Shallower sites provide marsh vegetation important to the production of estuarine prey items necessary for resident and migratory fish and wildlife. Shallow intertidal areas also provide beneficial estuarine refuge habitat during high tide. Deeper intertidal features, including low-slope intertidal channels, are also beneficial and available to fish for longer periods of time. Productive, stable, upper and lower intertidal areas, with direct connections to the Duwamish Waterway corridor, also support higher species diversity and density (e.g., Turning Basin Number 3). Dense native riparian vegetation will be established to benefit juvenile salmon and complement emergent vegetation, increasing the abundance and diversity of prey insect species.



Proposed Auburn bank site

Auburn

The Auburn site comprises approximately 34.1 acres south of South 277th Street, just east of the intersection of 45th Street Northeast and I Street Northeast in Auburn approximately 28 RMs upstream from the mouth of the Green-Duwamish River at Elliott Bay. A City of Auburn right-of-way crosses the 34-acre site, splitting the property into a northern portion (6.3 acres) and a southern portion (28.7 acres). The entire site is zoned Residential (R20) by the City and has supported agricultural use historically, but is not in a designated Agricultural Production District. The R20 zone is intended for multifamily residential development at 20 dwelling units per acre.

The 34-acre site is part of property purchased by the Port to construct compensatory mitigation for development activities associated with STIA's 1997 Master Plan Update. The Port built a 65-acre compensatory mitigation site adjacent to the Green-Duwamish River in 2006, but the 34-acre portion ultimately was not needed. The two sites share a boundary and are both located within the Green-Duwamish River floodplain.

Site Selection

The site has been evaluated in the context of the surrounding watershed. Development of the 34-acre property is limited by the presence of wetlands and buffers, and the Port has determined a joint wetland mitigation and habitat conservation bank site is the preferred use of this property. Using this property as a Bank site would add floodplain capacity to the area, providing a mitigation opportunity that would enable development that may otherwise not be possible. The 65-acre restrictive covenant site is protected from development in perpetuity.

Using the watershed-based site selection framework, key benefits of the Auburn site include the following:

- **Size.** Within the 34-acre property, approximately 14.8 acres of emergent, forested, and scrub-shrub wetland would be re-established, and approximately 18.8 acres of wetlands and associated buffer would be enhanced by proposed habitat construction activities.
- **Connectivity.** High-quality wetland habitat (contiguous to the Port's existing 65-acre restrictive covenant site) would be restored on the 34-acre site, making habitat enhancements that expand the existing wetland area more desirable because they would augment important habitat and floodplain availability near the Green-Duwamish River.
- **Distribution.** The project would contribute wetland habitat to the Green-Duwamish River floodplain and off-channel habitat in the Green-Duwamish River. Adjacent land use in the surrounding areas are zoned residential or commercial, and much of this area is already developed. The City of Auburn encourages "Floodplain by Design," a methodology focused on maintaining or protecting floodplain services (The Nature Conservancy 2018). Creation of wetland habitat to augment flood storage, improve water quality, and create new highly functioning habitat is needed in the entire Green River valley to offset historical and future development activities.
- **Urgency.** Significant loss of floodplain habitat and off-channel habitat in the Lower Green-Duwamish River has caused a significant reduction in the rearing habitat available to ESA-listed Chinook salmon, steelhead trout, and other species documented in the river (King County 2017). The creation of off-channel habitat in this area would provide significant benefits to juvenile fish. Increased flood storage is identified as a priority in the Preliminary Background Report (Our Green/Duwamish Watershed Advisory Group 2016). Additional flood storage would mitigate peak flows in the Green-Duwamish River, reducing erosion and scour to improve water quality for salmon.

Existing Conditions

Site Land Use and Structures

No buildings are present on the properties (**Figure 8**). A gravel access road extends from the end of 45th Street NE across the 34-acre property to the existing 65-acre restrictive covenant site. A City of Auburn right-of-way is present on the northern portion of the 34-acre property. Historical photographs show the site was used for agriculture. Two abandoned artificial stormwater ponds are present on the property, which were excavated sometime between 1990 and

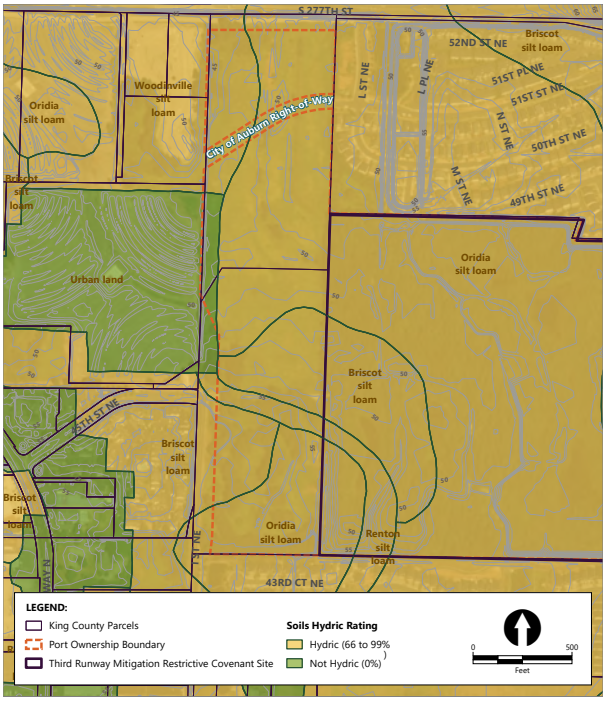
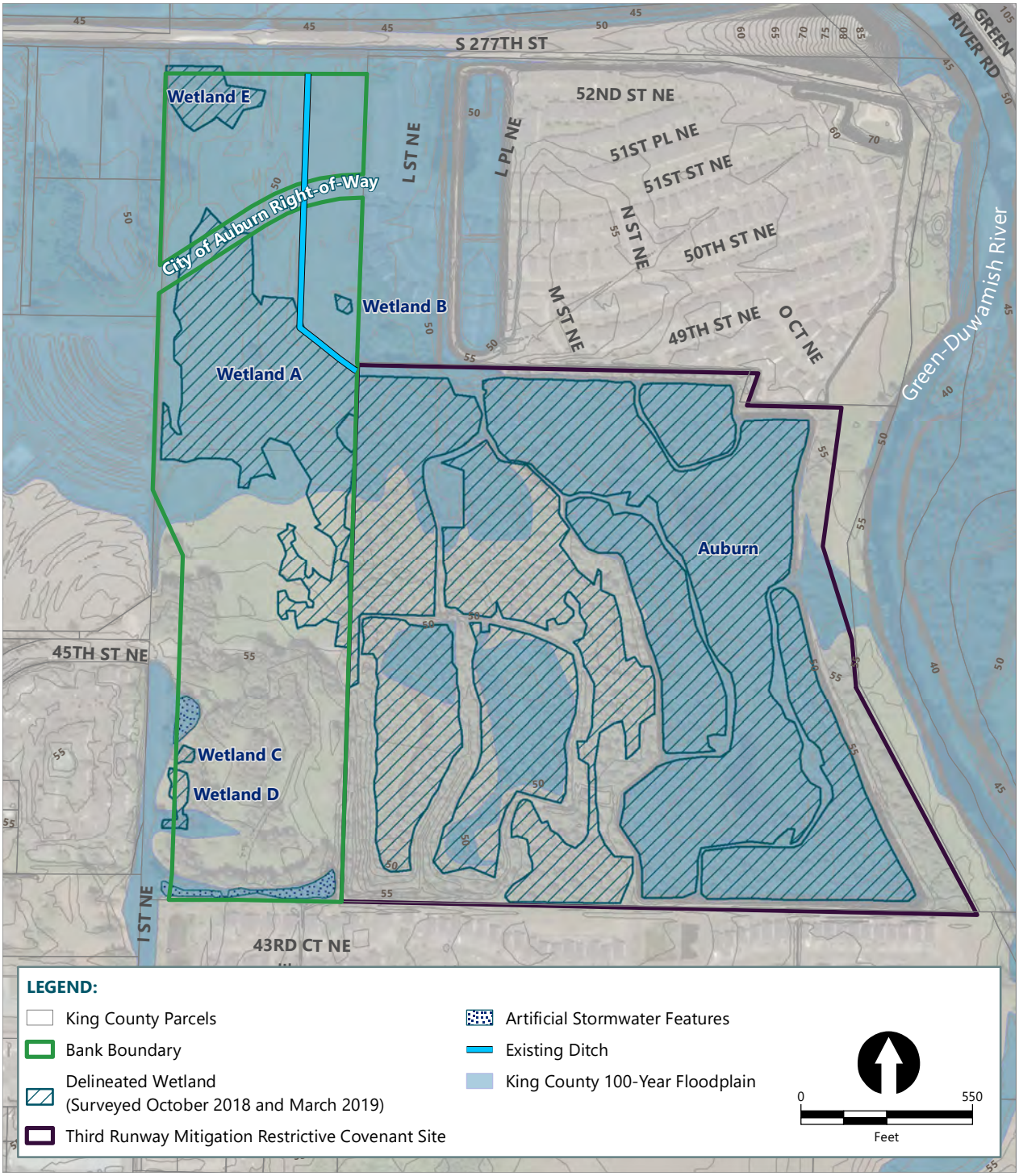


Figure 8: Auburn Site Existing Conditions



2002 (based on aerial photograph analysis). These ponds may have been excavated to capture stormwater during past road and housing development projects to the south and west.

Soils and Topography

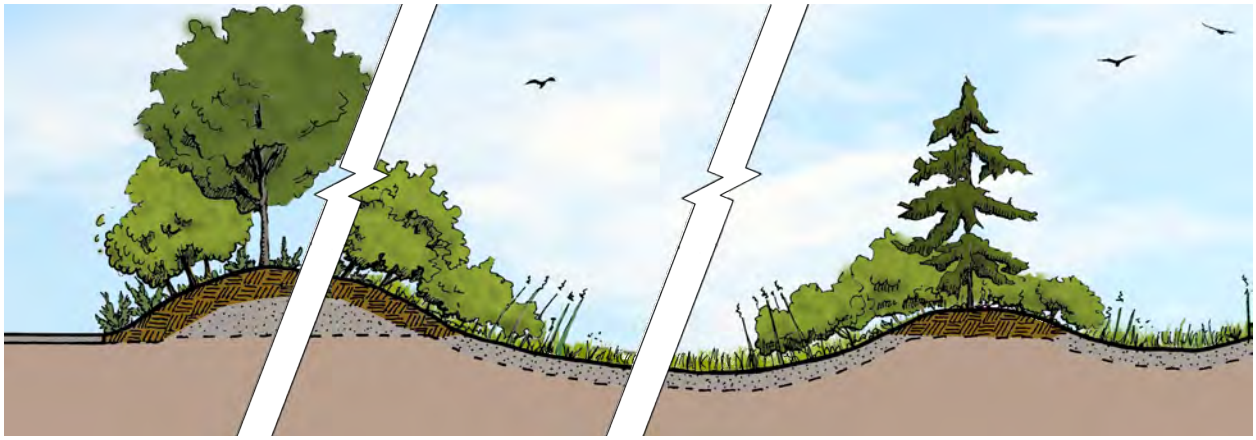
Site soils on the 34-acre property are mapped as somewhat poorly drained Briscot, Oridia, Renton, silt loams, with poorly drained Woodinville silt loam in the northwest corner; these are all designated hydric soils (NRCS 2019). Topography is generally flat, except for the lower elevations near Wetlands A, C, D, and E and each of the artificial stormwater features (**Figure 8**). Topography ranges from approximately 37 to 56 feet (National Geodetic Vertical Datum of 1929 [NGVD 29]) and generally grades to lower elevations at the northern end of the property.

Hydrology

Within the 34-acre property and outside of the existing restrictive covenant area, five wetland areas have been delineated (**Figure 8**). Wetland A is a large, 14.1-acre Category III wetland, 9.0 acres of which are within the 34-acre property, and 5.1 acres of which are part of the 33 acres of created and restored wetlands within the 65-acre restrictive covenant site. Wetland A is dominated by reed canary grass (*Phalaris arundinacea*) and is ponded much of the year. Wetland E is a smaller 1.0-acre Category III wetland in the northwest corner of the property with forested patches and reed canary grass dominating the herbaceous layer. Wetland B is a very small (less than 500 square feet) Category III wetland and does not appear to be connected to other wetlands, with vegetation dominated by invasive grasses.

The artificial stormwater ditch along the site's southern boundary contains open-water habitat and is dominated by mature cottonwood along the graded and armored banks. The other artificial stormwater pond contains open-water habitat and is north of Wetlands C and D along the western property boundary. Wetlands C and D are 0.06-acre and 0.2-acre Category III wetlands dominated by reed canary grass with clusters of mature black cottonwood (*Populus trichocarpa*) and Oregon ash (*Fraxinus latifolia*). A remnant ditch runs north to south and connects Wetland D to the southern artificial stormwater ditch.

Groundwater likely follows the topography, flowing south to north. Groundwater is expected to be similar to the elevations measured at monitoring wells on the neighboring, existing wetland mitigation site, which can range from standing water above the existing ground surface to 6 feet below ground surface during summer months. Wetland A connects to a ditch that continues off site in a pipe under South 277 Street, which takes several sharp turns before intersecting with the Green-Duwamish River after approximately 5,000 feet along the ditch and NE Auburn Drain stream. Flooding from the Green-Duwamish River extends through Wetland A and into the 65-acre existing wetland mitigation site, but despite its proximity to the Green-Duwamish River, no other surface water connections are present between the 65-acre mitigation site and the Green-Duwamish River.



Auburn Site marsh and scrub-shrub wetland habitat features

Vegetation

On the 34-acre property, reed canary grass is present over much of the western portion of the site, including in each of the wetlands and adjacent uplands, with groups of mature black cottonwood trees along the western and southern property boundaries. Meadow foxtail (*Alopecurus pratensis*) and colonial bentgrass (*Agrostis capillaris*) are the dominant grasses in Wetlands A, B, and E. Around Wetlands C and D and within their buffers, the forest community is more diverse with patches of Douglas fir (*Pseudotsuga menziesii*), red alder (*Alnus rubra*), vine maple (*Acer circinatum*), Pacific willow (*Salix lucida*) and Oregon ash. A dense area of Himalayan blackberry is present along the southern portion of the western boundary of the site and in pockets within the upland area adjacent to Wetlands A and B.

Fish and Wildlife Use

On the 34-acre property, habitat complexity is low, with limited emergent plant species diversity and low structural diversity. Amphibian habitat is poor, lacking forest cover and large woody debris. However, at the adjacent 65-acre wetland mitigation site, habitat has been created to encourage waterfowl feeding and resting during the winter and spring months. The site provides foraging and breeding habitat for small mammals and significant foraging habitat and cover for raptors, waterfowl, and other bird species. Wildlife species diversity increases closer to the Green-Duwamish River. Fish do not use the 34-acre or 65-acre properties.

Landscape and Site Constraints

The Port owns and controls the entire 34-acre and 65-acre sites; a 2.8-acre City right-of-way splits the 34-acre site into northern (6.3-acre) and southern (28.7-acre) segments. If the City of Auburn vacates the right-of-way, the vacated area could become part of the 34-acre site. Conservatively, for the purpose of design and analysis, the right-of-way defines the boundaries of the proposed restoration activities.

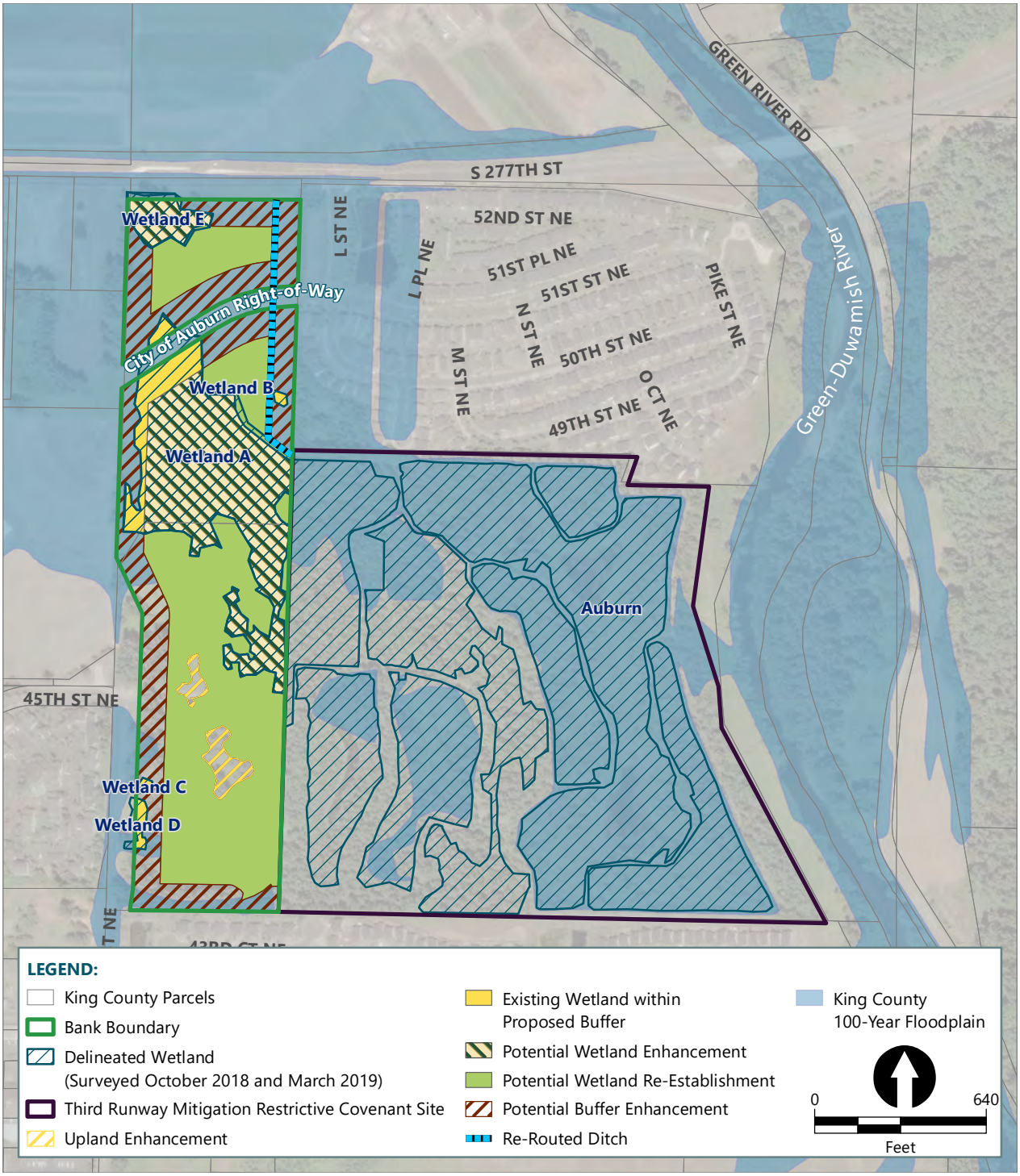
The drainage ditch that connects Wetland A to the Green-Duwamish River would be relocated and improved to ensure connectivity between the Green-Duwamish River, this site, and the third runway mitigation site. This site is more than 5 miles away from STIA, so the FAA would not likely require land use compatible with the airport.

Conceptual Site Design

On the 34-acre property, the proposed mitigation site design includes the 28.7-acre portion south of the City right-of-way and the 6.3 acres north of the City right-of-way. If the City of Auburn decides to abandon plans to develop a road and vacates its right-of-way, the site could expand into the right-of-way as well. The design presented in **Figure 9**

Third runway mitigation restrictive covenant site

Figure 9: Auburn Site Concept Design



proposes enhancing 8.0 acres of wetland and re-establishing 14.8 acres of wetland. The mitigation design enhances and preserves 10.7 acres of buffer habitat, assuming a 100-foot buffer around the wetland, within the Port's property boundary, that is not adjacent to the Port's previously constructed mitigation site.

Site Habitat Elements

For the 34-acre property, wetland re-establishment, wetland enhancement, and buffer enhancement are proposed at the site. Wetland restoration is defined by the Washington Department of Ecology (Ecology) as "the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural or historical functions to a former or degraded wetland" (Ecology 2006). Re-establishment falls under wetland restoration and results in a net gain in wetland function. Wetland re-establishment is proposed over a majority of the site around Wetlands A and E. To protect the functions of existing wetlands and the re-established wetlands, a 100-foot buffer will be enhanced where the site is open to existing uplands.

The proposed elevation range for the emergent wetland is 44 to 47 feet, so that the wetland will have seasonal flooding in years of average rainfall, and the groundwater table will be within 12 inches of the ground surface during the growing season. The proposed elevation range for the scrub-shrub and forested wetland is 47 to 49 feet, to achieve seasonal saturation or flooding during average rainfall years, with soil being saturated within 12 inches of the ground surface during the growing season.

The re-established wetlands will connect to the floodplain and create 15.5 acres of floodplain storage. Floodwater will not be the primary source of hydrology at these wetlands; however, floodwater will come from the drainage ditch connecting the site to the adjacent 65-acre restrictive covenant site wetlands, and through precipitation and groundwater.

Construction Elements

For the 34-acre site, invasive vegetation and fill will be removed to achieve desired elevations to re-establish wetland hydrogeomorphic functions and flood storage. Native vegetation will be planted at the site. Construction will involve the following elements:

- Excavation of approximately 84,700 cubic yards of upland soil to elevation 47 to 49 to support emergent, shrub-scrub, and forested wetland habitat
- Planting of approximately 9.2 acres of emergent marsh
- Planting of approximately 13.7 acres of shrub-scrub and forested habitat
- Planting of approximately 10.7 acres of native riparian buffer
- Relocation of drainage ditch approximately 80 feet to the east to support flood storage connection to the Green-Duwamish River

Functions to be Restored or Enhanced

The objective for the 34-acre wetland re-establishment is to increase the amount of wetland habitat adjacent to the existing third runway mitigation site, increasing the area and functional value of high-quality wildlife habitat near the Lower Green-Duwamish River. Additionally, wetland and buffer re-establishment at the 34-acre site is designed to provide 15.5 acres of flood storage capacity in and adjacent to the 100-year floodplain of the Green-Duwamish River (the 65-acre restrictive covenant site already provides 100-year flood storage).

Re-established wetlands will also provide benefits to water quality through enhanced infiltration and pollutant removal. Improvements to hydrology and habitat at the site will result, in part through increasing the size of the wetlands, diversity of plants, and complexity of habitat. Grading the site to a lower elevation in places will provide varied hydroperiods. As it matures, forested wetland habitat will increasingly provide nesting habitat for birds and enhanced cover for small mammals at the site. Amphibian use will increase as individuals migrate from the adjacent mitigation site.

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Future Mitigation and Conservation Sites

The Port evaluated mitigation and habitat restoration opportunities at several other sites in the East, West, and Lower Duwamish waterways.

The following sites were selected for future inclusion in the Bank: Terminals 105, 107, 108, and 115 South, and several overwater cover and in-water structure removal sites. Bank projects at these sites (**Figure 10**) would be developed as needed following implementation of the Terminal 25, Terminal 117, and Auburn projects. Prior to certification of the additional sites, the proposed projects would be fully reviewed by the IRT and the constructed habitat sites protected in perpetuity under a long-term management plan and site protection tool (e.g., deed restriction, conservation easement). Overwater cover and in-water structure removal sites will generate credits as a result of removal of overwater cover and/or removal of creosotetreated wood from the aquatic environment. Additional sites within the approved service area of the Bank would be selected, developed, and reviewed according to the same process.

This section provides an overview of each of the four selected sites, including a description of the current conceptual design for wetland mitigation and habitat conservation.

Overwater Cover and In-Water Structure Removal Sites

Four sites have been identified along the Elliott Bay shoreline that contain overwater cover and/or in-water structures (many of which contain creosote-treated wood) that could be removed from the aquatic environment. Credits generated by this removal would be banked and available for release to other parties to offset impacts of new in-water structures in the service area.

The Pier 48 site is the largest of these sites, located on Elliott Bay approximately 0.7 miles north of the mouth of the East Waterway. The Washington State Department of Transportation (WSDOT) owns the 4-acre pier and adjacent uplands. The uplands are used for Seattle ferry overflow holding. The site neighbors Pier 50, which is used for passenger-only ferries, as well as the Seattle ferry terminal at Colman Dock to the north. To the south is Terminal 46, which currently supports container cargo uses. The north portion of Terminal 46 is being redeveloped to support cruise ship moorage and a new facility. Approximately 6,000 square feet of Pier 48 was removed previously as mitigation for increased overwater cover associated with WSDOT projects in the area. The conceptual design for the Bank proposes to remove approximately 180,000 square feet of overwater cover and creosote-treated piles from shallow subtidal and deep subtidal habitat in Elliott Bay. Clean sand cover and other beneficial substrates would be installed on the seabed throughout the removal area, creating opportunities for bull kelp (*Nereocystis luetkeana*) establishment. Because Pier 48 is a WSDOT asset, details regarding project sponsorship would be identified in future phases of the Bank.

The Port controls the following overwater cover removal projects:

- **Terminal 5:** Approximately 1,000 piles and 11,000 square feet of overwater cover
- **Pier 16 on Harbor Island:** Approximately 50 piles and 3,000 square feet of overwater cover
- **Pier 34:** Approximately 350 piles and 10,000 square feet of overwater cover

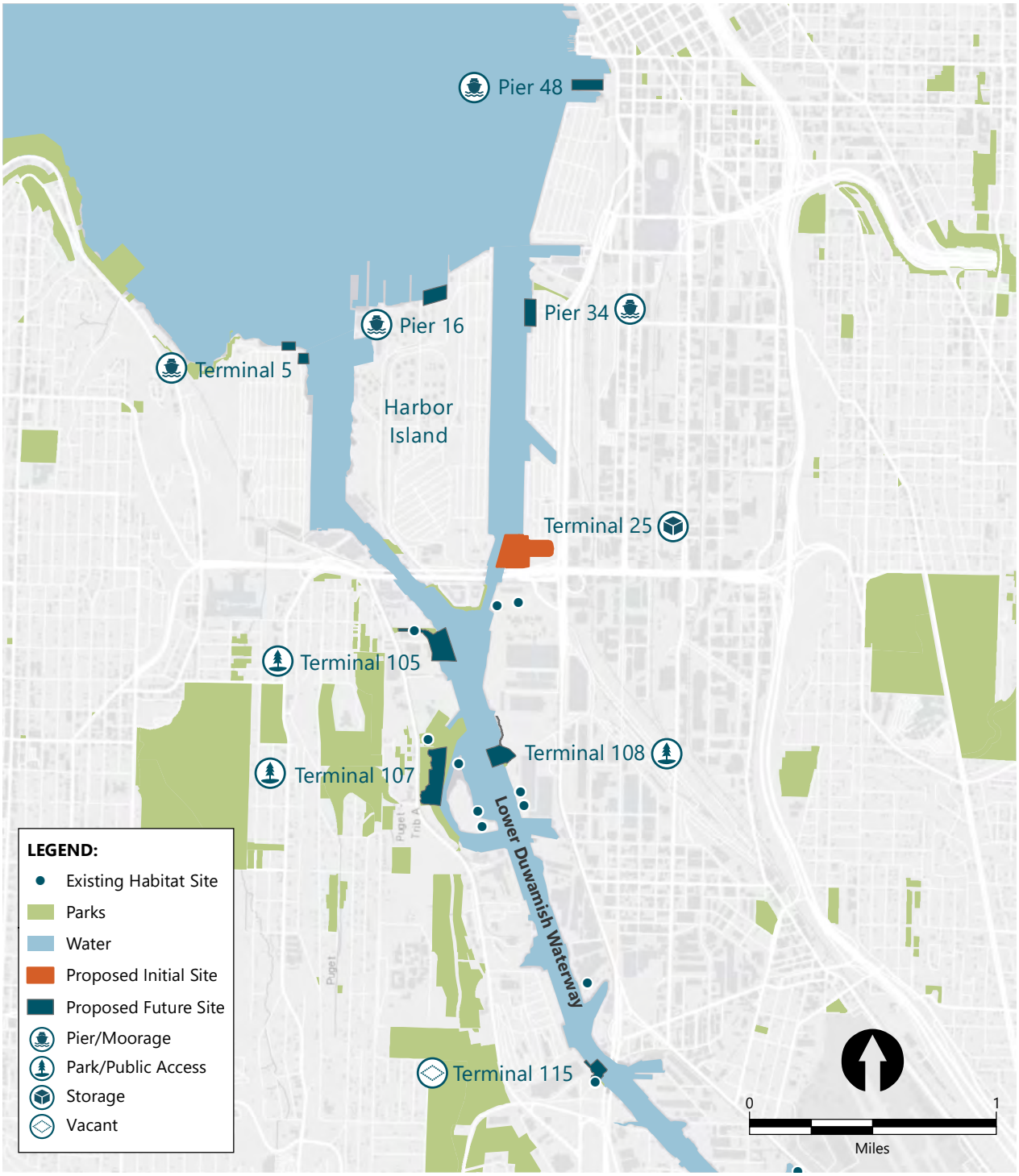
These overwater cover removal projects would improve intertidal, shallow subtidal, and deep subtidal habitat along the important migratory corridors in the East Waterway and Elliott Bay. The East Waterway is an important area for refuge and outmigration of juvenile salmonids (Duwamish Blueprint Working Group 2014).

Terminal 105

The Terminal 105 site is on the west bank of the Lower Duwamish Waterway at RM 0.7, just upstream from the southern tip of Harbor Island. The Port owns the entire waterfront parcel, which is currently vacant. The Port retained the property for future habitat mitigation and has no plans for commercial development. The Port sold the upland parcels adjacent to the site, which are now owned and operated by private industry, including Lipsett Co., LLC, and Pacific Biodiesel. These parcels' non-water-dependent uses do not require access to the waterway.

The site is immediately south of the Terminal 105 off-channel wetland re-establishment site completed by the Port in 1995, which features an intertidal slough with mudflat, marsh, and riparian habitat. The off-channel habitat site also features a

Figure 10: Proposed Future Mitigation and Conservation Sites



Terminal 105

Terminal 107

public access area, which would remain following project construction.

The conceptual design for the Bank consists of improvements to an 8-acre site following completion of restoration, which would create and enhance upslope mudflat (0.18 acres), emergent marsh (0.83 acres), and riparian (1.32 acres) habitat. Construction activities required for the Bank project would include grading the existing intertidal area to create marsh elevations, planting intertidal marsh, and planting riparian buffers.

Terminal 107

Terminal 107 is on the west bank of the Lower Duwamish Waterway at RM 1.7, upstream from Terminal 105. The Port owns the entire waterfront parcel. In 1985, the Port designated a portion of Terminal 107, including the northern half of Kellogg Island, as a public access preserve. In 1995, the Port developed Terminal 107 Park, an 8-acre upland public park with interpretive shoreline access, public art, and a view of Kellogg Island. Puget Creek Estuary, a small restoration site completed by the Corps in 1999, is at the southern end of the park.

An upland area south of the park is used for freight storage, which does not require access to the waterway. West Marginal Way Southwest borders the parcel to the west. Herring's House Park (an intertidal restoration project completed by the City of Seattle in 2000) borders the north side of the parcel.

The Terminal 107 Bank site includes portions of the Terminal 107 Park property. The conceptual design for the Bank consists of improvements to a 10-acre site following completion of restoration, which would create and enhance emergent marsh (1.93 acres), mudflat (3.64 acres), riparian buffer (1.68 acres), and upland habitat (0.53 acres) areas. A 1-acre off-channel marsh would be created, expanding upon a smaller off-channel area at the south end of the park. Construction activities required for the Bank project would include grading the existing upland and intertidal areas to create marsh elevations and installing intertidal marsh and riparian buffer plantings.

In the future, additional habitat value could be garnered through restoration and reconnection of the mouth of Puget Creek, which is culverted beneath Terminal 107. The public access areas outside of the habitat restoration would remain following construction of this Bank project.

Terminal 108

Terminal 108 is on the east bank of the Lower Duwamish Waterway at RM 1.2, across the waterway from Herring's House Park and the downstream tip of Kellogg Island. The Port owns the entire waterfront parcel, which is vacant. The adjacent upland parcel, also owned by the Port, is leased for container storage, which does not require access to the waterway. An old bulk cement transshipment facility at the northwest corner of the parcel is also leased for barge moorage.

The Diagonal Avenue South intertidal mitigation project and public shoreline access site is located at the southern end of the waterfront parcel. The Port constructed this project in 1986, with riparian enhancements constructed in 1989 and 1993, resulting in creation of an intertidal embayment. The Port recently replaced the riprapped bankline north of this embayment with native vegetation and anchored large wood.

Terminal 108

The conceptual design for the Bank consists of improvements to a 5-acre site following completion of restoration, which would create and enhance upslope off-channel marsh (0.54 acres), mudflat (0.55 acres), and riparian buffer (0.88 acres) areas. This would require excavating and grading existing uplands, including some paved areas, to create intertidal elevations, and planting intertidal marsh and riparian buffers.

Terminal 115 South

The Terminal 115 South site is on the west bank of the Lower Duwamish Waterway at RM 2.7, just north of the First Avenue South Bridge. Of the potential Bank sites, it is the farthest upstream. The Port owns the entire Terminal 115 parcel and has ownership rights over the adjacent Commercial Waterway. The Bank site is vacant, are there are no plans for commercial development. The remainder of the terminal is leased by private marine industrial businesses, which would not be adversely affected by the project.

The Terminal 115 parcel is bordered to the south and east by WSDOT and Seattle Department of Transportation (SDOT) parcels. These parcels are vacant, and Bluefield Holdings, Inc. leases the SDOT parcels for potential future compensatory habitat restoration. A completed WSDOT habitat restoration project is located next to these properties under the First Avenue South Bridge.

In 2011, the Port removed a derelict dock and two vacant buildings from the Terminal 115 South site, leaving the concrete building foundations. The site now features uneven topography and a mix of paved and unpaved groundcover.

Terminal 115 South

The conceptual design for the Bank consists of improvements to a 3-acre site following completion of restoration, which would create and enhance upslope emergent marsh (0.53 acres) and riparian buffer habitat (0.28 acres) areas. Construction activities would include creating the off-channel marsh by excavating the existing paved upland areas, grading the existing intertidal areas to create marsh elevations along the channel, and planting intertidal marsh and riparian buffers.

Proposed Service Area and Project Need

Proposed Service Area

The proposed service area for the potential Bank would serve the Elliott Bay shoreline and Lower Green River, Duwamish Estuary, and Nearshore subwatersheds within WRIA 9 (**Figure 11**). Each site may be associated with its own portion of the larger service area within the lower Green-Duwamish watershed. For example, sites along Elliott Bay that improve marine shoreline functions through overwater cover and in-water structure removal and sites in the Duwamish Estuary subwatershed that provide marine and estuarine habitat functions are intended to offset marine and estuarine impacts along the Elliott Bay shoreline, Duwamish estuary, and nearshore subwatersheds. The Auburn mitigation site would provide freshwater wetland functions intended to offset freshwater wetland impacts within the Lower-Green Duwamish watershed.

The proposed service area boundaries are based on aligning the anticipated functions of the Bank with the nature and likelihood of impacts requiring compensatory mitigation in the watershed surrounding it. Within the proposed service area, the Green-Duwamish River passes through industrial and commercial centers in Seattle, Tukwila, Renton, Auburn, Kent, and unincorporated King County. Future development in these areas, resulting in unavoidable impacts to aquatic habitat functions, would benefit from the use of the Bank.

STIA is outside the Lower Green-Duwamish watershed. The Port intends to mitigate for impacts at STIA within the subbasins in which the impacts are located (Miller, Walker, and Des Moines creeks). However, certain airport-related impacts may be required to be mitigated farther from the airfield due to FAA restrictions and concerns regarding waterfowl as a hazard to aviation. For example, impacts to emergent or open-water wetland areas would need to be mitigated elsewhere. Therefore, the credits generated by the Auburn site as part of this joint wetland mitigation and habitat conservation bank may be used to partially offset impacts at STIA.

The proposed service area boundaries align with restoration objectives and strategies for salmon recovery within WRIA 9, and encompass the "Habitat Focus Areas" defined by the Elliott Bay Trustee Council. These are priority focus areas for restoration with a strong nexus to the historically injured natural resources in the Lower Duwamish Waterway.

Project Need Analysis

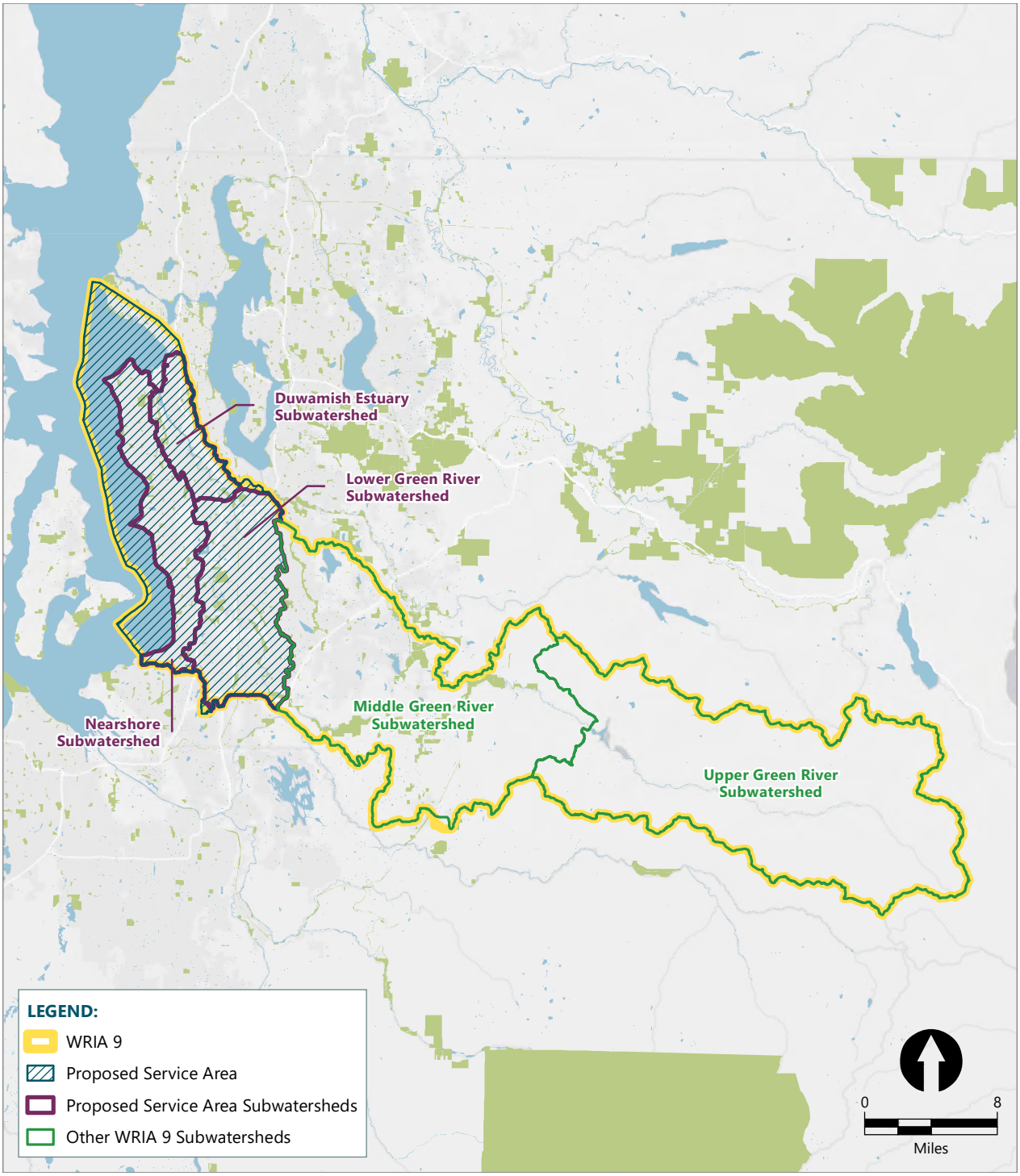
The Bank will create and restore essential habitat for fish and wildlife in a highly urbanized, commercial, and industrial watershed. With federal, state, and local regulations developing stricter mitigation requirements and developable land becoming scarcer, demand for mitigation is high. Credits from the Bank can be used for the Port's own future development projects, or development by other Port tenants, business owners, and government agencies to mitigate for wetland impacts and other freshwater and estuarine aquatic area impacts, as well as impacts to ESA-listed fish species, EFH, and other state- and federally protected species and habitat.

The National Research Council evaluated wetland mitigation extensively in 2001 and concluded that permittee-responsible mitigation on small sites experience higher rates of failure due to the increased temporal loss and risk (NRC 2001). Using mitigation banking reduces the risk associated with traditional permittee-responsible mitigation. Mitigation banking also undergoes a more stringent interagency review process, decreasing the chance of failure of the mitigation site. A 2002 study by Ecology yielded similar conclusions; small mitigation sites were likely to fail because monitoring periods were too short and maintenance was too limited (Johnson et. al 2002).

Other mitigation options in the area include the King County in-lieu fee (ILF) Mitigation Program, which sells credits for impacts in the Lower Green-Duwamish River and Nearshore subwatersheds. Mitigation for estuarine or

Terminal 5 restoration

Figure 11: Proposed Service Area Watersheds



marine impacts is available on a case-by-case basis. King County is constructing the Chinook Wind project as part of the ILF program, but this site is at RM 6.7 along the Lower Duwamish Waterway, and would not provide the same level of benefits as the other estuarine sites included in the Bank, based on their optimal location in the Duwamish Estuary.

Two other mitigation banks are in operation or proposed for operation in the WRIA 9 service area. The Springbrook Creek Wetland and Habitat Mitigation Bank is in Renton but is only available for mitigation credits to the City of Renton and WSDOT. The Thom Mitigation Bank is a proposed wetland mitigation bank adjacent to the Green-Duwamish River in Kent at RM 17.8, but the service area does not include the Duwamish Estuary subwatershed.

Emergent marsh at third runway mitigation site

Port Maritime Mitigation Needs

Overall, the Port has already created or enhanced more than 177 acres of wetlands and 30 acres of intertidal and saltwater habitat as mitigation or voluntary stewardship. Additional habitat restoration and mitigation will likely be required in the future.

The Maritime Division expects a substantial demand for mitigation credits along the Seattle waterfront and in the Lower Duwamish Waterway in the next 5 years. In recent years, the Port has also been contacted by many waterfront facility owners and development sponsors seeking mitigation opportunities to offset the expansion of waterfront structures and shoreline development. In addition, more common requirements for habitat mitigation, associated with waterfront structure repair, maintenance, rehabilitation, and replacement, have increased potential demand for mitigation credits associated with endangered salmon habitat impacts.

Port Aviation Mitigation Needs

STIA will need to expand to match the rapid growth expected in the next few years. According to the SAMP, STIA will require 35 new gates and 16 new wide-body gates to meet the demand of increased passengers and operations by 2034 (Port of Seattle 2018b). The airport expansion will come with expanded support services in the surrounding area, particularly in the South Aviation Support Area, which may result in unavoidable impacts to wetlands and other critical areas. Specific wetland mitigation needs have not been formally estimated, but will become more evident in the coming months and years.

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Site Protection

All constructed habitat Bank sites will be protected in perpetuity by a third-party conservation easement or deed restriction that meets the requirements set forth for such sites by agencies.

The Port will own and manage the constructed habitat Bank sites in perpetuity unless ownership is transferred to local, state, or federal agencies; tribal governments; or private nonprofit nature conservancy corporations under Revised Code of Washington 47.12.370. If transferred, the mechanism for transfer will require the site be maintained in a manner that complies with applicable permits, laws, and regulations pertaining to the maintenance and operation of the mitigation site. If not, the site will revert to Port ownership.

Once performance standards are achieved and monitoring has been completed, long-term management of the site will begin. Long-term management, including maintenance and monitoring, will either be performed by the Port as part of their normal operations, or by a third-party steward under an endowment. Ownership of the overwater cover and in-water structure removal sites may vary, depending on the site.

Restoration site protected by goose exclusion device

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Qualification of Sponsor and Design Teams

Development of the joint wetland mitigation and habitat conservation bank program, including design and permitting for individual sites, will be completed by the Port as the project sponsor, with technical support from consultants and other public agencies as needed.

Sponsor Qualification

The Port seeks to sustain and enhance both the natural environment and the water-dependent businesses in the Lower Duwamish Waterway. Over the past 30 years, the Port has implemented significant environmental restoration, cleanup, and habitat enhancement projects as part of its capital improvement programs and ongoing operations and management of Port facilities. As a result, the Port has a great deal of experience designing, developing, and maintaining compensatory mitigation sites.

The Port has successfully completed several estuarine restoration projects in the Lower Duwamish Waterway. These projects include critically important, mature, fully-functional habitat attributes that demonstrate successful and durable estuarine wetland establishment, native riparian buffer planting, and off-channel habitat development. Examples include a 3.4-acre wetland complex at Turning Basin Number 3 (at the upstream limit of the Duwamish Waterway navigation channel) and a 3.2-acre marsh and off-channel slough at Terminal 105 (near the southern tip of Harbor Island on the west bank of the river). The projects serve as important testing grounds for restoration techniques in the area and will provide good models for future restoration efforts.

Port's Auburn mitigation site

Importantly, they indicate that cleanup and restoration efforts in the industrialized Lower Duwamish Waterway can result in successful, self-sustaining habitat for fish and wildlife.

The Port has successfully constructed the third runway mitigation site in Auburn, and the site is meeting its performance standards in year 12 of the 15-year monitoring program. The site has developed mature forested wetland, emergent wetland, and scrub-shrub wetland habitat and is supporting four ponds where waterfowl can nest and forage. The Auburn site was built primarily to mitigate impacts to avian species, and recent monitoring notes that waterfowl, songbirds, and raptors increasingly use habitat in the site as forested areas mature.

The Port's current mitigation and preservation holdings total approximately 30 acres, including 12 acres of compensatory mitigation projects and 18 acres of voluntary habitat initiatives. A performance monitoring period to demonstrate that standards have been met has been successfully completed for most of the mitigation sites. Other sites are still undergoing monitoring and maintenance. Mitigation sites and riparian planting areas are maintained regularly as part of normal operations by the Port's Marine Maintenance Division.

As a major landowner in the Lower Duwamish Waterway, the Port is in a unique position to design and construct estuarine and freshwater habitat projects in critically important transition areas and manage those projects in perpetuity. The Port's role as a major landowner also places it in a unique position to advance social equity in the Lower Duwamish industrial lands, an area interspersed with residential neighborhoods that are heavily impacted by environmental justice issues.

The Port commits to taking a lead role in regional and national efforts to achieve equity and social justice; work supporting the joint bank will reflect this commitment. Diversity at the Port of Seattle is not an initiative or campaign; rather, it is integral to the policies, processes, and programs that are woven into all daily activities within the Port community. Diversity is essential to our mission, goals, and values.

Anchor QEA's Seahurst Park shoreline restoration project

Outside Services

The Port engaged Anchor QEA, LLC for overall project management and prospectus planning, wetland mitigation, and conceptual design of the proposed joint bank sites. Further planning and design of the mitigation and conservation sites will also be completed with consultant support, including natural resource professionals, landscape architects, engineers, and environmental planners. The Port has ambitious goals related to hiring certified women and minority-owned business enterprises and small businesses, in addition to robust community engagement programs.

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