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21 June 2023

Barbara Kincaid
City of DuPont
Department of Community Development
1700 Civic Drive
DuPont, WA 98327

Subject: Critical Areas Application for the Sequalitchew Creek Restoration Plan

Dear Barbara & Community Development Staff,

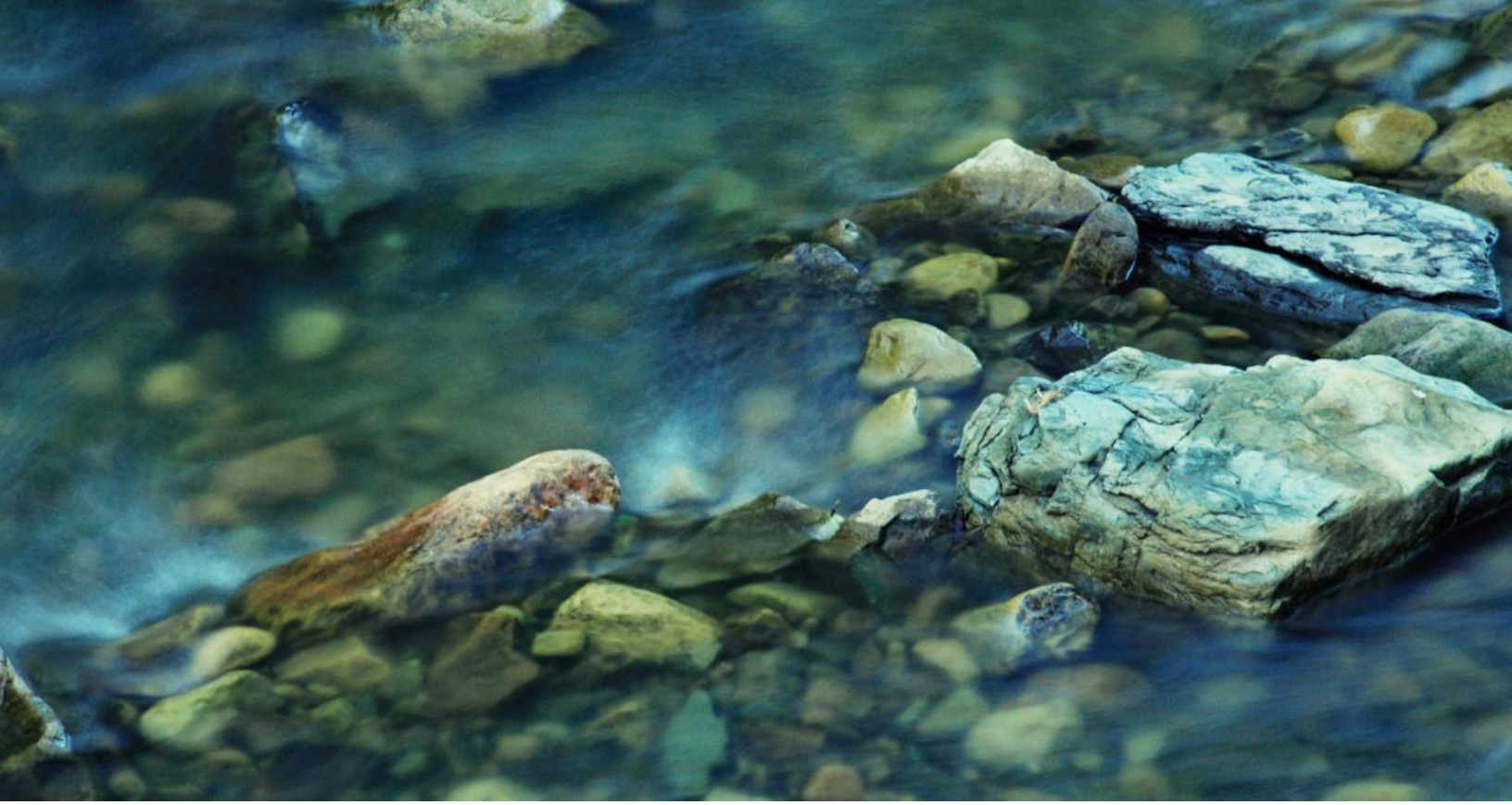
Please accept the enclosed application materials for the "Sequalitchew Creek Restoration Plan". This project is a fish barrier and surface water flow restoration project managed by the South Puget Sound Salmon Enhancement Group (SPSSEG). We are requesting review and approval for the Critical Areas Permit. The application packets have also been sent to the WA Dept. of Fish and Wildlife, WA Dept. of Ecology, Thurston County and the Army Corps of Engineers for review under other applicable permit processes. This project is working in conjunction with the upstream "Lake Outlet Repair Project" on Joint Base Lewis-McCord.

SPSSEG and the Planning Committee have worked with the City of DuPont over the past decade to design and plan the *Sequalitchew Creek Restoration Plan.* The City has been a welcomed partner to this project and is a critical stakeholder in the project's success. The primary goals of this project are to restore year-round instream surface water flow and correct a series of fish passage barriers. Although some temporary disturbance to the existing waterbody area will occur during construction, these effects will be temporary and self-mitigating, as the long-term benefits of the project will lead to increased habitat availability and water flow.

I trust you will find this to be an appropriate project for the requested permit processes, however please do not hesitate to contact me if you have any questions or if you need further information. The contaminated soils memo is in review under Department of Ecology and will be forwarded to the City once a determination is made. Please send all invoices for applicable fees to SPSSEG at 6700 Martin Way E, Suite 112 Olympia, WA 98516.

Sincerely,

Cole Baldino
Salmon Restoration Biologist
South Puget Sound Salmon Enhancement Group
360-464-0004 // coleb@spsseg.org



April 2023
Sequalitchew Creek Watershed Ecosystem Restoration Project

ANCHOR QEA

Critical Areas Report

Prepared for South Puget Sound Salmon Enhancement Group

April 2023
Sequalitchew Creek Watershed Ecosystem Restoration Project

Critical Areas Report

Prepared for
South Puget Sound Salmon Enhancement Group
6700 Martin Way East, Suite 112
Olympia, Washington 98516

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Project Number: 210331-01.02
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ABBREVIATIONS

BMP	best management practice
cfs	cubic foot per second
City	City of DuPont
CMP	corrugated metal pipe
cy	cubic yard
DMC	City of DuPont Municipal Code
Ecology	Washington State Department of Ecology
FEMA	Federal Emergency Management Agency
FWCA	fish and wildlife conservation area
JBLM	Joint Base Lewis-McChord
HGM	Hydrogeomorphic Wetland Classification
n/a	not applicable
NAVD88	North American Vertical Datum of 1988
OHWM	ordinary high water mark
PEM	Palustrine Emergent (Cowardin Vegetation Class)
PFO	Palustrine Forested (Cowardin Vegetation Class)
PSS	Palustrine Scrub-Shrub (Cowardin Vegetation Class)
Restoration Plan	Sequalitchew Creek Watershed Ecosystem Restoration Plan
sf	square foot
SPSSEG	South Puget Sound Salmon Enhancement Group
WDFW	Washington State Department of Fish and Wildlife

1 Introduction

Anchor QEA, LLC, was retained by South Puget Sound Salmon Enhancement Group (SPSSEG) to prepare a Critical Areas Report for the Sequalitchew Creek Watershed Ecosystem Restoration Project. The project is located on an approximately 135-acre site in DuPont, Washington (Figure 1; Section 25, Township 19 North, Range 1 East; Section 26, Township 19 North, Range 2 East). It includes tax parcels 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, and 0119224010 (Figure 2).

This Critical Areas Report supports the City of DuPont (City) project permitting and land use approvals by providing information regarding the presence of critical areas within the project site; evaluating potential impacts to existing critical areas and buffers, as defined in the City of DuPont Municipal Code (DMC) Chapter 25.105, Critical Areas; and providing a mitigation summary to address these impacts. This report addresses the following critical areas:

- Wetlands: DMC 25.105.050(1)
- Fish and wildlife conservation areas (FWCAs): DMC 25.105.050(2)

Anchor QEA ecologists conducted a review of the critical areas chapter of the DMC, gathered and reviewed existing information, and performed field surveys of the project site in 2022 and 2023 to identify and assess existing critical areas. Wetlands are discussed in Section 5.1, and FWCAs are discussed in Section 5.2.

2 Watershed Setting and Site Description

The project site is located in the Sequalitchew Creek Frontal Cormorant Passage Watershed (hydrologic unit code 171100190304) of the Puget Sound basin (USGS 2022) and in the Chambers-Clover Water Resource Inventory Area 12 (Ecology 2022). The Sequalitchew Creek Watershed covers approximately 38 square miles.

Sequalitchew Lake is the headwaters of Sequalitchew Creek (Figure 1). Historically, springs at the east end of the lake would flow into Sequalitchew Creek, through Edmond Marsh, and into a steep ravine to Puget Sound. Construction of a diversion canal and beaver activity have changed the creek hydrology such that continuous flow from the lake through the marshes to Puget Sound seldom occurs. Currently a portion of Sequalitchew Creek and the adjacent marsh drain eastward into a diversion canal rather than westward along their historical paths (Aspect 2022).

The diversion canal is an engineered channel that conveys stormwater from Fort Lewis through Bell, McKay, and Hamer marshes before crossing through culverts under Sequalitchew Creek. The diversion canal then skirts the perimeter of Fort Lewis and continues north, where it flows in a concrete-lined channel to Puget Sound near Tatsolo Point (Aspect 2022).

Vegetation on the project site and surrounding areas is described in the *Edmond Marsh Wetland Delineation Report* (Appendix A). The project site is surrounded by housing developments to the north, west, and south and a commercial and industrial center to the northeast. DuPont-Steilacoom Road runs in a north-south direction along the eastern edge of the site. Edmond Marsh, which occupies most of the project site, is divided into east and west portions by a raised gravel multiuse trail grade (Robison Trail). The project site is undeveloped and used for passive recreational activities, such as walking and wildlife viewing.

Topography on the project site ranges from approximately 220 feet North American Vertical Datum of 1988 (NAVD88) to 240 feet NAVD88 (USGS 2020). The lowest elevations are associated with the active channel of Sequalitchew Creek, which crosses through the entirety of Edmond Marsh, and associated side channels. The higher elevations are associated with upland hummocks and the embankments along the wetland edge. Edmond Marsh drainage flows west through Sequalitchew Creek toward the Nisqually Reach of Puget Sound.

3 Project Background and Purpose

3.1 Background

Human activities have greatly modified the Sequalitchew Creek Watershed since European settlement began two centuries ago. European settlement accelerated in the 1800s, when the Hudson Bay Company established Fort Nisqually. Around this time, Sequalitchew Creek was channelized and the area was drained for farming.

The military reserve now called Joint Base Lewis-McChord (JBLM) was established in the early 1900s. From that time through the 1950s, the hydrology of the Sequalitchew Creek Watershed was altered to provide water supply, reduce flooding, stabilize lake levels, and accommodate highway development. The project site itself was used by the DuPont explosives manufacturing company; those activities ended in 1970 when the land was sold to Weyerhaeuser.

The Washington State Department of Fish and Wildlife (WDFW) created a channel through Edmond Marsh around 1976 to facilitate the use of Lake Sequalitchew in a fish augmentation program (described in Section 5.2.5).

In 1996, the area surrounding Edmond Marsh began to be developed for the Northwest Landing planned community. Increased development with associated stormwater runoff continues to affect hydrology, as does ongoing beaver activity (SPSSEG 2014).

3.2 Purpose

The proposed project is part of the *Sequalitchew Creek Watershed Ecosystem Restoration Plan* (Restoration Plan; SPSSEG 2018). The Restoration Plan arose from a process defined in a settlement agreement between CalPortland Company, the City, the Washington State Department of Ecology (Ecology), and a coalition of environmental groups collectively known as the Environmental Caucus. In 2012, these groups signed an agreement called the *2011 Settlement Agreement for DuPont Mine, Restoration of Sequalitchew Creek Watershed, and Preservation of Puget Sound Shorelands and Adjacent Open Space*. The project activities described in this section are a part of this plan.

In developing the Restoration Plan, the SPSSEG led a year-long process, involving a core group of eight stakeholders (the City, Ecology, the Environmental Caucus, CalPortland, the Nisqually Indian Tribe, Sequalitchew Creek Watershed Council, JBLM, and Pierce County) and multiple opportunities for public comment.

The Restoration Plan, of which this project is a part, was developed to sequentially restore flows in Sequalitchew Creek, improve the sustainability of flows through the system, and restore aquatic habitat by removing flow-related fish passage barriers and increasing the habitat available to aquatic species. When the Restoration Plan is fully implemented, the benefits will be noticeable over a large

portion of the stream and wetland habitats in the basin and will largely restore lost and reduced ecosystem functions including the movement of water, sediment, nutrients, biota, and dissolved gasses through the watershed from the headwater springs on Sequalitchew Lake to Puget Sound. Flows will be restored to a reach of Sequalitchew Creek that currently experiences little to no consistent flow, re-establishing a functioning stream in the now frequently dry channel, providing new aquatic and riparian habitat, and connecting the Sequalitchew Creek ravine and the marshes.

The Restoration Plan will restore fish passage from Sequalitchew Creek to East and West Edmond Marsh. Two fish barrier culverts will be replaced by fish-passable structures, which in combination with increased flows, will allow migratory fish access above the ravine springs and into Edmond Marsh.

4 Project Description

4.1 Project Components

As described in Section 3, the project is part of a Restoration Plan to restore ecological function to the Sequalitchew Creek Watershed (SPSSEG 2018). Figures 3 to 8 illustrate the project components, which are described in this section.

Beaver Management: Active management of beaver activities in Edmond Marsh is proposed in order to maintain the hydraulic gradients that provide flows through the watershed. Proposed activities (Figures 4a, 4b, and 4c) include notching an existing beaver dam and installing two flexible pond levelers, a beaver dam analog, and a beaver exclusion device.

Robison Rail Bridge: The trail berm will be breached, and a new steel bridge will be installed to restore a surface water connection between the East and West Edmond Marsh (Figures 5a and 5b). The bridge will be 70 feet long and 12 feet wide, large enough to allow periodic maintenance vehicle access but primarily intended for pedestrian use. Approximately 82 linear feet of existing buried sewer pipe will be replaced, and two new manholes will be installed in the trail. The existing trail berm will be graded to match the bridge elevations; graded areas adjacent to the bridge will be replanted with native upland, wetland, and riparian plant species.

Losing Reach/Center Drive: Project activities in this area, shown in Figures 6a to 6j, will improve instream and riparian habitat and support restoration of year-round flows in Sequalitchew Creek. The existing concrete sidewalk along the creek will be removed to provide more space for the stream where it crosses under Center Drive and to improve riparian habitat on both sides of Center Drive. The existing concrete box culvert under Center Drive will not be modified. Approximately 1,400 linear feet of stream channel will be regraded to create instream pools and floodplain areas and a low-flow channel. The regraded channel will be lined with low-permeability materials and streambed gravels. Large woody materials will be installed in the channel and anchored with driven piles. Channel-spanning sill logs (anchored by chains) will also be added in the channel to create pools. Riparian areas along the restored channel will be replanted with native tree, shrub, and emergent species, and disturbed soils will be reseeded.

City Hall Culvert: Sequalitchew Creek passes through an existing 56-inch metal culvert under the pedestrian trail west of Center Drive. The existing culvert is perched above the stream channel and would not meet WDFW requirements for fish passage with increased water flows. The culvert and adjacent fill material supporting the trail will be removed and replaced with a new bridge that is 60 feet long and 6 feet wide (Figures 7a, 7b, and 7c). Adjacent portions of the trail will be regraded. Additionally, an existing timber diversion dam structure and a wire fence will be removed from the stream channel east of the new bridge. Approximately 150 linear feet of stream channel in this area

will be regraded, and large woody material will be added to create pools and improve instream habitat. All disturbed areas will be reseeded or replanted with native species to improve riparian habitat.

4.2 Construction Methods

Construction methods and equipment include the following:

- Workers and equipment will access the site from Steilacoom-DuPont Road, Center Drive, and the existing trail berms (Robison Trail and trail crossing the City Hall culvert).
- Equipment and materials will be staged in upland areas near the project site.
- An excavator will be used for removal of trail berm and other fill materials; the City Hall culvert; the timber diversion dam; and for grading of the creek channel, installation of low-permeability materials and gravel in the streambed, and installation of large woody materials.
- Beaver management devices will be installed using hand equipment.
- A crane will be used to place the two new bridge structures. Piles will be placed with a pile driver for bridge abutments.

4.3 Best Management Practices

The following best management practices (BMPs) will be implemented to avoid water quality and habitat impacts:

- All applicable permits for the project will be obtained prior to construction. All work will be performed according to the requirements and conditions of these permits.
- Prior to construction, all work areas will be clearly marked with high-visibility fencing, and vegetation disturbance will not occur outside these areas. Work areas will be the minimum size needed to complete the work safely and efficiently while minimizing impacts to vegetation and soils in surrounding areas.
- Concrete sidewalk and other materials removed as part of the project will be transported off site to a permitted landfill. Some of the existing gravel trail berm fill material to be removed will be reused as part of installing the Robison Trail bridge and regrading the adjacent trail segments.
- All areas disturbed by construction will be stabilized as soon as possible to prevent erosion. The contractor will be required to prepare and implement a temporary erosion and sediment control plan.
- The contractor will be required to develop and implement a spill plan to be used for the duration of the project to safeguard against unintentional release of fuel, lubricants, or hydraulic fluid from construction equipment.

- The contractor will be required to properly maintain construction equipment and vehicles to prevent them from leaking fuel or lubricants; if there is evidence of leakage, the further use of such equipment will be suspended until the deficiency has been satisfactorily corrected.
- Uncured concrete for bridge footings will not be allowed to enter or contact nearby surface waters.
- The project will require a Construction Stormwater General Permit due to land disturbance exceeding 1 acre. All elements of the permit will be complied with during construction.
- All areas outside of the stream channel that are disturbed during construction will be reseeded and revegetated to minimize the potential for soil erosion.
- Silt curtains will be applied, where required, for in water work.

4.4 Project Schedule

Table 1 provides an estimated timeline for project construction. Permitting and funding will determine the ultimate project schedule.

Table 1
Project Phasing and Schedule

Phase	Start Date	End Date	Activity Description
1	January 1, 2024	December 1, 2024	Flow Restoration Phase (beaver management and flow gradient management) • Install beaver exclusion device at Steilacoom-DuPont Road crossing. • Install beaver management techniques at strategic locations across Edmond Marsh. • Install vehicular bridge on Robison Trail. – This will be coordinated with flow restoration on JBLM that is being worked on by others under separate permit.
2	June 1, 2025	October 1, 2026	Flow Enhancement Phase (increase flows to meet goal thresholds) • Restore losing reach with fine sediment layer to maintain surface flow and habitat log jams and gravel augmentation to improve hyporheic flow.
3	June 1, 2025	October 1, 2026	Habitat Enhancement Phase • Remove concrete pedestrian trail beneath Center Drive and restore channel under bridge. • Install fish-passable pedestrian bridge over Sequalitchew Creek at City Hall culvert.
4	January 1, 2024	October 1, 2023	Operation and Management Phase • Adaptively manage flows and water surface elevations in Edmond Marsh.

5 Description of Identified Critical Areas

This section describes wetlands and FWCAs identified in the project site.

5.1 Wetlands

The *Edmond Marsh Wetland Delineation Report* (Appendix A) describes the methods and results of the wetland evaluation conducted on the project site in 2022. In summary, Anchor QEA biologists identified two wetlands (Edmond Marsh and Wetland 1-D) totaling approximately 135 acres on the project site (Figure 2). Table 2 summarizes the wetland characteristics. Category II wetlands in the City have a standard buffer width of 100 feet (DMC 25.105.050(1)(b)).

Table 2
Wetland Summary

Wetland	Surface Connection to Other Waters	Classification System		On-Site Area		Category[a]
		Cowardin	HGM	Square Feet	Acres	
Edmond Marsh	Sequalitchew Creek	PFO/PSS/PEM	Depressional/ Riverine	5,820,487	133.62	II
Wetland 1-D	None	PFO/PSS	Depressional	79,715	1.83	II

Note:

a. Wetlands were categorized using the *Washington State Wetland Rating System – Western Washington: 2014 Update* (Hruby 2014).

5.2 Fish and Wildlife Conservation Areas

FWCAs on the project site were identified based on the following definitions in DMC 25.105.030.140:

> *(a) Areas with which state or federally designated endangered, threatened, and sensitive species have a primary association. Federally designated endangered and threatened species are those fish and wildlife species identified by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service that are in danger of extinction or threatened to become endangered. State designated endangered, threatened, and sensitive species are those fish and wildlife species native to the state of Washington identified by the Department of Fish and Wildlife;*
>
> *(b) Lands and waters containing documented habitats for plant and animal species listed in the Washington Department of Fish and Wildlife's Priority Habitats and Species Program List. Habitats and species of local significance may be added by action of the city council where the value and significance of such species locally can be established and sound scientific evidence can be presented to establish that the species' existence is determined to be locally significant;*

(c) Public and private tidelands or bedlands are regulated under the City of DuPont 2013 Shoreline Master Program (SMP), as amended;

(d) Streams and waters of the state (see WAC 190-080(5)(a)(vi)) that provide habitat to endangered or threatened species, or certain species that have been identified as being sensitive to habitat manipulation, as defined in WAC 222-16-030, Forest Practices Rules and Regulations; lakes, ponds and streams planted with game fish, including those planted under the auspices of a federal, state, local or tribal program; and waters which support priority fish species as identified by the Department of Fish and Wildlife.

5.2.1 Federally Listed Species

The U.S. Fish and Wildlife Service lists several species as potentially occurring in the project vicinity (USFWS 2022). However, no federally listed species are known to occur on the project site.

The site is within the range of several listed prairie-associated species that occur in southern Puget Sound, including Mazama pocket gopher (Thomomys mazama), streaked horned lark (*Eremophila alpestris strigata*), Taylor's checkerspot (*Euphydryas editha taylori*), golden paintbrush (*Castilleja levisecta*), and marsh sandwort (*Arenaria paludicola*). However, surrounding land uses and vegetation both within and near the project site do not provide suitable prairie habitat to support these species.

Sequalitchew Creek joins Puget Sound approximately 1 mile northwest of the project site. This part of Puget Sound is within the state-designated Nisqually Reach Aquatic Reserve. Marine habitat in this area may provide foraging opportunities for federally listed marbled murrelets (*Brachyramphus marmoratus*). However, the nearest mapped critical habitat for marbled murrelet is more than 20 miles from the project site (USFWS 2011), and there is no mature forest on the project site that would provide nesting habitat for this species.

Similarly, the project site is not currently known to be used by federally listed salmonid species. The Nisqually River and Puget Sound nearshore provide important foraging and migration habitat for bull trout (*Salvelinus confluentus*; 50 *Code of Federal Regulations* 17). Other federally listed species that may occur in Puget Sound in the vicinity of the project include Chinook salmon (*Oncorhynchus tshawytscha*), chum salmon (*O. keta*), steelhead (*O. mykiss*), eulachon (*Thaleichthys pacificus*), bocaccio (*Sebastes paucispinis*), yelloweye rockfish (*S. ruberrimus*), green sturgeon (*Acipenser medirostris*), and killer whale (*Orcinus orca*) (NOAA Fisheries 2023). Summer chum salmon use the lower part of Sequalitchew Creek near its mouth on Puget Sound (WDFW 2023a). The other listed salmonids are not documented to occur on the project site (WDFW 2023a).

5.2.2 State-Listed Species

Western gray squirrel (*Sciurus griseus*), a Washington State threatened species, has been documented within the project vicinity (Herrera 2005). The species is not currently identified by WDFW as occurring within 1 mile of the project site (WDFW 2023b). This species favors Garry oak (also known as Oregon white oak; *Quercus garryana*) woodlands. The City has mapped Oak Woodland Management Units throughout the city; the project site is located within or near two of these units (Section 5.2.3). Western gray squirrels also forage in coniferous and mixed conifer-oak woodlands.

One of the primary limiting factors in western gray squirrel success in the Puget Trough is the lack of genetic diversity resulting from habitat fragmentation (Linders and Stinson 2007). The project site is separated from the primary western gray squirrel population at JBLM by Interstate 5 and other heavily used roadways. While a small amount of canopy connectivity to JBLM property exists across the Puget Sound Bluff and up Sequalitchew Creek ravine, the lack of connectivity to confirmed squirrel-populated sites makes it unlikely that the species uses the project site.

5.2.3 State Priority Species and Habitats

Table 3 lists Washington State priority habitats and species that occur within approximately 1 mile of the project vicinity based on WDFW mapping (WDFW 2023b). The three bat species, which are not state or federally listed, typically occupy mature trees. The project site and vicinity include some trees that may provide roosting habitat for these bat species, as well as surface waters that may provide insect foraging opportunities for bats.

Table 3
State Priority Species and Habitats in Project Vicinity

Common Name	Scientific Name	Location in Project Area
Coho salmon	*Oncorhynchus kisutch*	Sequalitchew Creek
Cutthroat trout	*Oncorhynchus clarkii*	Sequalitchew Creek
Big brown bat	*Eptesicus fuscus*	Vicinity
Little brown bat	*Myotis lucifugus*	Vicinity
Yuma myotis	*Myotis yumanensis*	Vicinity
Waterfowl concentrations	N/A	Vicinity
Wetlands	N/A	Vicinity
Biodiversity areas and corridor (steep open spaces)	N/A	Vicinity

Garry oak woodlands are a Washington State priority habitat. WDFW does not map any of these woodlands on or within 1 mile of the project site. In 1996, the City retained a consultant to survey

oak woodland areas and provide management recommendations (Jones & Stokes 1996). The City subsequently established Oak Mapping Units and adopted specific regulations to protect and preserve these areas (DMC 25.120.040; City of DuPont 2002). Figure 8 shows the oak management map over the primary project elements.

The City's Oak Mapping Unit 13 is located within the project site boundaries along Sequalitchew Creek west of Center Drive. This unit is a mixed oak woodland, approximately 11 acres in size, with a high condition class (City of DuPont 2002). The 1996 survey report described it as the City's highest quality mixed oak woodland because of its location along Sequalitchew Creek, lack of disturbance, complex vegetation structure, and the presence of snags and cavities (Jones & Stokes 1996).

The area east of Center Drive and immediately west of Edmond Marsh, just outside of the project site boundaries, contains oak-dominant Mapping Units O-2, O-3, O-4, O-5a, O-5b, and O-6 and mixed oak Mapping Unit MO-18 (City of DuPont 2002). Mapping Unit O-5a was described in the 1996 survey report as the highest rated oak woodland in the City, with large oak trees, a diverse understory, and snags and cavities. Mapping Unit O-5a is shown as having a high condition class and as a core area to be preserved on the City's oak woodland map. The other mapping units in this area were rated as low to moderate condition, with small oak trees, no snags or cavities, less complex vegetation structure, and proximity to roadways (Jones & Stokes 1996).

5.2.4 Tidelands and Bedlands

The project site does not contain any marine tidelands or any fresh waters regulated under the City's Shoreline Master Program.

5.2.5 Streams and Waters of the State (Sequalitchew Creek)

One stream, Sequalitchew Creek, is present on the project site and meets the City's definition of an FWCA. The following sections describe the general conditions, hydrology of the creek, and fish use and habitat based on existing documentation. This is followed by a summary of site observations made by Anchor QEA during a site visit in January 2023.

5.2.5.1 General Stream Conditions and Hydrology

Modifications of Sequalitchew Creek and its watershed over the past two centuries are described in Section 3.1. Today, Sequalitchew Creek is largely an artificial channel from its source at Lake Sequalitchew to the west end of West Edmond Marsh. WDFW created a channel through Edmond Marsh around 1976 to facilitate the use of Lake Sequalitchew in a fish augmentation program (described in Section 5.2.5.2). The channel was maintained to prevent beaver dams and vegetation from raising water levels in the marsh.

The combination of human and beaver activities in the Sequalitchew Creek Watershed has altered the primary direction of flows; instead of flowing from Sequalitchew Lake into the creek, water flows out through the diversion canal to Puget Sound. A beaver dam at the western outlet of Sequalitchew Lake blocks flows and redirects them to the diversion canal. Other beaver dams in the system keep water levels in Edmond Marsh higher than they were historically, and the fill beneath the DuPont Railroad trail further slows flows. This redirection of flows, in combination with highly permeable soils, creates a dry reach just west of Edmond Marsh and greatly reduces the flow through the spring-fed Sequalitchew Creek ravine downstream of the project site.

Sequalitchew Creek above river mile 1.0 and below Edmond Marsh is typically dry. Only rarely is there a surface water connection between Edmond Marsh and Lower Sequalitchew Creek. There are no gage data for this reach, but analysis of the mid ravine and lower ravine gages suggests that instances of surface water connection are infrequent (maybe a handful over 19 years) and short lived (approximately 1 to 5 days). Most appear related to storm events, but some are from humans removing or altering the beaver dam at the west end of Edmond Marsh. The source of water in the lower mile of the creek is groundwater discharged from the Vashon Aquifer as springs in the Sequalitchew Creek ravine, below elevations of approximately 195 feet down to the top elevation of the Olympia Bed deposits at elevations between approximately 100 and 120 feet, spanning a creek reach of approximately 0.7 mile. Based on stream-gaging data, this groundwater discharge to the creek varies between approximately 0.5 cubic foot per second (cfs) in the summer to 2.5 cfs in the winter. Progressing downstream past the Olympia Bed Truncation, Sequalitchew Creek becomes a losing stream as the water table drops through the outwash to near sea level. Comparison of recent flow monitoring results with earlier gaging efforts in the 1970s and 1980s indicates that the streamflow in the creek is about 38% to 55% lower now than it was in those periods. (Anchor QEA 2022a; Aspect 2022).

5.2.5.2 Fish Use and Fish Habitat

Maintenance of the channel through Edmond Marsh was necessary as part of WDFW's augmentation program to attract juvenile fish to migrate to Puget Sound via Edmond Marsh and the Sequalitchew Creek Ravine rather than the diversion canal. Coho salmon smolts were released into Sequalitchew Creek from 1980 to 1994 and again in 2001. Fall Chinook salmon smolts were also released into Sequalitchew Creek in 1990 and 1991 (Anchor QEA 2022a).

Mapping data indicate that Sequalitchew Creek currently supports state priority fish species (chum salmon, coho salmon, and cutthroat trout; WDFW 2023a, 2023b). Coho salmon smolts out-migrate from March to May, while returning adults spawn from late November to early January. Chum salmon spawn between December and February, and the fry out-migrate immediately after emerging from the gravels, which is usually between March and June. Resident and sea-run cutthroat trout reside in Sequalitchew Creek throughout the entire year. Adults typically spawn in the spring

and summer (February to August), and the fry emerge in late summer. Adult bull trout can potentially be present in the lowest portions of Sequalitchew Creek at any time of the year but are most likely to enter the stream to forage on out-migrating salmon smolts between March and June. Bull trout are not expected to use Sequalitchew Creek for spawning purposes due to the limited known distribution in the vicinity and the lack of spawning conditions that bull trout require (Anchor QEA 2022a).

Sequalitchew Creek in the lower ravine (downstream of the project site) has average annual flow of 2.8 cfs. The flows rises to between 3 and 4 cfs during the spawning periods for the salmonid species using the creek. During summer, flows drop, and sometimes the creek dries up completely, leaving only small pools wetted. As a result, fish are unable to use the creek throughout the year, and aquatic invertebrate prey production is reduced (Anchor QEA 2022a).

Anchor Environmental (2004a, 2004b) completed a modeling analysis of salmonid spawning and passage in Sequalitchew Creek based on water depth and flow. The analysis was conducted for coho salmon, chum salmon, and cutthroat trout. Results indicated that existing creek flows for both spawning and rearing in Sequalitchew Creek are lower than optimal flows, and cutthroat trout habitat is severely limited during dry periods. A later modeling study found that the creek could support a low number of natural chum salmon under current conditions, but the population would probably not be self-sustaining (ICF 2013). This later modeling study found adult coho capacity and abundance in the creek to be essentially zero under existing conditions.

5.2.5.3 Site Observations and OHWM Delineation (January 2023)

The City requires a 100-foot stream buffer measured from the ordinary high water mark (OHWM) (DMC 25.105.050(2)(a)). On January 20, 2023, Anchor QEA delineated the OHWM of the segment of Sequalitchew Creek that is proposed to be regraded and restored as part of the project. The results of the site investigation are described in the following subsections.

The OHWM boundaries were field delineated using the Ecology guidance document *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State* (Ecology 2016) and the U.S. Army Corps of Engineers document *A Guide to Ordinary High Water Mark (OHWM) Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States* (USACE 2014). Detailed methods and site photographs are provided in Appendix B. Anchor QEA used a Trimble Geoxh to collect GPS data for the OHWM at 54 points along the stream channel and recorded observations of vegetation and channel characteristics. The first point was collected southeast of a pedestrian footbridge for the Sequalitchew Creek Trail at a beaver dam, and the final point was collected north of City Hall, beyond the City Hall culvert to be replaced.

5.2.5.3.1 Observed Hydrology and Channel Characteristics

The delineated reach of Sequalitchew Creek generally flowed from the east to west. The reach was confined to a mostly straight channel, with only a few bends. Most of the reach was dry, with surface water at both ends of the delineated reach. The surface of the soil was moist or saturated in some locations.

At the beaver dam southeast of the pedestrian footbridge for the Sequalitchew Creek Trail, surface water was approximately 2 feet deep where observable, and flow was stagnant. Substrate was predominantly fines. Surface water disappeared to subsurface flows upstream of the pedestrian footbridge, where the bed transitioned to gravel and riprap. Moisture was evident beneath the bridge. As the channel straightened through an open, grassy area downstream of the footbridge, the bed became soft soils and mud. A small berm in the channel caused an absence of any OHWM indicators for approximately 30 feet. In some areas, the channel widened and flattened and became less defined (approximately 12 to 18 feet between OHWMs). The dry channel narrowed and meandered through vegetation for approximately 40 feet upstream of the Center Drive bridge crossing and was confined to an approximately 6-foot-wide channel under the bridge crossing. Downstream of the Center Drive bridge crossing, the channel gradually opened into a wide, grassy area for approximately 300 feet until it reached the tree line. The dry channel narrowed significantly (approximately 5 feet between OHWMs) beyond the tree line, continued downstream under an abandoned deteriorated dam diversion structure, and into the 56-inch-wide City Hall culvert.

There was no water in the City Hall culvert at the time of the site visit. A plunge pool with approximately 8 inches of surface water was approximately 1 foot below the bottom of the culvert. The substrate was cobble and gravel. Downstream of the plunge pool, the substrate was dry for approximately 20 feet until surface water was observed. The downstream right bank was protected by a deteriorating 1- to 2-foot timber bulkhead.

5.2.5.3.2 Observed Riparian Vegetation

Surrounding the beaver dam southeast of the Sequalitchew Creek Trail pedestrian footbridge, Sequalitchew Creek had a dense riparian cover of Pacific willow (*Salix lucida* ssp. *lasiandra)* and red osier dogwood (*Cornus sericea*), with reed canarygrass (*Phalaris arundinacea*) in the shallow areas and bank fringes. Immediately downstream, the canopy opened up and transitioned into reed canarygrass with dense brambles of Himalayan blackberry (*Rubus armeniacus*) surrounding the pedestrian footbridge. The canopy remained open and vegetated with reed canarygrass for approximately 600 feet to the Center Drive bridge crossing downstream. Snowberry (*Symphoricarpos albus*) and Scotch broom (*Cytisus scoparius*) grew in dense patches on the adjacent slopes in this area between the footbridge and bridge crossing. Dense Himalayan blackberry surrounded the bridge crossing. The stream channel meandered through a large patch of red osier dogwood upstream of the bridge crossing. Reed canarygrass dominated the streambed and banks for another 300 feet downstream of

the bridge crossing, and a large black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) was rooted on the right bank OHWM in this location. Immediately downstream, a few mature Douglas firs (*Pseudotsuga menziesii*) were growing on the slope of the left bank.

At the tree line, the riparian corridor was forested with a canopy and understory of native species, including Douglas fir, red alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*), oceanspray (*Holodiscus discolor*), red osier dogwood, tall Oregon grape (*Berberis aquifolium*), and sword fern (*Polystichum munitum*). Downstream of the City Hall culvert, the shrub stratum transitioned into a salmonberry (*Rubus spectabilis*) community with water parsley (*Oenanthe sarmentosa*) growing in the shallow, low-flow portion of the stream channel.

6 Project Impacts and Mitigation

Project construction will result in temporary impacts to wetlands and FWCAs. In the long term, the project is expected to benefit streamflows and aquatic habitat in Sequalitchew Creek and contribute to the overall success of the Restoration Plan. Short-term construction impacts, long-term impacts, and mitigation measures are discussed in this section.

6.1 Construction Impacts

6.1.1 Wetlands

Construction impacts to wetlands (Edmond Marsh) are summarized in Table 4. The project includes removing existing fill (trail berm material) from Edmond Marsh and installing a new Robson Trail bridge to restore a hydrologic connection between the east and west portions of the marsh (Figures 5a and 5b). Approximately 4,535 square feet (sf) of existing gravel fill (totaling approximately 546 cubic yards [cy]) will be removed at the new Robison Trail bridge location using an excavator.

Approximately 435 sf (147 cy) of gravel fill material will be installed at the new Robison Trail bridge abutments and as part of regrading the adjacent trail segments and installing sewer manholes. The fill will consist of gravel removed from the Robison Trail berm and will be placed using an excavator. The remaining fill material that is not reused on site will be transported off site to an approved disposal facility. Approximately 240 sf of wetland area will be occupied by the new concrete footings and steel piles for the Robson Trail bridge. Overall, the project will result in a permanent net reduction of fill material in Edmond Marsh.

Construction equipment access will result in temporary impacts to the wetland. The proposed beaver management activities will result in a minor amount of wood removal and installation of small wire cage, piping, fencing, and posts in the wetland. The BMPs described in Section 4.3 will serve to avoid and minimize impacts to water quality and avoid disturbance or compaction of wetland vegetation and soils outside the work area.

Table 4
Construction Impacts to Wetlands (Edmond Marsh)

Construction Activity	Impact Area and Fill Volume	Duration of Impact
Excavate existing trail berm material at Robison Trail new bridge location	5,000 sf (600 cy) existing gravel fill removed	Permanent
Install new Robison Trail bridge, regrade adjacent trail, install sewer manholes	500 sf (200 cy) gravel fill 275 sf concrete bridge footings and steel piles	Permanent
Notch existing beaver dam	15 sf (8 cy) woody material removed	Permanent

Construction Activity	Impact Area and Fill Volume	Duration of Impact
Install two flexible pond levelers for beaver management	400 sf wire cage and piping	Permanent
Install beaver exclusion device	70 sf hurricane fence and support	Permanent
Install beaver dam analog	40 sf wooden post and willow weave	Permanent
Equipment access, clearing, grubbing, planting	75,000 sf of vegetation disturbance within construction work areas	Temporary
Total	**3,860 sf net reduction of fill material in wetland**	

6.1.2 Streams

Construction impacts to streams (Sequalitchew Creek) are summarized in Table 5. Approximately 1,400 linear feet of stream channel will be regraded, and large wood will be added to create pools. The project will remove 49,499 cy of existing gravel and soil fill material from the stream channel and the channel will be regraded to create pools, floodplain, and low-flow channel areas. In addition, 440 cy of concrete, timber, and metal will be removed from the stream channel. Excavation and removal of materials will be done with an excavator.

Approximately 1,155 cy of on-site gravel and soil that is excavated for the project will be reused on site. The remaining soil and gravel, and all concrete, metal, and wood, will be transported off site to an approved disposal facility. Approximately 40,000 cy of low-permeability fines and clean streambed gravel will be imported from a reliable local source and placed in the stream channel to create pools, floodplains, and a low-flow channel and reduce infiltration through the streambed to improve stream flows throughout the year. Approximately 240 sf of stream channel area will be occupied by the new concrete footings and steel piles for the City Hall culvert bridge.

The BMPs described in Section 4.3 will serve to avoid and minimize impacts to water quality and avoid disturbance or compaction of riparian vegetation and soils outside the work area.

Table 5
Construction Impacts to Streams (Sequalitchew Creek)

Construction Activity	Duration of Impact	Volume of Material	Area of Impact
Remove concrete sidewalk along creek within Center Drive culvert	Permanent	105 cy concrete and reinforcements removed	2,840 sf of material removal
Grade to create in-stream pools, floodplain, and low-flow channel in losing reach	Permanent	45,850 cy existing soil and gravel excavated; 1,155 cy existing soil and gravel relocated as fill	92,400 sf existing soil and gravel excavated; 10,000 sf existing soil and gravel relocated as fill

Construction Activity	Duration of Impact	Volume of Material	Area of Impact
Line stream channel in losing reach to increase stream flows	Permanent	40,000 cy imported stream gravel and low-permeability fines placed	90,000 sf of material placed (1,400 linear feet)
Remove timber diversion dam near City Hall culvert	Permanent	270 cy timber, metal, and concrete removed	800 sf
Remove 56-inch CMP (City Hall culvert)	Permanent	65 cy CMP culvert removed	550 sf
Remove existing trail berm fill for new City Hall trail bridge and trail regrading	Permanent	3,649 cy existing gravel fill material removed	17,000 sf
Install City Hall trail bridge foundations	Permanent	n/a	240 sf concrete bridge footings and steel piles
Install large woody material and buried pile anchors	Permanent	See Figures 6b, 6c, and 6d for details	See Figures 6b, 6c, and 6d for details
Total	• **Removal of 103,590 sf existing fill and debris from stream channel** • **Addition of 240 sf bridge footings and piles in channel** • **Regrading and restoration of 1,400 linear feet (90,000 sf) of stream channel using 40,000 cy imported fines and stream gravel**		

6.1.3 Other Fish and Wildlife Conservation Areas

Construction activity will result in short-term noise and human disturbances that could temporarily affect wildlife using the project site and vicinity. Work will occur only during daylight hours and will not affect evening or nighttime foraging by bats. Any mature trees that could provide suitable bat habitat that are removed for the project will be replaced at a ratio of 2 to 1. In addition, the project site is surrounded by roadways and residential developments, and wildlife species that frequent the site are likely somewhat tolerant of human activity.

The project site is located within Oak Mapping Unit MO-13 along Sequalitchew Creek. Existing oaks will be protected during construction, and additional oaks will be planted in this area. The project will not affect any of the Oak Mapping Units between the west side of Edmond Marsh and Center Drive. An arborist's report is being prepared for the project that will address the City's specific requirements for protection of oak woodlands.

6.2 Long-Term Impacts

The intent of the project is to permanently route all but the highest flows from Sequalitchew Springs through Edmond Marsh and down the Sequalitchew Creek Ravine.

6.2.1 Sequalitchew Creek

Sequalitchew Creek flows in the ravine have been reduced by about 75% in the last 30 years (Aspect 2022). Due to rising water levels caused by beavers in Edmond Marsh the gradient of flow in parts of the creek has been reversed. The majority of the flow originating at Sequalitchew Springs is routed to a diversion canal that starts on at the mouth of Sequalitchew Lake where water would naturally flow directly into East Edmond Marsh. Work within the City being complimented by work on JBLM being led and permitted by others. Together the intent of these two projects is to restore as much of the original flow to Sequalitchew Creek as possible.

6.2.1.1 Hydrology

Under existing conditions, the reach of Sequalitchew Creek between the outlet of West Edmond Marsh and the top of the ravine experiences no consistent flow passing through the entire reach. This occurs because there is little outflow from West Edmond Marsh and the bottom of the channel in this reach is above the groundwater levels and has been disturbed by prior human activity, so any outflow readily infiltrates into the coarse native soils (Aspect 2022).

The Restoration Plan is predicted to result in an average flow of 10.8 cfs in the dry reach. The flow would vary seasonally from a monthly average of 2.2 cfs in August to 22.3 cfs in March. In the Sequalitchew Creek ravine downstream of the project site, the restoration project would result in a seven-fold increase in flow on an annual average basis, from the current 1.6 cfs up to 11.2 cfs. Overall, the restored streamflows are anticipated to re-establish a functioning stream in the now frequently dry channel (Aspect 2022; Anchor QEA 2022b).

6.2.1.2 Aquatic Habitat and Fish Use

The project will improve instream habitat structure in Sequalitchew Creek within the project site by adding flow, wetted channel area, large wood, and by creating pools for aquatic species. Riparian areas will be replanted with native species that are expected to improve shading and provide a future source of wood and invertebrate prey items to the stream. The restoration project would restore fish passage from Sequalitchew Creek to East and West Edmond Marsh. Two fish barrier culverts will be replaced by fish-passable structures, which in combination with increased flows will allow migratory access above the ravine springs and into Edmond Marsh.

The additional streamflow described in Section 6.2.1.1 will increase the capacity of Sequalitchew Creek as part of an effort to restore summer chum and coho salmon to the system. Additional flow in the lower reaches of Sequalitchew Creek is expected to significantly improve habitat conditions for coho and chum salmon and cutthroat trout. Re-establishment of peak flows and the associated sediment movement is key to restarting the arrested habitat-forming processes downstream of Edmond Marsh and a key objective of the Restoration Plan. Currently, even where flows persist perennially, they are inadequate to move sediment effectively, create pools, or scour finer-grained materials from the

substrate to create conditions suitable for spawning. The input of sediment and organic matter will stimulate biological productivity and develop greater resources at the lower trophic levels. This habitat and development of lower trophic productivity are key to developing conditions sufficient to restore target species such as chum salmon and cutthroat trout in the system. Chum salmon will also benefit from the restoration of a more varied hydrograph. Puget Sound stocks typically spawn in freshwater systems in November and December as flows rise in response to winter rains. This effect has been limited in the system due to the current lack of surface water connectivity (Anchor QEA 2022a, 2022b).

With the anticipated changes, the aquatic area of West Edmond Marsh should provide excellent rearing habitat for juvenile salmonids. Juvenile coho salmon typically stay in freshwater wetlands and small streams for 2 years or more after spawning (Anchor QEA 2022a).

6.2.2 Edmond Marsh

Once the hydraulic gradient between Sequalitchew Lake and the west end of West Edmond Marsh is restored, the area of jurisdictional wetland and seasonal inundation will decrease in some locations. This is necessary to restore flows and reverse the effects of water diversion and beaver activity. The creation of a gradient will allow flows out of Edmond Marsh, provide fish passage through the majority of the watershed, and improve water quality in the system. Lowering the water levels in some areas of the marsh is necessary to restore flow from Sequalitchew Lake because the marsh water levels are currently higher than the lake, forcing water to flow into the diversion canal instead of Sequalitchew Creek. While some wetland area is expected to be lost due to lower water levels, reducing fluctuations in water levels is expected to increase the diversity and complexity of wetland habitats (Anchor QEA 2022b).

It is expected that West Edmond Marsh will be more frequently and continuously inundated in the deeper areas of the wetland, and seasonal fluctuations in water levels will decrease. This will occur as a lower and more stable outlet hydrology is established in place of the existing beaver dam. The beaver dam currently prevents flow out of West Edmond Marsh, but it is occasionally breached. Reducing or eliminating these rapid changes in hydrology will help to stabilize the vegetation communities which are currently susceptible to hydrologic fluctuations. Currently scrub-shrub wetland vegetation establishes in the marsh over several years only to be killed when water levels rise. Emergent vegetation is not able to establish under the dead woody material before changes in water levels once again favor a scrub-shrub community (Anchor QEA 2022b).

The restoration will lower water levels in East Edmond Marsh to restore a gradient from Sequalitchew Lake to the ravine. This will impact habitats, particularly along fringes of the wetland where forested areas will be able to re-establish. Forested wetland and wetland buffer has been lost over the past decades as water levels have risen. Rising water levels have also been responsible for

the loss of scrub-shrub vegetation and detritus from those communities has prevented establishment of an emergent vegetation community (Anchor QEA 2022b).

6.3 Mitigation Measures

The project has been designed and will be implemented in accordance with the following mitigation sequencing approach:

1. **Avoid the adverse impact altogether by not taking a certain action or parts of an action.**
   Work within wetlands and Sequalitchew Creek is unavoidable due to the nature of the project; however, the project has been designed to include the minimum construction necessary to achieve restoration goals.
2. **Minimize adverse impacts by limiting the degree or magnitude of the action and its implementation by using appropriate technology or by taking affirmative steps to avoid or reduce impacts.**
   Potential adverse impacts to water quality, wetland soils, vegetation, or wildlife that could occur during project construction will be minimized by implementing the construction BMPs described in Section 4.3.
3. **Rectify the adverse impact by repairing, rehabilitating, or restoring the affected environment to the conditions existing at the time of the initiation of the project.**
   All areas temporarily disturbed during construction will be reseeded and/or revegetated.
4. **Reduce or eliminate the adverse impact over time by preservation and maintenance operations.**
   Features installed as part of the project (bridges and beaver management structures) will be maintained to prevent erosion or other potential adverse impacts in the future.
5. **Compensate for the adverse impact by replacing, enhancing, or providing substitute resources or environments.**
   Because the project is part of a Restoration Plan, no compensatory mitigation is proposed.
6. **Monitor the adverse impact and the compensation projects and take appropriate corrective measures.**
   The Restoration Plan includes a robust monitoring and adaptive management program that will continue to monitor and adjust the project until the project goals are met. If certain goals are not met additional action would be triggered. Table 6 includes some of the measures that could be taken to address problems.

Table 6
Preliminary Suite of Potential Response Actions

<table>
<tr><th>Threshold Not Being Met</th><th>Potential Response Actions</th></tr>
<tr><td colspan="2">Goal 1: Restore year-round flows in Sequalitchew Creek from Sequalitchew Lake to the mouth to support natural life history stages of native salmonid species that use the system.
Objective 1A: Achieve year-round surface water flow in Sequalitchew Creek from Sequalitchew Lake to the mouth, as climate conditions allow.</td></tr>
<tr><td>Performance Threshold: Average flows at the ravine monitoring stations exceed the following thresholds:
Time Period — Flow in cfs
December to April — 4 cfs
May to November — 0.5 cfs</td><td>Remove beaver obstructions.
Install additional beaver exclusion or flexible leveler devices.
Escalate beaver management efforts (remove dams, trap, etc.).
Expedite implementation of Hamer Marsh culvert.
Create connections from Bell or McKay marshes.
Install additional flow pathway(s) through trail.
Modify, suspend, or abandon mine dewatering.</td></tr>
<tr><td>Aspirational Thresholds: Beginning in the first year following completion of Elements B, C, and D, flow under the Center Drive culvert is greater than or equal to the flow leaving Sequalitchew Lake on a monthly average basis from October to June, except when necessary to prevent damage to private property or city infrastructure from flooding. From July to September, the flow under Center Drive culvert is not less than 75% of the flow leaving Sequalitchew Lake.
Beginning in the first year following completion of Elements B, C, and D, flows measured within the ravine are at least equal to the flow at Center Drive (i.e., the ravine is not a losing reach) on a monthly average basis.</td><td>Remove beaver obstructions.
Escalate beaver management efforts (remove dams, trap, etc.).
Seal losing reach.</td></tr>
<tr><td colspan="2">Objective 1B: Minimize the flow lost to the diversion canal.</td></tr>
<tr><td>Performance and Aspirational Thresholds: Following completion of Elements B, C, and D, average flow over the diversion weir is less than the thresholds shown below.
<table>
<tr><th>Threshold</th><th>Summer Slow (July to October)</th><th>Winter Base Flow* (January to May)</th></tr>
<tr><td>Performance</td><td>1 cfs</td><td>6 cfs</td></tr>
<tr><td>Aspirational</td><td>0 cfs</td><td>0 cfs</td></tr>
</table>
*Excludes storm peaks</td><td>Remove beaver obstructions.
Install additional beaver exclusion or flexible leveler devices.
Escalate beaver management efforts (remove dams, trap, etc.).
Expedite lake outlet area improvements.</td></tr>
</table>

7 City of DuPont Critical Areas Code Compliance

This report has been prepared to comply with DMC Chapter 25.105, Critical Areas. The following text describes how the project meets applicable City code requirements for wetlands and Sequalitchew Creek (an FWCA).

DMC 25.105.050(1)(c)(i): Activities that contribute to the restoration of wetlands and associated streams are allowed in wetlands and wetland buffers. The project is part of a Restoration Plan for the Sequalitchew Creek Watershed. As required by the code, the project has been designed by a civil engineer and a qualified biologist and will be implemented under the direct supervision of a qualified biologist.

DMC 25.105.050(2)(a): Alterations to streams and stream buffers are permitted under specific conditions. The following text lists the code conditions first in italics, followed by an explanation of how the project meets each condition.

(*i) If alterations to or development in streams and stream buffers are not reasonably avoidable, alterations or development may be allowed only if the following requirements are met:*
Because of the degraded conditions within Sequalitchew Creek, alterations within the stream channel are necessary and unavoidable in order to restore in-stream habitat.

A. *Alterations may only be permitted if based upon a study meeting the necessary requirements as determined and approved by the director.*
   This report and the other documentation submitted to the City have been prepared to meet the City's requirements.
B. *The applicant shall notify affected communities and native tribes of proposed alteration(s) prior to any alteration if the stream is in a flood hazard area. The applicant shall submit evidence of such notification to the Federal Emergency Management Agency.*
   The tribes and adjacent property owners will be notified as part of the Federal Permitting Process. We shall submit evidence of notification to the Federal Emergency Management Agency (FEMA).
C. *There shall be no introduction of any plant or wildlife which is not indigenous to the state into any stream or buffer unless authorized by a state or federal permit or approval by the city.*
   The planting plans included as part of the project design include only native tree, shrub, and ground cover species.
D. *Unavoidable impacts to streams and stream functions shall be mitigated to achieve no net loss of stream function.*
   The project is designed to restore stream functions.

(ii) The following surface water management activities and facilities may be allowed in stream buffers as follows:

A. *Surface water discharge to a stream from a detention facility, presettlement pond or other surface water management activity or facility may be allowed if the discharge is in compliance with the Surface Water Design Manual*;
   Not applicable; no surface water discharges or facilities are proposed.

B. Public and private trails may be allowed in the stream buffers only upon adoption of administrative rules consistent with the following:
   i. *The trail surface shall not be made of impervious materials, except that public trails may be made of impervious materials if required to comply with the Americans with Disabilities Act (ADA); or to provide for emergency access to remote areas; and*
      Trails will be restored using a 5/8-inch minus crushed aggregate base course and 1/4-inch minus crushed aggregate top course with stabilizer to meet accessibility requirements
   ii. *Buffers shall be expanded, where practicable, equal to the width of the trail corridor including disturbed areas.*
      No new trails or trail corridors are proposed. The two new bridges will be located within the footprint of the existing trails.

(*iii) Stream crossings may be allowed if:*

A. *Road crossings use bridges or other construction techniques which do not disturb the stream bed or bank, except that bottomless culverts or other appropriate methods demonstrated to provide fisheries protection may be used if the applicant demonstrates that such methods and their implementation will pose no harm to the stream or inhibit migration of fish*;
   The project includes removing existing culverts, trail grade fill material, and a concrete sidewalk and installing two new bridges. These elements will enhance fish movement and streamflow through the site.

B. *Stream crossings are constructed during the summer low flow and are timed to avoid stream disturbance during periods when use is critical to salmonids*;
   Our intent is to build the stream crossings before flows are fully restored and before salmonids return to the project area from lower Sequalitchew Creek.

C. *Crossings do not occur over salmonid spawning areas unless the city determines that no other possible crossing site exists*
   No salmonid spawning currently occurs in the two areas proposed for bridge crossings because these areas are currently occupied by culverts and fill material.

D. *Bridge piers or abutments are not placed within the FEMA floodway or the ordinary high water mark;*
Abutments are in upland areas without a mapped FEMA floodway.

E. *Crossings do not diminish the flood-carrying capacity of the stream;*
Crossings provide much more capacity than existing structures.

F. Underground utility crossings are laterally drilled and located at a depth of four feet below the maximum depth of the scour for the base flood predicted by a civil engineer licensed by the state of Washington; and
The Robinson Trail Bridge includes a Pierce County-owned gravity sewer that is underground and will be above the predicted base flood where attached to the bridge.

G. Crossings are minimized and serve multiple purposes and properties whenever possible.
The two new bridge crossings will be part of existing trails. No new additional crossing locations are proposed.

(iv) For any stream alteration allowed by this section, the applicant shall demonstrate, based on information provided by a civil engineer and/or a qualified biologist, that:

A. The equivalent base flood storage volume and function will be maintained;
Lowering Edmond Marsh summer water levels will provide a large increase in available flood storage within the wetland. The channel downstream of Edmond Marsh is designed to convey a 100-year flow.

B. *There will be no adverse impact to local ground water;*
The project will not introduce any pollutants to groundwater and is not likely to adversely affect the water table.

C. *There will be no adverse increase in velocity;*
Channel width and roughness will be increased with large woody material in the channel and floodplain to mitigate the effects of increased flows on water velocity.

D. *There will be no interbasin transfer of water*
The project intent is to maintain more flow within the natural basin and drainage of the creek.

E. *There will be no adverse hydrologic disruption of surface water flow regimes;*
The project is part of a Restoration Plan to restore streamflows to the watershed. Hydrologic changes are expected to benefit instream habitat.

F. *Requirements set out in the mitigation plan are met;*
SPSSEG and Anchor QEA will confirm that all project elements have been installed as required in the project plans and specifications.

G. *The relocation conforms to other applicable laws; and*
No stream relocation is proposed.

H. *All approved stream alteration work will be carried out under the direct supervision of a qualified biologist.*
One or more qualified biologists will supervise the project construction work.

DMC 25.105.050(2)(b): The project is for stream restoration, and it has been designed by a civil engineer and a qualified biologist. Construction will be carried out under the direct supervision of a qualified biologist.

DMC 25.105.080(4): This section provides criteria for review of critical areas permits. The following text lists the criteria first in italics, followed by an explanation of how the project meets each criterion.

i. *The proposal minimizes the impact on critical areas in accordance with mitigation as defined in the chapter;*
The project has been designed and will be implemented in accordance with the City's mitigation sequencing requirements as described in Section 6.3.

ii. *The proposal does not pose an unreasonable threat to the public health, safety. or welfare on or off the development proposal site;*
The bridges are designed to meet applicable standards of practice in the industry and the other project elements are mostly in water. The project will increase flows in the creek but would only pose a threat to those who intentionally go in or near the water.

iii. *The proposal is consistent with the general purposes of this chapter and the public interest;*
The project is part of a Restoration Plan for the Sequalitchew Creek Watershed, which is intended to improve ecological functions. This is consistent with the public interest in protecting critical areas and restoring fish populations.

iv. *Any alterations permitted to the critical area are mitigated in accordance with the mitigation requirements and standards of this chapter;*
The project has been designed and will be implemented in accordance with the City's mitigation sequencing requirements as described in Section 6.3.

v. *The proposal protects the critical area functions and values consistent with the best available science; and*
The potential impacts of the project have been assessed to improve critical area functions and values based on local studies for the project and best available science.

vi. *The proposal is consistent with other applicable regulations and standards. The granting of a critical areas permit should not be construed as approval of any other required underlying permit or approval for the development proposal.*

SPSSEG is working closely with the City and other permitting agencies to ensure the project meets all applicable regulations and standards.

8 References

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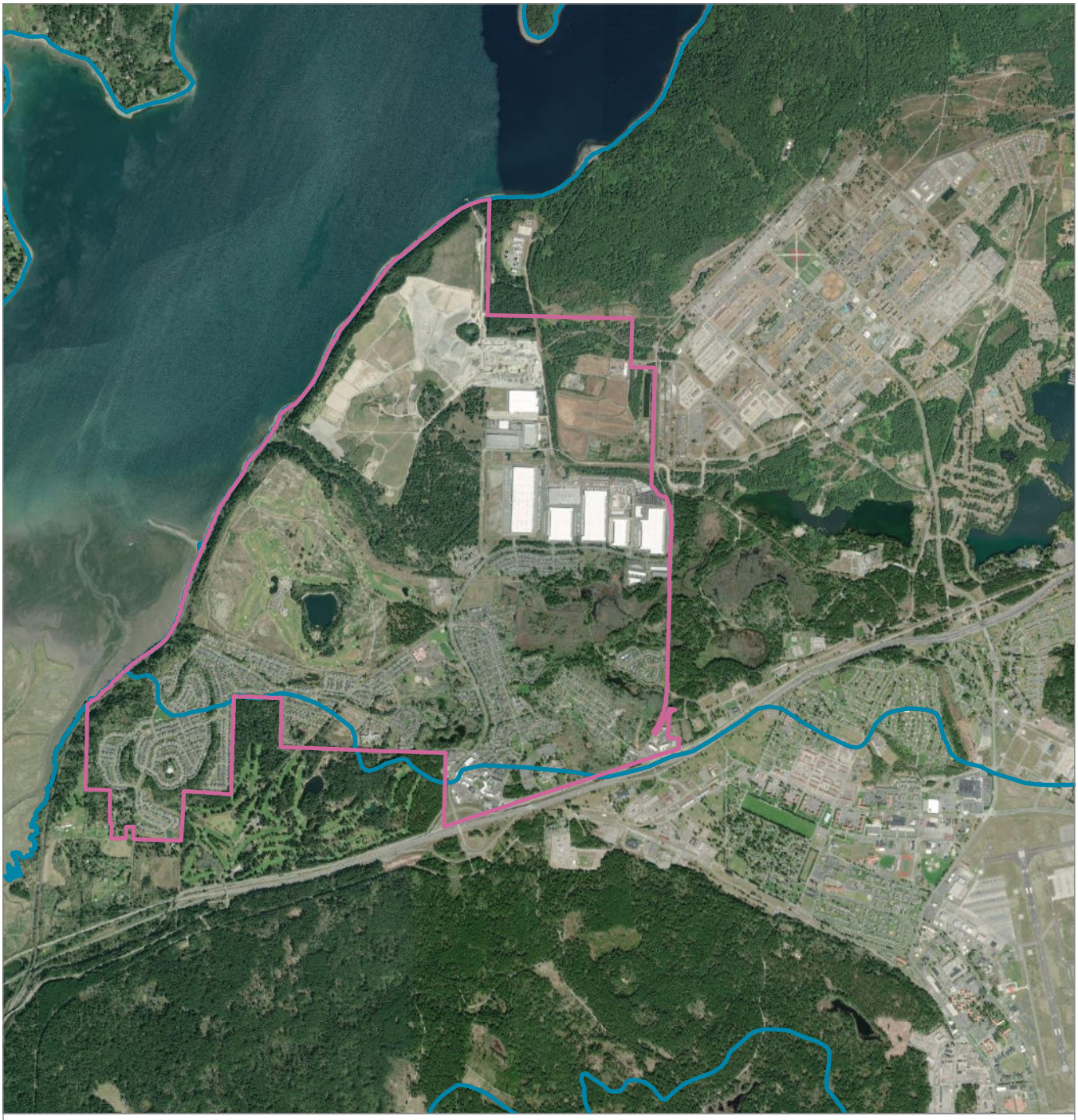
Figures



LEGEND:

City of DuPont

Watershed Boundary (USGS HUC12)

SOURCES:
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Washington State Geospatial Open Data Portal and Department of Ecology.

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ANCHOR QEA

Figure 1
Sequalitchew Creek Watershed
Critical Areas Report
Sequalitchew Creek Watershed Ecosystem Restoration Project

LEGEND:

- Edmond Marsh (Anchor QEA 2023)
- Edmond Marsh (Shapiro 1991)
- Area Without Wetland Signature 1981
- Area Without Wetland Signature 1957
- Area Without Wetland Signature 1957 and 1981

SOURCE(S):
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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ANCHOR QEA

Figure 2
Historical Change in the Extents of Edmond Marsh
Critical Areas Report
Sequalitchew Creek Watershed Ecosystem Restoration Project

NOTE:

1. AERIAL FROM ESRI.

FIGURE 3: PROJECT OVERVIEW

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

LATITUDE: N 47° 6' 16.09"
LONGITUDE: W 122° 38' 9.41"
S-T-R: SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E

HORIZONTAL DATUM: WSP, NAD83, SOUTH ZONE, US FEET
VERTICAL DATUM: NAVD88, FEET

PROPOSED: RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED

PURPOSE: TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD

IN: EDMOND MARSH AND SEQUALITCHEW CREEK
NEAR/AT: DUPONT
COUNTY: PIERCE
STATE: WASHINGTON

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NOTE:

1. NOTCH DAM FROM CREST TO TOE WITH A MINIMUM 60 DEGREE CREST ANGLE.

FIGURE 4a: BEAVER MANAGEMENT PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

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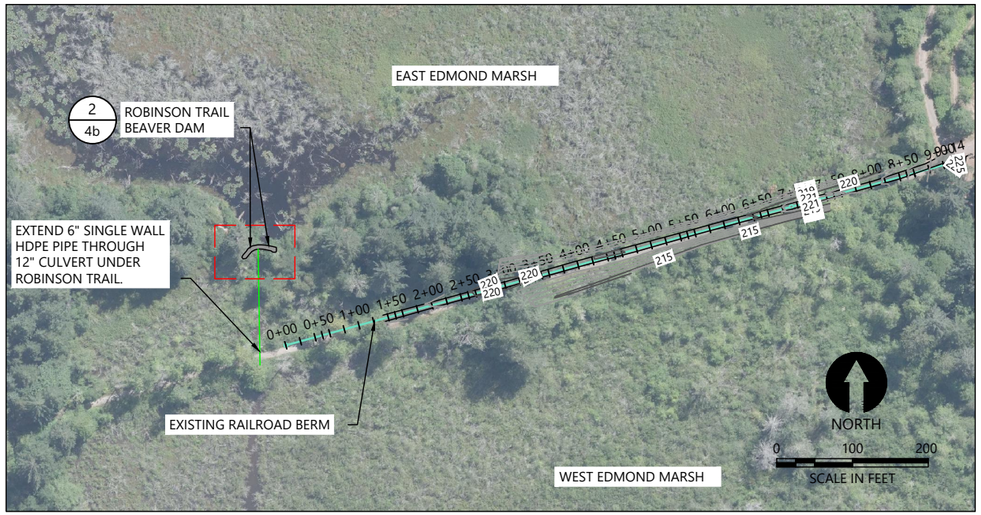
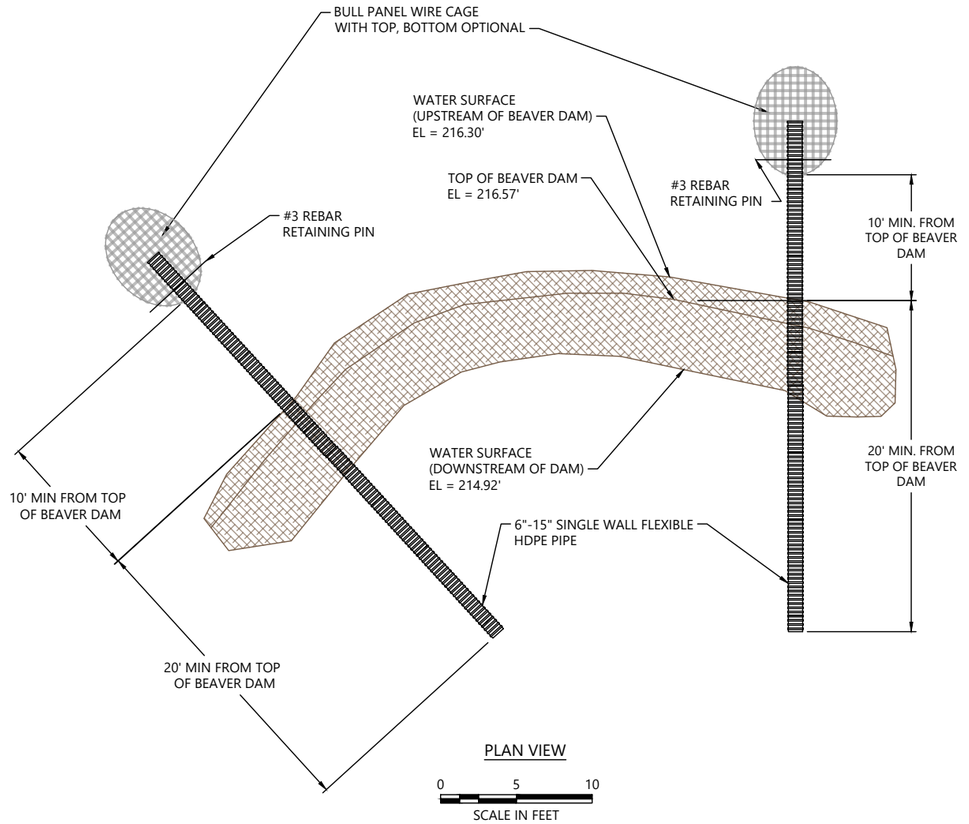
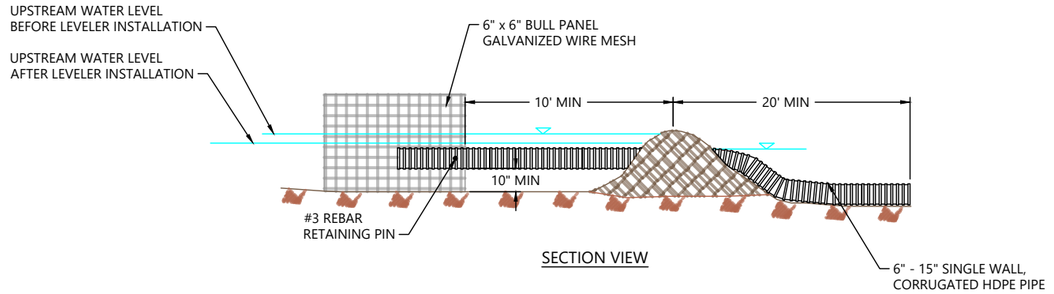


1 / 4a ROBINSON TRAIL BEAVER DAM FLEXIBLE LEVELER INSTALLATION
SCALE: NOT TO SCALE

ROBINSON TRAIL BEAVER DAM (FACING NORTH)





2 / 4a FLEXIBLE POND LEVELER INSTALLATION
SCALE: NOT TO SCALE

FIGURE 4b: FLEXIBLE LEVELER DETAILS

REFERENCE #: **APPLICANT:** SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP **ADJACENT PROPERTY OWNERS:** SEE ATTACHMENT C	**LOCATION:** 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010 **LATITUDE:** N 47° 6' 16.09" **LONGITUDE:** W 122° 38' 9.41" **S-T-R:** SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E **HORIZONTAL DATUM:** WSP, NAD83, SOUTH ZONE, US FEET **VERTICAL DATUM:** NAVD88, FEET	**PROPOSED:** RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED **PURPOSE:** TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD	**IN:** EDMOND MARSH AND SEQUALITCHEW CREEK **NEAR/AT:** DUPONT **COUNTY:** PIERCE **STATE:** WASHINGTON **DATE:** JANUARY 2023

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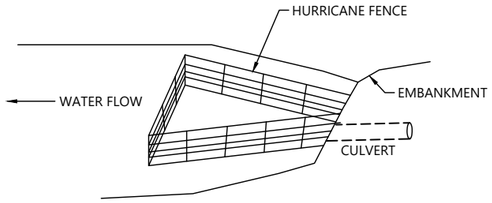
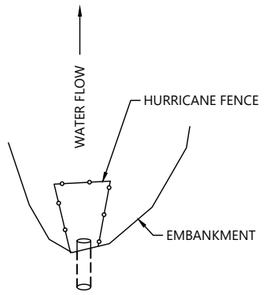


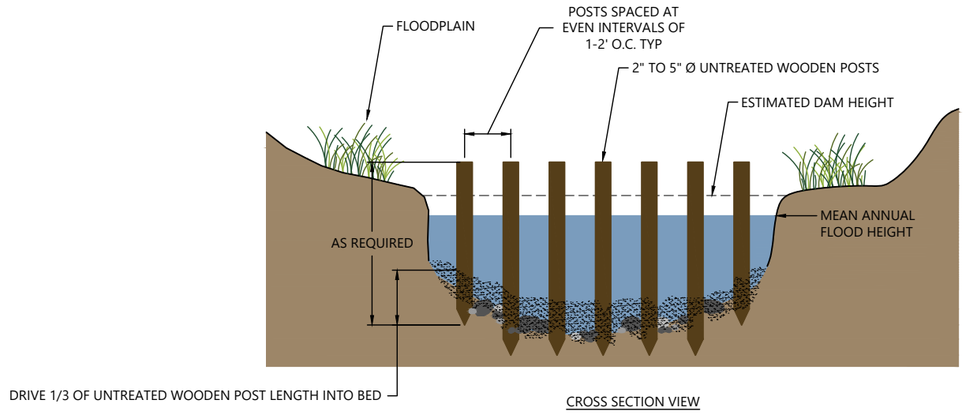
SIDE VIEW



PLAN VIEW

TYPICAL INSTALLATION

3
4a
BEAVER MANAGMENT DEVICE
SCALE: NOT TO SCALE



CROSS SECTION VIEW

PLAN VIEW (CONVEX PRIMARY DAM)

4
4a
BEAVER DAM ANALOG
SCALE: NOT TO SCALE

FIGURE 4c: BEAVER MANAGEMENT DETAILS

REFERENCE #: **APPLICANT:** SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP **ADJACENT PROPERTY OWNERS:** SEE ATTACHMENT C	**LOCATION:** 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010 **LATITUDE:** N 47° 6' 16.09" **LONGITUDE:** W 122° 38' 9.41" **S-T-R:** SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E **HORIZONTAL DATUM:** WSP, NAD83, SOUTH ZONE, US FEET **VERTICAL DATUM:** NAVD88, FEET	**PROPOSED:** RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED **PURPOSE:** TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD	**IN:** EDMOND MARSH AND SEQUALITCHEW CREEK **NEAR/AT:** DUPONT **COUNTY:** PIERCE **STATE:** WASHINGTON **DATE:** JANUARY 2023

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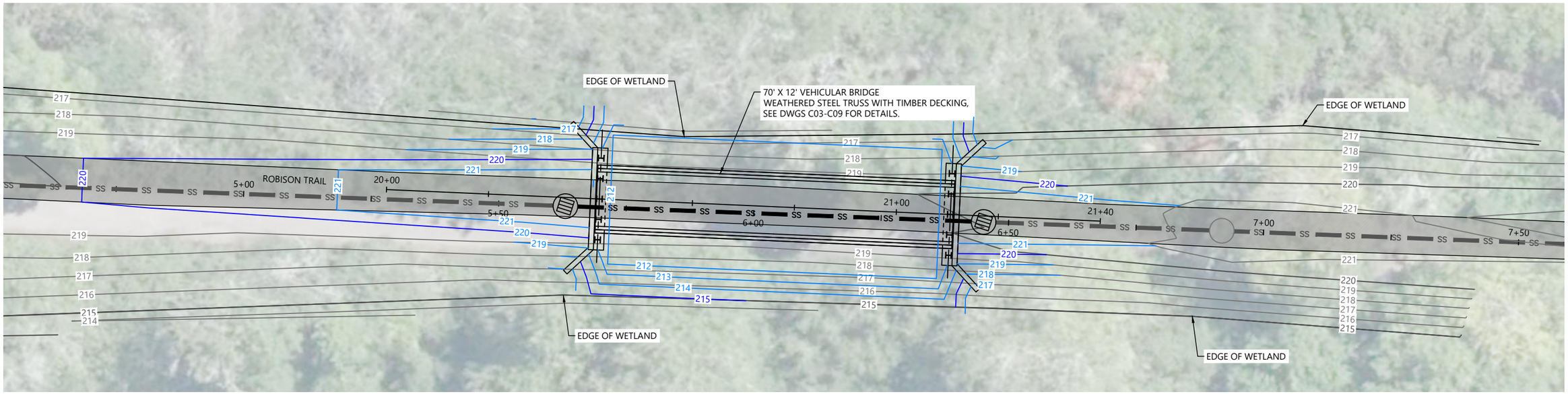

LEGEND:

EXISTING CONTOURS (1' & 5' INTERVALS)

PROPOSED CONTOURS (1' & 5' INTERVALS)

NORTH

0 10 20

SCALE IN FEET

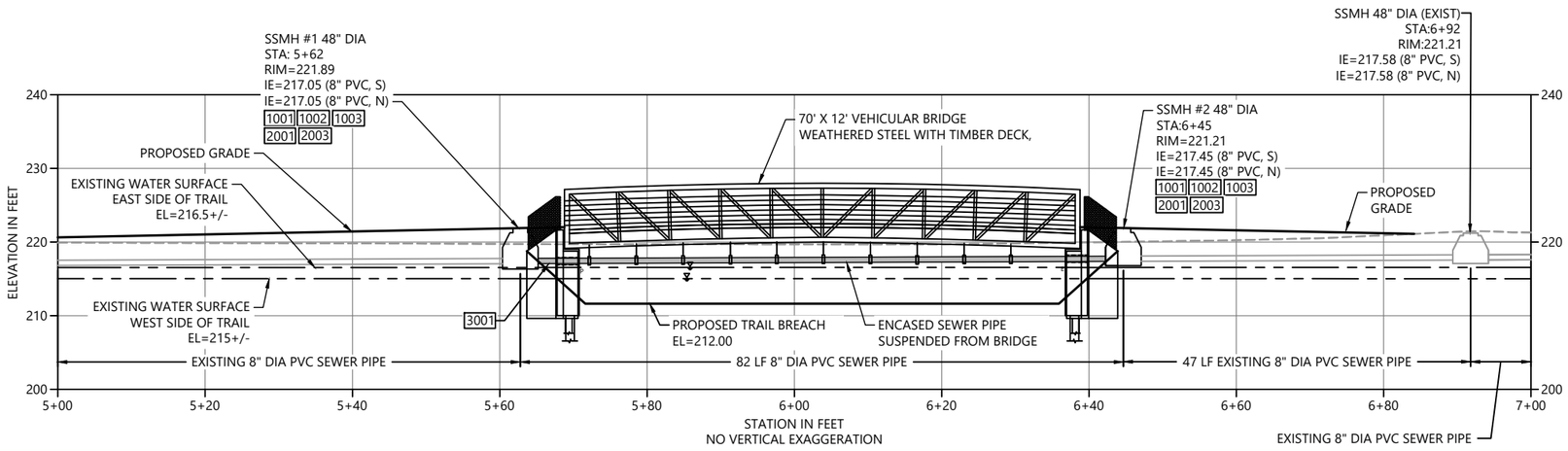

FIGURE 5a: ROBISON BRIDGE PLAN AND SECTION VIEW

REFERENCE #: **APPLICANT:** SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP **ADJACENT PROPERTY OWNERS:** SEE ATTACHMENT C	**LOCATION:** 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010 **LATITUDE:** N 47° 6' 16.09" **LONGITUDE:** W 122° 38' 9.41" **S-T-R:** SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E **HORIZONTAL DATUM:** WSP, NAD83, SOUTH ZONE, US FEET **VERTICAL DATUM:** NAVD88, FEET	**PROPOSED:** RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED **PURPOSE:** TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD	**IN:** EDMOND MARSH AND SEQUALITCHEW CREEK **NEAR/AT:** DUPONT **COUNTY:** PIERCE **STATE:** WASHINGTON **DATE:** JANUARY 2023 ANCHOR QEA 1201 3rd Ave, Suite 2600 Seattle, WA 98101 206-287-9130 **PAGE:** 7 OF 21

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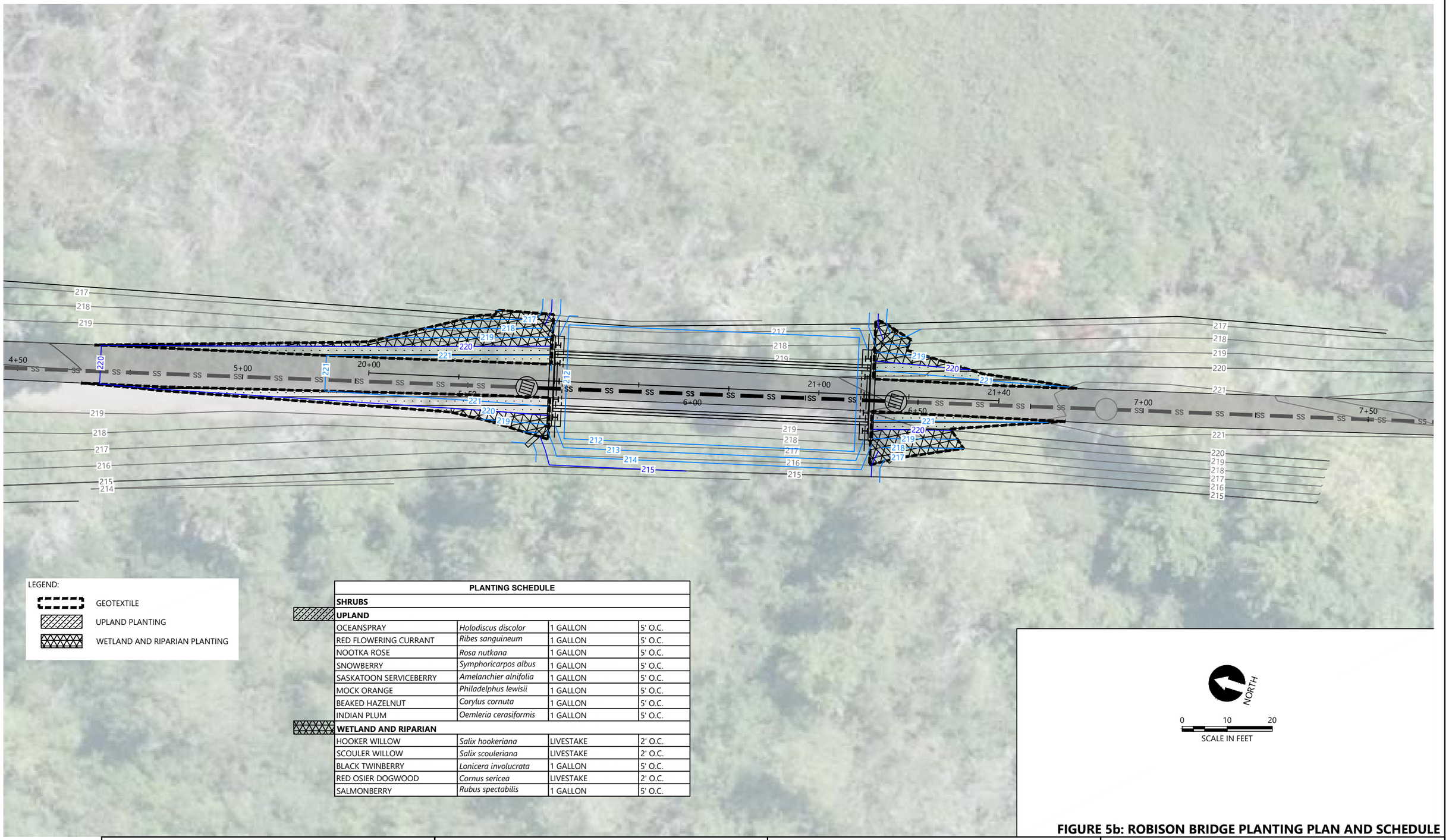

LEGEND:

- GEOTEXTILE
- UPLAND PLANTING
- WETLAND AND RIPARIAN PLANTING

PLANTING SCHEDULE				
SHRUBS				
UPLAND				
	OCEANSPRAY	*Holodiscus discolor*	1 GALLON	5' O.C.
	RED FLOWERING CURRANT	*Ribes sanguineum*	1 GALLON	5' O.C.
	NOOTKA ROSE	*Rosa nutkana*	1 GALLON	5' O.C.
	SNOWBERRY	*Symphoricarpos albus*	1 GALLON	5' O.C.
	SASKATOON SERVICEBERRY	*Amelanchier alnifolia*	1 GALLON	5' O.C.
	MOCK ORANGE	*Philadelphus lewisii*	1 GALLON	5' O.C.
	BEAKED HAZELNUT	*Corylus cornuta*	1 GALLON	5' O.C.
	INDIAN PLUM	*Oemleria cerasiformis*	1 GALLON	5' O.C.
WETLAND AND RIPARIAN				
	HOOKER WILLOW	*Salix hookeriana*	LIVESTAKE	2' O.C.
	SCOULER WILLOW	*Salix scouleriana*	LIVESTAKE	2' O.C.
	BLACK TWINBERRY	*Lonicera involucrata*	1 GALLON	5' O.C.
	RED OSIER DOGWOOD	*Cornus sericea*	LIVESTAKE	2' O.C.
	SALMONBERRY	*Rubus spectabilis*	1 GALLON	5' O.C.

NORTH

0 10 20

SCALE IN FEET

FIGURE 5b: ROBISON BRIDGE PLANTING PLAN AND SCHEDULE

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

LATITUDE: N 47° 6' 16.09"
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S-T-R: SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E

HORIZONTAL DATUM: WSP, NAD83, SOUTH ZONE, US FEET
VERTICAL DATUM: NAVD88, FEET

PROPOSED: RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED

PURPOSE: TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD

IN: EDMOND MARSH AND SEQUALITCHEW CREEK
NEAR/AT: DUPONT
COUNTY: PIERCE
STATE: WASHINGTON

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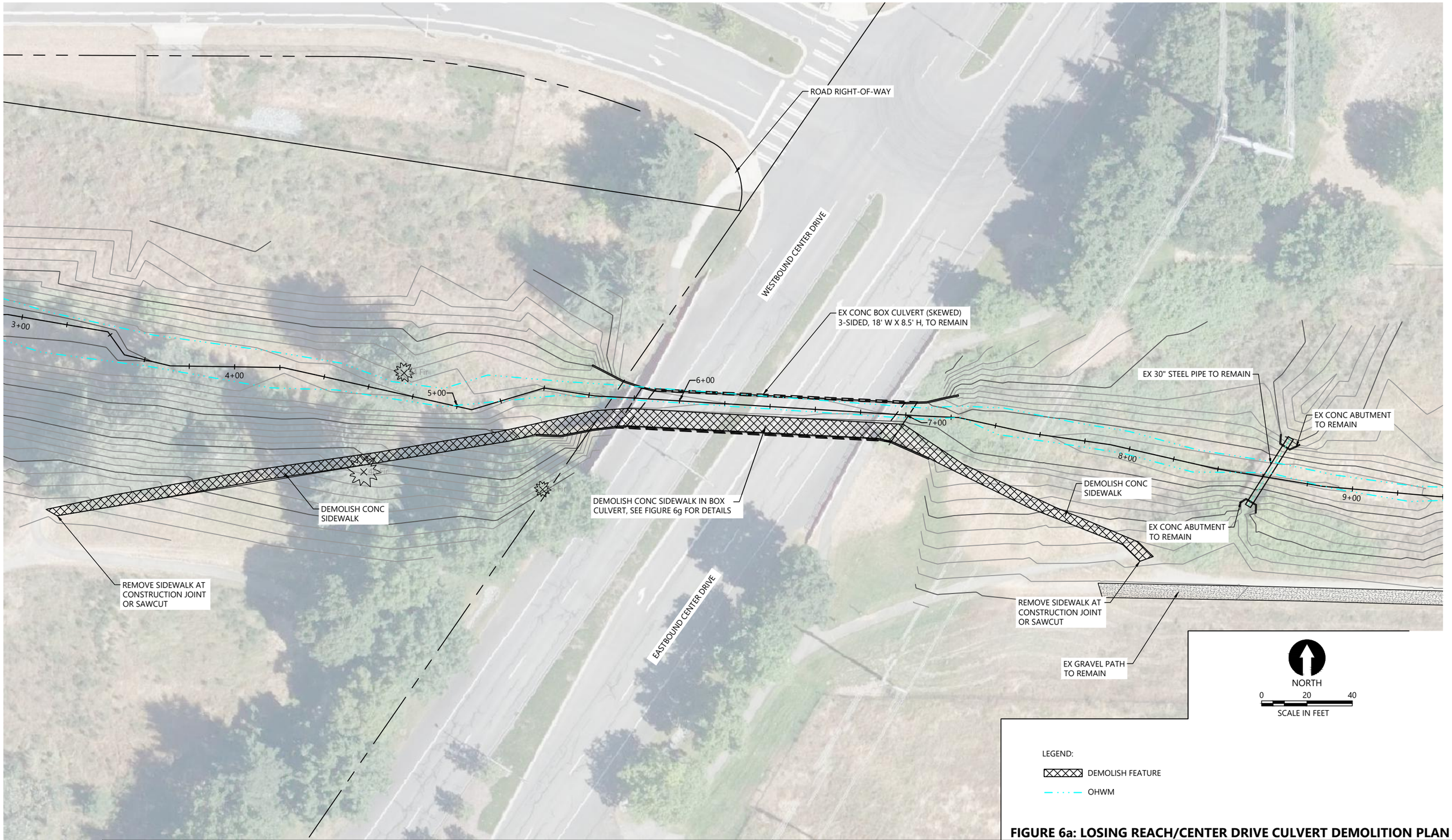

FIGURE 6a: LOSING REACH/CENTER DRIVE CULVERT DEMOLITION PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

LATITUDE: N 47° 6' 16.09"
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PROPOSED: RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED

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NEAR/AT: DUPONT
COUNTY: PIERCE
STATE: WASHINGTON

ANCHOR QEA
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DATE: JANUARY 2023

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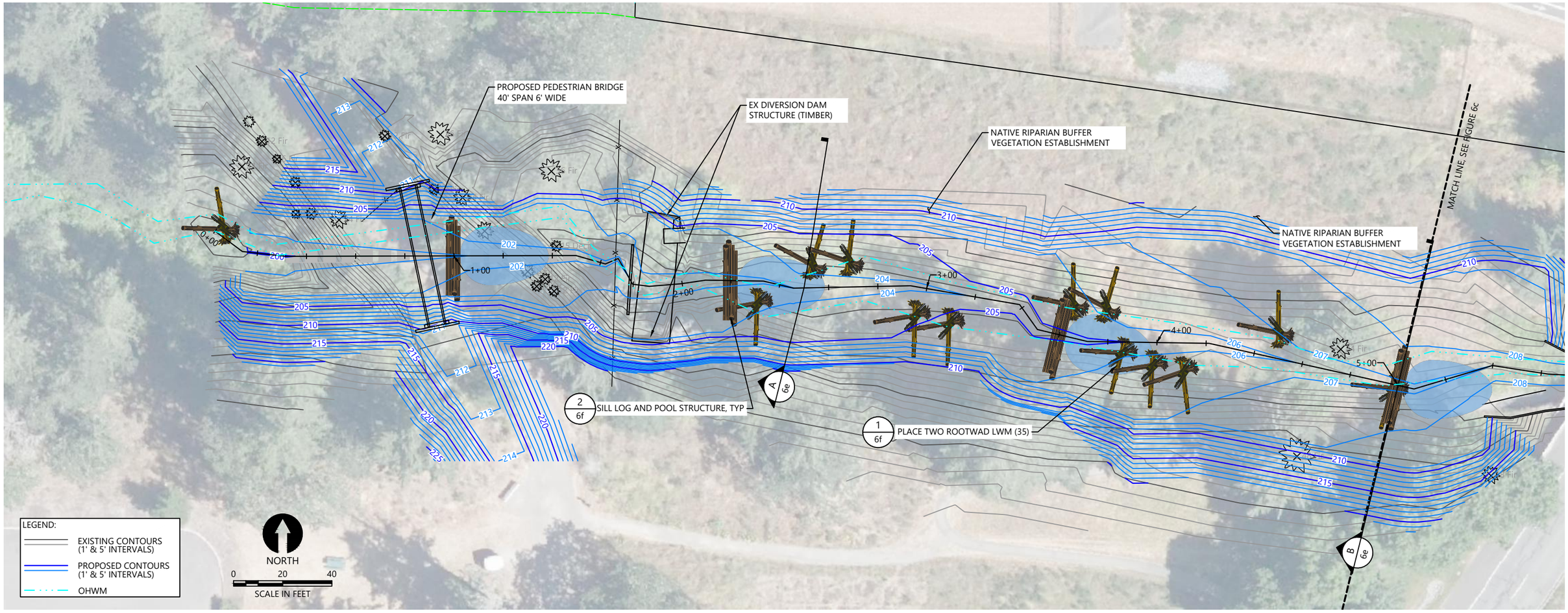

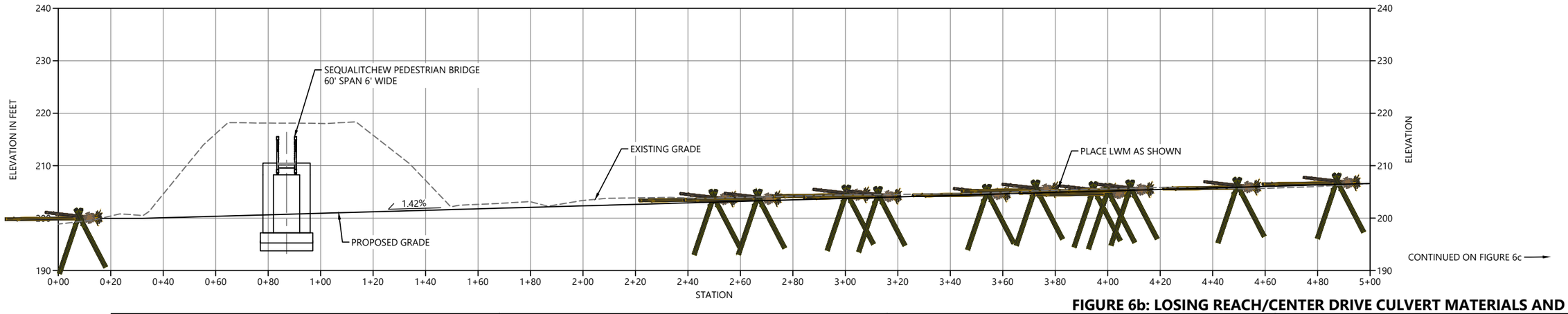

CONTINUED ON FIGURE 6c →

FIGURE 6b: LOSING REACH/CENTER DRIVE CULVERT MATERIALS AND LAYOUT PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

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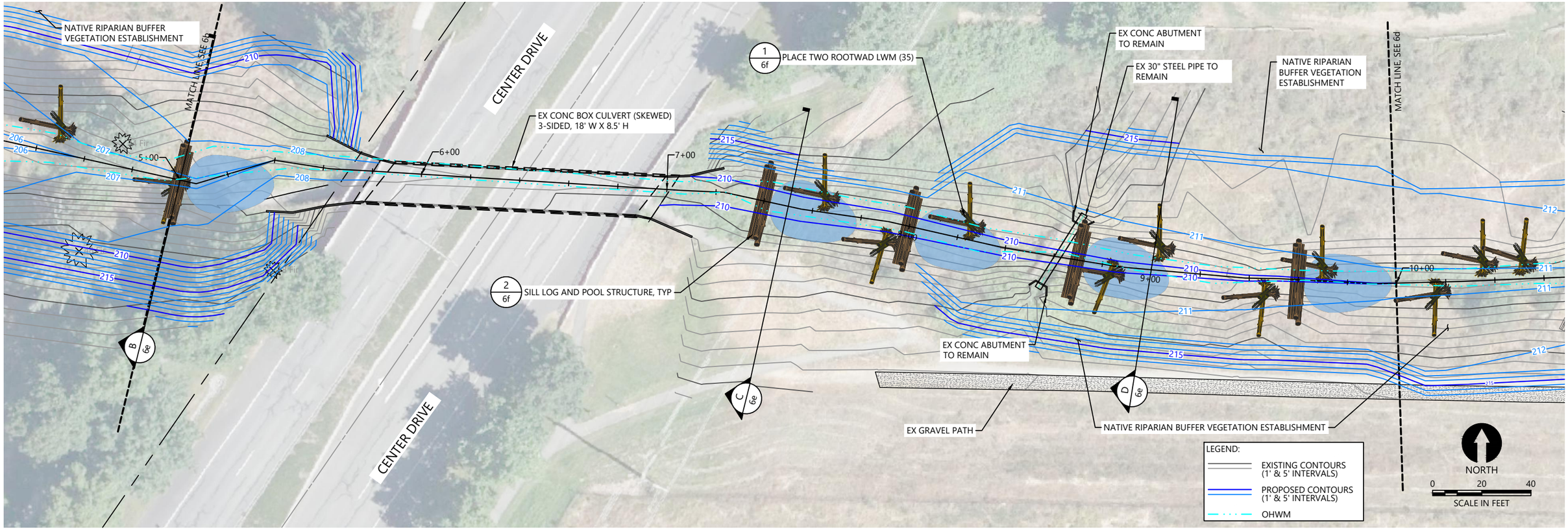

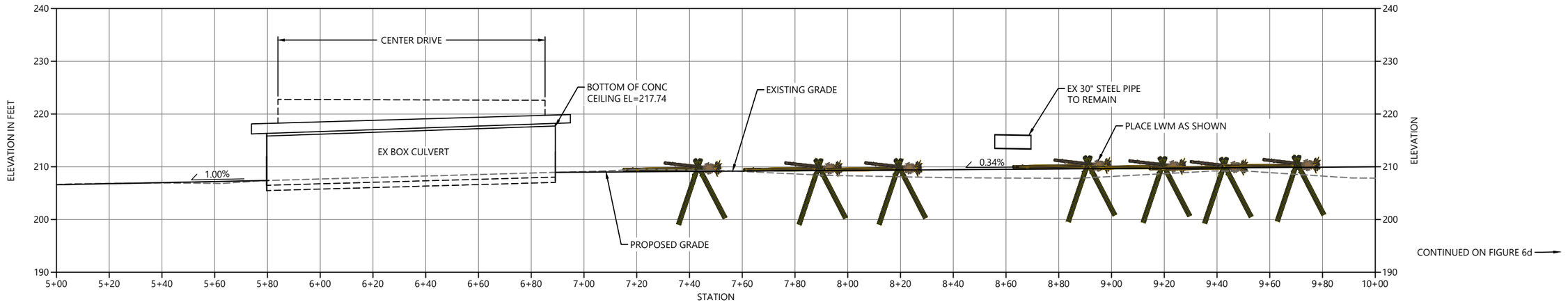

CONTINUED ON FIGURE 6d

FIGURE 6c: LOSING REACH/CENTER DRIVE CULVERT MATERIALS AND LAYOUT PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

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S-T-R: SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E
HORIZONTAL DATUM: WSP, NAD83, SOUTH ZONE, US FEET
VERTICAL DATUM: NAVD88, FEET

PROPOSED: RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED

PURPOSE: TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD

IN: EDMOND MARSH AND SEQUALITCHEW CREEK
NEAR/AT: DUPONT
COUNTY: PIERCE
STATE: WASHINGTON

ANCHOR QEA
1201 3rd Ave, Suite 2600
Seattle, WA 98101
206-287-9130

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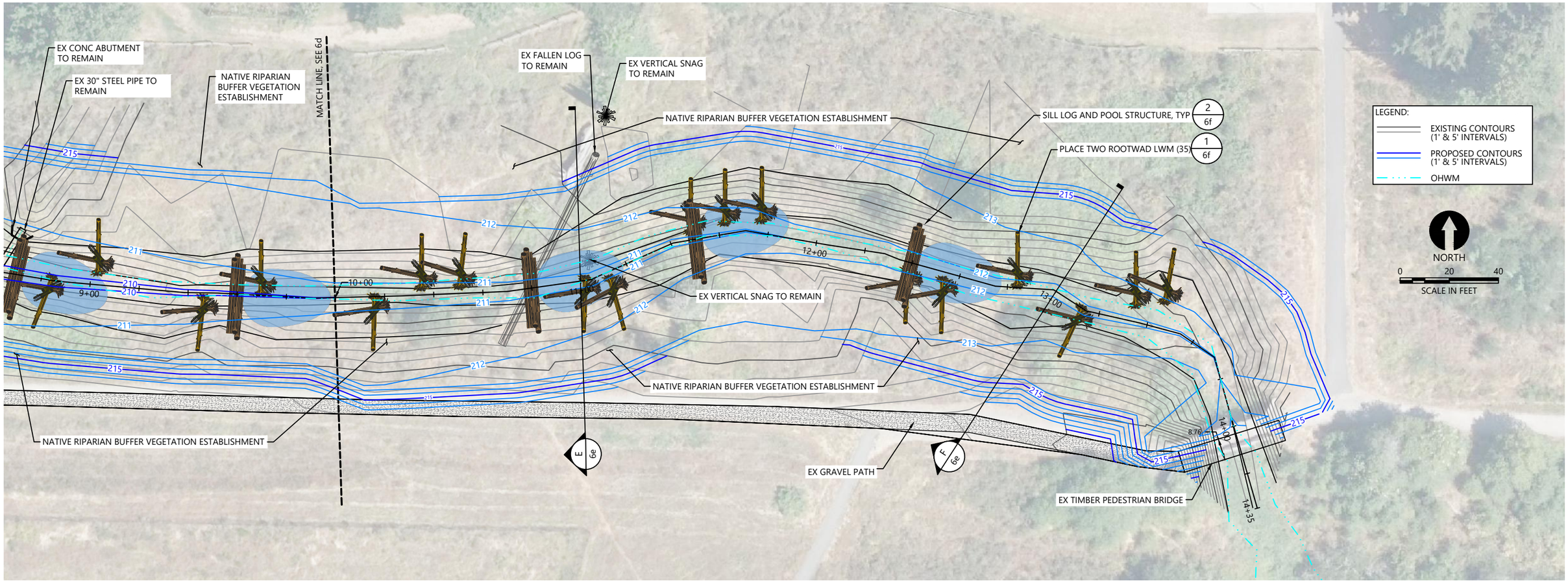

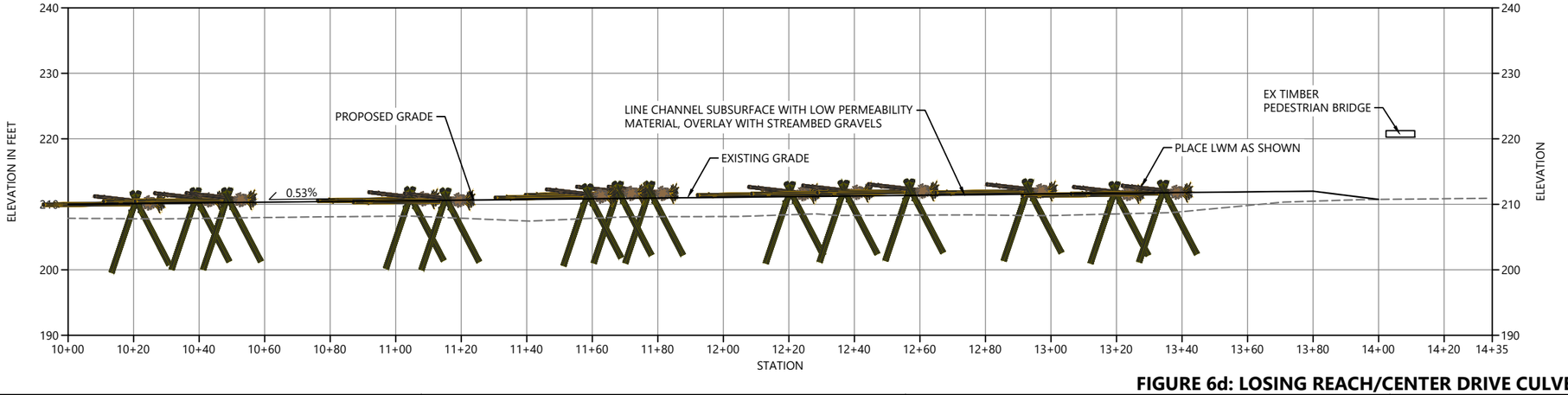

FIGURE 6d: LOSING REACH/CENTER DRIVE CULVERT MATERIALS AND LAYOUT PLAN

REFERENCE #: **APPLICANT:** SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP **ADJACENT PROPERTY OWNERS:** SEE ATTACHMENT C	**LOCATION:** 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010 **LATITUDE:** N 47° 6' 16.09" **LONGITUDE:** W 122° 38' 9.41" **S-T-R:** SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E **HORIZONTAL DATUM:** WSP, NAD83, SOUTH ZONE, US FEET **VERTICAL DATUM:** NAVD88, FEET	**PROPOSED:** RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED **PURPOSE:** TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD	**IN:** EDMOND MARSH AND SEQUALITCHEW CREEK **NEAR/AT:** DUPONT **COUNTY:** PIERCE **STATE:** WASHINGTON **DATE:** JANUARY 2023

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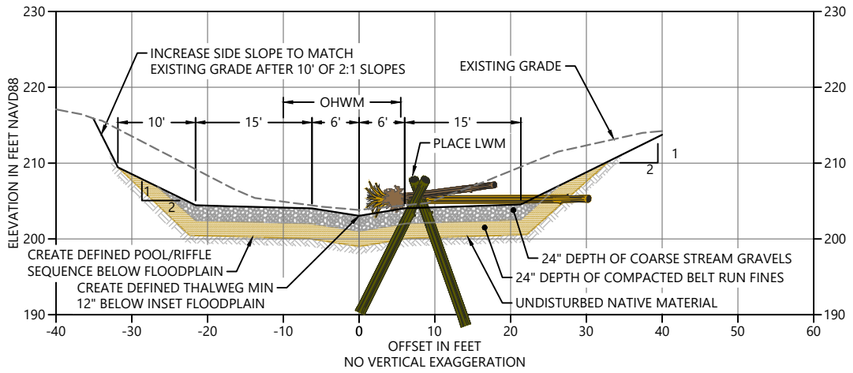
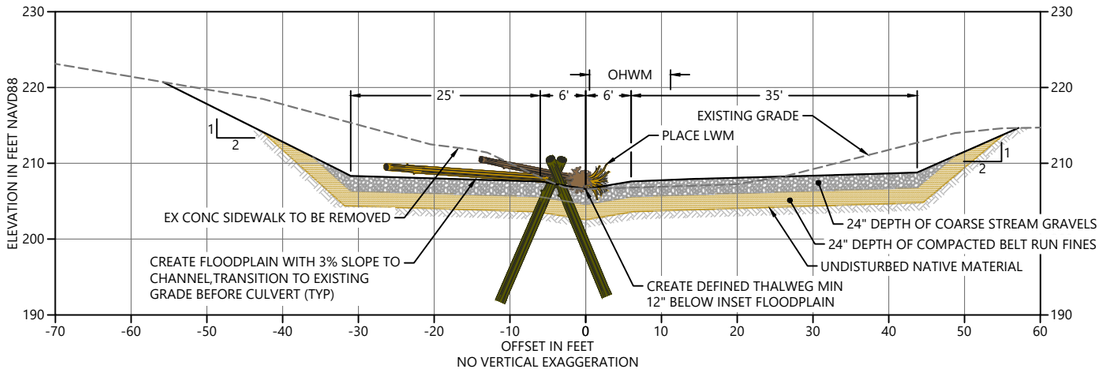


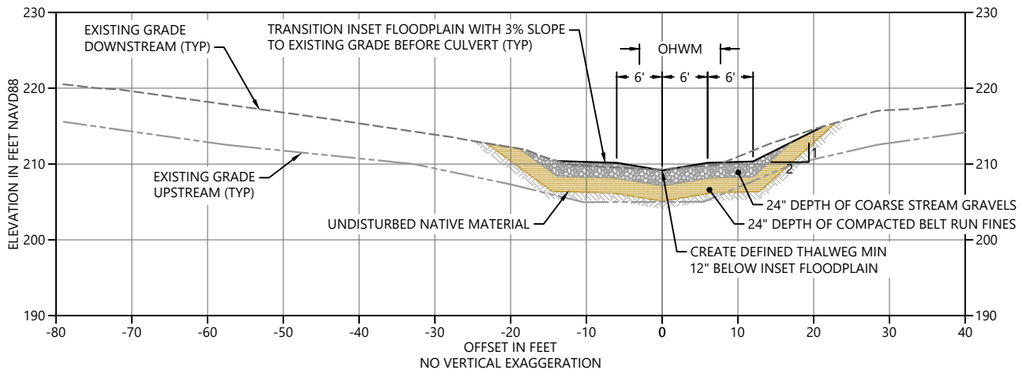
A 6b STA 2+50 LOSING REACH TYPICAL SECTION

HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 10'



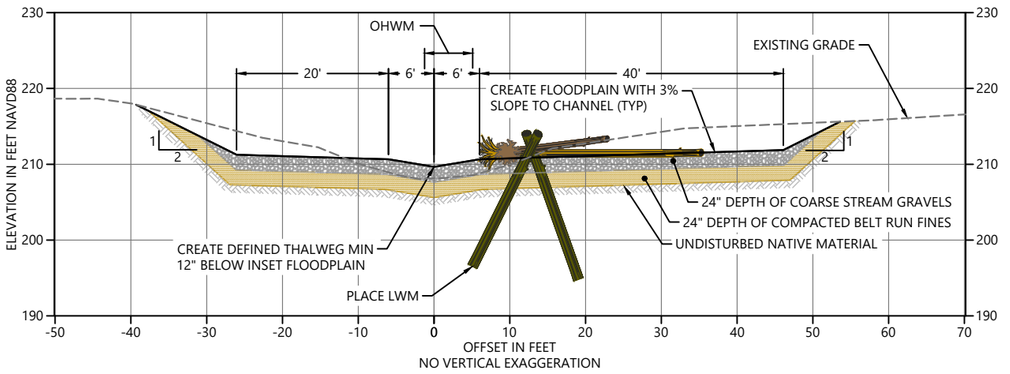
B 6b STA 5+00 LOSING REACH TYPICAL SECTION

HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 10'



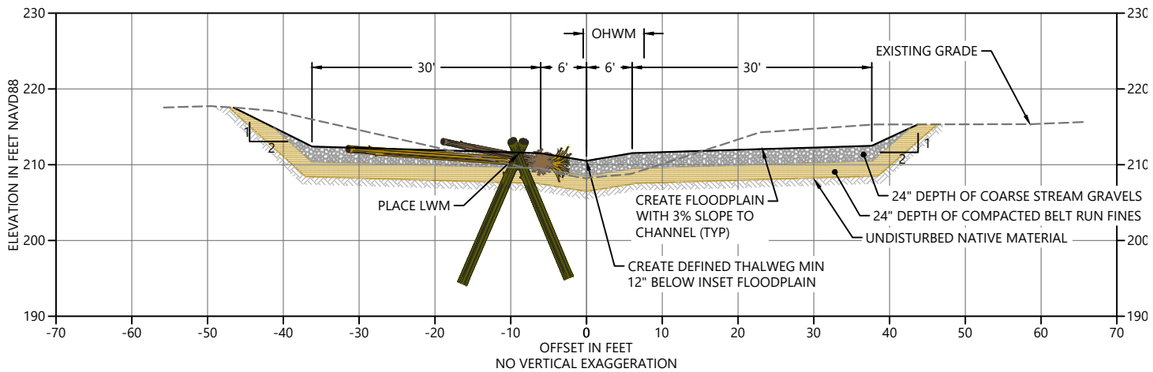
C 6c STA 7+50 LOSING REACH TYPICAL SECTION

HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 10'



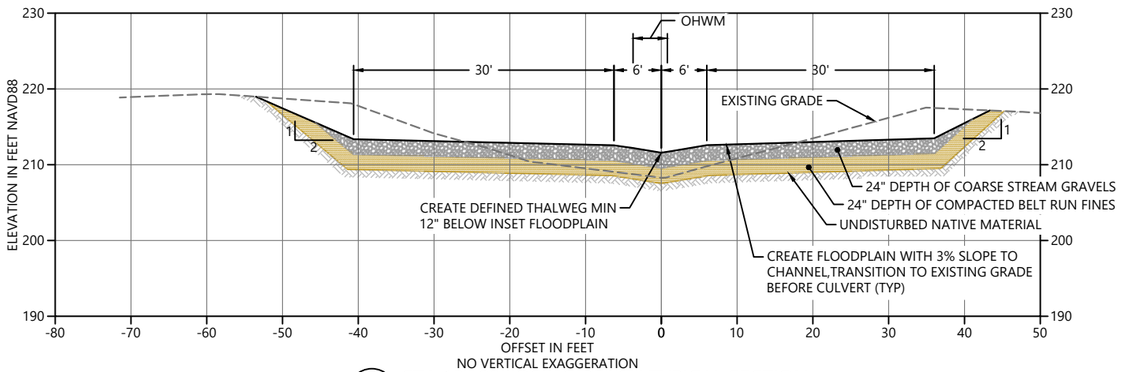
D 6c STA 9+00 LOSING REACH TYPICAL SECTION

HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 10'



E 6d STA 11+00 LOSING REACH TYPICAL SECTION

HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 10'



F 6d STA 13+00 LOSING REACH TYPICAL SECTION

HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 10'

FIGURE 6e: LOSING REACH/CENTER DRIVE CULVERT RESTORATION SECTIONS

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

LATITUDE: N 47° 6' 16.09"
LONGITUDE: W 122° 38' 9.41"
S-T-R: SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E
HORIZONTAL DATUM: WSP, NAD83, SOUTH ZONE, US FEET
VERTICAL DATUM: NAVD88, FEET

PROPOSED: RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED

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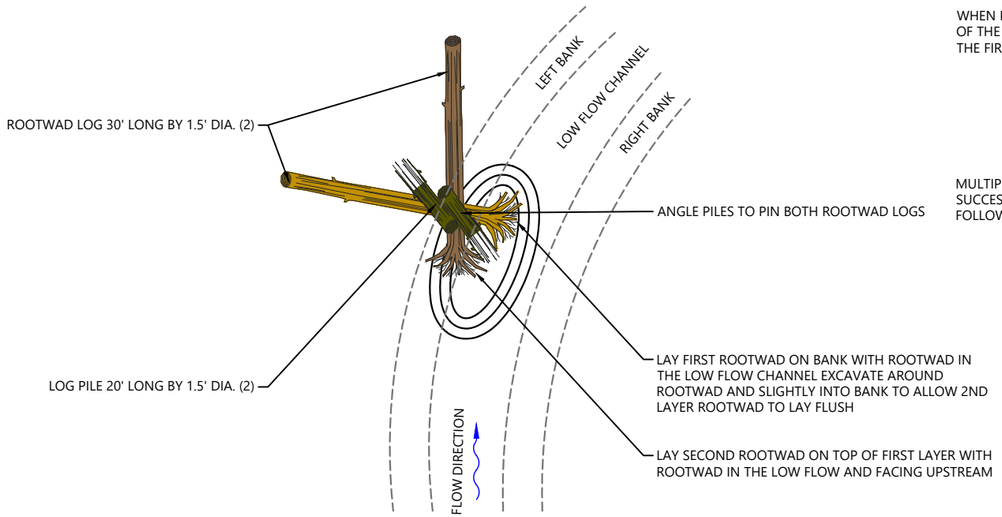
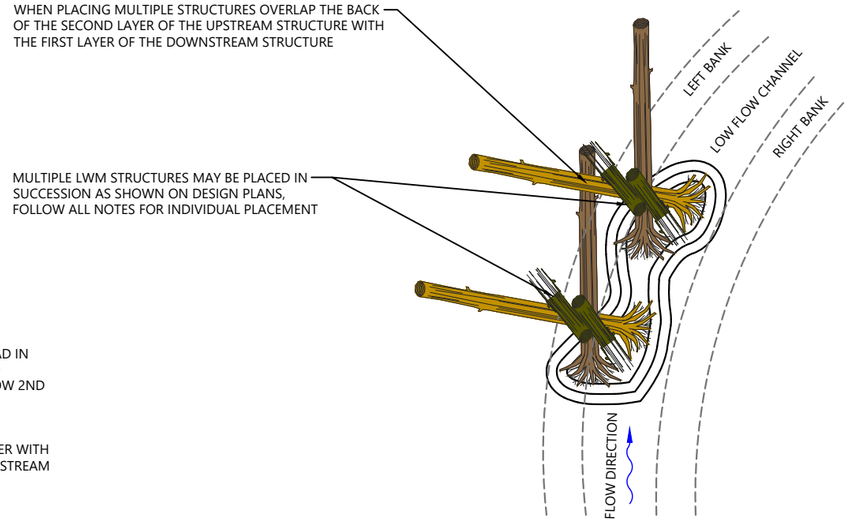


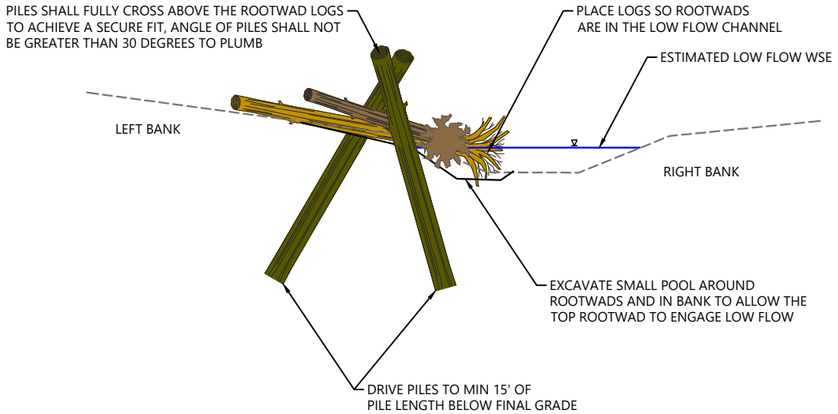
PLAN VIEW



MULTIPLE STRUCTURE PLAN VIEW

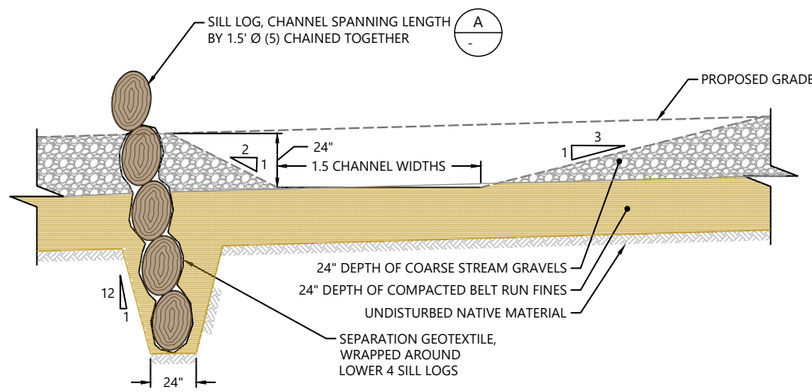
NOTES:

1. LOG DIAMETER TO BE MEASURED 4.5' FROM ROOTWAD COLLAR.
2. LOG PILES AND ROOTWAD LOGS SHALL BE DOUGLAS FIR. OTHER SPECIES MAY BE ALLOWED AT THE DIRECTION OF THE ENGINEER. LENGTHS AND DIAMETERS SHALL BE AS SPECIFIED IN THE TYPICAL.
3. PILES SHALL MEET THE REQUIREMENTS OF ASTM D25 WITH THE EXCEPTION THAT NO PRESSURE TREATMENT OR OTHER CHEMICAL TREATMENT SHALL BE USED.
4. LOW FLOW DEPTH MAY OR MAY NOT BE PRESENT DURING CONSTRUCTION. IF FLOW IS NOT PRESENT LOW FLOW DEPTH SHOULD BE CONSIDERED BELOW THE BANKFULL DEPTH OR AT THE SPECIFICATION OF THE ENGINEER.
5. NO HYDRAULIC MODELING WAS PERFORMED FOR THE DESIGN OF THESE STRUCTURES. STABILITY AND SCOUR REQUIREMENTS ARE ESTIMATED BASED ON ENGINEERS BEST JUDGEMENT AND THE ASSUMPTIONS DETAILED IN THE BASIS OF DESIGN REPORT.



SECTION VIEW

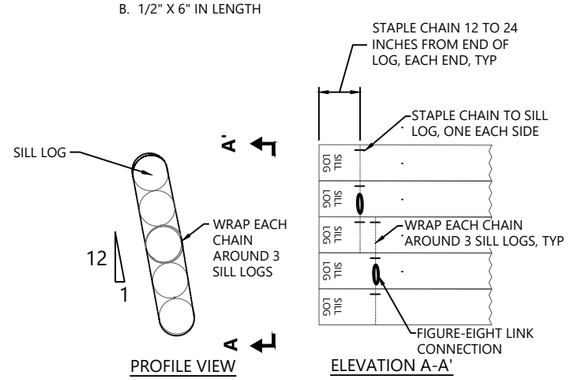
1 / - TYPICAL LWM PLACEMENT
SCALE: NTS



2 / - SILL LOG AND POOL STRUCTURE
SCALE: NTS

NOTES:

1. ALL CONNECTIONS SHALL BE APPROVED BY THE ENGINEER.
2. PRIOR TO FINISHING A CONNECTION REMOVE ALL SLACK FROM THE CONNECTION USING MECHANICAL ADVANTAGE
3. CHAIN MUST MEET THE FOLLOWING SPECIFICATIONS:
   A. 1/2-INCH TRADE SIZE
   B. GRADE 40/43 STEEL
   C. HOT-DIPPED GALVANIZED
   D. WLL NO LESS THAN 9,200 LB
4. CHAIN COUPLING LINKS MUST MEET THE FOLLOWING SPECIFICATIONS:
   A. HAMMERLOCK OR FIGURE EIGHT TWO PIECE - COUPLING TYPE
   B. HOT DIPPED GALVANIZED
   C. GRADE 80 OR 100
   D. FOR TRADE SIZES OF 1/2 INCH
   E. WLL 12,000 LB OR GREATER
7. STAPLES MUST MEET THE FOLLOWING SPECIFICATIONS:
   A. GALVANIZED OR ZINC PLATED STEEL
   B. 1/2" X 6" IN LENGTH



PROFILE VIEW ELEVATION A-A'

A / - SILL LOG CHAIN CONNECTION DETAIL
SCALE: NTS

FIGURE 6f: LOSING REACH/CENTER DRIVE CULVERT LMW TYPICALS

REFERENCE #: **APPLICANT:** SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP **ADJACENT PROPERTY OWNERS:** SEE ATTACHMENT C	**LOCATION:** 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010 **LATITUDE:** N 47° 6' 16.09" **LONGITUDE:** W 122° 38' 9.41" **S-T-R:** SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E **HORIZONTAL DATUM:** WSP, NAD83, SOUTH ZONE, US FEET **VERTICAL DATUM:** NAVD88, FEET	**PROPOSED:** RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED **PURPOSE:** TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD	**IN:** EDMOND MARSH AND SEQUALITCHEW CREEK **NEAR/AT:** DUPONT **COUNTY:** PIERCE **STATE:** WASHINGTON **DATE:** JANUARY 2023

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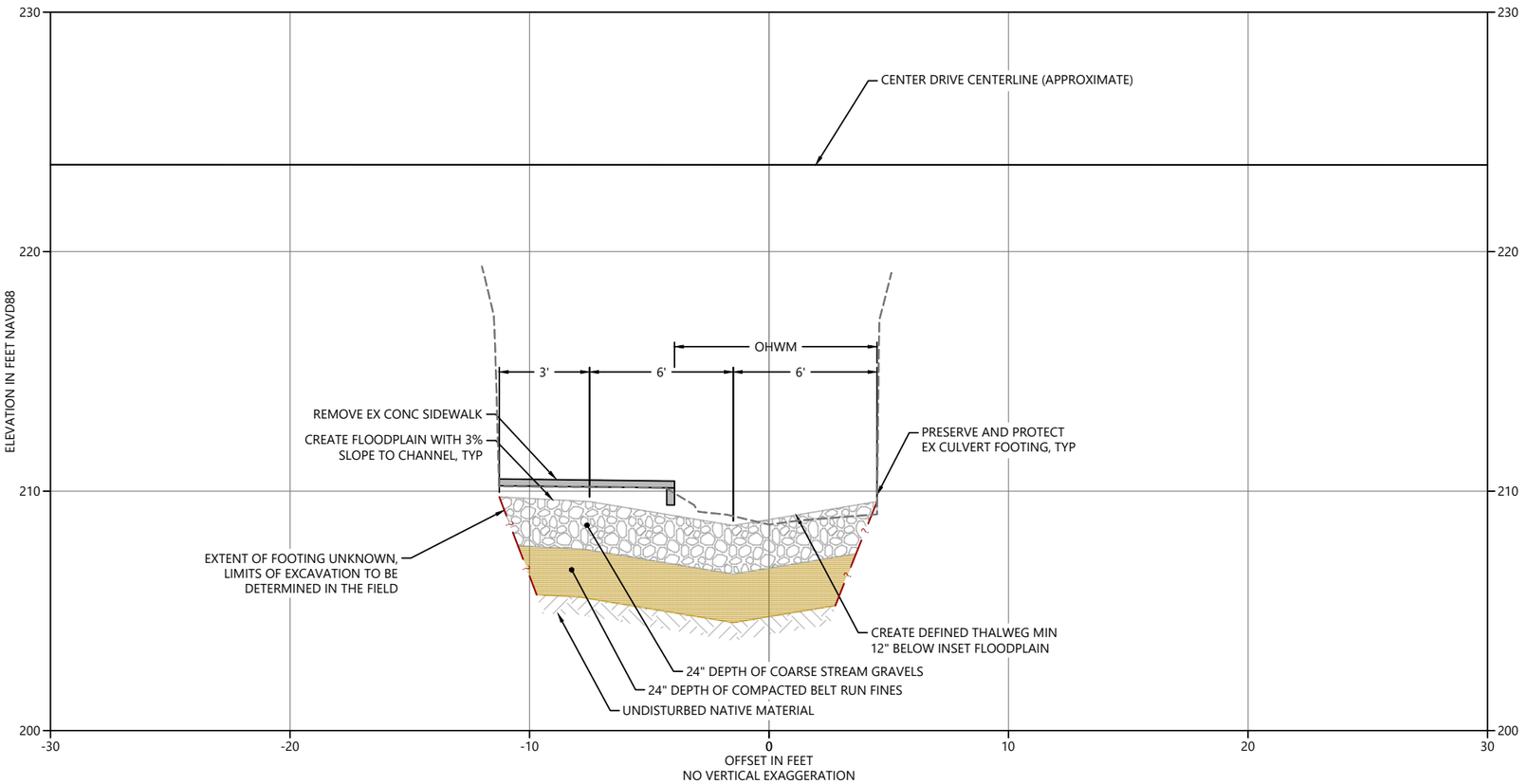
1 / 6a CENTER DRIVE CULVERT SIDEWALK DEMOLITION (WEST END OF CULVERT LOOKING EAST)
SCALE: NTS



2 / 6a STA 6+64 LOSING REACH TYPICAL SECTION
HORIZ. SCALE: 1" = 3'
VERT. SCALE: 1" = 3'

FIGURE 6g: LOSING REACH/CENTER DRIVE CULVERT DETAILS

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

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FIGURE 6h: LOSING REACH/CENTER DRIVE CULVERT PLANTING PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

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FIGURE 6i: LOSING REACH/CENTER DRIVE CULVERT PLANTING PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

LATITUDE: N 47° 6' 16.09"
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PLANTING SCHEDULE			
COMMON NAME	SPECIES NAME	SIZE	SPACING
TREES			
CONIFERS			
GRAND FIR	*Abies grandis*	5-6-FT HEIGHT	AS SHOWN
DOUGLAS FIR	*Pseudotsuga menziesii*	5-6-FT HEIGHT	AS SHOWN
WESTERN RED CEDAR	*Thuja plicata*	5-6-FT HEIGHT	AS SHOWN
WESTERN HEMLOCK	*Tsuga heterophylla*	5-6-FT HEIGHT	AS SHOWN
CRYPTOMERIA	*Cryptomeria japonica*	5-6-FT HEIGHT	AS SHOWN
DECIDUOUS			
RED ALDER	*Alnus rubra*	5-6-FT HEIGHT	AS SHOWN
BLACK COTTONWOOD	*Populus trichocarpa*	5-6-FT HEIGHT	AS SHOWN

PLANTING SCHEDULE			
SHRUBS			
UPLAND			
OCEANSPRAY	*Holodiscus discolor*	1 GALLON	5' O.C.
RED FLOWERING CURRANT	*Ribes sanguineum*	1 GALLON	5' O.C.
NOOTKA ROSE	*Rosa nutkana*	1 GALLON	5' O.C.
SNOWBERRY	*Symphoricarpos albus*	1 GALLON	5' O.C.
SASKATOON SERVICEBERRY	*Amelanchier alnifolia*	1 GALLON	5' O.C.
MOCK ORANGE	*Philadelphus lewisii*	1 GALLON	5' O.C.
BEAKED HAZELNUT	*Corylus cornuta*	1 GALLON	5' O.C.
INDIAN PLUM	*Oemleria cerasiformis*	1 GALLON	5' O.C.
WETLAND AND RIPARIAN			
HOOKER WILLOW	*Salix hookeriana*	LIVESTAKE	2' O.C.
SCOULER WILLOW	*Salix scouleriana*	LIVESTAKE	2' O.C.
BLACK TWINBERRY	*Lonicera involucrata*	1 GALLON	5' O.C.
RED OSIER DOGWOOD	*Cornus sericea*	LIVESTAKE	2' O.C.
SALMONBERRY	*Rubus spectabilis*	1 GALLON	5' O.C.

EMERGENT			
RED OSIER DOGWOOD	*Cornus sericea*	LIVESTAKE	2' O.C.
SALMONBERRY	*Rubus spectabilis*	1 GALLON	5' O.C.
COMMON RUSH	*Juncus effusus*	10-CUBIC INCH PLUG	2' O.C.
CREEPING SPIKE-RUSH	*Eleocharis palustris*	10-CUBIC INCH PLUG	2' O.C.
HARDSTEM BULRUSH	*Scirpus acutus*	10-CUBIC INCH PLUG	2' O.C.
SMALL-FRUITED BULRUSH	*Scirpus microcarpus*	10-CUBIC INCH PLUG	2' O.C.
SWITCHGRASS	*Panicum virgatum 'Shenadoah'*	1 GALLON	2' O.C.
SMALL-FRUITED BULRUSH	*Scirpus microcarpus*	10-CUBIC INCH PLUG	2' O.C.
SLOUGH SEDGE	*Carex obnupta*	10-CUBIC INCH PLUG	2' O.C.
STAGING AREA SEEDING			
NORTHWEST MEADOWSCAPES NORTHWEST PRAIRIE MIX OR APPROVED EQUAL, APPLY AS HYDROSEED WITH MULCH, FERTILIZER AND TACKIFIER ACCORDING TO SUPPLIERS RECOMENDATIONS			

FIGURE 6j: LOSING REACH/CENTER DRIVE CULVERT PLANTING SCHEDULE

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

LATITUDE: N 47° 6' 16.09"
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DEMOLISH EX GATE AND FIXTURE

DEMOLISH EX WIRE FENCE

DEMOLISH EX DIVERSION DAM STRUCTURE (TIMBER)

DEMOLISH EX 56" CMP CULVERT

SEQUALITCHEW CREEK

SEQUALITCHEW CREEK TRAIL

0+00

1+80

2+00

215

210

205

200

225

220

LEGEND:

- EXISTING CONTOURS (1' & 5' INTERVALS)
- DEMOLISH LINEAR FEATURE
- DEMOLISH FEATURE

NORTH

0 10 20

SCALE IN FEET

FIGURE 7a: CITY HALL BRIDGE DEMOLITION PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

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PROPOSED 12' WIDE TRAIL

PROPOSED PEDESTRIAN BRIDGE
60' SPAN 6' WIDE

SEQUALITCHEW CREEK

2
6f
SILL LOG AND POOL STRUCTURE, TYP

1
6f
PLACE TWO ROOTWAD LWM (35)

PROPOSED 12' WIDE TRAIL

A
7c

B
7c

LEGEND:

EXISTING CONTOURS
(1' & 5' INTERVALS)

PROPOSED CONTOURS
(1' & 5' INTERVALS)

NORTH

0 10 20

SCALE IN FEET

FIGURE 7b: CITY HALL BRIDGE GRADING PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

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HORIZONTAL DATUM:
WSP, NAD83, SOUTH ZONE, US FEET
VERTICAL DATUM:
NAVD88, FEET

PROPOSED: RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED

PURPOSE: TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD

IN: EDMOND MARSH AND SEQUALITCHEW CREEK
NEAR/AT: DUPONT
COUNTY: PIERCE
STATE: WASHINGTON

ANCHOR QEA
1201 3rd Ave, Suite 2600
Seattle, WA 98101
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DATE: JANUARY 2023

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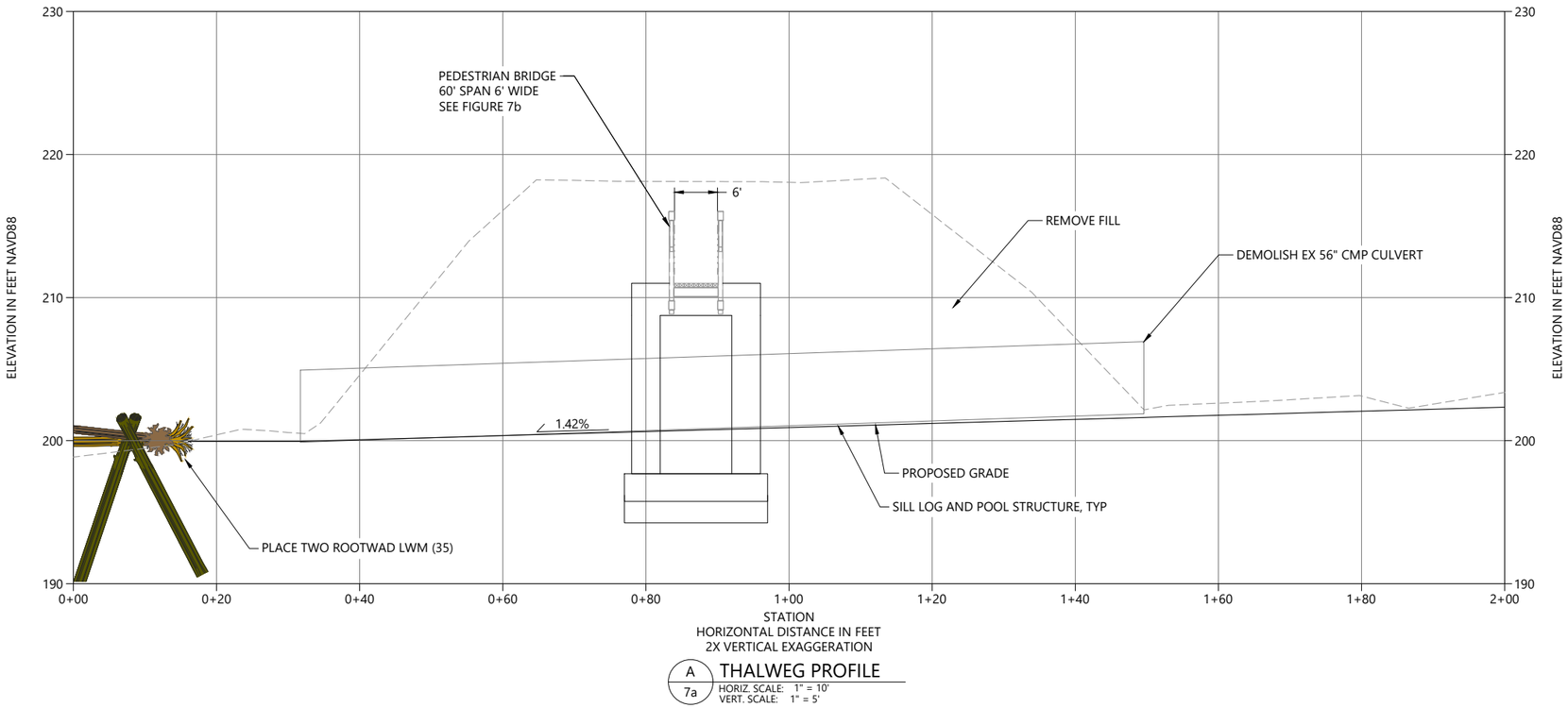
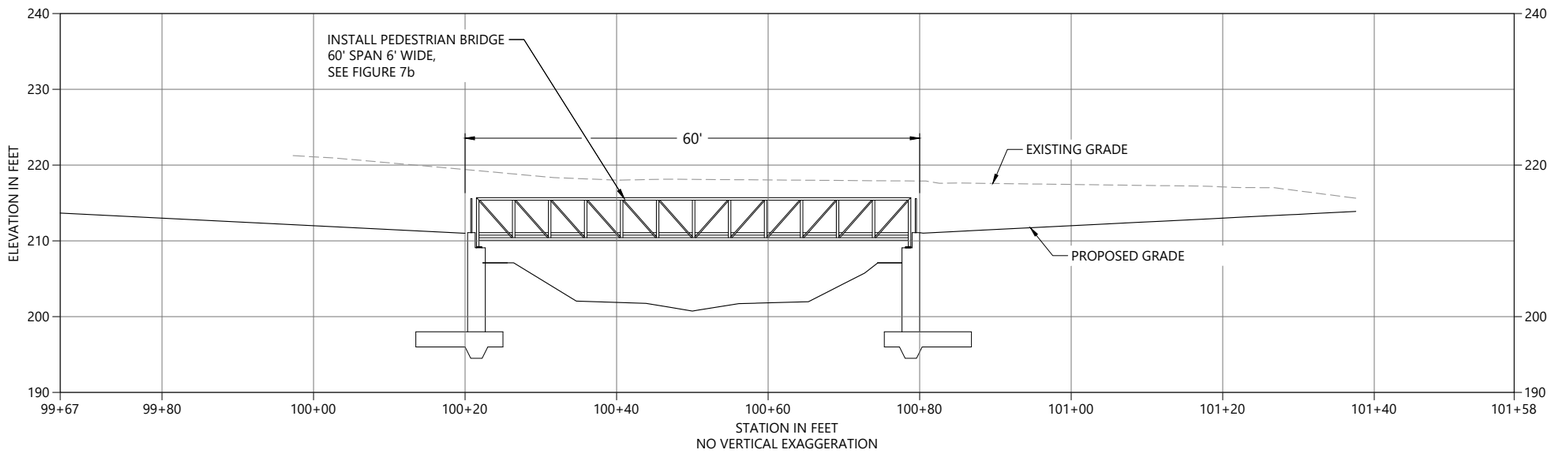


A / 7a THALWEG PROFILE
HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 5'



B / 7a PEDESTRIAN BRIDGE PROFILE
HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 10'

FIGURE 7c: CITY HALL BRIDGE GRADING AND DEMOLITION SECTIONS

REFERENCE #: **APPLICANT:** SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP **ADJACENT PROPERTY OWNERS:** SEE ATTACHMENT C	**LOCATION:** 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010 **LATITUDE:** N 47° 6' 16.09" **LONGITUDE:** W 122° 38' 9.41" **S-T-R:** SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E **HORIZONTAL DATUM:** WSP, NAD83, SOUTH ZONE, US FEET **VERTICAL DATUM:** NAVD88, FEET	**PROPOSED:** RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED **PURPOSE:** TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD	**IN:** EDMOND MARSH AND SEQUALITCHEW CREEK **NEAR/AT:** DUPONT **COUNTY:** PIERCE **STATE:** WASHINGTON **DATE:** JANUARY 2023

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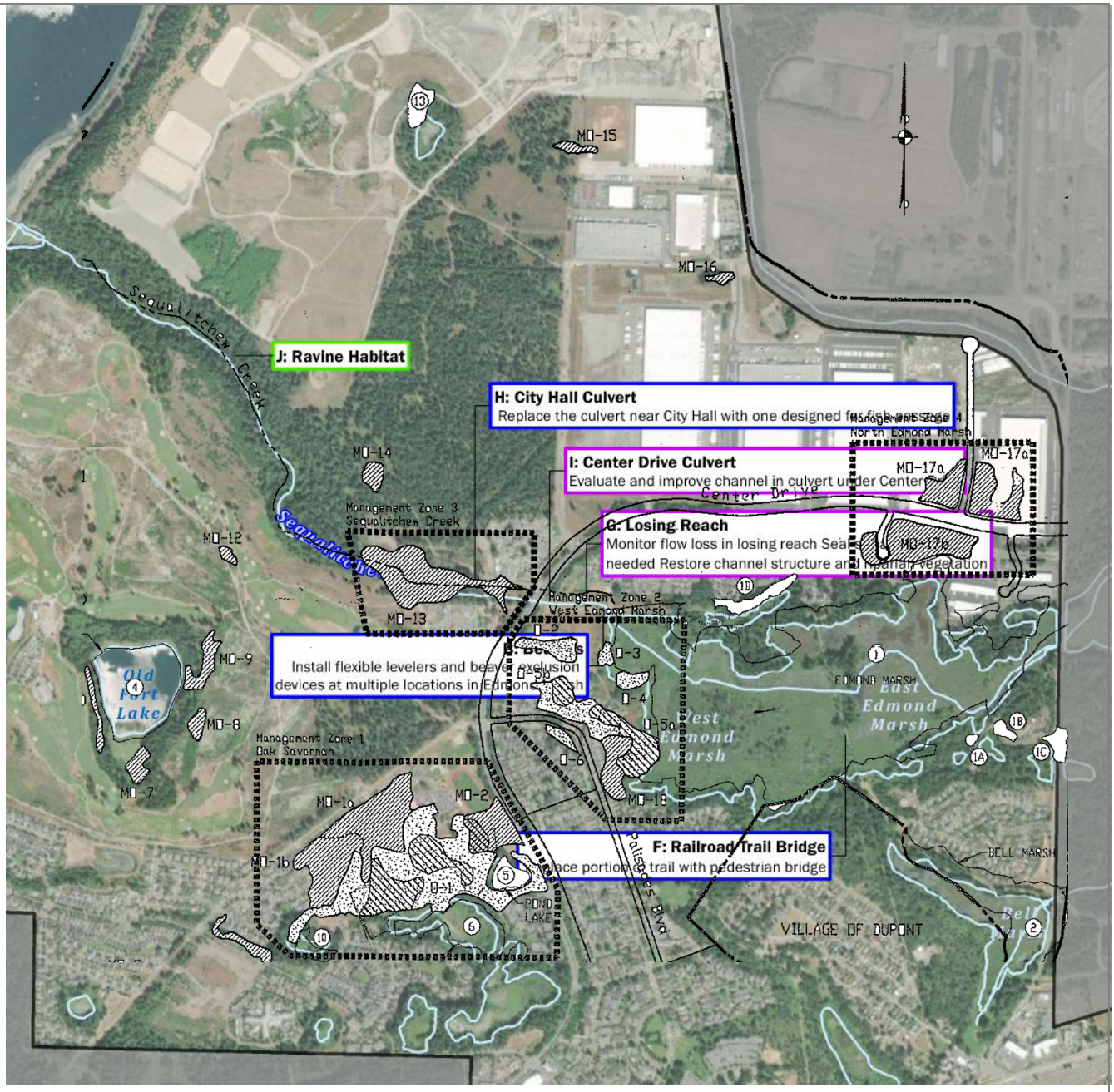

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ANCHOR QEA

Figure 8
Oak Management Unit Mapping Near the Project Area
Critical Areas Report
Sequalitchew Creek Watershed Ecosystem Restoration Project

Appendix A
Edmond Marsh Wetland Delineation Report

August 2022
South Puget Sound Salmon Enhancement Group

ANCHOR QEA

Edmond Marsh Wetland Delineation Report

Prepared for South Puget Sound Salmon Enhancement Group

August 2022
South Puget Sound Salmon Enhancement Group

Edmond Marsh Wetland Delineation Report

Prepared for
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6700 Martin Way East, Suite 112
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Prepared by
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Project Number: 190217-01.01

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Appendix A Precipitation Data

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ABBREVIATIONS

1987 Manual	*Corps of Engineers Wetland Delineation Manual*
2010 Regional Supplement	*Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*
DMC	City of DuPont Municipal Code
Ecology	Washington State Department of Ecology
FAC	facultative
FACU	facultative upland
FACW	facultative wetland
HGM	hydrogeomorphic
N/A	not applicable
NAVD88	North American Vertical Datum of 1988
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	obligate wetland
PEM	palustrine emergent
PFO	palustrine forested
PHS	Priority Habitats and Species
PSS	palustrine scrub-shrub
redox	redoximorphic
UPL	obligate upland
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife

1 Introduction

Anchor QEA, LLC, was retained by South Puget Sound Salmon Enhancement Group to prepare a wetland delineation report for Edmond Marsh in DuPont, Pierce County, Washington, to support the City of DuPont Critical Areas Ordinance permit for the Sequalitchew Creek Watershed Restoration Project (Figure 1). The study area consists of an approximately 135-acre site located in east DuPont that includes 15 city-owned parcels (Figures 2 and 3).

Specific location information for the project site is as follows:

City/County/State:	DuPont, Pierce County, Washington
General Location:	South of Center Drive, west of DuPont-Steilacoom Road
Tax Parcels:	3001000030, 3000791020, 3000580640, 3000580650, 3000410680, 0119253003, 0119252010, 3001100820, 3000060200, 0119256003, 0119256004, 0119256005, 3001000110, 3001000120, 3001000130
Latitude/Longitude[1]:	47.104419° North/-122.630814° West
Public Land Survey System:	Section 25, Township 19 North, Range 1 East; Section 26, Township 19 North, and Range 2 East
Street Address:	N/A
Approximate Area:	135 acres
Waterways:	Sequalitchew Creek

Note:
1. Latitude and longitude shown are for the approximate centroid of the study area.

This wetland delineation report presents the results of wetland delineation field work performed for the study area on April 18, 19, and 20, 2022. It describes the existing site conditions observed on the study area at the time of the site visits, presents the methods used to complete the delineation, describes the wetlands and other waters identified in the study area, and provides ratings for the identified wetland based on the *Washington State Wetland Rating System – Western Washington: 2014 Update* (Hruby 2014).

Supporting information is provided in the following appendices:

- Appendix A: Precipitation Data
- Appendix B: Wetland Determination Forms
- Appendix C: Wetland Rating Forms
- Appendix D: Site Photographs

1.1 Review of Existing Information

As part of the Edmond Marsh delineation analysis, Anchor QEA biologists reviewed the following sources of information to support the 2022 field observations and preparation of this wetland delineation report:

- Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2022a)
- U.S. Fish and Wildlife Service (USFWS) Wetlands Mapper for National Wetlands Inventory (NWI) map information (USFWS 2022)
- DuPont City Code (City of DuPont 2022)
- Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) maps (WDFW 2022)
- Aerial photograph, Google Earth, June 2021
- United States Geological Survey topographical maps (USGS 2020a)
- Pierce County PublicGIS maps (Pierce County 2022)

2 Landscape Setting and Land Use

2.1 Landscape Setting

The study area is situated in the Southern Puget Prairies subregion of the Puget Lowland ecoregion (EPA 2010). This subregion is characterized by nearly level to rolling glacial outwash plains and ground moraines. It contains the Nisqually and Deschutes rivers and generally has well-drained soils that promote a historic land cover mosaic of Douglas fir (*Pseudotsuga menziesii*) and western hemlock (*Tsuga heterophylla*) forests, prairies, and oak woodlands. Today, some forests, prairies, oak woodlands, streams, and wetlands still occur, but overall, the watershed is dominated by urban and suburban development characterized by a combination of residential, industrial, commercial, military, forestry, and agricultural land uses. The Puget Lowland ecoregion has a Mediterranean-like climate, with warm, dry summers, and mild, wet winters.

Hydrologically, the study area is located in the Sequalitchew Creek Frontal Cormorant Passage watershed (hydrologic unit code 171100190304) of the Puget Sound basin (USGS 2022b) and in the Chambers-Clover Water Resource Inventory Area 12 (Ecology 2022).

2.2 Study Area Conditions and Land Use

The current conditions and land use of the study area are depicted in the June 2021 aerial photograph provided on Figure 4. The study area is surrounded by planned housing developments to the north, west, and south and a commercial and industrial center to the northeast. The study area is bounded by DuPont-Steilacoom Road, which runs in a north-south direction.

Much of the study area wetlands are surrounded by a forested buffer strip with diverse, layered upland vegetation communities. Common tree species found within the buffer area include Douglas fir, big-leaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera*), western hemlock, western red cedar (*Thuja plicata*), Garry oak (*Quercus garryana*), western crabapple (*Malus fusca*), Douglas hawthorn (*Crataegus douglasii*), and beaked hazelnut (*Corylus cornuta*). Common shrub species include salal (*Gaultheria shallon*), snowberry (*Symphoricarpos albus*), salmonberry (*Rubus spectabilis*), osoberry (*Oemleria cerasiformis*), black twinberry (*Lonicera involucrata*), vine maple (*Acer circinatum*), Oregon grape (*Mahonia nervosa*), stink currant (*Ribes bracteosum*), bald-hip rose (*Rosa gymnocarpa*), oceanspray (*Holodiscus discolor*), evergreen huckleberry (*Vaccinium ovatum*), red huckleberry (*Vaccinium parvifolium*), and trailing blackberry (*Rubus ursinus*). Herbaceous species include sword fern (*Polystichum munitum*), bracken fern (*Pteridium aquilinum*), false lily-of-the-valley (*Maianthemum dilatatum*), and Pacific trillium (*Trillium ovatum*). Vegetation observed at each of the wetland delineation data plots established during the site visits is presented on the field data forms in Appendix A.

2.3 Geology, Topography, and On-Site Drainage

Geologically, Edmond Marsh was formed during glacial retreat, when the stagnant melting ice sheet left large blocks of stranded glacial ice called "dead ice." An ablation till (a loose, relatively permeable earthy material) was formed when stagnant ice evaporated, leaving the glacial fines once contained in the ice as a low-permeability deposit.

Topography within the study area varies across the study area and ranges from approximately 220 feet North American Vertical Datum of 1988 (NAVD88) to 240 feet NAVD88 (USGS 2020). The lowest elevations are associated with the active channel of Sequalitchew Creek, which crosses through the entirety of Edmond Marsh, and associated side channels (Figure 3). The higher elevations are associated with upland hummocks and the embankments along the wetland edge. Edmond Marsh drainage flows west through Sequalitchew Creek towards the Nisqually Reach of Puget Sound. At the time of the site visit, Sequalitchew Creek went subsurface approximately 200 feet northwest of the Edmond Marsh boundary.

3 Methods

This section describes the methodology used to perform the 2022 wetland delineation field investigation procedures. These methods are consistent with current federal and state agency requirements, as well as local (City of DuPont) jurisdiction requirements, for performing wetland delineations and identifying protective wetland buffer widths.

3.1 Field Data Collection

As specified by the City of DuPont Municipal Code (DMC; City of DuPont 2022), the Edmond Marsh boundary was identified, delineated, and verified according to the methods defined in the *Corps of Engineers Wetland Delineation Manual* (1987 Manual; Environmental Laboratory 1987); the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (2010 Regional Supplement; USACE 2010); and *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 8.2, 2018* (USDA and NRCS 2018). Soil colors were classified by their numerical description as identified using the Munsell Soil Color System (Munsell Color 2009).

The U.S. Army Corps of Engineers (USACE) 1987 Manual (Environmental Laboratory 1987) defines wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

In accordance with that definition, the method for delineating wetlands is based on the presence of three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology. These parameters are defined in the 1987 Manual (Environmental Laboratory 1987) as follows:

- Hydrophytic vegetation is "the macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present."
- Hydric soils are "formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part."
- Wetland hydrology "encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface for a sufficient duration during the growing season."

Data collection methods for each of these parameters are described in the following subsections.

A total of 16 paired data plots were sampled and recorded in the field. Vegetation, soils, and hydrology information was collected at each of the plots and recorded on field data forms

(Appendix A). The Edmond Marsh boundary was determined based on paired plot data and visual observations of wetland conditions. Delineated wetland boundaries and data plots were flagged in the field and surveyed using a Trimble Geo7x GPS receiver. Location data collected with the GPS were then differentially corrected in the office to submeter accuracy.

3.1.1 Vegetation

Plant species occurring in each plot were recorded on field data forms using one data form per plot (Appendix A). At each plot, trees within a 30-foot radius, shrubs within a 15-foot radius, and herbs within a 5-foot radius from the center of the plot were identified and recorded. Species were listed by both common and scientific name, and the percent absolute cover for each species was estimated and recorded for each strata (trees, shrubs, herbs, and woody vines). Dominant plant species were identified based on observed cover and the "50/20 Rule." A wetland plant indicator status that describes the probability of individual plant species occurring in wetlands in the United States was assigned using the *2020 National Wetland Plant List for the Western Mountains, Valleys, and Coasts Region* (USACE 2020). Using the estimated cover information and indicator status, a determination was made as to whether the vegetation in the plot was hydrophytic. To meet the hydrophytic parameter, more than 50% of the dominant species, with 20% or greater cover, must have an indicator of obligate wetland (OBL), facultative wetland (FACW), or facultative (FAC). Table 1 provides the wetland indicator status categories.

Table 1
Wetland Plant Indicator Definitions

Indicator Status	Description
Obligate wetland (OBL)	Plant species occur almost always in wetlands (estimated probability greater than 99%) under natural conditions
Facultative wetland (FACW)	Plant species usually occur in wetlands (estimated probability 67% to 99%) but are occasionally found in non-wetlands
Facultative (FAC)	Plant species are equally likely to occur in wetlands or non-wetlands (estimated probability 34% to 66%)
Facultative upland (FACU)	Plant species usually occur in non-wetlands (estimated probability 67% to 99%) but are occasionally found in wetlands
Obligate upland (UPL)	Plant species occur almost always in non-wetlands (estimated probability greater than 99%) under natural conditions

Source: Reed 1988

3.1.2 Soils

Soils were sampled in each plot and evaluated for the presence of hydric soil indicators in their upper (i.e., top 12 inches) horizons. Soil pits were dug to a depth of 18 inches, unless prevented by

impenetrable substrate. The soil profile at each pit was described on the data forms by its texture, predominant matrix color, and the prevalence and color of any redoximorphic features or gleying present in the profile. Soil colors were classified by their numerical description under the Munsell Soil Color System (Munsell Color 2009). Soil profile descriptions were compared with the hydric soil indicators provided in the 2010 Regional Supplement (USACE 2010) and *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 8.2, 2018* (USDA and NRCS 2018). If any one of these indicators was determined to be met, the soil was considered hydric. Generally, hydric soil indicators include low soil matrix chroma, gleying, and redoximorphic (or "redox") features. Redox features are spots of contrasting color that occur within the soil matrix (the predominant soil color). Gleyed soils are predominantly bluish, greenish, or grayish in color.

3.1.3 Hydrology

Wetland hydrology was evaluated at each data plot to determine if the site experiences 14 or more consecutive days of flooding or ponding or has a water table 12 inches or less below the soil surface during the growing season at a minimum frequency of 5 years out of 10 (50% or higher probability; USACE 2010). Indicators of wetland hydrology are typically divided into primary and secondary indicators. Examples of primary indicators include the presence of surface water, saturation in the upper 12 inches of the soil column, water marks or lines on adjacent stationary objects (e.g., trees), sediment deposits or drift lines on vegetation, and oxidized rhizospheres along living roots, among others. Examples of secondary indicators include, but are not limited to, observable drainage patterns on the ground surface, visible saturation on aerial photography, geomorphic position, and raised ant mounds. According to the methods presented in the 1987 Manual (Environmental Laboratory 1987) and the 2010 Regional Supplement (USACE 2010), wetland hydrology is confirmed by the presence of one or more primary indicators or two or more secondary indicators.

At each plot, the presence or absence of primary and secondary wetland hydrology indicators was recorded on the data forms. If present, the depth of any inundation was recorded in inches above the soil surface. The presence of current or recent saturation was determined using the pits excavated for soil samples. Within each pit, the depth to the saturated zone (if present) was recorded in inches from the soil surface, as was the depth to any free water (i.e., water that naturally entered from the bottom or sides of the pit after the hole had been opened) that collected in the pit during sampling. Wetland hydrology was determined to be present if one or more of the primary indicators, or two or more of the secondary indicators, listed on the data form were present.

3.2 Wetland Classifications

Wetland community types are discussed according to the USFWS classification developed by Cowardin et al. (1979) for use in the NWI. This system, published in 1979 by a team of USFWS scientists led by L.M. Cowardin, bases the classification of wetlands on their physical characteristics,

such as where a wetland is located in the landscape (e.g., inland, along a river, adjacent to a lake, or near the ocean), the general type of vegetation in the wetland (e.g., trees, shrubs, or grass) and how often and how much water is typically present in the wetland (e.g., permanently flooded, intermittently flooded, seasonally flooded/saturated, or temporarily flooded).

The Cowardin system provides a classification for every known wetland type that occurs throughout the United States. Under this system, a wetland can be classified as having one or more wetland classification types. Edmond Marsh contained the following Cowardin wetland classification types:

- **Palustrine forested (PFO):** These wetlands have at least 30% cover of woody vegetation that is at least 20 feet high.
- **Palustrine scrub-shrub (PSS):** These wetlands have at least 30% cover of woody vegetation that is less than 20 feet high.
- **Palustrine emergent (PEM):** These wetlands have erect, rooted, herbaceous vegetation present for most of the growing season in most years.

3.3 State Hydrogeomorphic Classification System

Scientists have come to understand that wetlands can perform functions in different ways. The way a wetland functions depends to a large degree on hydrologic and geomorphic conditions. To recognize these differences among wetlands, scientists have developed and alternative way to classify them into categories or types based on the geomorphic and hydrologic characteristics that control many of their functions. This classification system, called the hydrogeomorphic (HGM) classification, is based on a wetland's position in the landscape (i.e., geomorphic setting) and the way that water moves into, out of, and through them (i.e., hydrology).

The *Washington State Wetland Rating System – Western Washington: 2014 Update* (Hruby 2014) incorporates the HGM classification system as part of the questionnaire for characterizing a wetland's functions. The rating system uses only the highest grouping in the HGM classification system (i.e., wetland class). Wetland classes are based on geomorphic settings, such as Riverine, Slope, Lake Fringe, or Depressional. A classification key is provided within the rating form to help identify which of the following HGM classifications apply to the wetland: Riverine, Depressional, Slope, Lake Fringe, Tidal Fringe, or Flats.

3.4 Wetland Ratings

Wetland ratings were determined using the most current version of the *Washington State Wetland Rating System – Western Washington: 2014 Update* (Hruby 2014) and the City of DuPont wetland rating criteria, as defined in the DMC (City of DuPont 2022). The Washington rating system was updated by the Washington State Department of Ecology (Ecology) as of January 1, 2015.

The rating system developed by Ecology is used to differentiate wetlands based on their sensitivity to disturbance, significance in the watershed, rarity, ability to be replaced, and the beneficial functions they provide to society. The Ecology rating system requires the user to collect specific information about the wetland in a step-by-step process. Three major functions are analyzed (water quality improvement, hydrologic functions, and habitat). Ratings are based on a point system, where points are given if a wetland meets specific criteria related to the wetland's potential and the opportunity to provide certain benefits.

Per Ecology's rating system, wetlands are categorized according to the following criteria and to points given by the rating process:

- **Category I wetlands (23 or more points)** represent a unique or rare wetland type, are more sensitive to disturbance, or are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime.
- **Category II wetlands (20 to 22 points)** are difficult, though not impossible, to replace and provide high levels of some functions.
- **Category III wetlands (16 to 19 points)** have moderate levels of functions. They have been disturbed in some ways and are often less diverse or more isolated from other natural resources in the landscape than Category II wetlands.
- **Category IV wetlands (less than 16 points)** have the lowest levels of functions and are often heavily disturbed.

3.5 Wetland Functional Assessment

Wetland functions were assessed as part of the wetland rating process using the methods presented in *Washington State Wetland Rating System – Western Washington: 2014 Update* (Hruby 2014) and its most recent update from January 1, 2015. Using Ecology's rating system, wetlands were assigned points in three functional categories (water quality, hydrologic functions, and wildlife habitat) based on their physical characteristics (site potential), their surrounding environment (landscape potential), and their importance to humans (value). Points were assigned by ranking the wetland's performance in multiple aspects of each category as being high, medium, or low. These qualitative values were then converted to numeric scores for each category based on the wetland's HGM type.

4 Wetland Delineation Results

Anchor QEA biologists delineated two wetlands (Edmond Marsh and Wetland 1-D) totaling approximately 135 acres within the study area (Figure 3). This section describes the wetland delineation results of the 2022 wetland delineation. The individual characteristics of each of these areas are summarized in Table 2 and described in more detail in the following subsections. Wetland determination data forms are provided in Appendix B, wetland rating forms and figures are provided in Appendix C, and site photographs showing these features are included in Appendix D.

Table 2
Wetlands Delineated Within the Study Area

Wetland/Other Water	Surface Connection to Other Waters	Classification System		On-Site Area	
		Cowardin	HGM	Square Feet	Acres
Edmond Marsh	Sequalitchew Creek	PFO/PSS/PEM	Depressional/ Riverine	5,820,487	133.62
Wetland 1-D	None	PFO/PSS	Depressional	79,715	1.83
			Total Area of Wetlands	**5,900,202**	**135.45**

4.1 Edmond Marsh

Edmond Marsh is an approximately 134-acre wetland complex associated with Sequalitchew Creek (Figure 3). The wetland includes a mosaic of active channel (with Sequalitchew Creek flowing in an east-west direction); forested, scrub-shrub, and emergent wetland vegetation communities; seasonally open water; and large upland hummocks supporting forested upland vegetation communities. Edmond Marsh is divided in two (East and West Edmond Marsh) by a raised gravel multiuse trail grade that also encircles the perimeter of the wetland. East and West Edmond Marsh are hydrologically connected through a culvert within the trail prism. The outlet of Edmond Marsh is in the northwest corner, through Sequalitchew Creek. Edmond Marsh is classified as a PFO/PSS/PEM wetland with a seasonally flooded water regime under the Cowardin system and as a Depressional and Riverine wetland under the HGM classification system.

4.1.1 Vegetation

Edmond Marsh is a forested, scrub-shrub, and herbaceous wetland dominated by Pacific willow (*Salix lasiandra*; FACW), red alder (FAC), black cottonwood (FAC), Pacific crabapple (FACW), Douglas' spirea (*Spiraea douglasii*; FACW), red osier dogwood (*Cornus sericea*; FACW), salmonberry (FAC), black twinberry (FAC), and vine maple (FAC) in the tree or sapling/scrub-shrub layer and reed canarygrass (*Phalaris arundinacea*; FACW), broadleaf cattail (*Typha latifolia*; OBL), water parsley (*Oenanthe sarmentosa*; OBL), false lily-of-the-valley (FAC), starry false Solomon's seal (*Maianthemum stellatum*;

FAC) lady fern (*Athyrium cyclosorum*; FAC), creeping buttercup (*Ranunculus repens*, FAC), stinging nettles (*Urtica dioica*; FAC), slough sedge (*Carex obnupta*; OBL), and soft rush (*Juncus effusus*; FACW), in the herbaceous layer. Vegetation in Wetland A meets the Dominance Test hydrophytic vegetation indicator and satisfies the hydrophytic vegetation criteria of the 2010 Regional Supplement (USACE 2010).

4.1.2 Soils

The NRCS maps four soil series within Edmond Marsh (USDA 2022a): Dupont muck (63.1%); Spanaway gravelly sandy loam (27.3%); Semiahmoo muck, 0% to 1% slopes (1.6%); and Everett-Spanaway-Spana complex, 0% to 30% slopes (8.0%).

- The Dupont muck series generally consists of very deep, very poorly drained soils formed in organic deposits. They tend to be found in depressions or basins in the glaciated uplands.
- The Spanaway series generally consists of very deep, somewhat excessively drained soils formed in glacial outwash. They tend to be found on terraces and plains.
- The Semiahmoo series generally consists of very deep, very poorly drained soils formed in herbaceous organic deposits. The Semiahmoo soils are typically found in depressions, on glacial outwash plains, and on broad floodplains.
- The Everett-Spanaway-Spana complex series is composed of the Everett, Spanaway, and Spana series and generally are very deep, somewhat excessively drained soils formed in glacial outwash terraces and escarpments. They tend to be found on glacial drift plains.

Of the aforementioned soils series, Dupont and Semiahmoo are listed as hydric by NRCS (USDA 2022b). Mapped soils are shown on Figure 5.

Edmond Marsh soil characteristics generally consisted of a thick layer (6 to 18 inches) of black mucky loam. The mucky loam contained low chroma (less than 1) with fragments of slightly decomposed wood indicative of extended periods of inundation. Soils below the thick, black layer varied and generally consisted of redox depletions within a black layer or a layer of depleted lower-permeability silty gravely clay. It's likely that soils along the edges of the wetland where soil plots were taken are transitional between the surrounding loamy soils and the mucky soils in the central portions of the marsh.

Upland soils adjacent to the wetland boundary generally consisted of higher-chroma (greater than or equal to 2), dry, brown Spanaway gravelly sandy loam. The wetland boundary corresponded with a clear topographic shift and a change in soils from black mucky loams to gravelly sandy loam in the surrounding upland. Data plot soils are presented in the field data forms in Appendix B.

4.1.3 Hydrology

Edmond Marsh is hydrologically supported through flows from Sequalitchew Creek, a seasonal high water table, precipitation, and runoff from the adjacent uplands. Primary wetland hydrology indicators included High Water Table (A2), Saturation (A3), Inundation Visible on Aerial Imagery (B7), and Water-Stained Leaves (B9). Secondary indicators of wetland hydrology include Saturation Visible on Aerial Imagery (C9), Geomorphic Position (D2), and FAC-Neutral Test (D5). The presence of these indicators satisfies the wetland hydrology criteria of the 2010 Regional Supplement (USACE 2010). Additionally, although not included in any of the determination plots, numerous raised ant mounds were observed near the wetland boundary. Data plot hydrology is presented in the field data forms in Appendix A. Based on existing data and field observations, the primary water regime of Edmond Marsh was determined to be seasonally flooded, with areas of saturation around the outer edges of the wetland.

4.1.4 Wetland Function Scores and Rating

Edmond Marsh was rated as a Category II wetland, with a score of 8 for water quality functions, a score of 5 for hydrologic functions, and a score of 8 for habitat functions. The ratings are discussed in more detail in the following sections, and the wetland rating form for Edmond Marsh is provided in Appendix C.

4.1.4.1 Improving Water Quality Functions

Overall, Edmond Marsh has high and moderate functions for improving water quality. Factors that contribute to this function rating include the presence of true organic soils, the amount of persistent vegetation and seasonal ponding, moderate potential for pollutants to enter the wetland, and the high potential to improve water quality functions within the basin for society.

4.1.4.2 Hydrologic Functions

Edmond Marsh has moderate and low hydrologic functions. Factors that contribute to this function include an unconstricted permanently flowing outlet, high water storage depth above the bottom of the outlet, moderate storage potential compared to the size of the watershed, moderate potential for pollutants to enter the wetland, and a lack of flooding issues in close proximity downstream of the wetland.

4.1.4.3 Habitat Functions

Edmond Marsh has high and moderate habitat functions. Factors that contribute to the function include the presence of multiple plant community layers and hydroperiods, high plant species richness, a moderate amount of accessible and undisturbed surrounding habitat, and multiple special and priority habitat features.

4.2 Wetland 1-D

Wetland 1-D, located north of Edmond Marsh, is an approximately 1.83-acre depressional wetland (Figure 6). The wetland includes forested, scrub-shrub, and emergent wetland vegetation communities. Wetland 1-D is divided in two by the same raised gravel multiuse trail grade that encircles the perimeter of Edmond Marsh. The two portions do not appear to be hydrologically connected, and no culvert was observed. Wetland 1-D does not have an outlet. Wetland 1-D is classified as a PFO/PSS wetland with a seasonally flooded water regime under the Cowardin system and as a Depressional wetland under the HGM classification system.

4.2.1 Vegetation

Wetland 1-D is a forested and scrub-shrub wetland dominated by red alder (FAC), black cottonwood, Douglas' spirea, Pacific crabapple, red osier dogwood, salmonberry, and black twinberry in the tree or sapling/scrub-shrub layer and lady fern, false lily-of-the-valley, starry false Solomon's seal, and water parsley in the herbaceous layer. Vegetation in Wetland 1-D meets the Dominance Test hydrophytic vegetation indicator and satisfies the hydrophytic vegetation criteria of the 2010 Regional Supplement (USACE 2010).

4.2.2 Soils

The NRCS maps one soil series within Wetland 1-D (Figure 5; USDA 2022a): Spanaway gravelly sandy loam (100%). The Spanaway series generally consists of very deep, somewhat excessively drained soils formed in glacial outwash. They tend to be found on terraces and plains. This soil series is not listed as hydric or known to contain hydric inclusions by NRCS (USDA 2022b).

Wetland 1-D soil characteristics generally consist of a thick layer (5 to 18 inches) of black mucky loam. The mucky loam contained low chroma (less than 1) with partially decomposed organic material and fragments of slightly decomposed wood indicative of extended periods of inundation. Soils below the thick black layer varied and generally consisted of redox concentrations within a layer of depleted higher-permeability gravelly, sandy loam. A layer of split-matrix, depleted gravelly, silty sandy loam was present in one soil plot. The wetland boundary corresponded with a clear topographic shift and a change in soils from black mucky loam to gravelly sandy loam in the surrounding upland. Data plot soils are presented in the field data forms in Appendix B.

4.2.3 Hydrology

Wetland 1-D is hydrologically supported through a seasonal high water table, precipitation, and runoff from the adjacent uplands. Approximately 4 to 8 inches of inundation was observed throughout most of Wetland 1-D at the time of the field visits. It is likely that Wetland 1-D is hydrologically connected to Edmond Marsh through groundwater due to the seasonal high water table; however, a direct surface water connection to Edmond Marsh was not observed. Primary wetland hydrology indicators included

High Water Table (A2), Saturation (A3), Iron Deposits (B5), and Water-Stained Leaves (B9). Secondary indicators of wetland hydrology include Geomorphic Position (D2) and FAC-Neutral Test (D5). The presence of these indicators satisfies the wetland hydrology criteria of the 2010 Regional Supplement (USACE 2010). Data plot hydrology is presented in the field data forms in Appendix B. Based on existing data and field observations, the primary water regime of Wetland 1-D was determined to be primarily seasonally flooded with a small outer band of saturated only.

4.2.4 Wetland Function Scores and Rating

Wetland 1-D was rated as a Category II wetland, with a score of 8 for water quality functions, a score of 5 for hydrologic functions, and a score of 7 for habitat functions. The ratings are discussed in more detail in the following subsections, and the wetland rating form for Wetland 1-D is provided in Appendix C.

4.2.4.1 Improving Water Quality Functions

Overall Wetland 1-D has high and moderate functions for improving water quality. Factors that contribute to this function rating include the absence of an outlet, the amount of persistent vegetation and seasonal ponding, moderate potential for pollutants to enter the wetland, and the high potential to improve water quality functions within the basin for society.

4.2.4.2 Hydrologic Functions

Wetland 1-D has moderate and low hydrologic functions. Factors that contribute to this function include the absence of an outlet, moderate storage depth, low storage potential within the watershed, moderate potential for pollutants to enter the wetland, and a lack of flooding issues in close proximity downstream of the wetland.

4.2.4.3 Habitat Functions

Wetland 1-D has moderate and high habitat functions. Factors that contribute to the function include the presence of multiple plant community layers and hydroperiods, moderate plant species richness, low invasive species cover, a moderate amount of accessible and undisturbed surrounding habitat, and multiple special and priority habitat features.

5 Deviation from National Wetlands Inventory or Priority Habitats and Species Maps

The delineated locations of Edmond Marsh and Wetland 1-D generally correspond to one large PFO and PSS wetland (Table 3) and shown on the NWI map (Figure 6) and the mapped PHS resource (Table 4) in the study area. The maps do not distinguish between the main Edmond Marsh area and the smaller depressional Wetland 1-D to the north. The NWI map units even extend into a housing development north of Wetland 1-D.

Table 3
Mapped NWI with Delineated Wetlands Within the Study Area

Wetland/Other Water	NWI Code	NWI Code Description
Edmond Marsh	PFOC	Palustrine forested wetland with a seasonally flooded water regime
	PFOA	Palustrine forested wetland with a temporarily flooded water regime
	PSSC	Palustrine scrub-shrub wetland with a seasonally flooded water regime
	PSSF	Palustrine emergent, persistent wetland with a semipermanently flooded water regime
Wetland 1-D	PFOA	Palustrine forested wetland with a temporarily flooded water regime
	PSSA	Palustrine scrub-shrub wetland with a temporarily flooded water regime

Table 4
PHS Resources Within the Study Area

Common Name	Scientific Name	Location in Study Area
Coho salmon	*Oncorhynchus kisutch*	Sequalitchew Creek
Cutthroat trout	*Oncorhynchus clarkii*	Sequalitchew Creek
Big brown bat	*Eptesicus fuscus*	Vicinity
Little brown bat	*Myotis lucifugus*	Vicinity
Yuma myotis	*Myotis yumanensis*	Vicinity
Waterfowl concentrations	N/A	Vicinity
Freshwater forested/shrub wetlands	N/A	Vicinity
Wetlands	N/A	Vicinity

6 Mapping Method

Wetland boundary and data plot locations for Edmond Marsh and Wetland 1-D were plotted in the field using World Geodetic System 1984 datum. GPS points were plotted on a base map in ArcGIS to create the wetland delineation map shown on Figure 7. Much of the wetland has a very abrupt boundary based on topography or a change in vegetation from wetland vegetation to upland forested vegetation.

7 City of DuPont Wetland Buffer Guidance

Required wetland buffers have been identified according to the current DMC Chapter 25.105.050 (City of DuPont 2022). The DMC identifies minimum protective buffer widths based on the wetland category, per the 2014 Ecology rating system (Hruby 2014). Table 5 summarizes DMC ratings and buffer widths based on the 2014 Ecology rating system. Wetland boundaries with associated buffers are shown on Figure 7.

Table 5
Wetland Rating and Standard Buffer Widths

Wetland	2014 State Rating (Ecology)	Local Rating (City of DuPont)	Buffer Width (feet)[1]
Edmond Marsh	II	II	100
Wetland 1-D	II	II	100

Source: City of DuPont 2022

8 Results and Conclusions

Anchor QEA wetland biologists delineated two wetlands (Edmond Marsh and Wetland 1-D) in the study area during site visits on April 18, 19, and 20, 2022 (Figure 7). The total area of wetlands was estimated to be 5,900,202 square feet (135.45 acres). Both Edmond Marsh and Wetland 1-D are Category II wetlands and provide moderate to high water quality, hydrologic, and habitat functions.

9 Wetland Delineation and Typing Limitations

Wetland identification is an inexact science, and differences of professional opinion occasionally occur between trained individuals. Final determinations for wetland boundaries and typing concurrence or adjustments to these are the responsibility of the regulating resource agency. Wetlands are, by definition, transitional areas; their boundaries can be altered by changes in hydrology or land use. In addition, the definition of jurisdictional wetlands may change. If a physical change occurs in the basin, or if 3 years pass before the proposed project is undertaken, another wetland survey should be conducted. The results and conclusions expressed herein represent Anchor QEA's professional judgment based on the information available.

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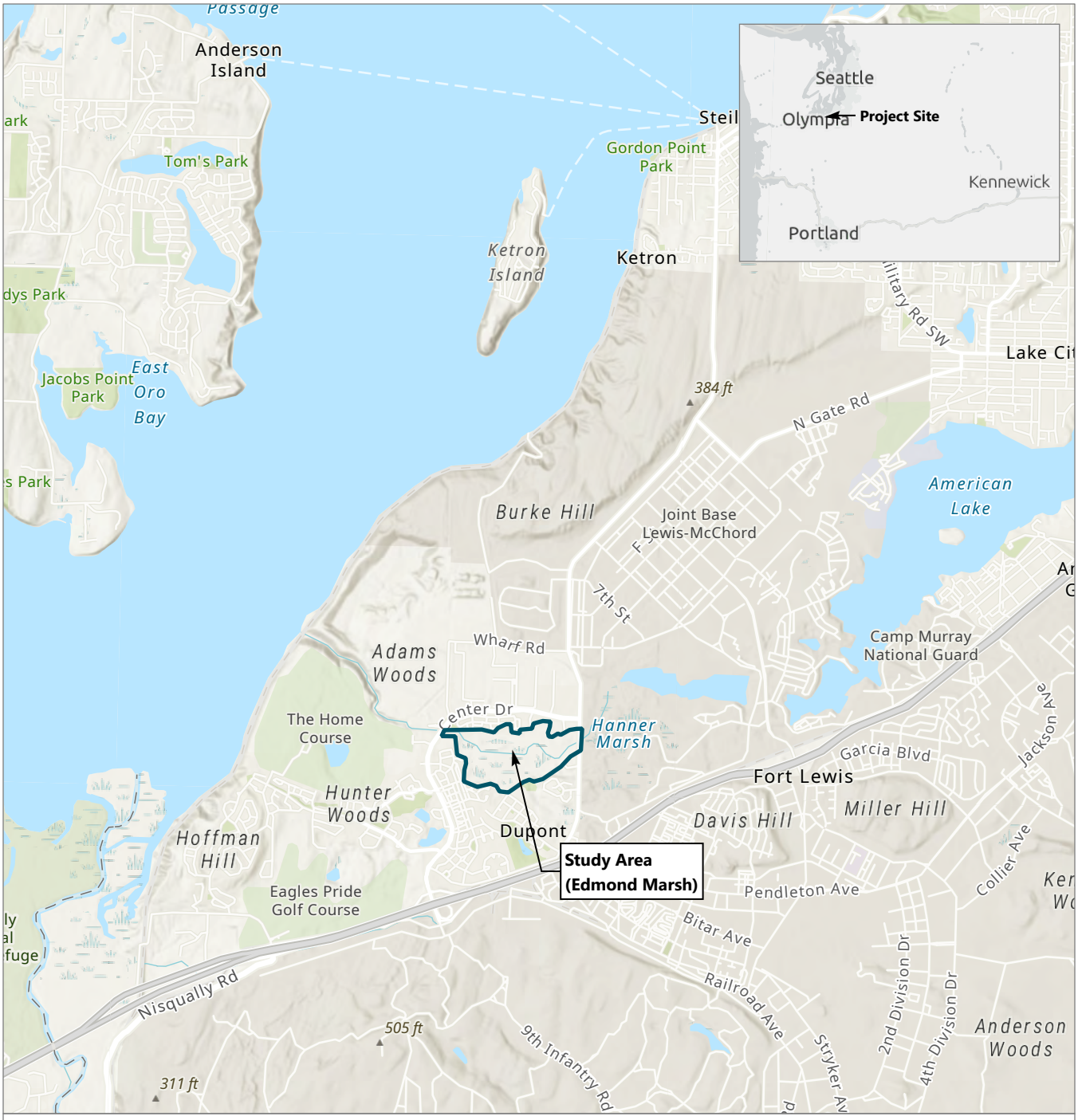
Figures



LEGEND:

Study Area

NOTE:

1. Basemap provided by Esri streaming services.

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ANCHOR QEA

Figure 1
Vicinity Map
Wetland Delineation Report
Edmond Marsh

LEGEND:

- Study Area
- Tax Parcel Within Study Area
- Tax Parcels

NOTE:

1. Basemap provided by USGS Topographic Maps, Fort Lewis, WA and Nisqually, WA quadrangles. Sourced by Esri streaming services.

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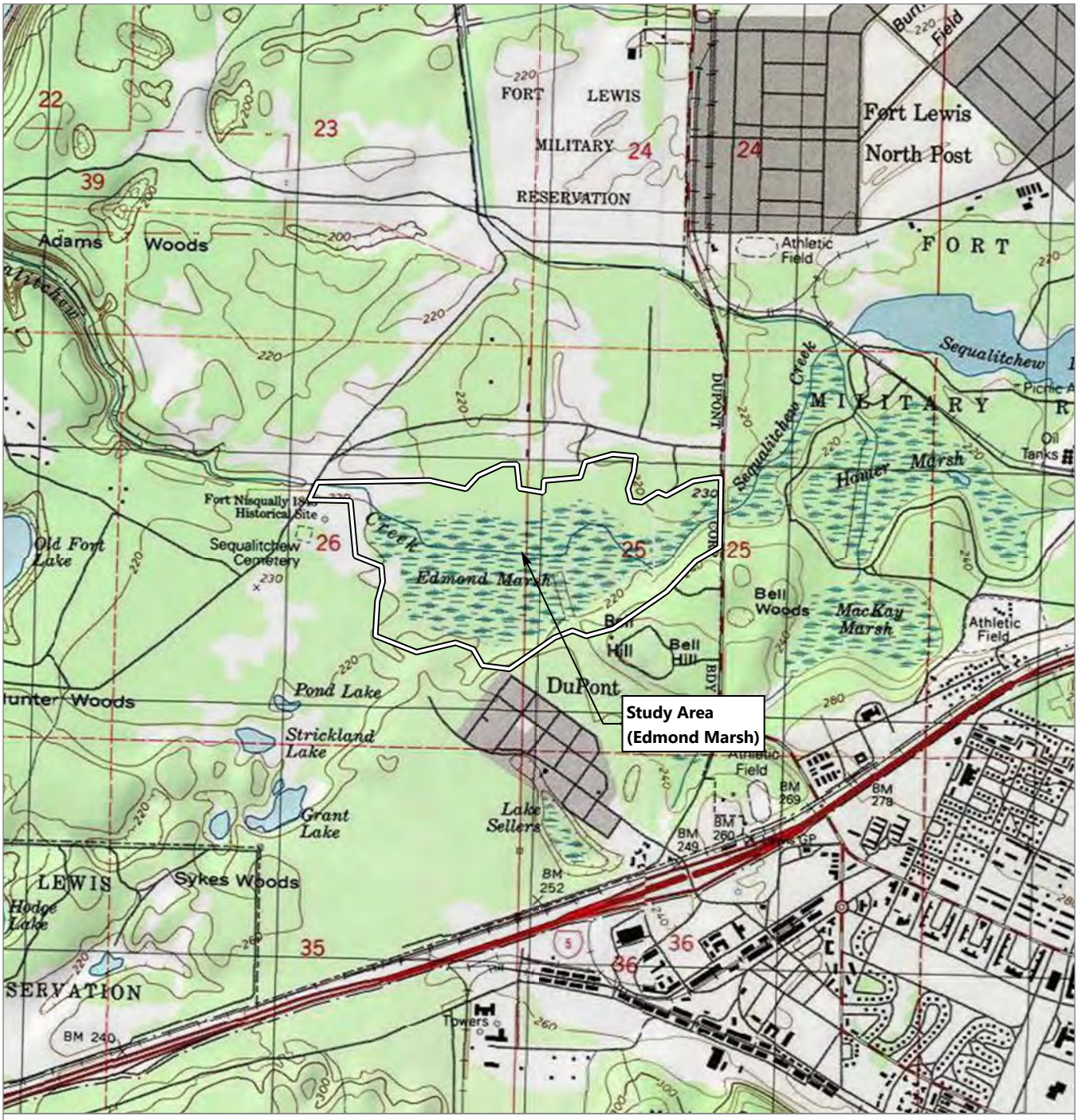
ANCHOR QEA

Figure 2
Tax Parcel Map
Wetland Delineation Report
Edmond Marsh



LEGEND:

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NOTE:

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ANCHOR QEA

Figure 3
Study Area
Wetland Delineation Report
Edmond Marsh

LEGEND:

Study Area

NOTE:
1. Basemap provided by Esri streaming services. Aerial imagery collected April 2021.

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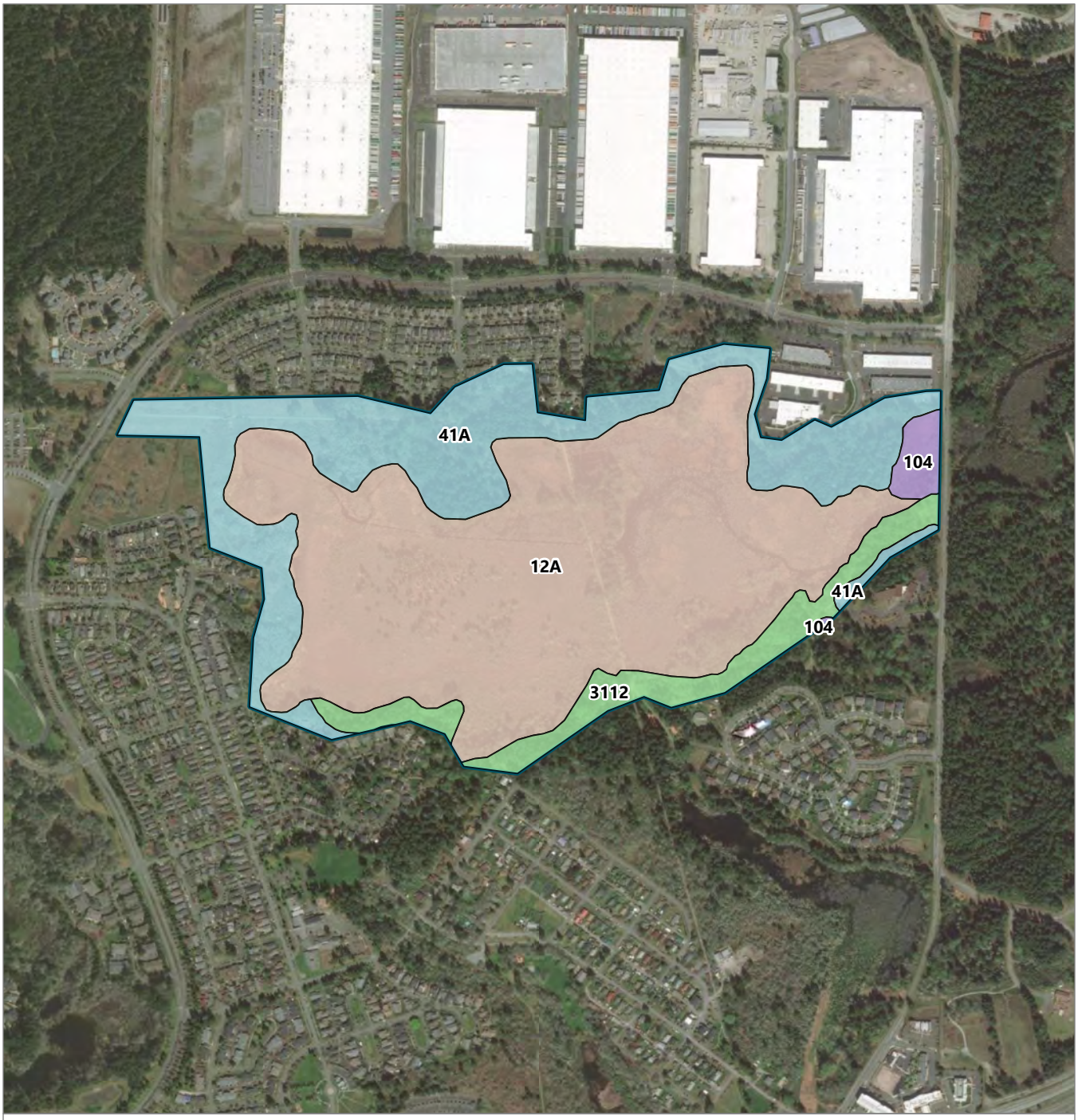
ANCHOR QEA

Figure 4
Current Conditions and Land Use of the Study Area
Wetland Delineation Report
Edmond Marsh



LEGEND:

NRCS Soils

- Semiahmoo muck, 0 to 1 percent slopes (104)
- Spanaway gravelly sandy loam (41A)
- Dupont muck (12A)
- Everett-Spanaway-Spana complex, 0 to 30 percent slopes (3112)

Study Area

NOTES:

1. Basemap provided by Esri streaming services.
2. Soil data from US Department of Agriculture NRCS Soils.

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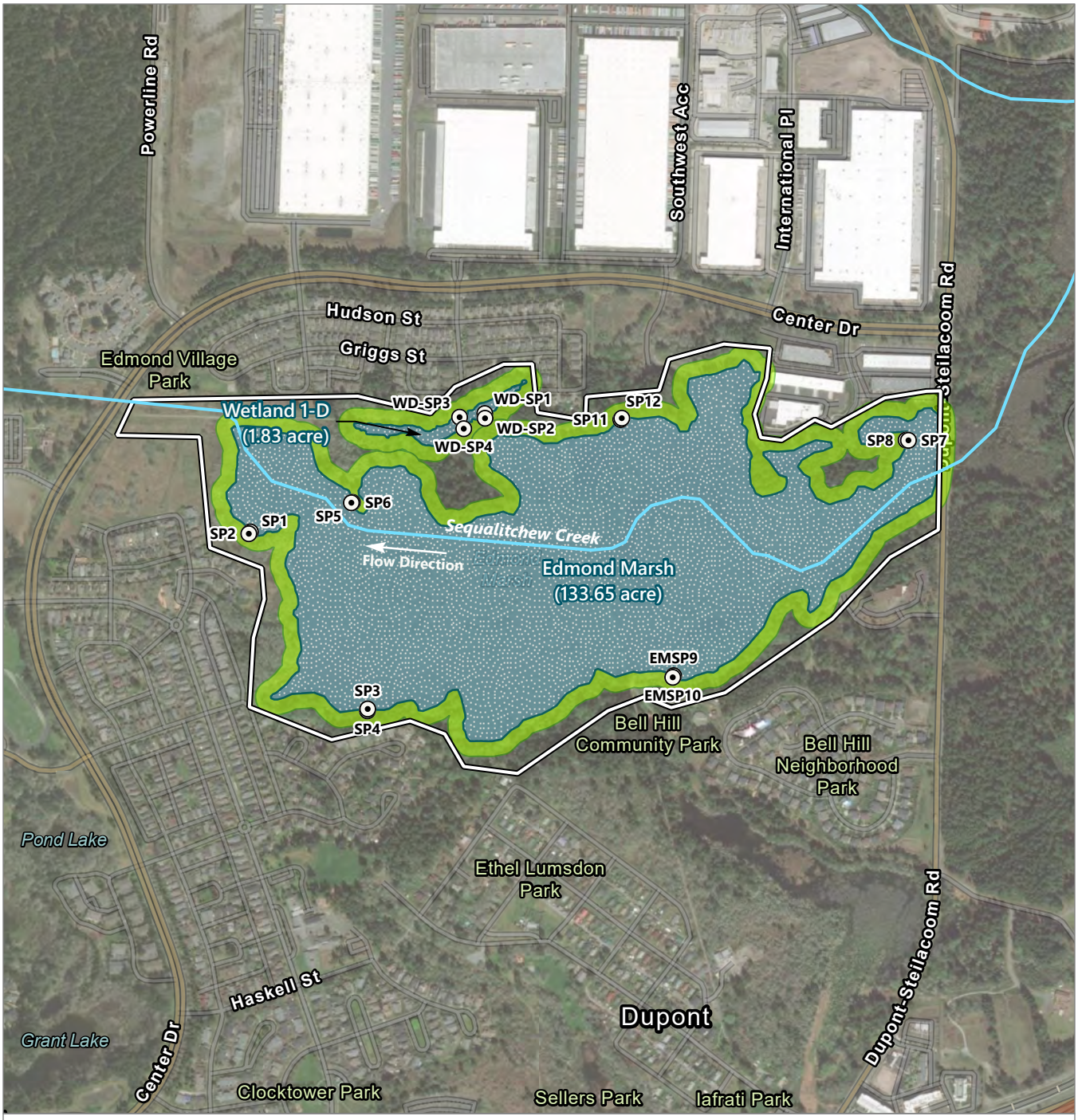
Figure 5
NRCS Soil Map
Wetland Delineation Report
Edmond Marsh



LEGEND:

- Soil Plot Location
- Study Area
- Wetland
- 100-foot Wetland Buffer
- Streams

NOTES:

1. Basemap provided by Esri streaming services.
2. Streams from NHD.
3. Tax Parcels from Pierce County GIS.
4. Flow direction arrow indicates flow direction of Sequalitchew Creek.

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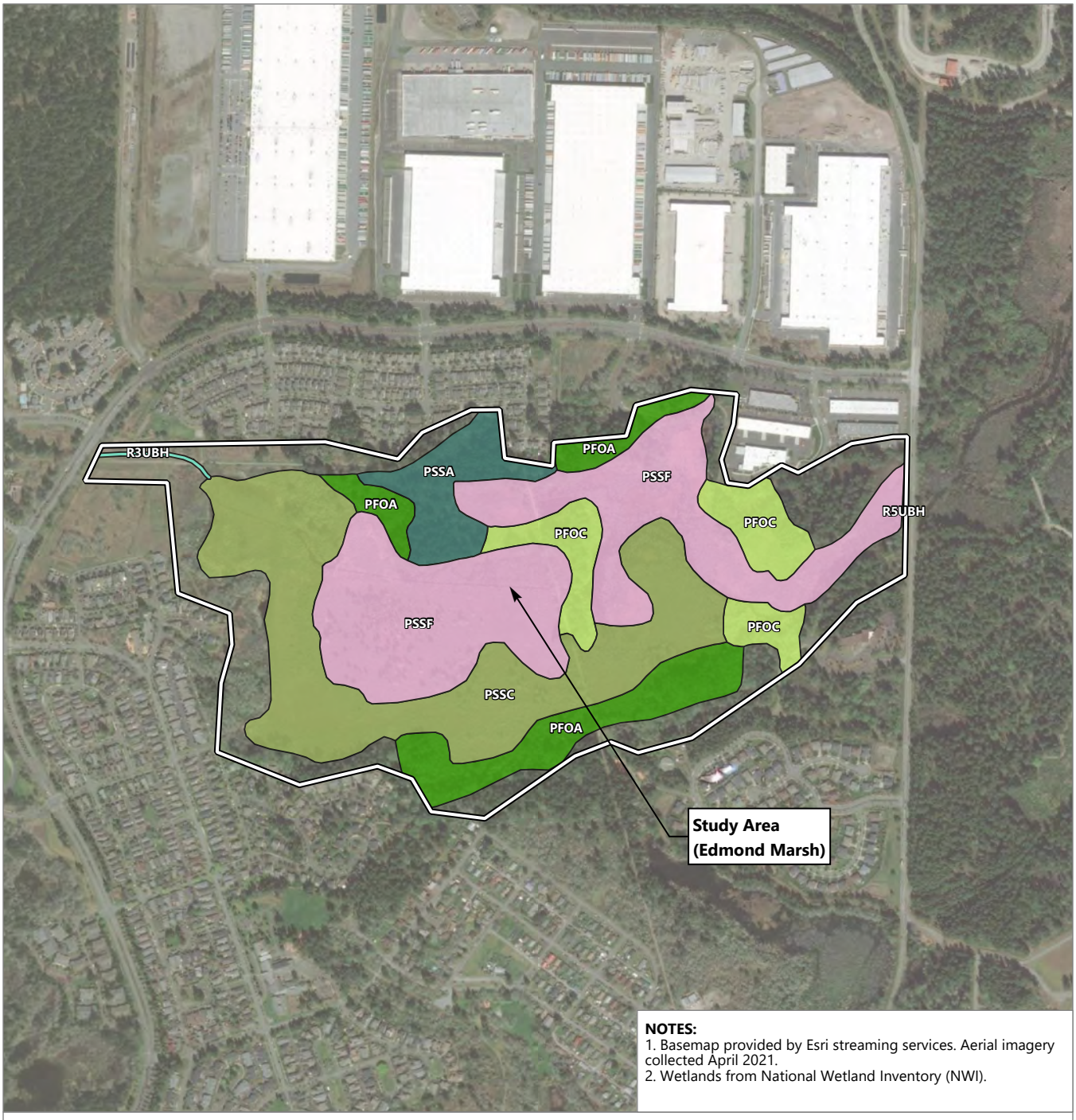
ANCHOR QEA

Figure 6
Wetland Delineation Map
Wetland Delineation Report
Edmond Marsh



NOTES:
1. Basemap provided by Esri streaming services. Aerial imagery collected April 2021.
2. Wetlands from National Wetland Inventory (NWI).

LEGEND:

- Study Area

NWI Wetlands

- Palustrine Forested Wetland, Temporarily Flooded (PFOA)
- Palustrine Forested Wetland, Seasonally Flooded (PFOC)
- Palustrine Scrub-Shrub Wetland, Temporarily Flooded (PSSA)
- Palustrine Scrub-Shrub Wetland, Seasonally Flooded (PSSC)
- Palustrine Scrub-Shrub Wetland, Semipermanently Flooded (PSSF)
- Riverine, Upper Perennial, Unconsolidated Bottom, Permanently Flooded (R3UBH)
- Riverine, Unknown Perennial, Unconsolidated Bottom, Permanently Flooded (R5UBH)

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ANCHOR QEA

Figure 7
National Wetland Inventory Map
Wetland Delineation Report
Edmond Marsh

Appendix A
Precipitation Data

WETS Table

WETS Station: OLYMPIA AP, WA								
Requested years: 1971 - 2022								
Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg Snowfall
Jan	45.8	32.5	39.1	7.79	5.27	9.31	14	3.0
Feb	49.0	32.3	40.7	5.49	3.58	6.60	12	2.5
Mar	53.9	34.3	44.1	5.39	3.91	6.36	13	0.6
Apr	59.1	36.8	48.0	3.50	2.46	4.15	9	0.1
May	65.8	42.4	54.1	2.30	1.33	2.80	7	0.0
Jun	71.0	47.0	59.0	1.66	1.00	2.02	5	0.0
Jul	77.4	50.2	63.8	0.65	0.25	0.76	2	0.0
Aug	78.0	50.2	64.1	1.01	0.31	1.18	3	0.0
Sep	72.0	45.8	58.9	2.17	1.00	2.53	5	0.0
Oct	60.5	39.9	50.2	4.67	2.78	5.67	9	0.0
Nov	50.4	35.6	43.0	8.25	5.70	9.83	15	0.9
Dec	44.7	32.3	38.5	7.85	5.84	9.19	14	2.1
Annual:					45.96	54.70		
Average	60.6	39.9	50.3	-	-	-	-	-
Total	-	-	-	50.75			106	9.3

GROWING SEASON DATES			
Years with missing data:	24 deg = 1	28 deg = 1	32 deg = 1
Years with no occurrence:	24 deg = 0	28 deg = 0	32 deg = 0
Data years used:	24 deg = 51	28 deg = 51	32 deg = 51
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	2/28 to 11/23: 268 days	4/13 to 10/28: 198 days	5/4 to 10/10: 159 days
70 percent *	2/19 to 12/3: 287 days	4/6 to 11/4: 212 days	4/29 to 10/15: 169 days
* Percent chance of the growing season occurring between the Beginning and Ending dates.			

STATS TABLE - total precipitation (inches)													
Yr	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annl
1941					M2.11	0.93	0.33	2.49	4.26	2.74	5.16	8.25	26.27
1942	4.09	3.38	2.63	1.16	1.38	2.59	1.53	0.11	0.10	3.78	11.33	5.31	37.39
1943	2.65	3.41	6.09	3.08	1.47	1.60	0.53	1.27	0.39	4.59	2.04	3.62	30.74
1944	4.13	2.82	1.90	3.25	1.33	0.46	T	0.50	2.37	2.87	4.81	2.06	26.50
1945	4.93	6.60	4.09	2.10	2.73	0.08	0.19	0.65	3.19	2.46	7.30	6.88	41.20
1946	6.30	6.12	4.11	2.73	0.54	4.09	1.06	0.12	2.26	4.92	5.88	5.91	44.04
1947	5.88	3.87	2.90	2.15	0.28	2.34	2.14	0.47	1.73	6.66	3.79	5.74	37.95
1948	5.87	7.64	4.69	4.78	5.83	1.35	1.10	2.27	3.92	4.35	10.19	12.11	64.10
1949	0.69	9.96	3.75	1.52	1.54	0.72	0.51	0.82	1.	5.	12.	10.	49.

									39	24	33	73	20
1950	9.31	9.66	10.13	3.10	0.79	0.86	1.35	1.47	2.19	9.20	9.49	9.16	66.71
1951	10.59	11.28	5.89	0.54	1.91	0.05	0.28	0.54	2.83	6.95	7.32	5.80	53.98
1952	5.65	3.96	3.13	2.25	0.85	1.22	0.10	0.74	0.43	1.55	1.39	8.65	29.92
1953	19.84	5.12	3.55	2.58	2.72	1.50	0.27	1.63	2.68	6.85	7.79	9.42	63.95
1954	11.96	8.40	3.13	4.07	1.63	3.36	0.82	1.74	1.89	3.38	7.87	6.99	55.24
1955	3.01	5.23	4.76	4.19	1.35	0.71	2.68	0.02	1.84	9.31	12.18	12.59	57.87
1956	10.75	3.93	8.27	0.37	0.30	2.57	0.38	0.88	2.30	9.52	2.81	9.36	51.44
1957	3.02	5.88	7.43	1.72	1.42	1.78	0.97	0.87	0.66	4.74	4.05	8.91	41.45
1958	7.87	6.40	2.29	4.39	1.47	1.65	T	0.62	1.52	5.41	12.35	8.43	52.40
1959	8.91	4.53	4.63	4.51	1.45	1.85	0.30	0.70	4.26	3.92	10.36	7.50	52.92
1960	6.35	5.93	6.12	4.53	3.50	0.59	T	1.16	1.21	5.84	11.33	3.89	50.45
1961	8.69	13.18	6.26	3.29	2.93	1.05	0.80	1.01	0.33	4.97	6.78	8.25	57.54
1962	3.22	3.72	3.82	4.50	1.81	0.89	0.14	3.17	2.45	6.00	15.51	5.81	51.04
1963	3.47	6.42	5.10	4.13	1.76	0.63	1.48	0.79	2.16	5.98	10.32	5.55	47.79
1964	15.13	2.54	4.47	1.58	0.98	2.35	1.07	1.47	2.26	1.79	9.18	9.11	51.93
1965	9.37	4.93	0.48	3.61	1.89	0.33	0.48	2.05	0.60	3.30	5.84	7.81	40.69
1966	7.89	3.38	7.28	1.71	1.30	1.28	1.34	0.68	1.95	4.83	8.16	11.53	51.33
1967	12.21	3.58	4.31	2.88	0.25	1.49	0.02	T	1.36	10.08	3.90	5.94	46.02
1968	9.04	7.83	6.53	3.02	2.57	2.43	0.89	5.45	2.51	6.07	7.96	9.95	64.25
1969	9.45	3.41	2.90	3.44	2.07	1.68	0.50	0.18	5.23	2.69	3.60	7.24	42.39
1970	12.48	4.30	3.07	4.76	1.21	0.14	0.16	0.15	3.20	2.71	7.40	14.32	53.90
1971	11.15	4.41	9.11	2.78	1.50	3.00	0.78	0.71	3.06	4.43	7.59	9.18	57.70
1972	12.43	11.06	10.01	5.87	0.83	1.07	1.72	0.70	5.04	0.85	4.17	10.66	64.41
1973	5.66	1.71	3.02	2.23	2.66	2.60	0.05	0.59	2.18	4.60	12.95	11.61	49.86
1974	10.57	5.68	6.65	4.77	2.65	1.57	2.29	0.07	0.50	1.38	7.44	8.86	52.43
1975	9.70	5.61	4.32	1.88	1.51	0.72	0.25	3.97	T	8.38	9.54	11.42	57.30
1976	9.40	7.25	4.24	2.79	2.66	1.07	1.26	2.71	1.22	2.64	1.37	3.00	39.61
1977	1.55	3.70	4.44	1.27	5.21	0.64	0.32	4.17	4.58	3.40	9.30	12.36	50.94
1978	6.61	4.39	3.45	3.97	2.90	1.54	1.49	1.47	7.59	0.78	6.81	2.95	43.95
1979	2.67	9.25	2.73	2.21	1.40	1.11	1.58	1.56	2.72	6.20	2.38	13.01	46.82
1980	6.27	6.18	3.98	4.14	0.93	2.46	0.41	0.36	2.21	1.84	9.77	10.92	49.47
1981	2.54	9.19	3.86	4.77	1.81	2.96	0.36	0.85	2.44	8.17	7.22	8.60	52.77
1982	7.79	9.91	4.67	3.89	0.51	1.15	0.54	0.55	1.89	6.12	5.74	10.64	53.40
1983	9.99	7.09	6.63	2.26	1.51	2.80	3.00	2.18	1.	1.	12.	7.28	59.

									89	66	84		13
1984	6.97	5.49	6.42	3.67	5.48	3.74	T	0.21	1.76	5.13	12.19	4.97	56.03
1985	0.29	3.54	4.10	2.65	0.94	2.48	0.37	0.70	2.65	9.86	4.99	2.50	35.07
1986	12.14	6.84	2.29	2.87	3.20	0.92	1.11	0.01	3.38	4.12	11.09	5.20	53.17
1987	8.38	3.55	7.14	3.11	2.71	0.32	0.84	0.24	0.29	0.39	3.65	9.14	39.76
1988	5.18	2.35	5.66	4.94	3.36	2.06	0.42	0.43	1.93	2.26	10.14	5.16	43.89
1989	5.41	4.19	7.88	2.49	1.99	1.47	0.70	0.55	0.49	2.42	8.50	5.66	41.75
1990	14.53	8.52	3.54	3.29	2.06	2.86	0.32	1.79	0.03	6.34	15.06	5.05	63.39
1991	5.35	5.85	4.32	7.80	1.69	1.30	0.33	2.31	T	2.20	7.00	4.28	42.43
1992	9.45	4.19	1.50	5.15	0.19	1.15	0.36	0.82	2.44	2.80	6.82	5.28	40.15
1993	5.36	0.22	4.95	6.67	4.57	1.77	1.35	0.15	T	1.63	2.86	6.02	35.55
1994	3.80	6.38	4.83	1.82	1.44	1.90	0.29	0.80	1.52	7.65	7.75	11.49	49.67
1995	5.76	6.10	6.73	2.70	1.16	1.10	1.71	1.22	1.97	5.20	13.56	7.69	54.90
1996	M7.22	11.07	2.65	7.61	3.14	1.14	0.71	0.42	2.21	5.46	6.25	M11.40	59.28
1997	9.22	5.03	11.79	4.80	3.10	2.94	1.18	2.45	4.57	8.18	6.07	5.50	64.83
1998	10.43	5.04	5.71	1.21	2.11	1.29	0.18	T	0.31	3.41	15.28	12.99	57.96
1999	12.25	15.50	6.95	1.42	1.54	1.84	0.58	0.69	0.12	3.85	11.93	9.97	66.64
2000	8.13	5.83	5.09	2.40	3.28	2.51	0.06	0.41	1.98	4.27	3.64	3.88	41.48
2001	3.45	2.60	3.84	3.49	1.92	2.63	0.18	2.28	0.53	3.98	13.31	11.86	50.07
2002	11.42	4.32	5.24	4.02	2.04	1.59	0.35	0.10	0.59	0.46	3.96	7.39	41.48
2003	9.60	2.17	7.62	4.72	1.14	0.28	0.14	0.34	1.17	10.72	8.67	5.99	52.56
2004	7.85	2.95	2.83	1.33	2.00	0.93	0.03	3.93	3.88	4.63	3.76	5.30	39.42
2005	5.86	1.01	6.17	4.14	4.06	1.64	0.93	0.19	1.76	5.72	7.21	8.88	47.57
2006	15.86	3.44	3.57	1.89	2.36	1.64	0.15	0.13	0.69	1.43	19.68	9.10	59.94
2007	6.04	5.52	7.00	2.33	1.22	1.30	1.85	0.67	2.24	4.88	4.04	11.71	48.80
2008	6.69	4.01	4.83	2.33	0.48	1.41	0.42	1.86	0.27	3.36	9.36	5.05	40.07
2009	8.58	1.60	5.75	3.13	4.68	0.22	0.15	1.22	2.49	5.32	10.08	4.58	47.80
2010	6.78	4.53	5.07	3.34	4.14	3.34	0.16	0.51	5.79	6.21	6.20	9.35	55.42
2011	7.27	4.46	9.00	4.11	4.16	0.67	1.42	0.25	1.62	4.26	8.78	4.69	50.69
2012	8.72	5.01	8.57	4.35	2.73	2.31	0.90	0.04	T	8.07	9.15	9.74	59.59
2013	3.91	4.04	3.88	4.52	3.21	1.86	T	1.84	9.36	2.13	4.69	2.02	41.46
2014	4.69	8.35	9.17	4.26	3.34	0.88	0.27	1.45	3.07	6.91	6.12	6.00	54.51
2015	6.68	5.28	5.94	1.92	0.67	0.14	0.15	2.84	0.90	6.68	11.82	14.50	57.52
2016	8.47	6.67	8.51	1.58	0.15	1.24	0.62	0.40	1.73	12.43	9.28	6.39	57.47
2017	3.82	9.18	11.35	5.53	3.07	1.33	0.05	0.11	1.	6.	12.	6.90	61.

									24	58	28		44
2018	9.87	3.63	2.59	7.24	0.24	0.88	0.07	0.17	2.06	4.34	5.89	8.34	45.32
2019	4.88	5.16	1.39	2.68	0.90	0.17	1.23	0.80	3.43	5.26	1.74	9.44	37.08
2020	15.56	3.38	3.35	1.40	2.87	2.24	0.18	0.37	3.33	4.04	9.07	7.32	53.11
2021	12.22	7.84	3.01	0.92	1.81	3.30	0.00	0.01	3.31	5.39	11.88	9.11	58.80
2022	10.78	5.37	3.07	5.35	4.33	3.04	0.09	M0.05					32.08

Notes: Data missing in any month have an "M" flag. A "T" indicates a trace of precipitation.

Data missing for all days in a month or year is blank.

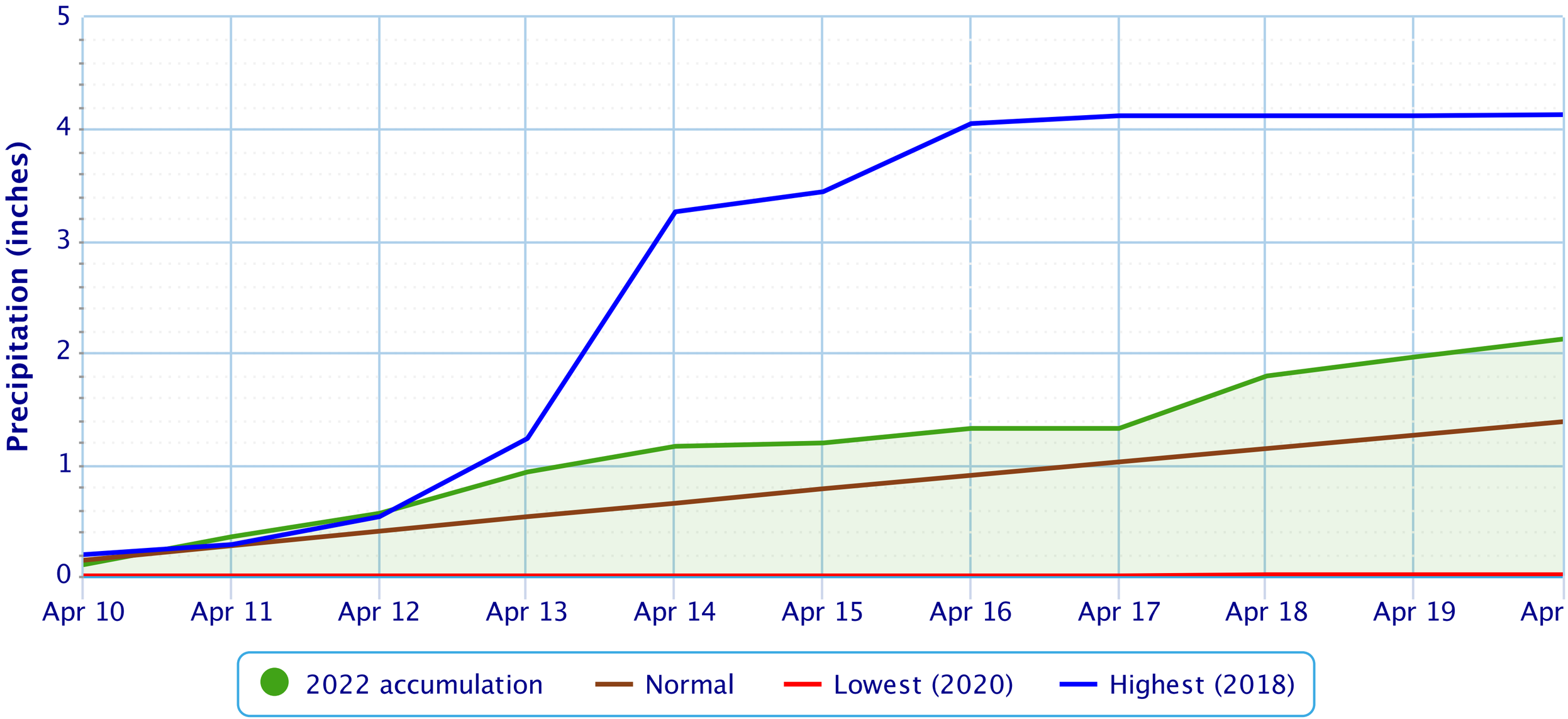
Creation date: 2022-08-29

Almanac for OLYMPIA AP, WA
April 20, 2022

Daily Data	Observed	----	Normal	Record Highest	Record Lowest
Max Temperature	51		60	83 in 2016	44 in 2008
Min Temperature	32		38	50 in 1965	26 in 1951
Avg Temperature	41.5		48.8	63.5 in 2016	36.5 in 2008
Precipitation	0.16		0.12	0.71 in 1960	0.00 in 2021
Snowfall	M		0.0	T in 1960	0.0 in 2021
Snow Depth	M		-	0 in 2021	0 in 2021
HDD (base 65)	23		16	28 in 2008	1 in 2016
CDD (base 65)	0		0	0 in 2022	0 in 2022
Month-to-Date Summary	Observed	----	Normal	Record Highest	Record Lowest
Avg Max Temperature	52.6		57.7	68.1 in 2016	51.4 in 2011
Avg Min Temperature	32.8		36.9	42.0 in 2019	31.4 in 1975
Avg Temperature	42.7		47.3	54.1 in 2016	42.7 in 2022
Total Precipitation	3.87		2.66	7.17 in 1991	0.01 in 1951
Total Snowfall	M		0.0	2.2 in 1972	0.0 in 2021
Max Snow Depth	M		-	T in 1970	0 in 2021
Total HDD (base 65)	441		354	443 in 1972	213 in 2016
Total CDD (base 65)	0		0	1 in 2016	0 in 2022
Year-to-Date Summary	Observed	----	Normal	Record Highest	Record Lowest
Avg Max Temperature	50.9		51.1	55.5 in 2015	44.9 in 1950
Avg Min Temperature	33.6		34.0	36.9 in 1958	29.4 in 1949
Avg Temperature	42.3		42.6	45.9 in 2015	37.3 in 1950
Total Precipitation	23.09		21.23	38.26 in 1972	8.43 in 1985
Total Snowfall (since July 1)	T		3.9	81.5 in 1969	0.0 in 2008
Max Snow Depth (since July 1)	0		-	24 in 1969	0 in 2021
Total HDD (since July 1)	4582		4712	5470 in 1949	3898 in 2015
Total CDD (since Jan 1)	0		0	1 in 2016	0 in 2022

Accumulated Precipitation - OLYMPIA AP, WA

Click and drag to zoom to a shorter time interval; green/black diamonds represent subsequent/missing values



Powered by ACIS

Climatological Data for OLYMPIA AP, WA - January 2022

Date	Max Temperature	Min Temperature	Avg Temperature	GDD Base 40	GDD Base 50	Precipitation	Snowfall	Snow Depth
2022-01-01	36	7	21.5	0	0	0.00	M	M
2022-01-02	44	35	39.5	0	0	1.15	M	M
2022-01-03	44	30	37.0	0	0	0.89	M	M
2022-01-04	41	33	37.0	0	0	0.17	M	M
2022-01-05	40	34	37.0	0	0	0.58	M	M
2022-01-06	53	34	43.5	4	0	3.99	M	M
2022-01-07	50	37	43.5	4	0	0.78	M	M
2022-01-08	47	29	38.0	0	0	T	M	M
2022-01-09	48	28	38.0	0	0	0.00	M	M
2022-01-10	51	27	39.0	0	0	0.20	M	M
2022-01-11	54	48	51.0	11	1	1.14	M	M
2022-01-12	61	41	51.0	11	1	0.80	M	M
2022-01-13	56	39	47.5	8	0	0.36	M	M
2022-01-14	54	38	46.0	6	0	0.00	M	M
2022-01-15	45	39	42.0	2	0	0.00	M	M
2022-01-16	44	42	43.0	3	0	0.00	M	M
2022-01-17	52	40	46.0	6	0	0.00	M	M
2022-01-18	53	42	47.5	8	0	0.01	M	M
2022-01-19	53	41	47.0	7	0	0.03	M	M
2022-01-20	55	35	45.0	5	0	0.29	M	M
2022-01-21	50	36	43.0	3	0	0.00	M	M
2022-01-22	48	36	42.0	2	0	0.00	M	M
2022-01-23	42	39	40.5	1	0	0.00	M	M
2022-01-24	41	35	38.0	0	0	0.00	M	M
2022-01-25	42	37	39.5	0	0	0.00	M	M
2022-01-26	43	32	37.5	0	0	0.00	M	M
2022-01-27	49	26	37.5	0	0	0.00	M	M
2022-01-28	56	24	40.0	0	0	0.00	M	M
2022-01-29	56	29	42.5	3	0	0.02	M	M
2022-01-30	51	37	44.0	4	0	0.33	M	M
2022-01-31	49	32	40.5	1	0	0.04	M	M
Average|Sum	48.6	34.3	41.5	89	2	10.78	M	M

Climatological Data for OLYMPIA AP, WA - February 2022

Date	Max Temperature	Min Temperature	Avg Temperature	GDD Base 40	GDD Base 50	Precipitation	Snowfall	Snow Depth
2022-02-01	44	26	35.0	0	0	0.00	M	M
2022-02-02	42	25	33.5	0	0	0.00	M	M
2022-02-03	49	41	45.0	5	0	0.04	M	M
2022-02-04	47	39	43.0	3	0	0.07	M	M
2022-02-05	49	29	39.0	0	0	0.00	M	M
2022-02-06	43	30	36.5	0	0	0.00	M	M
2022-02-07	51	33	42.0	2	0	0.01	M	M
2022-02-08	48	32	40.0	0	0	0.00	M	M
2022-02-09	54	34	44.0	4	0	0.00	M	M
2022-02-10	47	33	40.0	0	0	0.00	M	M
2022-02-11	51	29	40.0	0	0	0.00	M	M
2022-02-12	56	26	41.0	1	0	0.00	M	M
2022-02-13	61	23	42.0	2	0	0.00	M	M
2022-02-14	49	31	40.0	0	0	0.35	M	M
2022-02-15	52	29	40.5	1	0	0.00	M	M
2022-02-16	52	29	40.5	1	0	0.00	M	M
2022-02-17	48	28	38.0	0	0	0.00	M	M
2022-02-18	50	36	43.0	3	0	0.00	M	M
2022-02-19	47	39	43.0	3	0	0.03	M	M
2022-02-20	50	35	42.5	3	0	T	M	M
2022-02-21	44	32	38.0	0	0	0.04	M	M
2022-02-22	38	27	32.5	0	0	T	M	M
2022-02-23	40	14	27.0	0	0	0.00	M	M
2022-02-24	42	21	31.5	0	0	0.00	M	M
2022-02-25	48	16	32.0	0	0	0.00	M	M
2022-02-26	41	23	32.0	0	0	0.38	M	M
2022-02-27	50	39	44.5	5	0	1.33	M	M
2022-02-28	55	50	52.5	13	3	3.12	M	M
Average|Sum	48.1	30.3	39.2	46	3	5.37	M	M

Climatological Data for OLYMPIA AP, WA - March 2022

Date	Max Temperature	Min Temperature	Avg Temperature	GDD Base 40	GDD Base 50	Precipitation	Snowfall	Snow Depth
2022-03-01	59	43	51.0	11	1	0.45	M	M
2022-03-02	52	43	47.5	8	0	0.22	M	M
2022-03-03	51	35	43.0	3	0	0.02	M	M
2022-03-04	52	34	43.0	3	0	0.15	M	M
2022-03-05	53	30	41.5	2	0	0.00	M	M
2022-03-06	53	28	40.5	1	0	0.00	M	M
2022-03-07	50	29	39.5	0	0	0.00	M	M
2022-03-08	47	42	44.5	5	0	0.08	M	M
2022-03-09	49	23	36.0	0	0	0.00	M	M
2022-03-10	48	21	34.5	0	0	0.00	M	M
2022-03-11	58	34	46.0	6	0	0.00	M	M
2022-03-12	57	30	43.5	4	0	0.02	M	M
2022-03-13	53	38	45.5	6	0	0.28	M	M
2022-03-14	48	43	45.5	6	0	0.71	M	M
2022-03-15	54	40	47.0	7	0	0.34	M	M
2022-03-16	54	36	45.0	5	0	T	M	M
2022-03-17	52	36	44.0	4	0	0.01	M	M
2022-03-18	56	41	48.5	9	0	0.13	M	M
2022-03-19	52	37	44.5	5	0	0.27	M	M
2022-03-20	49	34	41.5	2	0	0.10	M	M
2022-03-21	48	41	44.5	5	0	0.17	M	M
2022-03-22	65	44	54.5	15	5	0.00	M	M
2022-03-23	56	36	46.0	6	0	0.08	M	M
2022-03-24	57	34	45.5	6	0	0.00	M	M
2022-03-25	60	37	48.5	9	0	0.00	M	M
2022-03-26	62	43	52.5	13	3	0.02	M	M
2022-03-27	66	41	53.5	14	4	0.00	M	M
2022-03-28	62	46	54.0	14	4	T	M	M
2022-03-29	55	39	47.0	7	0	0.00	M	M
2022-03-30	57	40	48.5	9	0	0.01	M	M
2022-03-31	56	34	45.0	5	0	0.01	M	M
Average|Sum	54.5	36.5	45.5	190	17	3.07	M	M

Appendix B
Wetland Determination Forms

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

Project/Site: Edmond Marsh City/County: DuPont/Pierce County Sampling Date: 4/20/2022
Applicant/Owner: SPSSEG State: WA Sampling Point: EMSP-9
Investigator(s): R. Mathonnet, G. Allen Section, Township, Range: T19-0N R1-0E S25
Landform (hillslope, terrace, etc.): Lowland Local relief (concave, convex, none): none Slope: 1%
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.101999 Long: -122.629508 Datum: NAD83
Soil Map Unit Name: Dupont muck NWI Classification: PFOA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" Present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes **X** No
Hydric Soil Present? Yes **X** No
Wetland Hydrology Present? Yes **X** No

Is the Sampled Area within a Wetland? **Yes X** **No**

Remarks:
Lowland near East marsh south boundary

VEGETATION

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Alnus rubra*	85	Yes	FAC
2.			
3.			
4.			
5.			
50%= 42.5 20%= 17 Total Cover:	**85**		
Sapling/Shrub Stratum (Plot size:)			
1. *Acer circinatum*	70	Yes	FAC
2. *Rubus spectabilis*	15	No	FAC
3.			
4.			
5.			
50%= 42.5 20%= 17 Total Cover:	**85**		
Herb Stratum (Plot size:)			
1. *Maianthemum canadense*	95	Yes	FACU
2. *Maianthemum racemosum*	2	No	FAC
3. *Urtica dioica*	2	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
50%= 49.5 20%= 19.8 Total Cover:	**99**		
Woody Vine Stratum (Plot size:)			
1.			
2.			
Total Cover:	**0**		

% Bare Ground in Herb Stratum **1** % Cover of Biotic Crust

Dominance Test worksheet:

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

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

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

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**0**	x2 =	**0**
FAC species	**174**	x3 =	**522**
FACU species	**95**	x4 =	**380**
UPL species	**0**	x5 =	**0**
Column Totals:	**269** (A)		**902** (B)

Prevalence Index = B/A = **3.4**

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- **X** 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
- 5 - Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes X** **No**

Remarks:

SOIL

Sampling Point: EMSP-9

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/1	100					SiL	
6-8	10YR 2/2	100					SiL	
8-16	10YR 4/1	60	2.5Y 7/1	10	D	M	SiL	Moist, crumbly texture silty
8-16	10YR 5/1	30					SiL	Silty, blocky, crumbly friable soil texture

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Thick, dense roots

Depth (inches): 16

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Refusal met a 16 inches due to thick roots, layer is permeable and does not perch water

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0-4 in.

Wetland Hydrology Present? **Yes** X **No** ___

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

Remarks:
Saturation to 4 in., water seeping through sides above depleted layer

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

Project/Site: Edmond Marsh City/County: DuPont/Pierce County Sampling Date: EMSP-10
Applicant/Owner: SPSSEG State: WA Sampling Point: 4/20/2022
Investigator(s): R. Mathonnet, G. Allen Section, Township, Range: T19-0N R1-0E S25
Landform (hillslope, terrace, etc.): gentle slope Local relief (concave, convex, none): convex Slope: 1-3
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.101969 Long: -122.62953 Datum: NAD83
Soil Map Unit Name: Everett-Spanaway-Spana complex NWI Classification: PFOA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks:
Lowland south boundary near East Marsh

VEGETATION

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Acer macrophyllum*	65	Yes	FACU
2. *Thuja plicata*	50	Yes	FAC
3.			
4.			
5.			
50%= 57.5 20%= 23 Total Cover: **115**			
Sapling/Shrub Stratum (Plot size: _____)			
1. *Acer circinatum*	50	Yes	FAC
2. *Rubus spectabilis*	10	No	FAC
3. *Oemleria cerasiformis*	30	Yes	FACU
4. *Mahonia nervosa*	3	No	FACU
5.			
50%= 46.5 20%= 18.6 Total Cover: **93**			
Herb Stratum (Plot size: _____)			
1. *Polystichum munitum*	20	Yes	FACU
2. *Trillium ovatum*	5	No	FACU
3. *Maianthemum canadense*	10	Yes	FACU
4. *Maianthemum racemosum*	3	No	FAC
5. *Urtica dioica*	2	No	FAC
6.			
7.			
8.			
9.			
50%= 20 20%= 8 Total Cover: **40**			
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
Total Cover: **0**			
% Bare Ground in Herb Stratum **60** % Cover of Biotic Crust _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)
Total Number of Dominant Species Across All Strata: **6** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **33%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**0**	x2 =	**0**
FAC species	**115**	x3 =	**345**
FACU species	**133**	x4 =	**532**
UPL species	**0**	x5 =	**0**
Column Totals:	**248** (A)		**877** (B)

Prevalence Index = B/A = **3.5**

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation
_____ 2 - Dominance Test is >50%
_____ 3 - Prevalence Index is ≤3.0[1]
_____ 4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
_____ 5 - Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes _____ No **X**

Remarks:

SOIL

Sampling Point: EMSP-10

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100					L	Large cobble

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Cobble

Depth (inches): 12

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

Refusal at 12 in., cobble, fist to egg size, likely fill material from road prism, layer is permeable and does not perch water

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes _____ No **X** Depth (inches): _____

Water table Present? Yes _____ No **X** Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No **X** Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** X

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

Remarks:

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

Project/Site: Edmonds Marsh City/County: DuPont/ Pierce County Sampling Date: 4/18/2022
Applicant/Owner: SPSSEG State: WA Sampling Point: SP1
Investigator(s): R. Mathonnet, C. Douglas, G. Allen Section, Township, Range: T19-0N R1-0E S26
Landform (hillslope, terrace, etc.): gentle slope Local relief (concave, convex, none): none Slope: 1-3
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.104395 Long: -122.640693 Datum: NAD83
Soil Map Unit Name: Spanaway gravelly sandy loam NWI Classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" Present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes **X** No
Hydric Soil Present? Yes **X** No
Wetland Hydrology Present? Yes **X** No

Is the Sampled Area within a Wetland? **Yes X** **No**

Remarks:
Soil plot located at southwestern edge of marsh.

VEGETATION

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status?
1.			
2.			
3.			
4.			
5.			
50%= 0 20%= 0 Total Cover: **0**			
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. *Spiraea douglasii*	40	Yes	FACW
2. *Salix lasiandra*	30	Yes	FACW
3.			
4.			
5.			
50%= 35 20%= 14 Total Cover: **70**			
Herb Stratum (Plot size: 5 ft r)			
1. *Phalaris arundinacea*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
50%= 50 20%= 20 Total Cover: **100**			
Woody Vine Stratum (Plot size: 15 ft r)			
1.			
2.			
Total Cover: **0**			

% Bare Ground in Herb Stratum **0** % Cover of Biotic Crust

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **3** (A)
Total Number of Dominant Species Across All Strata: **3** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**170**	x2 =	**340**
FAC species	**0**	x3 =	**0**
FACU species	**0**	x4 =	**0**
UPL species	**0**	x5 =	**0**
Column Totals:	**170** (A)		**340** (B)

Prevalence Index = B/A = **2.0**

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
5 - Wetland Non-Vascular Plants[1]
Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes X** **No**

Remarks:

SOIL

Sampling Point: SP1

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	100					SiL	mucky
8-18	10YR 2/1	90	10YR 6/2	10	D	M	SiL	gravelly

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

Prominent redox depletions from 8 to 18 inches BGS.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

Water table Present? Yes X No _____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** _____

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

Remarks:

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

Project/Site: Edmonds Marsh City/County: DuPont/ Pierce County Sampling Date: 4/18/2022
Applicant/Owner: SPSSEG State: WA Sampling Point: SP2
Investigator(s): R. Mathonnet, C. Douglas, G. Allen Section, Township, Range: T19-0N R1-0E S26
Landform (hillslope, terrace, etc.): gentle slope Local relief (concave, convex, none): none Slope: 1-3
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.104363 Long: -122.640733 Datum: NAD83
Soil Map Unit Name: Spanaway gravelly sandy loam NWI Classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Soil plot located at southwestern edge of marsh approximately 12 feet upslope

VEGETATION

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status?
1.			
2.			
3.			
4.			
5.			
50%= 0 20%= 0 Total Cover: **0**			
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. *Malus fusca*	50	Yes	FACW
2. *Symphoricarpos albus*	40	Yes	FACU
3. *Crataegus douglasii*	15	No	FAC
4. *Mahonia nervosa*	10	No	FACU
5. *Oemleria cerasiformis*	5	No	FACU
50%= 60 20%= 24 Total Cover: **120**			
Herb Stratum (Plot size: 5 ft r) **CHECK RANKED VALUES**			
1. *Phalaris arundinacea*	100	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
50%= 50 20%= 20 Total Cover: **100**			
Woody Vine Stratum (Plot size: 15 ft r)			
1.			
2.			
Total Cover: **0**			

% Bare Ground in Herb Stratum **0** % Cover of Biotic Crust _____

Dominance Test worksheet:

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

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

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

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**150**	x2 =	**300**
FAC species	**15**	x3 =	**45**
FACU species	**55**	x4 =	**220**
UPL species	**0**	x5 =	**0**
Column Totals:	**220** (A)		**565** (B)

Prevalence Index = B/A = **2.6**

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
_____ 4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
_____ 5 - Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes **X** No _____

Remarks:

SOIL

Sampling Point: SP2

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	100					SiL	gravelly
8-12	10YR 4/1	100					SCL	
12-18	10YR 4/1	100					SiL	gravelly

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks: Soils crumbly.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

Water table Present? Yes _____ No X Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): 0

Wetland Hydrology Present? **Yes** _____ **No** X

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

Remarks:

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

Project/Site: Edmonds Marsh City/County: DuPont/ Pierce County Sampling Date: 4/18/2022
Applicant/Owner: SPSSEG State: WA Sampling Point: SP3
Investigator(s): R. Mathonnet, C. Douglas, G. Allen Section, Township, Range: T19-0N R1-0E S26
Landform (hillslope, terrace, etc.): gentle slope Local relief (concave, convex, none): none Slope: 1-3
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.101275 Long: -122.637508 Datum: NAD83
Soil Map Unit Name: Dupont muck NWI Classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes **X** No _____
Hydric Soil Present? Yes **X** No _____
Wetland Hydrology Present? Yes **X** No _____

Is the Sampled Area within a Wetland? **Yes X** **No** _____

Remarks: Soil plot located along southern edge of marsh north of housing development.

VEGETATION

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Alnus rubra*	20	Yes	FAC
2.			
3.			
4.			
5.			
50%= 10 20%= 4 Total Cover:	**20**		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. *Cornus alba*	40	Yes	FACW
2. *Lonicera involucrata*	15	Yes	FAC
3. *Crataegus douglasii*	10	No	FAC
4. *Malus fusca*	5	No	FACW
5. *Salix lasiandra*	5	No	FACW
50%= 37.5 20%= 15 Total Cover:	**75**		
Herb Stratum (Plot size: 5 ft r)			
1. *Athyrium cyclosorum*	10	Yes	FAC
2. *Oenanthe sarmentosa*	5	Yes	OBL
3. *Maianthemum dilatatum*	5	Yes	FAC
4. *Ranunculus repens*	2	No	FAC
5.			
6.			
7.			
8.			
9.			
50%= 11 20%= 4.4 Total Cover:	**22**		
Woody Vine Stratum (Plot size: 15 ft r)	**CHECK RANKED VALUES**		
1.			
2.			
Total Cover:	**0**		

% Bare Ground in Herb Stratum **78** % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **6** (A)

Total Number of Dominant Species Across All Strata: **6** (B)

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

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**5**	x1 =	**5**
FACW species	**50**	x2 =	**100**
FAC species	**62**	x3 =	**186**
FACU species	**0**	x4 =	**0**
UPL species	**0**	x5 =	**0**
Column Totals:	**117** (A)		**291** (B)

Prevalence Index = B/A = **2.5**

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
_____ 4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
_____ 5 - Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes X** **No** _____

Remarks:

SOIL

Sampling Point: SP3

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/1	100					SiL	mucky
10-18	10YR 2/1	65	10YR 7/2	10	D	M	SiL	split matrix
	10YR 3/2	25						

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks: Distinct band of 10YR 3/2 at 11 inches BGS and also diffused throughout matrix.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water table Present? Yes X No ___ Depth (inches): 1

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** _____

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

Remarks:

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

Project/Site: Edmonds Marsh City/County: DuPont/ Pierce County Sampling Date: 4/18/2022
Applicant/Owner: SPSSEG State: WA Sampling Point: SP4
Investigator(s): R. Mathonnet, C. Douglas, G. Allen Section, Township, Range: T19-0N R1-0E S26
Landform (hillslope, terrace, etc.): gentle slope Local relief (concave, convex, none): none Slope: 1-3
Subregion (LRR): Northwest Forests and Coast (LRA A) Lat: 47.101243 Long: -122.637514 Datum: NAD83
Soil Map Unit Name: Dupont muck NWI Classification: PSSC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Soil plot located along southern edge of marsh north of housing development. Approximately 8 feet uphill from SP3

VEGETATION

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Alnus rubra*	40	Yes	FAC
2. *Pseudotsuga menziesii*	30	Yes	FACU
3. *Acer macrophyllum*	20	Yes	FACU
4.			
5.			
50%= 45 20%= 18 Total Cover: **90**			
Sapling/Shrub Stratum (Plot size: 15 ft r)	**CHECK RANKED VALUES**		
1. *Oemleria cerasiformis*	30	Yes	FACU
2. *Ilex aquifolium*	25	Yes	FACU
3. *Crataegus douglasii*	20	Yes	FAC
4. *Malus fusca*	15	No	FACW
5. *Rubus ursinus*	5	No	FACU
50%= 47.5 20%= 19 Total Cover: **95**			
Herb Stratum (Plot size: 5 ft r)	**CHECK RANKED VALUES**		
1. *Maianthemum dilatatum*	65	Yes	FAC
2. *Athyrium cyclosorum*	5	No	FAC
3. *Maianthemum stellatum*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
50%= 37.5 20%= 15 Total Cover: **75**			
Woody Vine Stratum (Plot size: 15 ft r)			
1.			
2.			
Total Cover: **0**			
% Bare Ground in Herb Stratum **25** % Cover of Biotic Crust _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **3** (A)
Total Number of Dominant Species Across All Strata: **7** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **43%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**15**	x2 =	**30**
FAC species	**135**	x3 =	**405**
FACU species	**110**	x4 =	**440**
UPL species	**0**	x5 =	**0**
Column Totals:	**260** (A)		**875** (B)

Prevalence Index = B/A = **3.4**

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation
_____ 2 - Dominance Test is >50%
_____ 3 - Prevalence Index is ≤3.0[1]
_____ 4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
_____ 5 - Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes _____ No **X**

Remarks:

SOIL

Sampling Point: SP4

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y 2.5/1	100					SiL	gravelly
4-16	2.5Y 2.5/1	55					SiL	split matrix
	10YR 2/1	45						

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Thick, dense roots

Depth (inches): 16

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks:
Refusal met a 16 inches due to thick roots, layer is permeable and does not perch water

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No **X** Depth (inches): ___

Water table Present? Yes **X** No ___ Depth (inches): 5

Saturation Present? (includes capillary fringe) Yes **X** No ___ Depth (inches): 2

Wetland Hydrology Present? **Yes** **X** **No** ___

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

Remarks:
High water table in the adjacent marsh due to recent and ongoing heavy rainfall.

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

Project/Site: Edmond Marsh City/County: DuPont/ Pierce County Sampling Date: 4/19/2022
Applicant/Owner: SPSSEG State: WA Sampling Point: SP5
Investigator(s): R. Mathonnet, G. Allen Section, Township, Range: T19-0N R1-0E S26
Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope: 1-3
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.104961 Long: -122.638063 Datum: NAD83
Soil Map Unit Name: Dupont muck NWI Classification: PSSF
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Soil plot located along northwest boundary in lobe located 2 feet away from waterline.

VEGETATION

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status?
1.			
2.			
3.			
4.			
5.			
50%= 0 20%= 0 Total Cover: **0**			
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. *Cornus alba*	40	Yes	FACW
2. *Spiraea douglasii*	20	Yes	FACW
3. *Lonicera involucrata*	5	No	FAC
4. *Oemleria cerasiformis*	5	No	FACU
5.			
50%= 35 20%= 14 Total Cover: **70**			
Herb Stratum (Plot size: 5 ft r)			
1. *Phalaris arundinacea*	20	Yes	FACW
2. *Maianthemum dilatatum*	15	Yes	FAC
3. *Typha latifolia*	10	Yes	OBL
4. *Maianthemum stellatum*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
50%= 25 20%= 10 Total Cover: **50**			
Woody Vine Stratum (Plot size: 5 ft r)	**CHECK RANKED VALUES**		
1.			
2.			
Total Cover: **0**			
% Bare Ground in Herb Stratum **50** % Cover of Biotic Crust _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **5** (A)
Total Number of Dominant Species Across All Strata: **5** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**10**	x1 =	**10**
FACW species	**80**	x2 =	**160**
FAC species	**25**	x3 =	**75**
FACU species	**5**	x4 =	**20**
UPL species	**0**	x5 =	**0**
Column Totals:	**120** (A)		**265** (B)

Prevalence Index = B/A = **2.2**

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
_____ 4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
_____ 5 - Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes X No** _____

Remarks:

SOIL

Sampling Point: SP5

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100					SiL	peat ; decomposing wood
5-12	7.5YR 2.5/1	100					SiL	peat; decomposing wood
12-16	10YR 2/1	85	10YR 5/4	15	C	M	SiL	mucky

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Thick, dense roots

Depth (inches): 16

Hydric Soil Present? Yes X No ___

Remarks:
Refusal met a 16 inches due to thick roots.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water table Present? Yes X No ___ Depth (inches): 1

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? Yes X No ___

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

Remarks:

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

Project/Site: Edmonds Marsh City/County: DuPont/ Pierce County Sampling Date: 4/19/2022
Applicant/Owner: SPSSEG State: WA Sampling Point: SP6
Investigator(s): R. Mathonnet, G. Allen Section, Township, Range: T19-0N R1-0E S26
Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): convex Slope: 5-7
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.104968 Long: -122.638036 Datum: NAD83
Soil Map Unit Name: Dupont muck NWI Classification: PSSF
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks: Soil plot located along northwest boundary in lobe located 10 feet uphill from SP5.

VEGETATION

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Salix lasiandra*	50	Yes	FACW
2. *Alnus rubra*	10	No	FAC
3.			
4.			
5.			
50%= 30 20%= 12 Total Cover:	60		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. *Cornus alba*	65	Yes	FACW
2. *Symphoricarpos albus*	45	Yes	FACU
3. *Oemleria cerasiformis*	15	No	FACU
4. *Crataegus douglasii*	3	No	FAC
5. *Rubus ursinus*	3	No	FACU
50%= 65.5 20%= 26.2 Total Cover:	131		
Herb Stratum (Plot size: 5 ft r)	**CHECK RANKED VALUES**		
1. *Polystichum munitum*	15	Yes	FACU
2. *Maianthemum stellatum*	15	Yes	FAC
3. *Galium aparine*	10	Yes	FACU
4. *Pteridium aquilinum*	5	No	FACU
5.			
6.			
7.			
8.			
9.			
50%= 22.5 20%= 9 Total Cover:	45		
Woody Vine Stratum (Plot size: _____)	**CHECK RANKED VALUES**		
1.			
2.			
Total Cover:	0		
% Bare Ground in Herb Stratum 55 % Cover of Biotic Crust			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x1 =	0
FACW species	115	x2 =	230
FAC species	28	x3 =	84
FACU species	93	x4 =	372
UPL species	0	x5 =	0
Column Totals:	236 (A)		686 (B)

Prevalence Index = B/A = 2.9

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation
_____ 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
_____ 4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
_____ 5 - Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: SP6

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/1	100					L	gravel and cobble throughout profile

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Thick, dense roots

Depth (inches): 16

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks:
Refusal met a 16 inches due to thick roots.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No **X** Depth (inches): ___

Water table Present? Yes ___ No **X** Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No **X** Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

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

Remarks:

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

Project/Site: Edmond Marsh City/County: Dupont/Pierce County Sampling Date: 4/18/2022
Applicant/Owner: SPSSEG State: WA Sampling Point: SP-7
Investigator(s): R. Mathonnet, G. Allen Section, Township, Range: T19-0N R1-0E S25
Landform (hillslope, terrace, etc.): Marsh edge Local relief (concave, convex, none): none Slope: 1%
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.106 Long: -122.624 Datum: NAD83
Soil Map Unit Name: Semiahmoo muck NWI Classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" Present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes **X** No
Hydric Soil Present? Yes **X** No
Wetland Hydrology Present? Yes **X** No

Is the Sampled Area within a Wetland? **Yes X** **No**

Remarks:
Northeast side of East Marsh

VEGETATION

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status?
1.			
2.			
3.			
4.			
5.			
50%= 0 20%= 0 Total Cover: **0**			
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. *Rubus Spectabilis*	40	Yes	FAC
2. *Spiraea douglasii*	10	Yes	FACW
3.			
4.			
5.			
50%= 25 20%= 10 Total Cover: **50**			
Herb Stratum (Plot size: 5 ft r)			
1. *Athyrium cyclosorum*	15	Yes	FAC
2. *Gaultheria shallon*	2	No	FACU
3. *Ranunculus repens*	15	Yes	FAC
4. *Phalaris arundinacea*	5	No	FACW
5. *Maianthemum canadense*	15	Yes	FACU
6.			
7.			
8.			
9.			
50%= 26 20%= 10.4 Total Cover: **52**			
Woody Vine Stratum (Plot size: 15 ft r)	**CHECK RANKED VALUES**		
1.			
2.			
Total Cover: **0**			
% Bare Ground in Herb Stratum **48** % Cover of Biotic Crust			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **4** (A)
Total Number of Dominant Species Across All Strata: **5** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **80%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**15**	x2 =	**30**
FAC species	**70**	x3 =	**210**
FACU species	**17**	x4 =	**68**
UPL species	**0**	x5 =	**0**
Column Totals:	**102** (A)		**308** (B)

Prevalence Index = B/A = **3.0**

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- **X** 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
- 5 - Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes X** **No**

Remarks:

SOIL

Sampling Point: SP-7

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	N2.5/_	90	10YR 3/4	10	C	M	L	Mucky, large organic features
12-15	2.5Y 4/3	100					CL	
15-18	N2.5/_	100					SL	Mucky

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

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

Water table Present? Yes X No _____ Depth (inches): 3 in.

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 1 in.

Wetland Hydrology Present? **Yes** X **No** _____

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

Remarks:
Standing water 4 ft. away

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

Project/Site: Edmond Marsh City/County: DuPont/Pierce County Sampling Date: 4/18/2022
Applicant/Owner: SPSSEG State: WA Sampling Point: SP-8
Investigator(s): R. Mathonnet, G. Allen Section, Township, Range: T19-0N R1-0E S25
Landform (hillslope, terrace, etc.): gentle slope Local relief (concave, convex, none): none Slope: 1
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.106 Long: -122.624 Datum: NAD83
Soil Map Unit Name: Semiahmoo muck, 0 to 1 percent slopes NWI Classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" Present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks:
Uphill slightly from SP-7 10-12 ft.

VEGETATION

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Alnus rubra*	35	Yes	FAC
2. *Pseudotsuga menziesii*	60	Yes	FACU
3. *Tsuga heterophylla*	20	No	FACU
4.			
5.			
50%= 57.5 20%= 23	Total Cover: **115**		
Sapling/Shrub Stratum (Plot size:)			
1. *Corylus cornuta*	60	Yes	FACU
2. *Oemleria cerasiformis*	10	No	FACU
3. *Rubus spectabilis*	5	No	FAC
4. *Rosa nutkana*	5	No	FAC
5. *Holodiscus discolor*	10	No	FACU
50%= 45 20%= 18	Total Cover: **90**		
Herb Stratum (Plot size:)			
1. *Polystichum munitum*	80	Yes	FACU
2. *Pteridium aquilinum*	5	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
50%= 42.5 20%= 17	Total Cover: **85**		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	Total Cover: **0**		

% Bare Ground in Herb Stratum **15** % Cover of Biotic Crust

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)
Total Number of Dominant Species Across All Strata: **4** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **25%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**0**	x2 =	**0**
FAC species	**45**	x3 =	**135**
FACU species	**245**	x4 =	**980**
UPL species	**0**	x5 =	**0**
Column Totals:	**290** (A)		**1115** (B)

Prevalence Index = B/A = **3.8**

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
- 5 - Wetland Non-Vascular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes No X

Remarks:

SOIL

Sampling Point: SP-8

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100			D	M	SiL	
5-16	10YR 4/3	60	2.5YR 5/2	30	D	M	SiL	Dry, crumbly soil
			5Y 5/2	10	D	M	SiL	Gravel throughout

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Thick, dense roots

Depth (inches): 16

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks:
Refusal met a 16 inches due to thick roots, layer is permeable and does not perch water

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No **X** Depth (inches): ___

Water table Present? Yes ___ No **X** Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No **X** Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

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

Remarks:

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

Project/Site: Edmond Marsh City/County: DuPont/Pierce County Sampling Date: 4/20/2022
Applicant/Owner: SPSSEG State: WA Sampling Point: SP-11
Investigator(s): R. Mathonnet, G. Allen Section, Township, Range: T19-0N R1-0E S25
Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): none Slope: <1
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.106563 Long: -122.63105 Datum: NAD83
Soil Map Unit Name: Spanaway gravelly sandy loam NWI Classification: PSSF
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes **X** No _____
Hydric Soil Present? Yes **X** No _____
Wetland Hydrology Present? Yes **X** No _____

Is the Sampled Area within a Wetland? **Yes X** **No** _____

Remarks:
Soil plot located along East Marsh waters edge, north boundary

VEGETATION

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status?
1.			
2.			
3.			
4.			
5.			
50%= 0 20%= 0 Total Cover: **0**			
Sapling/Shrub Stratum (Plot size: _____)			
1. *Salix sitchensis*	30	Yes	FACW
2. *Spiraea douglasii*	75	Yes	FACW
3. *Lonicera involucrata*	15	No	FAC
4. *Malus sp.*	5	No	-
5.			
50%= 62.5 20%= 25 Total Cover: **125**			
Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
50%= 0 20%= 0 Total Cover: **0**			
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
Total Cover: **0**			

% Bare Ground in Herb Stratum **100** % Cover of Biotic Crust _____

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: **2** (B)

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

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**105**	x2 =	**210**
FAC species	**15**	x3 =	**45**
FACU species	**0**	x4 =	**0**
UPL species	**0**	x5 =	**0**
Column Totals:	**120** (A)		**255** (B)

Prevalence Index = B/A = **2.1**

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
_____ 4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
_____ 5 - Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes X** **No** _____

Remarks:

SOIL

Sampling Point: SP-11

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR 2/1	100					SL	Mucky
9-15	10YR 4/2	100					LS	Gravelly

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:
Refusal at 15 in., gravelly till, layer is permeable and does not perch water

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes X No _____ Depth (inches): 0.5 in.

Water table Present? Yes X No _____ Depth (inches): 0 in.

Saturation Present? (includes capillary fringe) Yes X No _____ Depth (inches): 0 in.

Wetland Hydrology Present? **Yes** X **No** _____

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

Remarks:

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

Project/Site: Edmond Marsh | City/County: DuPont/Pierce County | Sampling Date: 4/20/2022
Applicant/Owner: SPSSEG | State: WA | Sampling Point: SP-12
Investigator(s): R. Mathonnet, G. Allen | Section, Township, Range: T19-0N R1-0E S25
Landform (hillslope, terrace, etc.): gentle slope | Local relief (concave, convex, none): none | Slope: 1-3
Subregion (LRR): Northwest Forests and Coast (LRR A) | Lat: 47.106589 | Long: -122.631025 | Datum: NAD83
Soil Map Unit Name: Spanaway gravelly sandy loam | NWI Classification: PSSF
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks:
10-12 ft. upslope from SP-11

VEGETATION

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Pseudotsuga menziesii*	60	Yes	FACU
2. *Salix sitchensis*	20	Yes	FACW
3.			
4.			
5.			
50%= 40 20%= 16 Total Cover: **80**			
Sapling/Shrub Stratu (Plot size: _____)			
1. *Malus sp.*	30	Yes	-
2. *Ilex aquifolium*	5	No	FACU
3. *Corylus cornuta*	15	No	FACU
4. *Mahonia aquifolium*	3	No	FACU
5 *Oemleria cerasiformis*	3	No	FACU
6 *Rosa nutkana*	3	No	FAC
7 *Frangula purshiana*	25	Yes	FAC
8 *Symphoricarpos albus*	40	Yes	FACU
50%= 62 20%= 24.8 Total Cover: **124**			
Herb Stratum (Plot size: _____) **CHECK RANKED VALUES**			
1. *Linnaea borealis*	60	Yes	FACU
2. *Trillium ovatum*	2	No	FACU
3. *Pteridium aquilinum*	3	No	FACU
4. *Cirsium vulgare*	3	No	FACU
5. *Polystichum munitum*	5	No	FACU
6.			
50%= 36.5 20%= 14.6 Total Cover: **73**			
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
Total Cover: **0**			
% Bare Ground in Herb Stratum **27** % Cover of Biotic Crust _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)
Total Number of Dominant Species Across All Strata: **4** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **25%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**20**	x2 =	**40**
FAC species	**0**	x3 =	**0**
FACU species	**196**	x4 =	**784**
UPL species	**0**	x5 =	**0**
Column Totals:	**216** (A)		**824** (B)
Prevalence Index = B/A =			**3.8**

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation
_____ 2 - Dominance Test is >50%
_____ 3 - Prevalence Index is ≤3.0[1]
_____ 4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
_____ 5 - Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes _____ No **X**

Remarks:
(Internal Note: more species were noted on field notes than can fit in this form, how should we prioritize species for this form)

SOIL

Sampling Point: SP-12

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-11	10YR 2/1	100					L	
11-12	7.5Y 3/3	100					SL	Coarse, gravel and cobble

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Compacted gravel

Depth (inches): 12

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Refusal at 12 in. due to compacted gravelly till

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No **x** Depth (inches): ___

Water table Present? Yes ___ No **x** Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No **x** Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

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

Remarks:
Moist, but not saturated

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

Project/Site: Edmond Marsh City/County: DuPont/Pierce County Sampling Date: 4/20/2022
Applicant/Owner: SPSSEG State: WA Sampling Point: WD SP-1
Investigator(s): R. Mathonnet, G. Allen Section, Township, Range: T19-0N R1-0E S26
Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope: <1
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.106618 Long: -122.634635 Datum: NAD83
Soil Map Unit Name: Spanaway gravelly sandy loam NWI Classification: PSSA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes **X** No _____
Hydric Soil Present? Yes **X** No _____
Wetland Hydrology Present? Yes **X** No _____

Is the Sampled Area within a Wetland? **Yes X** **No** _____

Remarks:
Wetland D north of path

VEGETATION

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Alnus rubra*	30	Yes	FAC
2.			
3.			
4.			
5.			
50%= 15 20%= 6 Total Cover: **30**			
Sapling/Shrub Stratum (Plot size: _____)			
1. *Malus sp.*	15	No	-
2. *Cornus alba*	45	Yes	FACW
3. *Salix sitchensis*	55	Yes	FACW
4. *Spiraea douglasii*	15	No	FACW
5. *Lonicera involucrata*	15	No	FAC
50%= 72.5 20%= 29 Total Cover: **145**			
Herb Stratum (Plot size: _____) **CHECK RANKED VALUES**			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
50%= 0 20%= 0 Total Cover: **0**			
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
Total Cover: **0**			

% Bare Ground in Herb Stratum **100** % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **3** (A)
Total Number of Dominant Species Across All Strata: **3** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**115**	x2 =	**230**
FAC species	**45**	x3 =	**135**
FACU species	**0**	x4 =	**0**
UPL species	**0**	x5 =	**0**
Column Totals:	**160** (A)		**365** (B)

Prevalence Index = B/A = **2.3**

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
_____ 4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
_____ 5 - Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes X** **No** _____

Remarks:

SOIL

Sampling Point: WD SP-1

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100					SiL	
5-14	10Y 5/1	65	10YR 5/8	10	C	M	SL	Gravel, split matrix
5-14	2.5Y 4/1	20	7.5YR 3/4	5	C	M	SL	Gravel, split matrix

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Dense, thick roots

Depth (inches): 14

Hydric Soil Present? Yes X No ___

Remarks:
Refusal at 14 in. due to thick roots. Layer is permeable and does not perch water.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water table Present? Yes X No ___ Depth (inches): 4 in.

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0 in.

Wetland Hydrology Present? Yes X No ___

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

Remarks:
Slightly uphill of surface water

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

Project/Site: Edmond Marsh City/County: DuPont/Pierce County Sampling Date: 4/20/2022
Applicant/Owner: SPSSEG State: WA Sampling Point: WD SP-2
Investigator(s): R. Mathonnet, G. Allen Section, Township, Range: T19-0N R1-0E S26
Landform (hillslope, terrace, etc.): gentle slope Local relief (concave, convex, none): none Slope: 1-3
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.106535 Long: -122.634625 Datum: NAD83
Soil Map Unit Name: Spanaway gravelly sandy loam NWI Classification: PSSA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" Present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks:
Wetland D north of path

VEGETATION

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Pseudotsuga menziesii*	55	Yes	FACU
2. *Alnus rubra*	20	Yes	FAC
3.			
4.			
5.			
50%= 37.5 20%= 15 Total Cover:	**75**		
Sapling/Shrub Stratum (Plot size:)			
1. *Corylus cornuta*	70	Yes	FACU
2. *Oemleria cerasiformis*	5	No	FACU
3. *Rubus ursinus*	5	No	FACU
4. *Symphoricarpos albus*	30	Yes	FACU
5. *Frangula purshiana*	2	No	FAC
50%= 56 20%= 22.4 Total Cover:	**112**		
Herb Stratum (Plot size:)			
1. *Maianthemum canadense*	85	Yes	FACU
2. *Trillium ovatum*	5	No	FACU
3. *Polystichum munitum*	5	No	FACU
4. *Athyrium cyclosorum*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
50%= 50 20%= 20 Total Cover:	**100**		
Woody Vine Stratum (Plot size:)			
1.			
2.			
Total Cover:	**0**		
% Bare Ground in Herb Stratum **0** % Cover of Biotic Crust			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **1** (A)
Total Number of Dominant Species Across All Strata: **5** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **20%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**0**	x2 =	**0**
FAC species	**27**	x3 =	**81**
FACU species	**260**	x4 =	**1040**
UPL species	**0**	x5 =	**0**
Column Totals:	**287** (A)		**1121** (B)
Prevalence Index = B/A =	**3.9**		

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation
2 - Dominance Test is >50%
3 - Prevalence Index is ≤3.0[1]
4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
5 - Wetland Non-Vascular Plants[1]
Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes No **X**

Remarks:

SOIL

Sampling Point: WD SP-2

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	100					L	Slight gravel
8-14	2.5Y 4/1	95					SL	Cobbles, gravel
8-14	10YR 4/4	5					SL	Cobbles, gravel, split matrix

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Cobbles and gravel

Depth (inches): 14

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Refusal at 14 in. cobbles and gravel, layer is permeable and does not perch water

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water table Present? Yes X No ___ Depth (inches): 14 in.

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 12 in.

Wetland Hydrology Present? **Yes** X **No** ___

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

Remarks:
Heavy rain occurred for several days before and during the collection of data at WD SP-2

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

Project/Site: Edmond Marsh City/County: DuPont/Pierce County Sampling Date: 4/20/2022
Applicant/Owner: SPSSEG State: WA Sampling Point: WD SP-3
Investigator(s): R. Mathonnet, G. Allen Section, Township, Range: T19-0N R1-0E S26
Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): none Slope: <1
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.106544 Long: -122.635293 Datum: NAD83
Soil Map Unit Name: Spanaway gravelly sandy loam NWI Classification: PSSA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks:
South section of wetland D, north of trail

VEGETATION

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Alnus rubra*	15	Yes	FAC
2.			
3.			
4.			
5.			
50%= 7.5 20%= 3 Total Cover: **15**			
Sapling/Shrub Stratum (Plot size: _____)			
1. *Rubus spectabilis*	20	No	FAC
2. *Lonicera involucrata*	15	No	FAC
3. *Malus fusca*	80	Yes	FACW
4.			
5.			
50%= 57.5 20%= 23 Total Cover: **115**			
Herb Stratum (Plot size: _____)			
1. *Athyrium cyclosorum*	10	Yes	FAC
2. *Maianthemum canadense*	5	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
50%= 7.5 20%= 3 Total Cover: **15**			
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
Total Cover: **0**			
% Bare Ground in Herb Stratum **85** % Cover of Biotic Crust _____			

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: **4** (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: **75%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**80**	x2 =	**160**
FAC species	**60**	x3 =	**180**
FACU species	**5**	x4 =	**20**
UPL species	**0**	x5 =	**0**
Column Totals:	**145** (A)		**360** (B)

Prevalence Index = B/A = **2.5**

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
_____ 4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
_____ 5 - Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? **Yes X No _____**

Remarks:

SOIL

Sampling Point: WD SP-3

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/1	100					SiL	Mucky, sandy
3-11	2.5Y 2.5/1	97	10YR 6/1	3	D	M	SL	Gravelly

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Dense, thick roots

Depth (inches): 11

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Refusal at 11 in. due to thick roots

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water table Present? Yes X No ___ Depth (inches): 2

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

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

Remarks:
Iron deposits and oil looking sheen in surface water 3 ft. from plot

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

Project/Site: Edmond Marsh City/County: DuPont/Pierce County Sampling Date: 4/20/2022
Applicant/Owner: SPSSEG State: WA Sampling Point: WD SP-4
Investigator(s): R. Mathonnet, G. Allen Section, Township, Range: T19-0N R1-0E S26
Landform (hillslope, terrace, etc.): gentle slope Local relief (concave, convex, none): convex Slope: 1-3
Subregion (LRR): Northwest Forests and Coast (LRR A) Lat: 47.106339 Long: -122.635177 Datum: NAD83
Soil Map Unit Name: Spanaway gravelly sandy loam NWI Classification: PSSA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" Present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks:
South section of Wetland D 6 ft upload of WD SP-1

VEGETATION

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status?
1. *Pseudotsuga menziesii*	40	Yes	FACU
2. *Alnus rubra*	25	Yes	FAC
3.			
4.			
5.			
50%= 32.5 20%= 13 Total Cover: **65**			
Sapling/Shrub Stratum (Plot size: _____)			
1. *Corylus cornuta*	30	Yes	FACU
2. *Lonicera involucrata*	20	Yes	FAC
3. *Rubus spectabilis*	10	No	FAC
4. *Oemleria cerasiformis*	3	No	FACU
5. *Ilex aquifolium*	15	No	FACU
50%= 39 20%= 15.6 Total Cover: **78**			
Herb Stratum (Plot size: _____) **CHECK RANKED VALUES**			
1. *Polystichum munitum*	35	Yes	FACU
2. *Maianthemum canadense*	30	Yes	FACU
3. *Rubus ursinus*	5	No	FACU
4. *Athyrium cyclosorum*	15	No	FAC
5.			
6.			
7.			
8.			
9.			
50%= 42.5 20%= 17 Total Cover: **85**			
Woody Vine Stratum (Plot size: _____) **CHECK RANKED VALUES**			
1.			
2.			
Total Cover: **0**			
% Bare Ground in Herb Stratum **15** % Cover of Biotic Crust _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: **2** (A)
Total Number of Dominant Species Across All Strata: **6** (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: **33%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL species	**0**	x1 =	**0**
FACW species	**0**	x2 =	**0**
FAC species	**70**	x3 =	**210**
FACU species	**158**	x4 =	**632**
UPL species	**0**	x5 =	**0**
Column Totals:	**228** (A)		**842** (B)

Prevalence Index = B/A = **3.7**

Hydrophytic Vegetation Indicators:

_____ 1 - Rapid Test for Hydrophytic Vegetation
_____ 2 - Dominance Test is >50%
_____ 3 - Prevalence Index is ≤3.0[1]
_____ 4 - Morphological Adaptation[1] (Provide supporting data in Remarks or on a separate sheet)
_____ 5 - Wetland Non-Vascular Plants[1]
_____ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes _____ No **X**

Remarks:

SOIL

Sampling Point: WD SP-4

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/1	100					L	

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

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

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: Thick roots and cobble

Depth (inches): 10

Hydric Soil Present? **Yes** ___ **No** **X**

Remarks:
Refusal at 10 in., large roots and cobble, layer is permeable and does not perch water

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No **X** Depth (inches): ___

Water table Present? Yes ___ No **X** Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No **X** Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** **X**

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

Remarks:

Appendix C
Wetland Rating Forms

Wetland name or number: Edmond Marsh

RATING SUMMARY - Western Washington

Name of wetland (or ID#): Edmond Marsh **Date of site visit:** 04/18/2022
Rated By: Gabriel Allen **Trained by Ecology? Yes** [X] **No** [ ] **Date of Training:** 06/03/2022
HGM Class used for rating: Depressional
Wetland has multiple HGM classes? Yes [ ] **No** [X]

NOTE: Form is not complete without the figures requested *(figures can be combined).*
Source of base aerial photo/map:

OVERALL WETLAND CATEGORY: [**Category II**] (based on functions [X] or special characteristics [ ])

1. Category of wetland based on FUNCTIONS

[ ] **Category I** - Total score = 23 - 27
[X] **Category II** - Total score = 20 - 22
[ ] **Category III** - Total score = 16 - 19
[ ] **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Site Potential	**H**	**M**	**H**	
Landscape Potential	**M**	**M**	**M**	
Value	**H**	**L**	**H**	**Total**
Score Based on Ratings	**8**	**5**	**8**	**21**

Score for each function based on three ratings (order of ratings is not important)
9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	
Wetland of High Conservation Value	
Bog	
Forested	
Coastal Lagoon	
Interdunal	
None of the above	**Not Applicable**

Wetland name or number: Edmond Marsh

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet *(can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1km Polygon: Area that extends 1km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Wetland name or number: Edmond Marsh

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0 Does the site have the potential to improve water quality?

D 1.1 What are the characteristics of surface water outflows from the wetland?		
Wetland has no surface water outlet.	points = 3	
Wetland has an intermittently flowing, or highly constricted, outlet.	points = 2	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 1	
Wetland is a flat depression whose outlet is a permanently flowing ditch.	points = 1	**Score: 1**
D 1.2 Can the soil 2in below the surface be identified as true clay or organic soil?		
Mapped as true clay or organic (muck or peat)	points = 4	
Soil texture identified as clay or organic in field	points = 4	
Soil texture identified as clay or organic by laboratory test	points = 4	
None of the above	points = 0	**Score: 4**
D 1.3 What are the characteristics and distribution of persistent plants?		
Wetland has persistent, ungrazed, plants > 95% of area	points = 5	
Wetland has persistent, ungrazed, plants > 50% of area	points = 3	
Wetland has persistent, ungrazed plants > 10% of area	points = 1	
Wetland has persistent, ungrazed plants < 10% of area	points = 0	**Score: 5**
D 1.4 What are the characteristics of seasonal ponding or inundation in the wetland area?		
Area seasonally ponded is > 50% total area of wetland	points = 4	
Area seasonally ponded is > 25% total area of wetland	points = 2	
Area seasonally ponded is < 25% total area of wetland	points = 0	**Score: 4**
	Total for D 1:	**14**

Rating of Site Potential [X] **12-16 = H** [ ] **6-11 = M** [ ] **0-5 = L** *Record the rating on the first page*

D 2.0 Does the landscape have the potential to support the water quality function of the site?

D 2.1 Does the wetland unit receive stormwater discharges?		
Yes	points = 1	
No	points = 0	**Score: 1**
D 2.2 Is >10% of the area within 150ft of the wetland in land uses that generate pollutants in surface runoff?		
Yes	points = 1	
No	points = 0	**Score: 0**
D 2.3 Are there septic systems within 250ft of the wetland?		
Yes	points = 1	
No	points = 0	**Score: 0**
D 2.4 Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3?		
Yes	points = 1	
No	points = 0	**Score: 0**

Wetland name or number: Edmond Marsh

D 2.5 What are the other sources of pollutants coming into the wetland?	
Total for D 2:	**1**

Rating of Landscape Potential [ ] **3-4 = H** [X] **1-2 = M** [ ] **0 = L** *Record the rating on the first page*

D 3.0 Is the water quality improvement provided by the site valuable to society?		
D 3.1 Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?		
Yes	points = 1	
No	points = 0	**Score: 0**
D 3.2 Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list?		
Yes	points = 1	
No	points = 0	**Score: 1**
D 3.3 Has the site been identified in a watershed or local plan as important for maintaining water quality?		
Yes	points = 2	
No	points = 0	**Score: 2**
Total for D 3:		**3**

Rating of Value [X] **2-4 = H** [ ] **1 = M** [ ] **0 = L** *Record the rating on the first page*

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradtion

D 4.0 Does the site have the potential to reduce flooding and erosion?		
D 4.1 What are the characteristics of surface water outflows from the wetland?		
Wetland has no surface water outlet.	points = 4	
Wetland has an intermittently flowing, or highly constricted, outlet.	points = 2	
Wetland is a flat depression whose outlet is a permanently flowing ditch.	points = 1	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	**Score: 0**
D 4.2 What is the depth of storage during the wet periods?		
Marks of ponding are 3ft or more above the surface or bottom of the outlet.	points = 7	
Marks of ponding are between 2ft to <3ft from the surface or bottom of the outlet.	points = 5	
Marks of ponding are at least 0.5ft to <2ft from the surface or the bottom of the outlet.	points = 3	
The wetland is a "headwater" wetland.	points = 3	
The wetland is flat but has small depressions on the surface that trap water.	points = 1	
Marks of ponding are less than 0.5ft (6in).	points = 0	**Score: 7**

Wetland name or number: Edmond Marsh

D 4.3 What is the contribution of the wetland to storage in the watershed?		
The area of the basin is less than 10 times the area of the unit	points = 5	
The area of the basin is 10 to 100 times the area of the unit	points = 3	
The area of the basin is more than 100 times the area of the unit	points = 0	
Entire wetland is in the Flats class	points = 5	**Score: 3**
	Total for D 4:	**10**

Rating of Site Potential [ ] **12-16 = H** [X] **6-11 = M** [ ] **0-5 = L** *Record the rating on the first page*

D 5.0 Does the landscape have the potential to support hydrologic functions of the site?		
D 5.1 Does the wetland unit receive stormwater discharges?		
Yes	points = 1	
No	points = 0	**Score: 1**
D 5.2 Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff?		
Yes	points = 1	
No	points = 0	**Score: 0**
D 5.3 Is more than 25% of the contributing basin of the wetland covered with intensive human land uses?		
Yes	points = 1	
No	points = 0	**Score: 1**
	Total for D 5:	**2**

Rating of Landscape Potential [ ] **3 = H** [X] **1-2 = M** [ ] **0 = L** *Record the rating on the first page*

D 6.0 Are the hydrologic functions provided by the site valuable to society?		
D 6.1 Is the wetland in a landscape that has flooding problems?		
Flooding occurs in a sub-basin that is immediately down-gradient of the wetland.	points = 2	
Surface flooding problems are in a sub-basin farther down-gradient.	points = 1	
Flooding from groundwater is an issue in the basin.	points = 1	
The existing or potential outflow from the wetland is so constrained that water cannot reach areas that flood.	points = 0	
There are no problems with flooding downstream of the wetland.	points = 0	**Score: 0**
D 6.2 Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?		
Yes	points = 2	
No	points = 0	**Score: 0**
	Total for D 6:	**0**

Rating of Value [ ] **2-4 = H** [ ] **1 = M** [X] **0 = L** *Record the rating on the first page*

Wetland name or number: Edmond Marsh

HABITAT FUNCTIONS

These questions apply to wetlands of all HGM classes - Indicators that the site functions to provide important habitat

H 1.0 Does the wetland have the potential to provide habitat for many species?

H 1.1 What is the structure of the plant community?

- [ ] Aquatic Bed
- [x] Emergent
- [x] Scrub-shrub
- [x] Forested
- [x] Multiple strata within the Forested class (canopy, sub-canopy, shrubs, herbaceous, moss/ground cover)

4 structures or more	points = 4	
3 structures	points = 2	
2 structures	points = 1	
1 structure	points = 0	
No structures present	points = 0	**Score: 4**

H 1.2 What are the hydroperiods that meet the size thresholds in the wetland?

- [ ] Permanently flooded or inundated
- [x] Seasonally flooded or inundated
- [ ] Occasionally flooded or inundated
- [x] Saturated only
- [ ] Permanently flowing stream or river in, or adjacent to, the wetland
- [ ] Seasonally flowing stream in, or adjacent to, the wetland
- [ ] Lake Fringe wetland
- [ ] Freshwater Tidal wetland

4 or more types present	points = 3	
3 types present or Lake Fringe / Freshwater Tidal Fringe	points = 2	
2 types present	points = 1	
1 type present	points = 0	
None present	points = 0	**Score: 1**

H 1.3 What is the richness of the plant species in the wetland?

>19 species	points = 2	
5-19 species	points = 1	
<5 species	points = 0	**Score: 2**

Wetland name or number: Edmond Marsh

H 1.4 What is the interspersion of habitats?

High	points = 3	
Moderate	points = 2	
Low	points = 1	
None	points = 0	**Score: 3**

H 1.5 What are the special habitat features in the wetland?

- [✓] Large, downed, woody debris within the wetland (>4in diameter and 6ft long).
- [✓] Standing snags (dbh >4in) within the wetland
- [✓] Undercut banks are present for at least 6.6ft (2m) and/or overhanging plants extend at least 3.3ft (1m) over open water or a stream (or ditch) in, or contiguous with the wetland, for at least 33ft (10m)
- [✓] Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30 degree slope) OR signs of recent beaver activity are present (cut shrubs or trees that have not yet weathered where wood is exposed)
- [✓] At least 0.25ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (structures for egg-laying by amphibians)
- [ ] Invasive plants cover less than 25% of the wetland area in every stratum of plants (see H 1.1 for list of strata)

6 habitats selected	points = 6	
5 habitats selected	points = 5	
4 habitats selected	points = 4	
3 habitats selected	points = 3	
2 habitats selected	points = 2	
1 habitat selected	points = 1	
No habitats selected	points = 0	**Score: 5**

Total for H 1: **15**

Rating of Site Potential [X] **15-18 = H** [ ] **7-14 = M** [ ] **0-6 = L** *Record the rating on the first page*

H 2.0 Does the landscape have the potential to support habitat functions of the site?

H 2.1 What is the percentage of accessible habitat within 1km of the wetland?

>33% of 1km Polygon	points = 3	
20-33% of 1km Polygon	points = 2	
10-19% of 1km Polygon	points = 1	
<10% of 1km Polygon	points = 0	**Score: 1**

H 2.2 What is the percentage of total habitat in a 1km polygon around the wetland?

Total habitat is >50% of the Polygon	points = 3	
Total habitat is 10-50% of the Polygon and in 1-3 patches	points = 2	
Total habitat is 10-50% of the Polygon and in >3 patches	points = 1	
Total habitat is <10% of the Polygon	points = 0	**Score: 1**

Wetland name or number: Edmond Marsh

H 2.3 What is the land use intensity in the 1km polygon?

50% of the Polygon is high intensity land use	points = -2	
<50% of the Polygon is high intensity land use	points = 0	**Score: 0**
	Total for H 2:	**2**

Rating of Landscape Potential [ ] **4-6 = H** [X] **1-3 = M** [ ] **0 = L** *Record the rating on the first page*

H 3.0 Is the habitat provided by the site valuable to society?

H 3.1 Does the site provide habitat for species valued in laws, regulations, or policies?

- [ ] Aspen Stands
- [ ] Biodiversity Areas and Corridors
- [ ] Herbaceous Balds
- [ ] Old-growth/Mature Forests
- [✓] Oregon White Oak
- [✓] Riparian
- [ ] Westside Prarie
- [ ] Fresh Deepwater
- [✓] Instream
- [ ] Nearshore (Coastal, Open Coast, Puget Sound)
- [ ] Caves
- [ ] Cliffs
- [✓] Snags and Logs
- [ ] Talus

The following criteria automatically score 2 points:

- [ ] The wetland provides habitat for Threatened or Endangered species
- [ ] The wetland is mapped as a location for an individual WDFW priority species
- [ ] The wetland is a Wetland of High Conservation Value
- [ ] The wetland has been categorized as an important habitat site in a local plan

The wetland has 3 or more WDFW priority habitats within 100m, or meets the criteria for societal value	points = 2	
The site has 1 or 2 WDFW priority habitats within 100m	points = 1	
The site does not meet any of the criteria for societal value	points = 0	**Score: 2**
	Total for H 3:	**2**

Rating of Value [X] **2 = H** [ ] **1 = M** [ ] **0 = L** *Record the rating on the first page*

Wetland name or number: Edmond Marsh

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

SC 1.0 Estuarine Wetlands

SC 1.1 Does the wetland meet all of the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal
☐ The wetland is vegetated
☐ The water salinity is greater than 0.5 ppt

Yes - Go to SC 1.2
No - Not an Estuarine Wetland **Result:**

SC 1.2 Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

Yes - Category I Estuarine Wetland
No - Go to SC 1.3 **Result:**

SC 1.3 Is the wetland unit at least 1ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 10% cover of non-native plant species.
☐ At least 75% of the landward edge of the wetland has a 100ft buffer of shrub, forest, or un-grazed or un-mowed grassland
☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

Yes - Category I Estuarine Wetland
No - Category II Estuarine Wetland **Result:**

SC 2.0 Wetlands of High Conservation Value

SC 2.1 Is the wetland listed by Washington Natural Heritage Program WDNR as a Wetland of High Conservation Value (WHCV)?

Yes - Category I Wetland of High Conservation Value
No - Go to SC 2.2 **Result: Go to SC 2.2**

SC 2.2 Does the wetland have a rare plant species, rare plant community, or high-quality common plant community that may qualify the site as a WHCV?

Yes - Category I Wetland of High Conservation Value

No - Not a Wetland of High Conservation Value **Result: Not a Wetland of High Conservation Value**

Wetland name or number: Edmond Marsh

SC 3.0 Bogs

SC 3.1 Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16in or more of the first 32in of the soil profile?

Yes - Go to SC 3.3
No - Go to SC 3.2 **Result: Go to SC 3.2**

SC 3.2 Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

Yes - Go to SC 3.3

No - Not a Bog Wetland **Result: Not a Bog Wetland**

SC 3.3 Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least 30% cover of plant species listed in the table provided in the instructions?

Yes - Category I Bog Wetland
No - Go to SC 3.4 **Result:**

SC 3.4 Is an area with peats or mucks forested (>30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann Spruce, or western white pine AND any of the species (or combinations of species) listed in the table found in the instructions provide more than 30% of the cover under the canopy?

Yes - Category I Bog Wetland
No - Not a Bog Wetland **Result:**

SC 4.0 Forested Wetlands

SC 4.1 Does the wetland have at least 1 contiguous acre of forest that meets one of the following criteria?

☐ Old-growth forests
☐ Mature forests

Yes - Category I Forested Wetland

No - Not a Forested Wetland **Result: Not a Forested Wetland**

Wetland name or number: Edmond Marsh

SC 5.0 Wetlands in Coastal Lagoons

SC 5.1 Coastal Lagoons: Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or rocks

☐ The depression in which the wetland is located contains ponded water that is saline or brackish (>0.5 ppt) during most of the year in at least a portion of the open water area (measured near the bottom)

Yes - Go to SC 5.2

No - Not a Coastal Lagoon Wetland

Result: Not a Coastal Lagoon Wetland

SC 5.2 Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species).

☐ At least 75% of the landward edge of the wetland has a 100ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ the wetland is larger than 0.10ac (4350 sqft)

Yes - Category I Coastal Lagoon

No - Category II Coastal Lagoon

Result:

SC 6.0 Interdunal Wetlands

SC 6.1 Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership WBUO)?

Yes - Go to SC 6.2

No - Not an Interdunal Wetland

Result: Not an Interdunal Wetland

SC 6.2 Is the wetland 1ac or larger in size, or a mosaic that is 1ac or larger in size?

Wetland is larger than 1ac in size - Go to SC 6.3

Wetland is a mosaic larger than 1ac is size - Category II Interdunal Wetland

No - Go to SC 6.4

Result:

SC 6.3 Does the wetland score 8 or 9 points for the habitat functions?

Yes - Category I Interdunal Wetland

No - Category II Interdunal Wetland

Result:

SC 6.4 Is the wetland unit between 0.1ac and 1ac, or in a mosaic of wetlands that is between 0.1ac and 1ac in size?

Yes - Category III Interdunal Wetland

No - Category IV Interdunal Wetland

Result:

Wetland name or number: Edmond Marsh

Category of wetland based on Special Characteristics	
If you answered No for all types, enter "Not Applicable" on Summary Form	**Final Category: Not Applicable**

Legend | Wetland Tools | Zoom | Tools

Add/Remove map data layers

Location of Outlet Items

Wetland

Outlet location

Project: **Edmond Marsh** Wetland: **Edmond Marsh** (Depressional) Date: **08/11/2022**

Legend | Wetland Tools | Zoom | Tools

Add/Remove map data layers

Cowardin Plant Class Items

Cowardin Classes

Forested

Scrub-shrub

Emergent

Aquatic bed

Open water

Wetland/Unmapped wetland

Project: **Edmond Marsh** Wetland: **Edmond Marsh** (Depressional) Date: **08/11/2022**

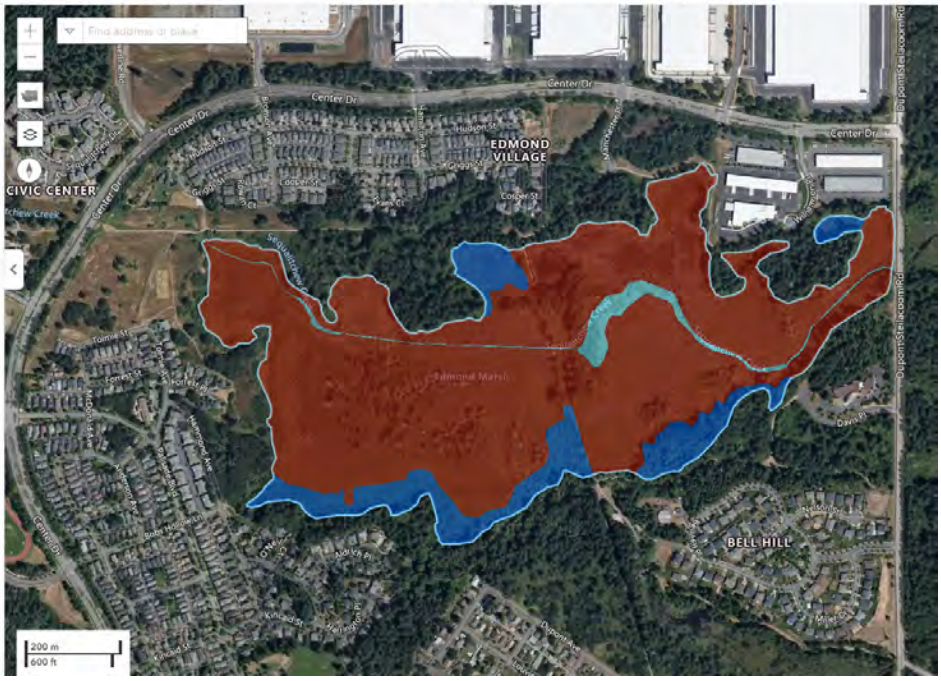
Legend | Wetland Tools | Zoom | Tools

Add/Remove map data layers

Hydroperiod Items

- Permanent Stream
- Seasonal Stream
- Permanently
- Seasonally
- Ocasionally
- Saturated only
- Wetland/Unmapped wetland

Project: **Edmond Marsh** Wetland: **Edmond Marsh** (Depressional) Date: **08/11/2022**



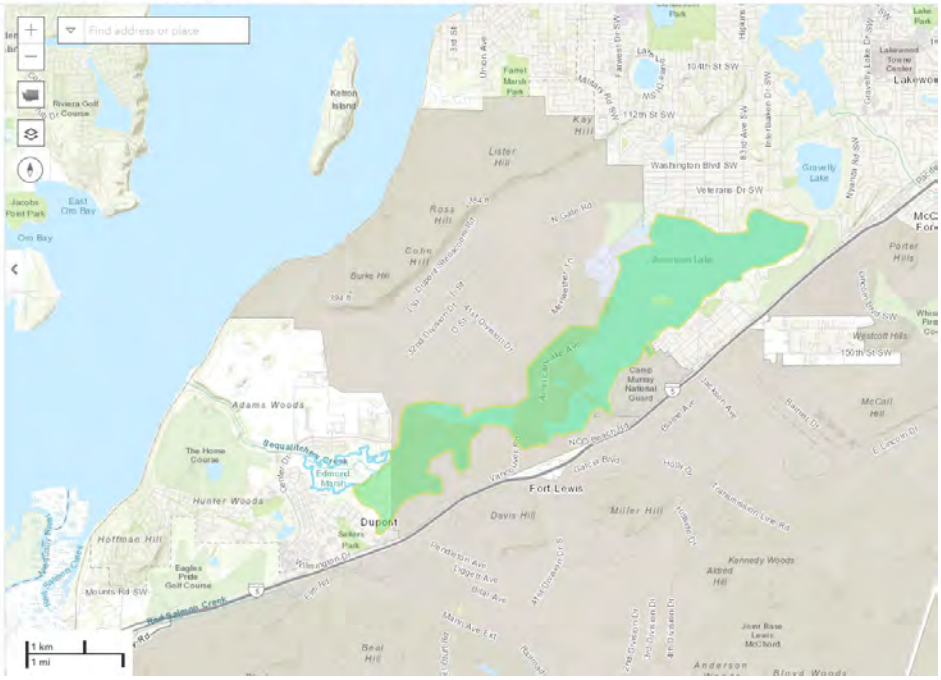
Legend | Wetland Tools | Zoom | Tools

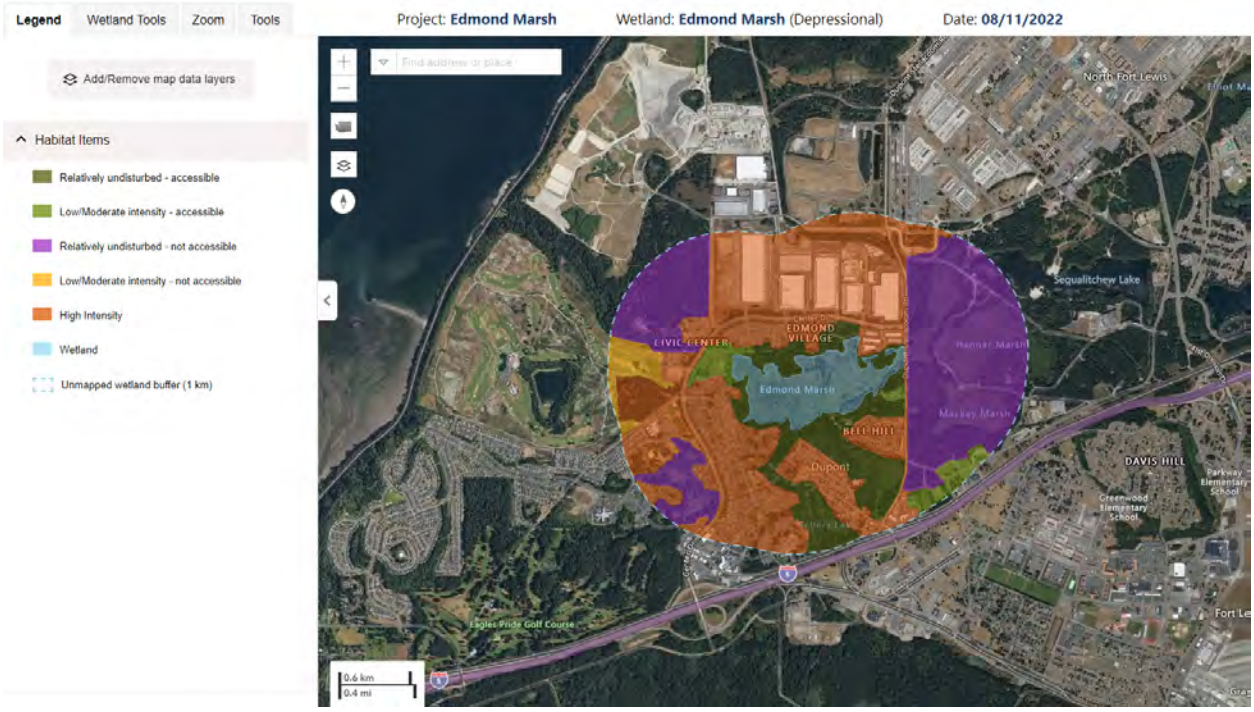
Add/Remove map data layers

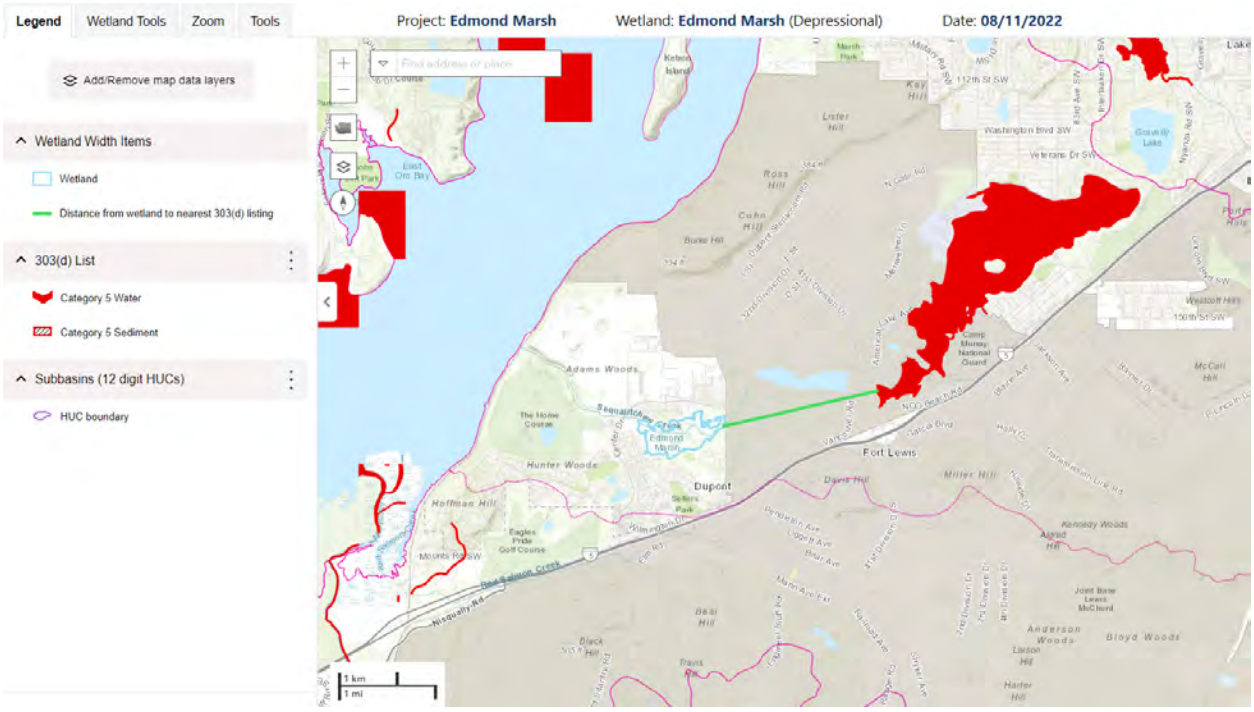
Contributing Basin Items

- Wetland
- Contributing basin

Project: **Edmond Marsh** Wetland: **Edmond Marsh** (Depressional) Date: **08/11/2022**




Legend
Wetland Tools
Zoom
Tools
Add/Remove map data layers
Habitat Items
Relatively undisturbed - accessible
Low/Moderate intensity - accessible
Relatively undisturbed - not accessible
Low/Moderate intensity - not accessible
High Intensity
Wetland
Unmapped wetland buffer (1 km)
Project: Edmond Marsh
Wetland: Edmond Marsh (Depressional)
Date: 08/11/2022
Find address or place
North Fort Lewis
Sequalitchew Lake
CIVIC CENTER
EDMOND VILLAGE
Edmond Marsh
BELL HILL
Dupont
Hanner Marsh
Mackey Marsh
DAVIS HILL
Parkway Elementary School
Greenwood Elementary School
Eagles Pride Golf Course
0.6 km
0.4 mi

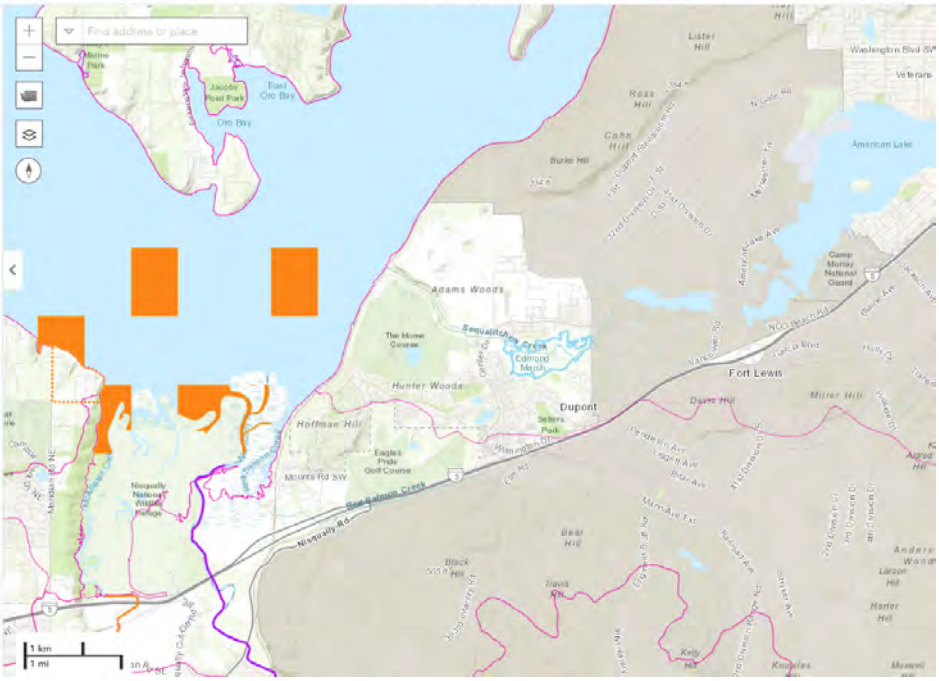

Legend
Wetland Tools
Zoom
Tools
Add/Remove map data layers
Wetland Width Items
Wetland
Distance from wetland to nearest 303(d) listing
303(d) List
Category 5 Water
Category 5 Sediment
Subbasins (12 digit HUCs)
HUC boundary
Project: Edmond Marsh
Wetland: Edmond Marsh (Depressional)
Date: 08/11/2022
Find address or place
Lister Hill
Ross Hill
Burke Hill
Cohn Hill
Washington Blvd SW
112th St SW
Veterans Dr SW
Gravelly Lake
Adams Woods
Sequalitchew Creek
Edmond Marsh
Hunter Woods
Dupont
Fort Lewis
Miller Hill
Hoffman Hill
Eagles Pride Golf Course
Nisqually Rd
Bear Hill
Black Hill
Travis
Kennedy Woods
Anderson Woods
Bloyd Woods
Larson Hill
Harter Hill
McCarr Hill
Camp Murray National Guard
150th St SW
1 km
1 mi

Legend | Wetland Tools | Zoom | Tools

Add/Remove map data layers

- TMDL Items
  - Wetland
- 305(b) List
  - Category 4A Water
  - Category 4A Sediment
  - Category 4B Water
  - Category 4B Sediment
  - Category 4C Water
- Subbasins (12 digit HUCs)
  - HUC boundary

Project: **Edmond Marsh** Wetland: **Edmond Marsh** (Depressional) Date: **08/11/2022**



Legend | Wetland Tools | Zoom | Tools

Add/Remove map data layers

- Habitat Items
  - Generates exessive runoff
  - Generates pollutants
  - Generates exessive runoff and pollutants
  - Upland within 150' wetland buffer
  - Wetland
  - Wetland buffer (150')

Project: **Edmond Marsh** Wetland: **Edmond Marsh** (Depressional) Date: **08/11/2022**

Wetland name or number: Wetland 1-D

RATING SUMMARY - Western Washington

Name of wetland (or ID#): Wetland 1-D **Date of site visit:** 04/20/2022
Rated By: Gabriel Allen **Trained by Ecology? Yes** [X] **No** [ ] **Date of Training:** 06/08/2022
HGM Class used for rating: Depressional
Wetland has multiple HGM classes? Yes [ ] **No** [X]

NOTE: Form is not complete without the figures requested *(figures can be combined).*
Source of base aerial photo/map:

OVERALL WETLAND CATEGORY: [**Category II**] (based on functions [X] or special characteristics [ ])

1. Category of wetland based on FUNCTIONS

[ ] **Category I** - Total score = 23 - 27
[X] **Category II** - Total score = 20 - 22
[ ] **Category III** - Total score = 16 - 19
[ ] **Category IV** - Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
Site Potential	**H**	**M**	**M**	
Landscape Potential	**M**	**M**	**M**	
Value	**H**	**L**	**H**	**Total**
Score Based on Ratings	**8**	**5**	**7**	**20**

Score for each function based on three ratings (order of ratings is not important)
9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	
Wetland of High Conservation Value	
Bog	
Forested	
Coastal Lagoon	
Interdunal	
None of the above	**Not Applicable**

Wetland name or number: Wetland 1-D

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet *(can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1km Polygon: Area that extends 1km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Wetland name or number: Wetland 1-D

DEPRESSIONAL AND FLATS WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

D 1.0 Does the site have the potential to improve water quality?

D 1.1 What are the characteristics of surface water outflows from the wetland?		
Wetland has no surface water outlet.	points = 3	
Wetland has an intermittently flowing, or highly constricted, outlet.	points = 2	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 1	
Wetland is a flat depression whose outlet is a permanently flowing ditch.	points = 1	**Score: 3**
D 1.2 Can the soil 2in below the surface be identified as true clay or organic soil?		
Mapped as true clay or organic (muck or peat)	points = 4	
Soil texture identified as clay or organic in field	points = 4	
Soil texture identified as clay or organic by laboratory test	points = 4	
None of the above	points = 0	**Score: 0**
D 1.3 What are the characteristics and distribution of persistent plants?		
Wetland has persistent, ungrazed, plants > 95% of area	points = 5	
Wetland has persistent, ungrazed, plants > 50% of area	points = 3	
Wetland has persistent, ungrazed plants > 10% of area	points = 1	
Wetland has persistent, ungrazed plants < 10% of area	points = 0	**Score: 5**
D 1.4 What are the characteristics of seasonal ponding or inundation in the wetland area?		
Area seasonally ponded is > 50% total area of wetland	points = 4	
Area seasonally ponded is > 25% total area of wetland	points = 2	
Area seasonally ponded is < 25% total area of wetland	points = 0	**Score: 4**
	Total for D 1:	**12**

Rating of Site Potential [X] **12-16 = H** [ ] **6-11 = M** [ ] **0-5 = L** *Record the rating on the first page*

D 2.0 Does the landscape have the potential to support the water quality function of the site?

D 2.1 Does the wetland unit receive stormwater discharges?		
Yes	points = 1	
No	points = 0	**Score: 1**
D 2.2 Is >10% of the area within 150ft of the wetland in land uses that generate pollutants in surface runoff?		
Yes	points = 1	
No	points = 0	**Score: 0**
D 2.3 Are there septic systems within 250ft of the wetland?		
Yes	points = 1	
No	points = 0	**Score: 0**
D 2.4 Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3?		
Yes	points = 1	
No	points = 0	**Score: 1**

Wetland name or number: Wetland 1-D

D 2.5 What are the other sources of pollutants coming into the wetland?
Dogs on trails in and around the wetland

Total for D 2: 2

Rating of Landscape Potential [ ] **3-4 = H** [X] **1-2 = M** [ ] **0 = L** *Record the rating on the first page*

D 3.0 Is the water quality improvement provided by the site valuable to society?

D 3.1 Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list?

Yes	points = 1	
No	points = 0	**Score: 0**

D 3.2 Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list?

Yes	points = 1	
No	points = 0	**Score: 1**

D 3.3 Has the site been identified in a watershed or local plan as important for maintaining water quality?

Yes	points = 2	
No	points = 0	**Score: 2**

Total for D 3: 3

Rating of Value [X] **2-4 = H** [ ] **1 = M** [ ] **0 = L** *Record the rating on the first page*

DEPRESSIONAL AND FLATS WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream degradtion

D 4.0 Does the site have the potential to reduce flooding and erosion?

D 4.1 What are the characteristics of surface water outflows from the wetland?

Wetland has no surface water outlet.	points = 4	
Wetland has an intermittently flowing, or highly constricted, outlet.	points = 2	
Wetland is a flat depression whose outlet is a permanently flowing ditch.	points = 1	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	**Score: 4**

D 4.2 What is the depth of storage during the wet periods?

Marks of ponding are 3ft or more above the surface or bottom of the outlet.	points = 7	
Marks of ponding are between 2ft to <3ft from the surface or bottom of the outlet.	points = 5	
Marks of ponding are at least 0.5ft to <2ft from the surface or the bottom of the outlet.	points = 3	
The wetland is a "headwater" wetland.	points = 3	
The wetland is flat but has small depressions on the surface that trap water.	points = 1	
Marks of ponding are less than 0.5ft (6in).	points = 0	**Score: 3**

Wetland name or number: Wetland 1-D

D 4.3 What is the contribution of the wetland to storage in the watershed?		
The area of the basin is less than 10 times the area of the unit	points = 5	
The area of the basin is 10 to 100 times the area of the unit	points = 3	
The area of the basin is more than 100 times the area of the unit	points = 0	
Entire wetland is in the Flats class	points = 5	**Score: 3**
	Total for D 4:	**10**

Rating of Site Potential [ ] **12-16 = H** [X] **6-11 = M** [ ] **0-5 = L** *Record the rating on the first page*

D 5.0 Does the landscape have the potential to support hydrologic functions of the site?		
D 5.1 Does the wetland unit receive stormwater discharges?		
Yes	points = 1	
No	points = 0	**Score: 1**
D 5.2 Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff?		
Yes	points = 1	
No	points = 0	**Score: 0**
D 5.3 Is more than 25% of the contributing basin of the wetland covered with intensive human land uses?		
Yes	points = 1	
No	points = 0	**Score: 1**
	Total for D 5:	**2**

Rating of Landscape Potential [ ] **3 = H** [X] **1-2 = M** [ ] **0 = L** *Record the rating on the first page*

D 6.0 Are the hydrologic functions provided by the site valuable to society?		
D 6.1 Is the wetland in a landscape that has flooding problems?		
Flooding occurs in a sub-basin that is immediately down-gradient of the wetland.	points = 2	
Surface flooding problems are in a sub-basin farther down-gradient.	points = 1	
Flooding from groundwater is an issue in the basin.	points = 1	
The existing or potential outflow from the wetland is so constrained that water cannot reach areas that flood.	points = 0	
There are no problems with flooding downstream of the wetland.	points = 0	**Score: 0**
D 6.2 Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?		
Yes	points = 2	
No	points = 0	**Score: 0**
	Total for D 6:	**0**

Rating of Value [ ] **2-4 = H** [ ] **1 = M** [X] **0 = L** *Record the rating on the first page*

Wetland name or number: Wetland 1-D

HABITAT FUNCTIONS

These questions apply to wetlands of all HGM classes - Indicators that the site functions to provide important habitat

H 1.0 Does the wetland have the potential to provide habitat for many species?

H 1.1 What is the structure of the plant community?

- [ ] Aquatic Bed
- [ ] Emergent
- [x] Scrub-shrub
- [x] Forested
- [x] Multiple strata within the Forested class (canopy, sub-canopy, shrubs, herbaceous, moss/ground cover)

4 structures or more	points = 4	
3 structures	points = 2	
2 structures	points = 1	
1 structure	points = 0	
No structures present	points = 0	**Score: 2**

H 1.2 What are the hydroperiods that meet the size thresholds in the wetland?

- [ ] Permanently flooded or inundated
- [x] Seasonally flooded or inundated
- [ ] Occasionally flooded or inundated
- [x] Saturated only
- [ ] Permanently flowing stream or river in, or adjacent to, the wetland
- [ ] Seasonally flowing stream in, or adjacent to, the wetland
- [ ] Lake Fringe wetland
- [ ] Freshwater Tidal wetland

4 or more types present	points = 3	
3 types present or Lake Fringe / Freshwater Tidal Fringe	points = 2	
2 types present	points = 1	
1 type present	points = 0	
None present	points = 0	**Score: 1**

H 1.3 What is the richness of the plant species in the wetland?

>19 species	points = 2	
5-19 species	points = 1	
<5 species	points = 0	**Score: 1**

Wetland name or number: Wetland 1-D

H 1.4 What is the interspersion of habitats?

High	points = 3	
Moderate	points = 2	
Low	points = 1	
None	points = 0	**Score: 2**

H 1.5 What are the special habitat features in the wetland?

- [x] Large, downed, woody debris within the wetland (>4in diameter and 6ft long).
- [x] Standing snags (dbh >4in) within the wetland
- [ ] Undercut banks are present for at least 6.6ft (2m) and/or overhanging plants extend at least 3.3ft (1m) over open water or a stream (or ditch) in, or contiguous with the wetland, for at least 33ft (10m)
- [ ] Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30 degree slope) OR signs of recent beaver activity are present (cut shrubs or trees that have not yet weathered where wood is exposed)
- [x] At least 0.25ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (structures for egg-laying by amphibians)
- [x] Invasive plants cover less than 25% of the wetland area in every stratum of plants (see H 1.1 for list of strata)

6 habitats selected	points = 6	
5 habitats selected	points = 5	
4 habitats selected	points = 4	
3 habitats selected	points = 3	
2 habitats selected	points = 2	
1 habitat selected	points = 1	
No habitats selected	points = 0	**Score: 4**

Total for H 1: **10**

Rating of Site Potential [ ] **15-18 = H** [X] **7-14 = M** [ ] **0-6 = L** *Record the rating on the first page*

H 2.0 Does the landscape have the potential to support habitat functions of the site?

H 2.1 What is the percentage of accessible habitat within 1km of the wetland?

>33% of 1km Polygon	points = 3	
20-33% of 1km Polygon	points = 2	
10-19% of 1km Polygon	points = 1	
<10% of 1km Polygon	points = 0	**Score: 2**

H 2.2 What is the percentage of total habitat in a 1km polygon around the wetland?

Total habitat is >50% of the Polygon	points = 3	
Total habitat is 10-50% of the Polygon and in 1-3 patches	points = 2	
Total habitat is 10-50% of the Polygon and in >3 patches	points = 1	
Total habitat is <10% of the Polygon	points = 0	**Score: 1**

Wetland name or number: Wetland 1-D

H 2.3 What is the land use intensity in the 1km polygon?

50% of the Polygon is high intensity land use	points = -2	
<50% of the Polygon is high intensity land use	points = 0	**Score: -2**
	Total for H 2:	**1**

Rating of Landscape Potential [ ] **4-6 = H** [X] **1-3 = M** [ ] **0 = L** *Record the rating on the first page*

H 3.0 Is the habitat provided by the site valuable to society?

H 3.1 Does the site provide habitat for species valued in laws, regulations, or policies?

- [ ] Aspen Stands
- [ ] Biodiversity Areas and Corridors
- [ ] Herbaceous Balds
- [ ] Old-growth/Mature Forests
- [ ] Oregon White Oak
- [x] Riparian
- [ ] Westside Prarie
- [ ] Fresh Deepwater
- [x] Instream
- [ ] Nearshore (Coastal, Open Coast, Puget Sound)
- [ ] Caves
- [ ] Cliffs
- [x] Snags and Logs
- [ ] Talus

The following criteria automatically score 2 points:

- [ ] The wetland provides habitat for Threatened or Endangered species
- [ ] The wetland is mapped as a location for an individual WDFW priority species
- [x] The wetland is a Wetland of High Conservation Value
- [ ] The wetland has been categorized as an important habitat site in a local plan

The wetland has 3 or more WDFW priority habitats within 100m, or meets the criteria for societal value	points = 2	
The site has 1 or 2 WDFW priority habitats within 100m	points = 1	
The site does not meet any of the criteria for societal value	points = 0	**Score: 2**
	Total for H 3:	**2**

Rating of Value [X] **2 = H** [ ] **1 = M** [ ] **0 = L** *Record the rating on the first page*

Wetland name or number: Wetland 1-D

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

SC 1.0 Estuarine Wetlands

SC 1.1 Does the wetland meet all of the following criteria for Estuarine wetlands?

☐ The dominant water regime is tidal
☐ The wetland is vegetated
☐ The water salinity is greater than 0.5 ppt

Yes - Go to SC 1.2

No - Not an Estuarine Wetland

Result: Not an Estuarine Wetland

SC 1.2 Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?

Yes - Category I Estuarine Wetland

No - Go to SC 1.3

Result:

SC 1.3 Is the wetland unit at least 1ac in size and meets at least two of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 10% cover of non-native plant species.

☐ At least 75% of the landward edge of the wetland has a 100ft buffer of shrub, forest, or un-grazed or un-mowed grassland

☐ The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.

Yes - Category I Estuarine Wetland

No - Category II Estuarine Wetland

Result:

SC 2.0 Wetlands of High Conservation Value

SC 2.1 Is the wetland listed by Washington Natural Heritage Program WDNR as a Wetland of High Conservation Value (WHCV)?

Yes - Category I Wetland of High Conservation Value

No - Go to SC 2.2

Result: Go to SC 2.2

SC 2.2 Does the wetland have a rare plant species, rare plant community, or high-quality common plant community that may qualify the site as a WHCV?

Yes - Category I Wetland of High Conservation Value

No - Not a Wetland of High Conservation Value

Result: Not a Wetland of High Conservation Value

Wetland name or number: Wetland 1-D

SC 3.0 Bogs

SC 3.1 Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16in or more of the first 32in of the soil profile?

Yes - Go to SC 3.3
No - Go to SC 3.2 **Result: Go to SC 3.2**

SC 3.2 Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond?

Yes - Go to SC 3.3

No - Not a Bog Wetland **Result: Not a Bog Wetland**

SC 3.3 Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least 30% cover of plant species listed in the table provided in the instructions?

Yes - Category I Bog Wetland
No - Go to SC 3.4 **Result:**

SC 3.4 Is an area with peats or mucks forested (>30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann Spruce, or western white pine AND any of the species (or combinations of species) listed in the table found in the instructions provide more than 30% of the cover under the canopy?

Yes - Category I Bog Wetland
No - Not a Bog Wetland **Result:**

SC 4.0 Forested Wetlands

SC 4.1 Does the wetland have at least 1 contiguous acre of forest that meets one of the following criteria?

☐ Old-growth forests
☐ Mature forests

Yes - Category I Forested Wetland

No - Not a Forested Wetland **Result: Not a Forested Wetland**

Wetland name or number: Wetland 1-D

SC 5.0 Wetlands in Coastal Lagoons

SC 5.1 Coastal Lagoons: Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or rocks

☐ The depression in which the wetland is located contains ponded water that is saline or brackish (>0.5 ppt) during most of the year in at least a portion of the open water area (measured near the bottom)

Yes - Go to SC 5.2

No - Not a Coastal Lagoon Wetland **Result: Not a Coastal Lagoon Wetland**

SC 5.2 Does the wetland meet all of the following three conditions?

☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species).

☐ At least 75% of the landward edge of the wetland has a 100ft buffer of shrub, forest, or un-grazed or un-mowed grassland.

☐ the wetland is larger than 0.10ac (4350 sqft)

Yes - Category I Coastal Lagoon

No - Category II Coastal Lagoon **Result:**

SC 6.0 Interdunal Wetlands

SC 6.1 Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership WBUO)?

Yes - Go to SC 6.2

No - Not an Interdunal Wetland **Result: Not an Interdunal Wetland**

SC 6.2 Is the wetland 1ac or larger in size, or a mosaic that is 1ac or larger in size?

Wetland is larger than 1ac in size - Go to SC 6.3

Wetland is a mosaic larger than 1ac is size - Category II Interdunal Wetland

No - Go to SC 6.4 **Result:**

SC 6.3 Does the wetland score 8 or 9 points for the habitat functions?

Yes - Category I Interdunal Wetland

No - Category II Interdunal Wetland **Result:**

SC 6.4 Is the wetland unit between 0.1ac and 1ac, or in a mosaic of wetlands that is between 0.1ac and 1ac in size?

Yes - Category III Interdunal Wetland

No - Category IV Interdunal Wetland **Result:**

Wetland name or number: Wetland 1-D

Category of wetland based on Special Characteristics	
If you answered No for all types, enter "Not Applicable" on Summary Form	**Final Category: Not Applicable**

Legend | Wetland Tools | Zoom | Tools

Add/Remove map data layers

Cowardin Plant Class Items

Cowardin Classes

- Forested
- Scrub-shrub
- Emergent
- Aquatic bed
- Open water
- Wetland/Unmapped wetland

Project: **Wetland 1-D** Wetland: **Wetland 1-D** (Depressional) Date: **08/10/2022**

Legend | Wetland Tools | Zoom | Tools

Add/Remove map data layers

Hydroperiod Items

- Permanent Stream
- Seasonal Stream
- Permanently
- Seasonally
- Occasionally
- Saturated only
- Wetland/Unmapped wetland

Project: **Wetland 1-D** Wetland: **Wetland 1-D** (Depressional) Date: **08/10/2022**

Legend | Wetland Tools | Zoom | Tools

Project: **Wetland 1-D** Wetland: **Wetland 1-D** (Depressional) Date: **08/10/2022**

Add/Remove map data layers

Contributing Basin Items

- Wetland
- Contributing basin

Legend | Wetland Tools | Zoom | Tools

Project: **Wetland 1-D** Wetland: **Wetland 1-D** (Depressional) Date: **08/10/2022**

Add/Remove map data layers

Habitat Items

- Relatively undisturbed - accessible
- Low/Moderate intensity - accessible
- Relatively undisturbed - not accessible
- Low/Moderate intensity - not accessible
- High intensity
- Wetland
- Unmapped wetland buffer (1 km)

Legend | Wetland Tools | Zoom | Tools

Add/Remove map data layers

Wetland Width Items

Wetland

Distance from wetland to nearest 303(d) listing

303(d) List

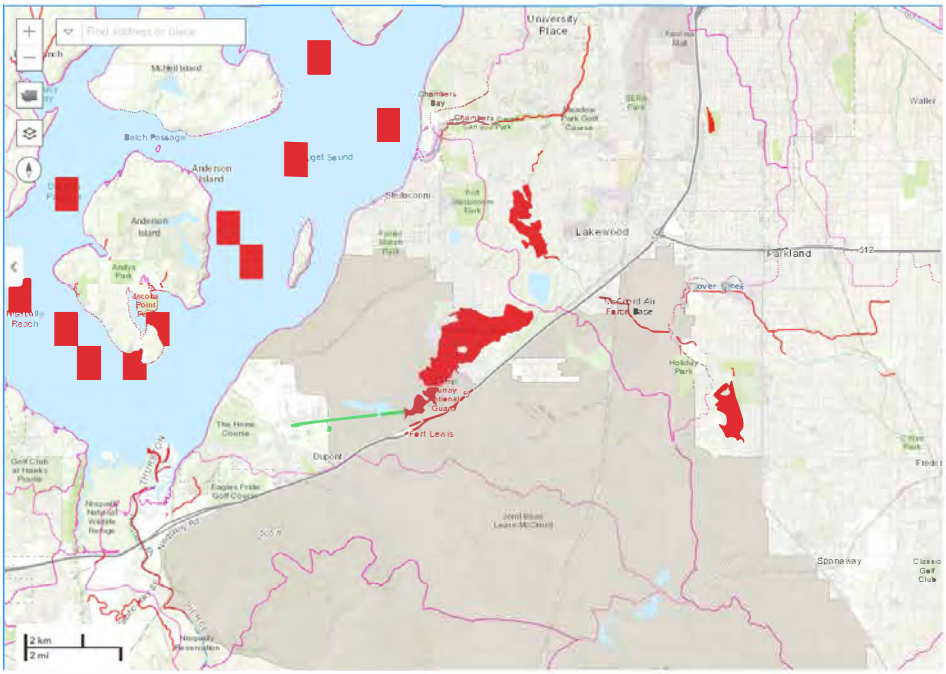
Category 5 Water

Category 5 Sediment

Subbasins (12 digit HUCs)

HUC boundary

Project: **Wetland 1-D** Wetland: **Wetland 1-D** (Depressional) Date: **08/10/2022**



Legend | Wetland Tools | Zoom | Tools

Add/Remove map data layers

TMDL Items

Wetland

303(b) List

Category 4A Water

Category 4A Sediment

Category 4B Water

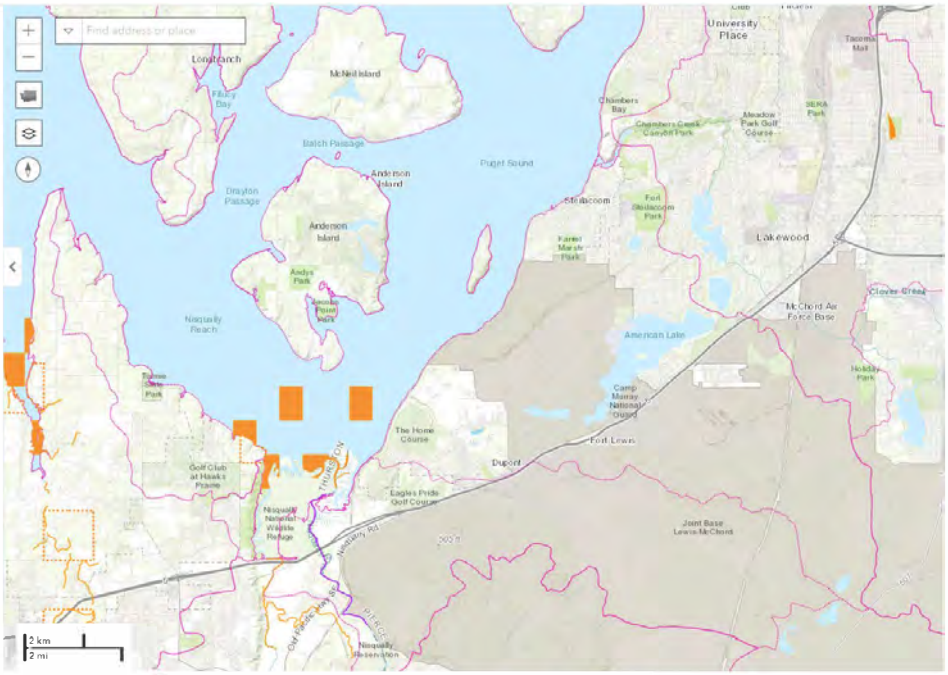
Category 4B Sediment

Category 4C Water

Subbasins (12 digit HUCs)

HUC boundary

Project: **Wetland 1-D** Wetland: **Wetland 1-D** (Depressional) Date: **08/10/2022**



Legend | Wetland Tools | Zoom | Tools

Project: **Wetland 1-D** Wetland: **Wetland 1-D** (Depressional) Date: **08/10/2022**

Add/Remove map data layers

Habitat Items

- Generates excessive runoff
- Generates pollutants
- Generates excessive runoff and pollutants
- Upland within 150' wetland buffer
- Wetland
- Wetland buffer (150')

Appendix D
Site Photographs

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Appendix B
OHWM Delineation Methods and Site Photographs

Determining the Ordinary High Water Mark

The ordinary high water mark (OHWM) boundaries of waterbodies in the study area were field delineated using the Washington State Department of Ecology guidance document *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State* (Ecology 2016) and the U.S. Army Corps of Engineers document *A Guide to Ordinary High Water Mark (OHWM) Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States* (USACE 2014). Determining an OHWM is not a precise science; thus, the guidance documents allow for the consideration of multiple physical and biological features. Field indicators used for field delineation of stream OHWMs include the following:

- Sediment bars (usually below OHWM)
- Scour line (usually below OHWM)
- Clean cobbles or boulders (usually below OHWM)
- Exposed roots (usually below OHWM)
- Stratified sediment deposits (occur both above and below OHWM)
- Flood or overbank deposits (may be at OHWM)
- Top of bank (may be at or above OHWM)
- Water stains or marks (occur at or above or below OHWM)
- Sediment lines (at or above OHWM)
- Flood debris or wrack deposition (at or above OHWM)
- Drainage patterns/flattened vegetation (usually below OHWM)
- Toe of lowest terrace (at or above OHWM)
- Organic material or duff layer (usually above OHWM)

Field indicators used for field delineation of lake OHWMs include many of the same indicators as for streams, with the addition of the following:

- Vegetation changes at lake-upland transition
- Morphological adaptations (e.g., buttressed tree trunks)
- Plants on hummocks
- Topographic breaks
- Substrate changes
- Filamentous algal growth/crust

Photograph 1
Sequalitchew Creek, Downstream of Pedestrian Footbridge, Looking East

Photograph 2
Sequalitchew Creek, Upstream of Center Drive Bridge Crossing, Looking West

WASHINGTON STATE
Joint Aquatic Resources Permit Application (JARPA) Form[1,2] [help]

US Army Corps of Engineers ®
Seattle District

USE BLACK OR BLUE INK TO ENTER ANSWERS IN THE WHITE SPACES BELOW.

AGENCY USE ONLY

Date received:

Agency reference #: _____

Tax Parcel #(s): _____

_____

Part 1–Project Identification

1. Project Name (A name for your project that you create. Examples: Smith's Dock or Seabrook Lane Development) [help]
Sequalitchew Creek Watershed Ecosystem Restoration Project

Part 2–Applicant

The person and/or organization responsible for the project. [help]

2a. Name (Last, First, Middle)			
Baldino, Cole			
2b. Organization (If applicable)			
South Puget Sound Salmon Enhancement Group			
2c. Mailing Address (Street or PO Box)			
6700 Martin Way East, Suite 112			
2d. City, State, Zip			
Olympia, WA 98516			
2e. Phone (1)	**2f.** Phone (2)	**2g.** Fax	**2h.** E-mail
(360) 464-0004		(360) 412-0809	coleb@spsseg.org

[1]Additional forms may be required for the following permits:
- If your project may qualify for Department of the Army authorization through a Regional General Permit (RGP), contact the U.S. Army Corps of Engineers for application information (206) 764-3495.
- Not all cities and counties accept the JARPA for their local Shoreline permits. If you need a Shoreline permit, contact the appropriate city or county government to make sure they accept the JARPA.

[2]To access an online JARPA form with [help] screens, go to http://www.epermitting.wa.gov/site/alias__resourcecenter/jarpa_jarpa_form/9984/jarpa_form.aspx.

For other help, contact the Governor's Office for Regulatory Innovation and Assistance at (800) 917-0043 or help@oria.wa.gov.

Part 3–Authorized Agent or Contact

Person authorized to represent the applicant about the project. (Note: Authorized agent(s) must sign 11b of this application.) [help]

3a. Name (Last, First, Middle)			
Baldino, Cole			
3b. Organization (If applicable)			
South Puget Sound Salmon Enhancement Group			
3c. Mailing Address (Street or PO Box)			
6700 Martin Way East, Suite 112			
3d. City, State, Zip			
Olympia, WA 98516			
3e. Phone (1)	**3f.** Phone (2)	**3g.** Fax	**3h.** E-mail
(360) 464-0004		(360) 412-0809	coleb@spsseg.org

Part 4–Property Owner(s)

Contact information for people or organizations owning the property(ies) where the project will occur. Consider both **upland and aquatic** ownership because the upland owners may not own the adjacent aquatic land. [help]

☐ Same as applicant. (Skip to Part 5.)

☐ Repair or maintenance activities on existing rights-of-way or easements. (Skip to Part 5.)

☐ There are multiple upland property owners. Complete the section below and fill out JARPA Attachment A for each additional property owner.

☐ Your project is on Department of Natural Resources (DNR)-managed aquatic lands. If you don't know, contact the DNR at (360) 902-1100 to determine aquatic land ownership. If yes, complete JARPA Attachment E to apply for the Aquatic Use Authorization.

4a. Name (Last, First, Middle)			
Kincaid, Barb			
4b. Organization (If applicable)			
City of DuPont			
4c. Mailing Address (Street or PO Box)			
1700 Civic Drive			
4d. City, State, Zip			
DuPont, WA 98327-9603			
4e. Phone (1)	**4f.** Phone (2)	**4g.** Fax	**4h.** E-mail
(253) 964-8121			bkincaid@dupontwa.gov

Part 5–Project Location(s)

Identifying information about the property or properties where the project will occur. [help]

☐ There are multiple project locations (e.g. linear projects). Complete the section below and use JARPA Attachment B for each additional project location.

5a. Indicate the type of ownership of the property. (Check all that apply.) [help]

☐ Private
☐ Federal
☒ Publicly owned (state, county, city, special districts like schools, ports, etc.)
☐ Tribal
☐ Department of Natural Resources (DNR) – managed aquatic lands (Complete JARPA Attachment E)

5b. Street Address (Cannot be a PO Box. If there is no address, provide other location information in 5p.) [help]

West of DuPont Steilacoom Road, south and west of Center Drive, near DuPont City Hall (Figures 1, 2, and 3)

5c. City, State, Zip (If the project is not in a city or town, provide the name of the nearest city or town.) [help]

DuPont, WA 98327

5d. County [help]

Pierce

5e. Provide the section, township, and range for the project location. [help]

¼ Section	Section	Township	Range
	Sections 25 and 26	Township 19N	Range 01E

5f. Provide the latitude and longitude of the project location. [help]

- Example: 47.03922 N lat. / -122.89142 W long. (Use decimal degrees - NAD 83)

47° 6'16.09"N, 122°38'9.41"W

5g. List the tax parcel number(s) for the project location. [help]

- The local county assessor's office can provide this information.

Parcels 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

5h. Contact information for all adjoining property owners. (If you need more space, use JARPA Attachment C.) [help]

Name	Mailing Address	Tax Parcel # (if known)
See Attachment C.		

5i. List all wetlands on or adjacent to the project location. [help]

Two wetlands have been identified and delineated on site: Edmond Marsh and Wetland 1-D (Figure 4; Anchor QEA 2022).

5j. List all waterbodies (other than wetlands) on or adjacent to the project location. [help]

Sequalitchew Creek and Puget Sound.

5k. Is any part of the project area within a 100-year floodplain? [help]

☒ Yes ☐ No ☐ Don't know

5l. Briefly describe the vegetation and habitat conditions on the property. [help]

The project site is undeveloped except for roadways and trails. The area east of Center Drive is almost entirely occupied by the following wetlands (Figure 4; Anchor QEA 2022):

- **Edmond Marsh** is an approximately 134-acre wetland complex associated with Sequalitchew Creek. The wetland includes a mosaic of active channel (with Sequalitchew Creek flowing in an east-west direction); forested, scrub-shrub, and emergent wetland vegetation communities; seasonal open water; and large upland hummocks supporting forested upland vegetation communities. Edmond Marsh is a forested, scrub-shrub, and herbaceous wetland dominated by Pacific willow, red alder, black cottonwood, Pacific crabapple, Douglas' spirea, red osier dogwood, salmonberry, black twinberry, vine maple, reed canarygrass, broadleaf cattail, water parsley, false lily-of-the-valley, starry false Solomon's seal, lady fern, creeping buttercup, stinging nettle, slough sedge, and soft rush.
- **Wetland 1-D**, located north of Edmond Marsh, is an approximately 1.83-acre depressional wetland containing forested, scrub-shrub, and emergent wetland vegetation communities. The wetland is dominated by red alder, black cottonwood, Douglas' spirea, Pacific crabapple, red osier dogwood, salmonberry, black twinberry, lady fern, false lily-of-the-valley, starry false Solomon's seal, and water parsley.

The upland areas surrounding the wetlands are largely forested with Douglas fir (*Pseudotsuga menziesii*), bigleaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera*), western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), Garry oak (*Quercus garryana*), western crabapple (*Malus fusca*), Douglas hawthorn (*Crataegus douglasii*), and beaked hazelnut (*Corylus cornuta*).

5m. Describe how the property is currently used. [help]

The property is currently undeveloped and is used for passive recreational activities such as walking and wildlife viewing. An existing sewer line crosses Edmond Marsh within the Robison Trail berm.

5n. Describe how the adjacent properties are currently used. [help]

The site is surrounded by housing developments to the north, west, and south and a commercial and industrial center to the northeast.

5o. Describe the structures (above and below ground) on the property, including their purpose(s) and current condition. [help]

Edmond Marsh is divided into east and west portions by a raised gravel multiuse trail grade (Robison Trail; Figure 3). East and West Edmond Marsh are hydrologically connected through a culvert within the trail prism. Center Drive crosses Sequalitchew Creek west of Edmond Marsh via a bridge. A concrete sidewalk parallels the stream crossing through a box culvert under the bridge (Figure 15).

5p. Provide driving directions from the closest highway to the project location, and attach a map. [help]

From I-5 southbound you can take Exit 118 toward DuPont City Center/Center Drive. Once on Northbound Center Drive, you drive for 1.2 miles and take a left on Civic Drive and then a right into the City of DuPont City Hall parking lot. From here you can walk to the Sequalitchew Trail and the rest of the proposed project site.

Part 6–Project Description

6a. Briefly summarize the overall project. You can provide more detail in 6b. [help]

The project is part of a Restoration Plan to restore ecological function to the Sequalitchew Creek Watershed (SPSSEG 2018). It includes the following components, which are illustrated in the plan drawings (Figures 3 through 21):

- **Robison Rail Bridge:** The trail berm will be breached and a new steel bridge installed to restore a surface water connection between the East and West Edmond Marsh areas (Figures 5a and 5b). The bridge will be 70 feet long and 12 feet wide, large enough to allow periodic maintenance vehicle access but primarily intended for pedestrian use. Eighty-two linear feet of existing buried sewer pipe will be replaced, and two new manholes will be installed in the trail. The existing trail berm will be graded to match the bridge elevations; graded areas adjacent to the bridge will be replanted with native upland, wetland, and riparian plant species.
- **Losing Reach/Center Drive:** Project activities in this area, shown in Figures 6a through 6j, will improve in-stream and riparian habitat and support restoration of year-round flows in Sequalitchew Creek. The existing concrete sidewalk along the creek will be removed to provide more space for the stream where it crosses under Center Drive and to improve riparian habitat on both sides of Center Drive. The existing concrete box culvert under Center Drive will not be modified. Approximately 1,400 linear feet of stream channel will be regraded to create in-stream pools and floodplain areas and a low-flow channel. The regraded channel will be lined with low-permeability materials and streambed gravels. Large woody materials will be installed in the channel and anchored with driven piles. Channel-spanning sill logs (anchored by chains) will also be added in the channel to create pools. Riparian areas along the restored channel will be replanted with native tree, shrub, and emergent species, and disturbed soils will be reseeded.
- **City Hall Culvert:** Sequalitchew Creek passes through an existing 56-inch metal culvert under the pedestrian trail west of Center Drive. The existing culvert is perched above the stream channel and would not meet Washington Department of Fish and Wildlife requirements for fish passage with increased water flows. The culvert and adjacent fill material supporting the trail will be removed and replaced with a new bridge that is 60 feet long and 6 feet wide (Figures 7a through 7c). Adjacent portions of the trail will be regraded. Additionally, an existing timber diversion dam structure and a wire fence will be removed from the stream channel east of the new bridge. Approximately 150 linear feet of stream channel in this area will be regraded and large woody material added to create pools and improve in-stream habitat. All disturbed areas will be reseeded or replanted with native species to improve riparian habitat.
- **Beaver Management:** Active management of water levels and beaver activities in Edmond Marsh is proposed in order to maintain the hydraulic gradients that provide flows through the watershed. Proposed activities (Figures 4a through 4c) include notching an existing beaver dam and installing two flexible pond levelers, a beaver dam analog, and a beaver exclusion device. Work will be implemented incrementally and monitored and adjusted as need to achieve stability.

6b. Describe the purpose of the project and why you want or need to perform it. [help]

The Sequalitchew Creek Watershed Restoration Plan (SPSSEG 2018) arose from a process defined in a settlement agreement between CalPortland Company, the City of DuPont (the City), the Washington State Department of Ecology (Ecology), and a coalition of environmental groups collectively known as the Environmental Caucus. In 2012, these groups signed an agreement called the *2011 Settlement Agreement for DuPont Mine, Restoration of Sequalitchew Creek Watershed, and Preservation of Puget Sound Shorelands and Adjacent Open Space*. The project activities described in this application are a part of this plan.

In developing the Restoration Plan, the South Puget Sound Salmon Enhancement Group (SPSSEG) led a yearlong process involving a core group of eight stakeholders (the City, Ecology, the Environmental Caucus, CalPortland, the Nisqually Indian Tribe, Sequalitchew Creek Watershed Council, Joint Base Lewis-McChord, and Pierce County) and multiple opportunities for public comment.

The Restoration Plan is intended to restore ecological function to the Sequalitchew Creek Watershed. As described in Section 9j, human activities have greatly modified watershed hydrology since European settlement began two centuries ago. The combination of human and beaver activities in the Sequalitchew Creek Watershed has altered the primary direction of flows: instead of flowing from Sequalitchew Lake into the creek, water flows out through the Diversion Canal to Puget Sound. A beaver dam at the western outlet of Sequalitchew Lake blocks flows and redirects them to the Diversion Canal. Other beaver dams in the system keep water levels in Edmond Marsh higher than they were historically, and the fill beneath the DuPont Railroad trail further slows flows. This redirection of flows, in combination with highly permeable soils, creates a dry reach just west of Edmond Marsh and greatly reduces the flow through the spring-fed Sequalitchew Creek ravine.

The Restoration Plan, of which this project is a part, was developed to sequentially restore flows in the Sequalitchew Creek, improve the sustainability of flows through the system, and restore aquatic habitat by removing flow-related fish passage barriers and increasing the habitat available to aquatic species.

6c. Indicate the project category. (Check all that apply) [help]

☐ Commercial ☐ Residential ☐ Institutional ☐ Transportation ☐ Recreational

☐ Maintenance ☒ Environmental Enhancement

6d. Indicate the major elements of your project. (Check all that apply) [help]

☐ Aquaculture	☐ Culvert	☐ Float	☐ Retaining Wall (upland)
☐ Bank Stabilization	☐ Dam / Weir	☐ Floating Home	☐ Road
☐ Boat House	☐ Dike / Levee / Jetty	☐ Geotechnical Survey	☐ Scientific Measurement Device
☐ Boat Launch	☐ Ditch	☐ Land Clearing	☐ Stairs
☐ Boat Lift	☐ Dock / Pier	☐ Marina / Moorage	☐ Stormwater facility
☒ Bridge	☐ Dredging	☐ Mining	☐ Swimming Pool
☐ Bulkhead	☐ Fence	☐ Outfall Structure	☐ Utility Line
☐ Buoy	☐ Ferry Terminal	☐ Piling/Dolphin	
☒ Channel Modification	☐ Fishway	☐ Raft	

☒ Other: Removal of corrugated metal pipe (CMP) culvert, timber diversion dam, and fill material; installation of in-stream large woody material and riparian habitat plantings; and installation of beaver management devices.

6e. Describe how you plan to construct each project element checked in 6d. Include specific construction methods and equipment to be used. [help]

- Identify where each element will occur in relation to the nearest waterbody.
- Indicate which activities are within the 100-year floodplain.

All project elements are within the floodplain of Sequalitchew Creek and will be located within the creek channel, in Edmond Marsh, and on adjacent fill areas (gravel trail berms). Construction methods and equipment include the following:

- Workers and equipment will access the site from Steilacoom DuPont Road, Center Drive, and the existing trail berms (Robison Trail and the trail crossing the City Hall culvert).
- Equipment and materials will be staged in upland areas near the project site.
- An excavator will be used for removal of trail berm and other fill materials, the City Hall culvert, and the timber diversion dam and for grading of the creek channel, installation of low-permeability materials and gravel in the streambed, and installation of large woody materials.
- Beaver management devices will be installed using hand equipment.
- A crane will be used to place the two new bridge structures. Piles will be placed with a pile driver for bridge abutments.
- The following best management practices will be implemented to avoid water quality and habitat impacts:
  - All applicable permits for the Project will be obtained prior to construction. All work will be performed according to the requirements and conditions of these permits.
  - Prior to construction, all work areas will be clearly marked with high-visibility fencing, and vegetation disturbance will not occur outside these areas. Work areas will be the minimum size needed to complete the work safely and efficiently while minimizing impacts to vegetation and soils in surrounding areas.
  - Concrete sidewalk and other materials removed as part of the project will be transported off site to a permitted landfill. Some of the existing gravel trail berm fill material to be removed will be reused as part of installing the Robison Trail bridge and regrading the adjacent trail segments.
  - All areas disturbed by construction will be stabilized as soon as possible to prevent erosion. The contractor will be required to prepare and implement a Temporary Erosion and Sediment Control Plan.
  - The contractor will be required to develop and implement a Spill Plan to be used for the duration of the project to safeguard against unintentional release of fuel, lubricants, or hydraulic fluid from construction equipment.
  - The contractor will be required to properly maintain construction equipment and vehicles to prevent them from leaking fuel or lubricants; if there is evidence of leakage, the further use of such equipment will be suspended until the deficiency has been satisfactorily corrected.
  - Uncured concrete for bridge footings will not be allowed to enter or contact nearby surface waters.
  - The project will require a Construction Stormwater General Permit due to land disturbance exceeding 1 acre. All elements of the permit will be complied with during construction.
  - All areas outside of the stream channel that are disturbed during construction will be reseeded and revegetated to minimize the potential for soil erosion.
  - Silt curtains will be applied, where required, for in-water work.

6f. What are the anticipated start and end dates for project construction? (Month/Year) [help]

- If the project will be constructed in phases or stages, use JARPA Attachment D to list the start and end dates of each phase or stage.

Start Date: _____ End Date: _____ ☒ See JARPA Attachment D

6g. Fair market value of the project, including materials, labor, machine rentals, etc. [help]

$4,000,000.

6h. Will any portion of the project receive federal funding? [help]

- **If yes**, list each agency providing funds.

☐ Yes ☒ No ☐ Don't know

Part 7–Wetlands: Impacts and Mitigation

☒ Check here if there are wetlands or wetland buffers on or adjacent to the project area.
(If there are none, skip to Part 8.) [help]

7a. Describe how the project has been designed to avoid and minimize adverse impacts to wetlands. [help]

☐ Not applicable

The best management practices described in Section 6e will avoid and minimize the potential for temporary impacts to wetlands and wetland buffers during construction. Habitat along Sequalitchew Creek within Edmond Marsh will be improved through installation of native plant species.

7b. Will the project impact wetlands? [help]

☒ Yes ☐ No ☐ Don't know

7c. Will the project impact wetland buffers? [help]

☒ Yes ☐ No ☐ Don't know

7d. Has a wetland delineation report been prepared? [help]

- **If Yes**, submit the report, including data sheets, with the JARPA package.

☒ Yes ☐ No

7e. Have the wetlands been rated using the Western Washington or Eastern Washington Wetland Rating System? [help]

- **If Yes**, submit the wetland rating forms and figures with the JARPA package.

☒ Yes ☐ No ☐ Don't know

7f. Have you prepared a mitigation plan to compensate for any adverse impacts to wetlands? [help]

- **If Yes**, submit the plan with the JARPA package and answer 7g.
- **If No, or Not applicable**, explain below why a mitigation plan should not be required.

☐ Yes ☒ No ☐ Don't know

The purpose of the project is to restore ecological functions. The project will result in a net reduction of fill material in Edmond Marsh. Wetland and wetland buffer areas temporarily disturbed during construction will be revegetated with native species.

7g. Summarize what the mitigation plan is meant to accomplish, and describe how a watershed approach was used to design the plan. [help]

As described in Section 6b, the project described in this application is part of a watershed-wide Restoration Plan that was developed over several years and with input from agencies and other stakeholders (SPSSEG 2018).

7h. Use the table below to list the type and rating of each wetland impacted, the extent and duration of the impact, and the type and amount of mitigation proposed. Or if you are submitting a mitigation plan with a similar table, you can state (below) where we can find this information in the plan. [help]

Activity (fill, drain, excavate, flood, etc.)	Wetland Name[1]	Wetland type and rating category[2]	Impact area (sq. ft. or Acres)	Duration of impact[3]	Proposed mitigation type[4]	Wetland mitigation area (sq. ft. or acres)
Excavate existing trail berm material at Robison Trail new bridge location	Edmond Marsh	PFO/PSS/PEM Category II	5,000 sq. ft. (600 cubic yards [cy]) existing gravel fill removed	Permanent	n/a	n/a
Install new Robison Trail bridge, regrade adjacent trail, install sewer manholes	Edmond Marsh	PFO/PSS/PEM Category II	500 sq. ft. (200 cy) gravel fill 275 sq. ft. concrete bridge footings and steel piles	Permanent	n/a	4,100 sq. ft. net reduction of fill material in wetland
Notch existing beaver dam	Edmond Marsh	PFO/PSS/PEM Category II	15 sq. ft. (8 cy) woody material removed	Permanent	n/a	n/a
Install two flexible pond levelers for beaver management	Edmond Marsh	PFO/PSS/PEM Category II	400 sq. ft. wire cage and piping	Permanent	n/a	n/a
Install beaver exclusion device	Edmond Marsh	PFO/PSS/PEM Category II	70 sq. ft. hurricane fence and support	Permanent	n/a	n/a
Install beaver dam analog	Edmond Marsh	PFO/PSS/PEM Category II	40 sq. ft. wooden post and willow weave	Permanent	n/a	n/a
Equipment access	Edmond Marsh	PFO/PSS/PEM Category II	75,000 sq. ft. of vegetation disturbance within construction work areas	Temporary	Reseed and restore disturbed areas with native vegetation	Same as area of disturbance

[1] If no official name for the wetland exists, create a unique name (such as "Wetland 1"). The name should be consistent with other project documents, such as a wetland delineation report.
[2] Ecology wetland category based on current Western Washington or Eastern Washington Wetland Rating System. Provide the wetland rating forms with the JARPA package.
[3] Indicate the days, months or years the wetland will be measurably impacted by the activity. Enter "permanent" if applicable.
[4] Creation (C), Re-establishment/Rehabilitation (R), Enhancement (E), Preservation (P), Mitigation Bank/In-lieu fee (B)

Page number(s) for similar information in the mitigation plan, if available: n/a

7i. For all filling activities identified in 7h, describe the source and nature of the fill material, the amount in cubic yards that will be used, and how and where it will be placed into the wetland. [help]

Approximately 435 sq. ft. (147 cy) of gravel fill material will be installed at the new Robison Trail bridge abutments and as part of regrading the adjacent trail segments and installing sewer manholes. The fill will consist of gravel removed from the Robison Trail berm and will be placed using an excavator.

7j. For all excavating activities identified in 7h, describe the excavation method, type and amount of material in cubic yards you will remove, and where the material will be disposed. [help]

Approximately 4,535 sq. ft. (546 cy) of existing gravel fill will be removed at the new Robison Trail bridge location using an excavator. A portion of the material will be reused as described in Section 7i. The remaining material will be transported off site to an approved disposal facility.

Part 8–Waterbodies (other than wetlands): Impacts and Mitigation

In Part 8, "waterbodies" refers to non-wetland waterbodies. (See Part 7 for information related to wetlands.) [help]

☒ Check here if there are waterbodies on or adjacent to the project area. (If there are none, skip to Part 9.)

8a. Describe how the project is designed to avoid and minimize adverse impacts to the aquatic environment. [help]

☐ Not applicable

The project is intended to restore streamflows and improve aquatic and riparian habitats of Sequalitchew Creek. The best management practices described in Section 6e will avoid and minimize the potential for temporary impacts to water quality and vegetation during construction. Riparian habitat along Sequalitchew Creek will be improved through installation of native plant species.

8b. Will your project impact a waterbody or the area around a waterbody? [help]

☒ Yes ☐ No

8c. Have you prepared a mitigation plan to compensate for the project's adverse impacts to non-wetland waterbodies? [help]

- **If Yes**, submit the plan with the JARPA package and answer 8d.
- **If No, or Not applicable,** explain below why a mitigation plan should not be required.

☐ Yes ☒ No ☐ Don't know

The purpose of the project is to restore ecological functions. The project will improve stream flows, in-stream habitat, and riparian habitat of Sequalitchew Creek. Approximately 1,400 linear feet of stream channel will be regraded and large wood will be added to create pools. Riparian areas temporarily disturbed during construction will be revegetated with native species.

8d. Summarize what the mitigation plan is meant to accomplish. Describe how a watershed approach was used to design the plan.

- If you already completed 7g you do not need to restate your answer here. [help]

As described in Section 6b, the project described in this application is part of a watershed-wide Restoration Plan that was developed over several years and with input from agencies and other stakeholders (SPSSEG 2018).

8e. Summarize impact(s) to each waterbody in the table below. [help]

Activity (clear, dredge, fill, pile drive, etc.)	Waterbody name[1]	Impact location[2]	Duration of impact[3]	Amount of material (cubic yards) to be placed in or removed from waterbody	Area (sq. ft. or linear ft.) of waterbody directly affected
Remove concrete sidewalk along creek within Center Drive culvert	Sequalitchew Creek	In-stream channel (within box culvert)	Permanent	105 cy concrete and reinforcements removed	2,840 sq. ft. of material removal
Grade to create in-stream pools, floodplain, and low-flow channel in losing reach	Sequalitchew Creek	In-stream channel	Permanent	45,850 cy existing soil and gravel excavated 1,155 cy existing soil and gravel relocated as fill	92,400 sq. ft. existing soil and gravel excavated 10,000 sq. ft. existing soil and gravel relocated as fill
Line stream channel in losing reach to increase stream flows	Sequalitchew Creek	In-stream channel	Permanent	40,000 cy imported stream gravel and low-permeability fines placed	90,000 sq. ft. of material placed

Remove timber diversion dam near City Hall culvert	Sequalitchew Creek	In-stream channel	Permanent	270 cy timber, metal, and concrete removed	800 sq. ft.
Remove 56-inch CMP (City Hall culvert)	Sequalitchew Creek	In-stream channel	Permanent	65 cy CMP culvert	550 sq. ft.
Remove existing trail berm fill for new City Hall trail bridge and trail regrading	Sequalitchew Creek	In-stream channel	Permanent	3,649 cy existing gravel fill material removed	17,000 sq. ft.
Install City Hall trail bridge foundations	Sequalitchew Creek	In-stream channel	Permanent	n/a	240 sq. ft. concrete bridge footings and steel piles
Install large woody material and buried pile anchors	Sequalitchew Creek	In-stream channel	Permanent	See Figures 6b, 6c, and 6d for details	See Figures 6b, 6c, and 6d for details

[1] If no official name for the waterbody exists, create a unique name (such as "Stream 1") The name should be consistent with other documents provided.
[2] Indicate whether the impact will occur in or adjacent to the waterbody. If adjacent, provide the distance between the impact and the waterbody and indicate whether the impact will occur within the 100-year flood plain.
[3] Indicate the days, months or years the waterbody will be measurably impacted by the work. Enter "permanent" if applicable.

8f. For all activities identified in 8e, describe the source and nature of the fill material, amount (in cubic yards) you will use, and how and where it will be placed into the waterbody. [help]

Approximately 1,155 cy of on-site gravel and soil that is excavated for the project will be reused on site. Approximately 40,000 cy of low-permeability fines and clean streambed gravel will be imported from a reliable local source and placed in the stream channel to create pools, floodplains, and a low-flow channel and reduce infiltration through the streambed to improve stream flows throughout the year.

8g. For all excavating or dredging activities identified in 8e, describe the method for excavating or dredging, type and amount of material you will remove, and where the material will be disposed. [help]

The project will remove 49,499 cy of existing gravel and soil fill material from the stream channel in areas where the two new bridges will be installed and the channel regraded to create pools, floodplain, and low-flow channel areas. In addition, 440 cy of concrete, timber, and metal will be removed from the stream channel. Excavation and removal of materials will be done with an excavator. Part of the excavated soil and gravel material will be reused as described in Section 8f. The remaining soil and gravel, and all concrete, metal, and wood, will be transported off site to an approved disposal facility.

Part 9–Additional Information

Any additional information you can provide helps the reviewer(s) understand your project. Complete as much of this section as you can. It is ok if you cannot answer a question.

9a. If you have already worked with any government agencies on this project, list them below. [help]

Agency Name	Contact Name	Phone	Most Recent Date of Contact
USACE	Jenifer Casper	(206) 764-3443	12/05/2022
WDOE	Zach Meyer	(360) 481-9885	12/01/2022
WDFW	Eric Kinney/Portia Leigh	(360) 480-3510	12/01/2022

9b. Are any of the wetlands or waterbodies identified in Part 7 or Part 8 of this JARPA on the Washington Department of Ecology's 303(d) List? [help]

- **If Yes,** list the parameter(s) below.
- If you don't know, use Washington Department of Ecology's Water Quality Assessment tools at: https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-improvement/Assessment-of-state-waters-303d.

☐ Yes ☒ No

9c. What U.S. Geological Survey Hydrological Unit Code (HUC) is the project in? [help]

- Go to http://cfpub.epa.gov/surf/locate/index.cfm to help identify the HUC.

Sequalitchew Creek Frontal Cormorant Passage Watershed (HUC 171100190304) of the Puget Sound basin.

9d. What Water Resource Inventory Area Number (WRIA #) is the project in? [help]

- Go to https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-availability/Watershed-look-up to find the WRIA #.

Chambers-Clover Water Resource Inventory Area 12.

9e. Will the in-water construction work comply with the State of Washington water quality standards for turbidity? [help]

- Go to https://ecology.wa.gov/Water-Shorelines/Water-quality/Freshwater/Surface-water-quality-standards/Criteria for the standards.

☐ Yes ☐ No ☒ Not applicable *No in-water work is proposed*

9f. If the project is within the jurisdiction of the Shoreline Management Act, what is the local shoreline environment designation? [help]

- If you don't know, contact the local planning department.
- For more information, go to: https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Shoreline-coastal-planning/Shoreline-laws-rules-and-cases.

☐ Urban ☐ Natural ☐ Aquatic ☐ Conservancy ☒ Other: not in shoreline jurisdiction

9g. What is the Washington Department of Natural Resources Water Type? [help]

- Go to http://www.dnr.wa.gov/forest-practices-water-typing for the Forest Practices Water Typing System.

☐ Shoreline ☐ Fish ☐ Non-Fish Perennial ☒ Non-Fish Seasonal

9h. Will this project be designed to meet the Washington Department of Ecology's most current stormwater manual? [help]

- **If No**, provide the name of the manual your project is designed to meet.

☒ Yes ☐ No

Name of manual: _____

9i. Does the project site have known contaminated sediment? [help]

- **If Yes**, please describe below.

☒ Yes ☐ No Tacoma Smelter Plume

9j. If you know what the property was used for in the past, describe below. [help]

The Nisqually Tribe has used the Sequalitchew Creek area for thousands of years, residing primarily along the Puget Sound shoreline and major rivers and obtaining resources from both the waters and upland areas. European settlement accelerated in the 1800s when the Hudson Bay Company established Fort Nisqually. Around this time Sequalitchew Creek was channelized and the area drained for farming. The military reserve now called Joint Base Lewis-McChord was established in the early 1900s. From that time through the 1950s, the hydrology of the Sequalitchew Creek Watershed was altered to provide water supply, reduce flooding, stabilize lake levels, and accommodate highway development. The project site itself was used by the DuPont explosives manufacturing company; those activities ended in 1970 when the land was sold to Weyerhaeuser. In 1996 the area surrounding Edmond Marsh began to be developed for the Northwest Landing planned community. Increased development with associated stormwater runoff continues to affect hydrology, as does ongoing beaver activity (SPSSEG 2014).

9k. Has a cultural resource (archaeological) survey been performed on the project area? [help]

- **If Yes**, attach it to your JARPA package.

☒ Yes ☐ No

9l. Name each species listed under the federal Endangered Species Act that occurs in the vicinity of the project area or might be affected by the proposed work. [help]

No federally listed species are known to occur on the project site. The site is within the range of several listed prairie-associated species that occur in southern Puget Sound (pocket gopher, streaked horned lark, Taylor's checkerspot, golden paintbrush, or marsh sandwort). However, no suitable prairie habitat is present on site to support these species, and they would not be affected by the project.

Sequalitchew Creek joins Puget Sound approximately 1 mile northwest of the project site. This part of Puget Sound is within the state-designated Nisqually Reach Aquatic Reserve. Marine habitat in this area likely provides foraging opportunities for marbled murrelets; however, there is no mature forest on the project site that would provide nesting habitat for this species. Similarly, the project site is not currently known to be used by federally listed salmonid species (Chinook salmon, steelhead, and bull trout), but the aquatic reserve likely provides nearshore areas where these species can migrate and forage. The project would not directly affect any federally listed aquatic species; however, it is intended to increase the area of available freshwater fish habitat and may thereby result in an indirect benefit to salmonids (and to marbled murrelets by increasing their prey base in Puget Sound).

9m. Name each species or habitat on the Washington Department of Fish and Wildlife's Priority Habitats and Species List that might be affected by the proposed work. [help]

Common Name	Scientific Name	Location in Project Area
Coho salmon	*Oncorhynchus kisutch*	Sequalitchew Creek
Cutthroat trout	*Oncorhynchus clarkii*	Sequalitchew Creek
Big brown bat	*Eptesicus fuscus*	Vicinity
Little brown bat	*Myotis lucifugus*	Vicinity
Yuma myotis	*Myotis yumanensis*	Vicinity
Waterfowl concentrations	n/a	Vicinity
Freshwater forested/shrub wetlands	n/a	Vicinity
Wetlands	n/a	Vicinity

Part 10–SEPA Compliance and Permits

Use the resources and checklist below to identify the permits you are applying for.

- Online Project Questionnaire at http://apps.oria.wa.gov/opas/.
- Governor's Office for Regulatory Innovation and Assistance at (800) 917-0043 or help@oria.wa.gov.
- For a list of addresses to send your JARPA to, click on agency addresses for completed JARPA.

10a. Compliance with the State Environmental Policy Act (SEPA). (Check all that apply.) [help]

- For more information about SEPA, go to https://ecology.wa.gov/regulations-permits/SEPA-environmental-review.

☐ A copy of the SEPA determination or letter of exemption is included with this application.

☒ A SEPA determination is pending with The City of Dupont (lead agency). The expected decision date is July 2023.

☐ I am applying for a Fish Habitat Enhancement Exemption. (Check the box below in 10b.) [help]

☐ This project is exempt (choose type of exemption below).

☐ Categorical Exemption. Under what section of the SEPA administrative code (WAC) is it exempt? _____

☐ Other: _____

☐ SEPA is pre-empted by federal law.

10b. Indicate the permits you are applying for. (Check all that apply.) [help]

LOCAL GOVERNMENT

Local Government Shoreline permits:

☐ Substantial Development ☐ Conditional Use ☐ Variance

☐ Shoreline Exemption Type (explain): _____

Other City/County permits:

☒ Floodplain Development Permit ☒ Critical Areas Ordinance

STATE GOVERNMENT

Washington Department of Fish and Wildlife:

☒ Hydraulic Project Approval (HPA) ☒ Fish Habitat Enhancement Exemption – Attach Exemption Form

Washington Department of Natural Resources:

☐ Aquatic Use Authorization

Complete JARPA Attachment E and submit a check for $25 payable to the Washington Department of Natural Resources. **Do not send cash.**

Washington Department of Ecology:

☒ Section 401 Water Quality Certification

☐ Authorization to impact waters of the state, including wetlands (Check this box if the proposed impacts are to waters not subject to the federal Clean Water Act)

FEDERAL AND TRIBAL GOVERNMENT

United States Department of the Army (U.S. Army Corps of Engineers):

☒ Section 404 (discharges into waters of the U.S.) ☐ Section 10 (work in navigable waters)

United States Coast Guard:

For projects or bridges over waters of the United States, contact the U.S. Coast Guard at:

☐ Bridge Permit: D13-SMB-D13-BRIDGES@uscg.mil

☐ Private Aids to Navigation (or other non-bridge permits): D13-SMB-D13-PATON@uscg.mil

United States Environmental Protection Agency:

☐ Section 401 Water Quality Certification (discharges into waters of the U.S.) on tribal lands where tribes do not have treatment as a state (TAS)

Tribal Permits: (Check with the tribe to see if there are other tribal permits, e.g., Tribal Environmental Protection Act, Shoreline Permits, Hydraulic Project Permits, or other in addition to CWA Section 401 WQC)

☐ Section 401 Water Quality Certification (discharges into waters of the U.S.) where the tribe has treatment as a state (TAS).

Part 11–Authorizing Signatures

Signatures are required before submitting the JARPA package. The JARPA package includes the JARPA form, project plans, photos, etc. [help]

11a. Applicant Signature (required) [help]

I certify that to the best of my knowledge and belief, the information provided in this application is true, complete, and accurate. I also certify that I have the authority to carry out the proposed activities, and I agree to start work only after I have received all necessary permits.

I hereby authorize the agent named in Part 3 of this application to act on my behalf in matters related to this application. _____ (initial)

By initialing here, I state that I have the authority to grant access to the property. I also give my consent to the permitting agencies entering the property where the project is located to inspect the project site or any work related to the project. _____ (initial)

Applicant Printed Name	Applicant Signature	Date

11b. Authorized Agent Signature [help]

I certify that to the best of my knowledge and belief, the information provided in this application is true, complete, and accurate. I also certify that I have the authority to carry out the proposed activities and I agree to start work only after all necessary permits have been issued.

Authorized Agent Printed Name	Authorized Agent Signature	Date

11c. Property Owner Signature (if not applicant) [help]

Not required if project is on existing rights-of-way or easements (provide copy of easement with JARPA).

I consent to the permitting agencies entering the property where the project is located to inspect the project site or any work. These inspections shall occur at reasonable times and, if practical, with prior notice to the landowner.

Property Owner Printed Name	Property Owner Signature	Date

18 U.S.C §1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious, or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than 5 years or both.

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA publication number: ORIA-16-011 rev. 09/2018

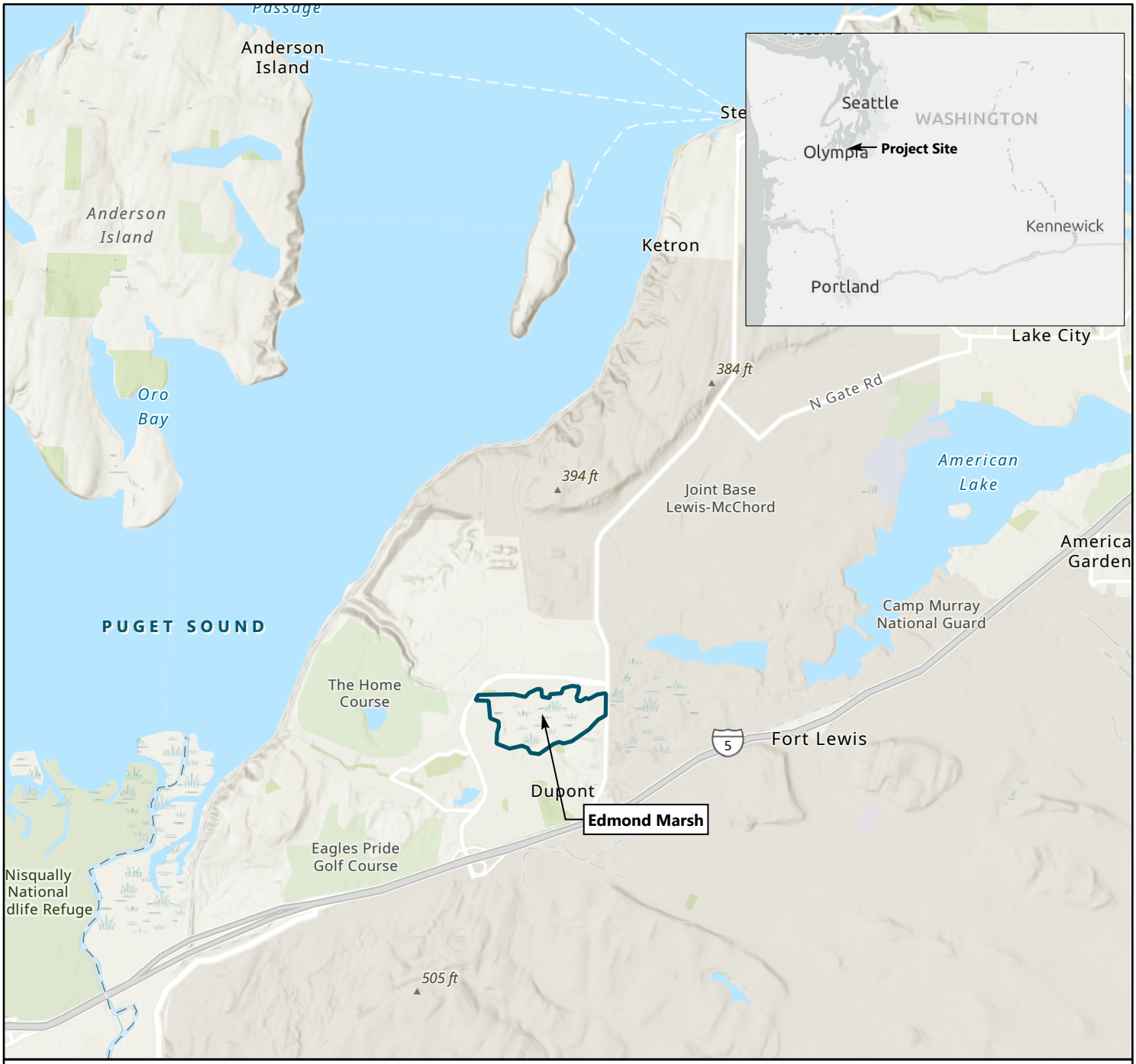
References

Anchor QEA (Anchor QEA, LLC), 2022. *Edmond Marsh Wetland Delineation Report*. Prepared for South Puget Sound Salmon Enhancement Group. August 2022.

SPSSEG (South Puget Sound Salmon Enhancement Group), 2014. *Final Briefing Memo – Sequalitchew Creek Watershed. Core Group Recommendations for a Restoration Plan*. January 2014.

SPSSEG, 2018. *Restoration Plan – Sequalitchew Creek Watershed*. Prepared for Environmental Caucus and CalPortland Company. March 2018.

Figures



NOTE:
1. Basemap provided by Esri streaming services.

LEGEND

Edmond Marsh

ANCHOR QEA
720 Olive Way, Suite 1900
Seattle, WA 98101
206-287-9130

0 4,000
Scale in Feet

VICINITY MAP

LATITUDE: 47°6'16.09"N
LONGITUDE: 122°38'9.41"W
S-T-R: SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E

NAME: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

PARCELS: 3000791020, 3000580650, 3001000110, 3000060200, 0119224010, 0119256003, 0119256004

ADJACENT PROPERTY OWNERS: SEE ATTACHMENT C.

PROPOSED PROJECT: SEQUALITCHEW CREEK WATERSHED ECOSYSTEM RESTORATION PROJECT

IN: EDMOND MARSH AND SEQUALITCHEW CREEK
NEAR/AT: DUPONT, WA
COUNTY OF: PIERCE
STATE: WA

FIGURE 1

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NOTE:
1. Basemap provided by Esri streaming services.

LEGEND

Tax Parcel in or Adjacent to Project Site

Tax Parcels

ANCHOR QEA
720 Olive Way, Suite 1900
Seattle, WA 98101
206-287-9130

0 1,000
Scale in Feet

TAX PARCEL MAP

LATITUDE: 47°6'16.09"N
LONGITUDE: 122°38'9.41"W
S-T-R: SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E

NAME: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

PARCELS: 3000791020, 3000580650, 3001000110, 3000060200, 0119224010, 0119256003, 0119256004

ADJACENT PROPERTY OWNERS: SEE ATTACHMENT C.

PROPOSED PROJECT: SEQUALITCHEW CREEK WATERSHED ECOSYSTEM RESTORATION PROJECT

IN: EDMOND MARSH AND SEQUALITCHEW CREEK
NEAR/AT: DUPONT, WA
COUNTY OF: PIERCE
STATE: WA

FIGURE 2

\\orcas\gis\Jobs\SPSSEG_0331\Sequalitchew_Creek_Estuary\Maps\EdmondMarsh_WetlandDelineation\EdmondMarsh.aprx alesueur 3/7/2023 9:22 AM

NOTE:

1. AERIAL FROM ESRI.

FIGURE 3: PROJECT OVERVIEW

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

LATITUDE: N 47° 6' 16.09"
LONGITUDE: W 122° 38' 9.41"
S-T-R: SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E

HORIZONTAL DATUM: WSP, NAD83, SOUTH ZONE, US FEET
VERTICAL DATUM: NAVD88, FEET

PROPOSED: RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED

PURPOSE: TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD

IN: EDMOND MARSH AND SEQUALITCHEW CREEK
NEAR/AT: DUPONT
COUNTY: PIERCE
STATE: WASHINGTON

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NOTE:

1. NOTCH DAM FROM CREST TO TOE WITH A MINIMUM 60 DEGREE CREST ANGLE.

FIGURE 4a: BEAVER MANAGEMENT PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

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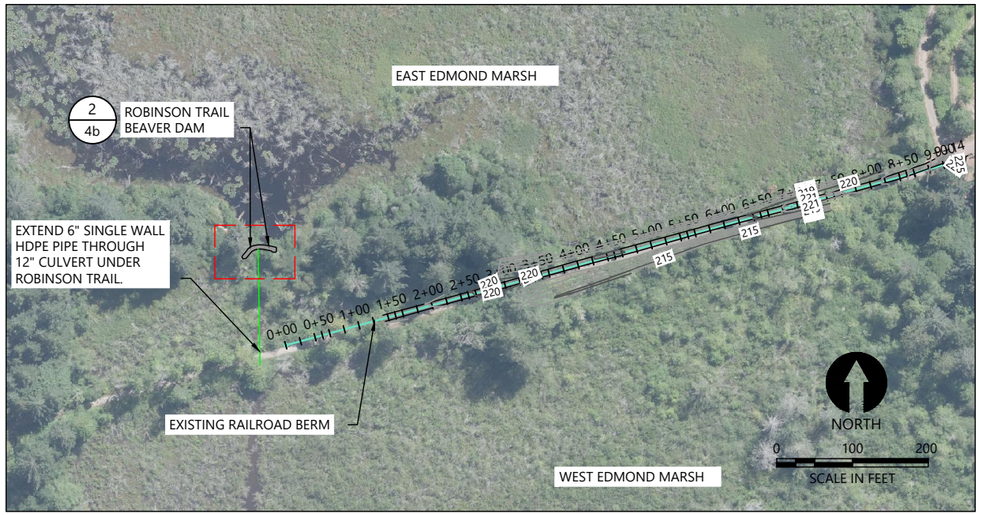
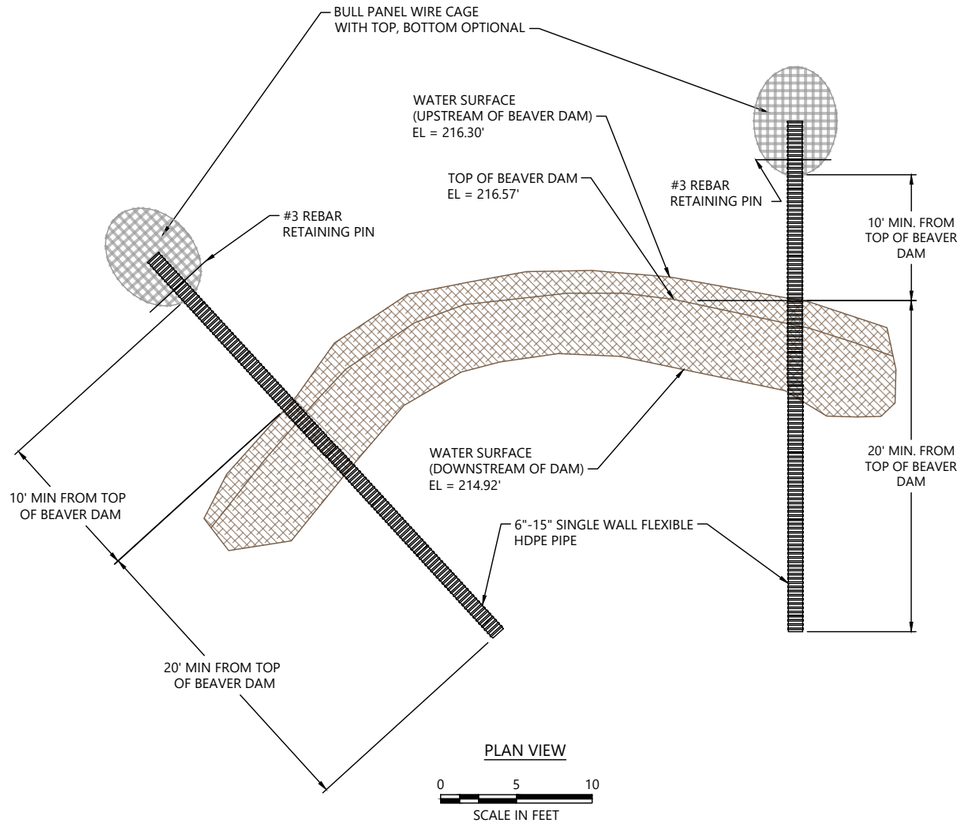
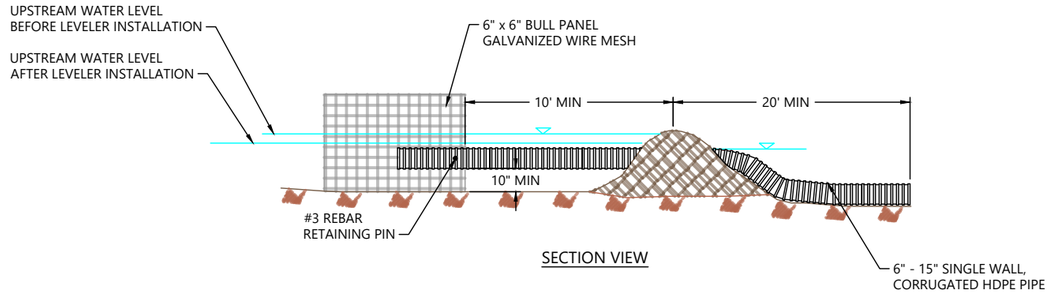


1 / 4a ROBINSON TRAIL BEAVER DAM FLEXIBLE LEVELER INSTALLATION
SCALE: NOT TO SCALE

ROBINSON TRAIL BEAVER DAM (FACING NORTH)





2 / 4a FLEXIBLE POND LEVELER INSTALLATION
SCALE: NOT TO SCALE

FIGURE 4b: FLEXIBLE LEVELER DETAILS

REFERENCE #: **APPLICANT:** SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP **ADJACENT PROPERTY OWNERS:** SEE ATTACHMENT C	**LOCATION:** 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010 **LATITUDE:** N 47° 6' 16.09" **LONGITUDE:** W 122° 38' 9.41" **S-T-R:** SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E **HORIZONTAL DATUM:** WSP, NAD83, SOUTH ZONE, US FEET **VERTICAL DATUM:** NAVD88, FEET	**PROPOSED:** RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED **PURPOSE:** TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD	**IN:** EDMOND MARSH AND SEQUALITCHEW CREEK **NEAR/AT:** DUPONT **COUNTY:** PIERCE **STATE:** WASHINGTON **DATE:** JANUARY 2023

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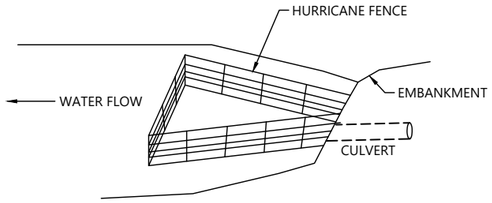
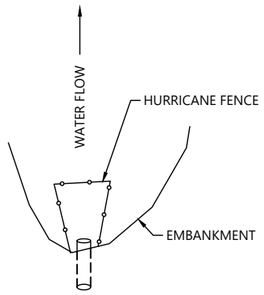


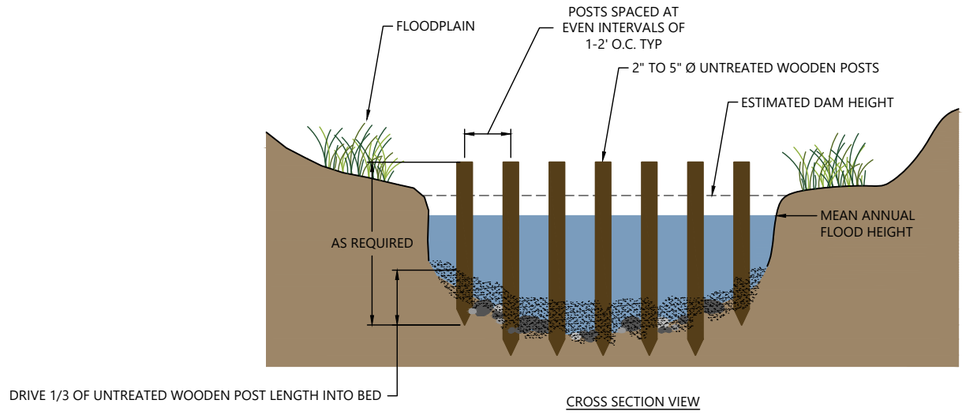
SIDE VIEW



PLAN VIEW

TYPICAL INSTALLATION

3
4a
BEAVER MANAGMENT DEVICE
SCALE: NOT TO SCALE



CROSS SECTION VIEW

PLAN VIEW (CONVEX PRIMARY DAM)

4
4a
BEAVER DAM ANALOG
SCALE: NOT TO SCALE

FIGURE 4c: BEAVER MANAGEMENT DETAILS

REFERENCE #: **APPLICANT:** SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP **ADJACENT PROPERTY OWNERS:** SEE ATTACHMENT C	**LOCATION:** 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010 **LATITUDE:** N 47° 6' 16.09" **LONGITUDE:** W 122° 38' 9.41" **S-T-R:** SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E **HORIZONTAL DATUM:** WSP, NAD83, SOUTH ZONE, US FEET **VERTICAL DATUM:** NAVD88, FEET	**PROPOSED:** RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED **PURPOSE:** TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD	**IN:** EDMOND MARSH AND SEQUALITCHEW CREEK **NEAR/AT:** DUPONT **COUNTY:** PIERCE **STATE:** WASHINGTON **DATE:** JANUARY 2023

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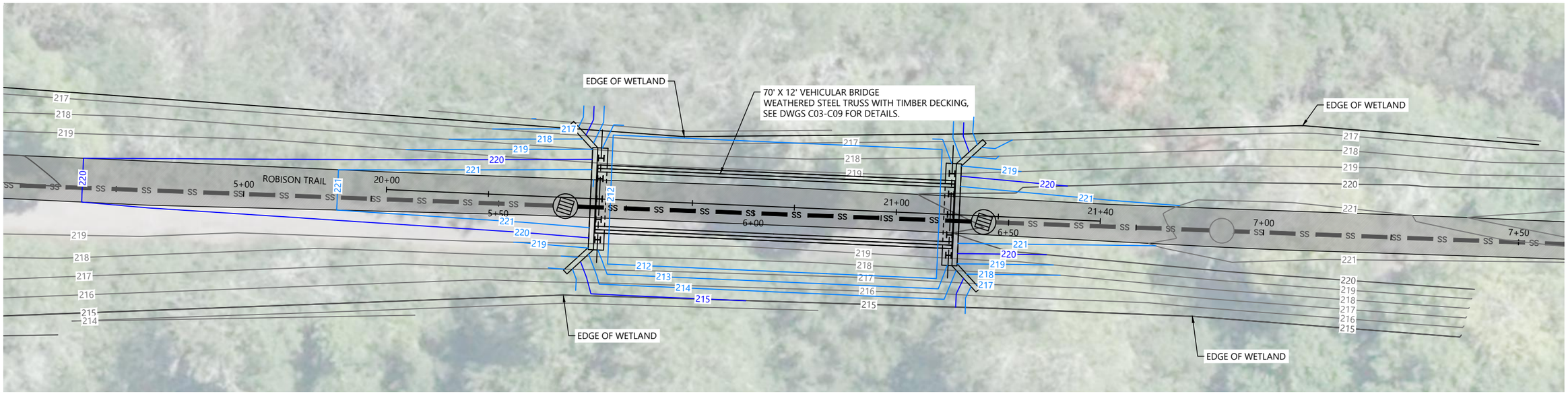

LEGEND:

EXISTING CONTOURS (1' & 5' INTERVALS)

PROPOSED CONTOURS (1' & 5' INTERVALS)

NORTH

0 10 20

SCALE IN FEET

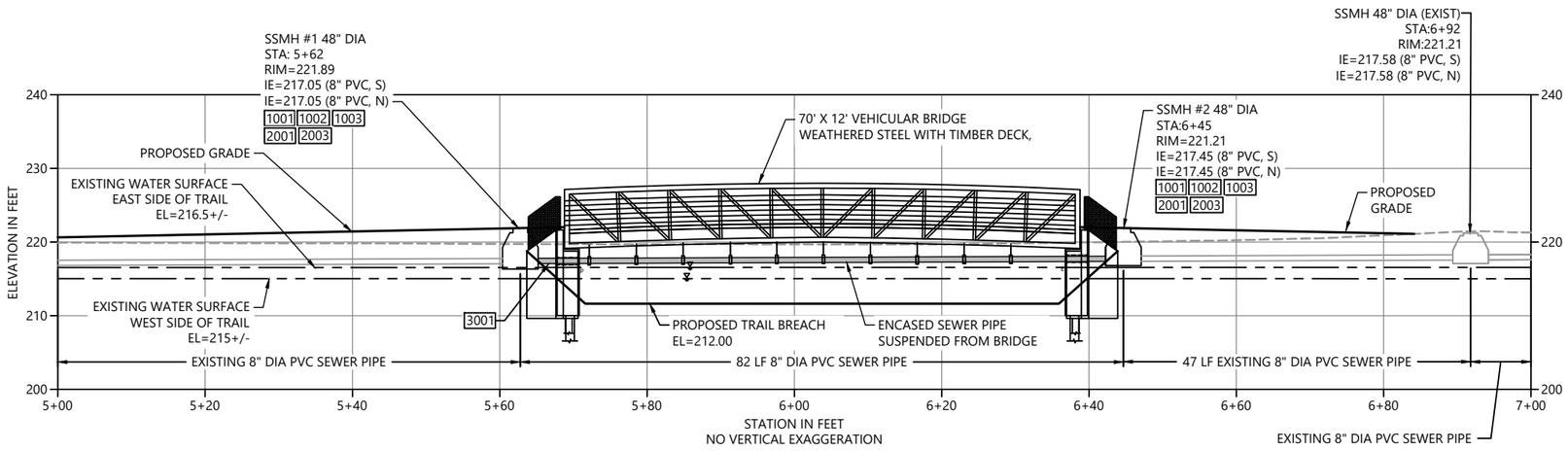

FIGURE 5a: ROBISON BRIDGE PLAN AND SECTION VIEW

REFERENCE #: **APPLICANT:** SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP **ADJACENT PROPERTY OWNERS:** SEE ATTACHMENT C	**LOCATION:** 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010 **LATITUDE:** N 47° 6' 16.09" **LONGITUDE:** W 122° 38' 9.41" **S-T-R:** SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E **HORIZONTAL DATUM:** WSP, NAD83, SOUTH ZONE, US FEET **VERTICAL DATUM:** NAVD88, FEET	**PROPOSED:** RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED **PURPOSE:** TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD	**IN:** EDMOND MARSH AND SEQUALITCHEW CREEK **NEAR/AT:** DUPONT **COUNTY:** PIERCE **STATE:** WASHINGTON **DATE:** JANUARY 2023 ANCHOR QEA 1201 3rd Ave, Suite 2600 Seattle, WA 98101 206-287-9130 **PAGE:** 7 OF 21

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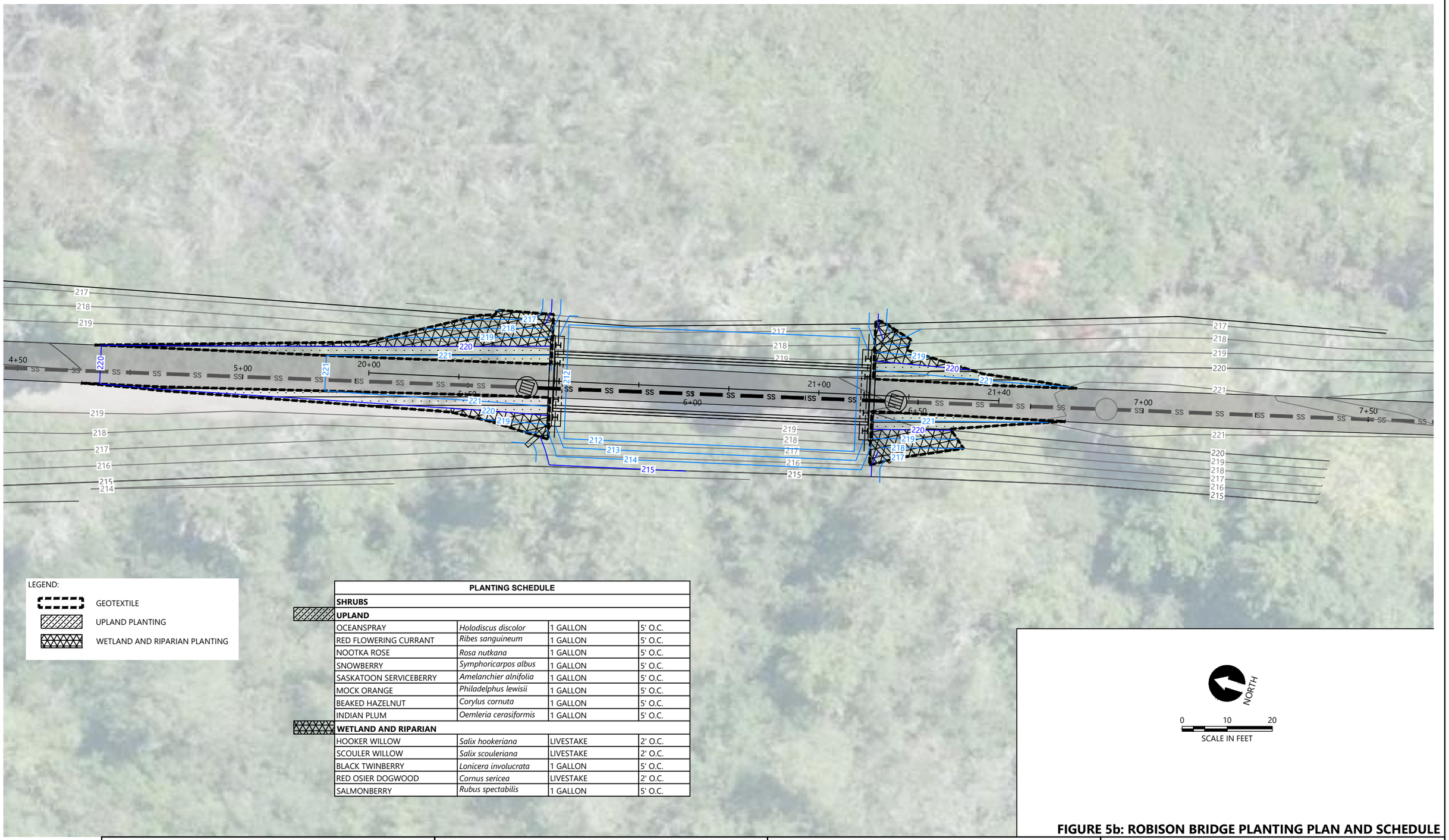

LEGEND:

- GEOTEXTILE
- UPLAND PLANTING
- WETLAND AND RIPARIAN PLANTING

PLANTING SCHEDULE				
SHRUBS				
UPLAND				
	OCEANSPRAY	*Holodiscus discolor*	1 GALLON	5' O.C.
	RED FLOWERING CURRANT	*Ribes sanguineum*	1 GALLON	5' O.C.
	NOOTKA ROSE	*Rosa nutkana*	1 GALLON	5' O.C.
	SNOWBERRY	*Symphoricarpos albus*	1 GALLON	5' O.C.
	SASKATOON SERVICEBERRY	*Amelanchier alnifolia*	1 GALLON	5' O.C.
	MOCK ORANGE	*Philadelphus lewisii*	1 GALLON	5' O.C.
	BEAKED HAZELNUT	*Corylus cornuta*	1 GALLON	5' O.C.
	INDIAN PLUM	*Oemleria cerasiformis*	1 GALLON	5' O.C.
WETLAND AND RIPARIAN				
	HOOKER WILLOW	*Salix hookeriana*	LIVESTAKE	2' O.C.
	SCOULER WILLOW	*Salix scouleriana*	LIVESTAKE	2' O.C.
	BLACK TWINBERRY	*Lonicera involucrata*	1 GALLON	5' O.C.
	RED OSIER DOGWOOD	*Cornus sericea*	LIVESTAKE	2' O.C.
	SALMONBERRY	*Rubus spectabilis*	1 GALLON	5' O.C.

NORTH

0 10 20

SCALE IN FEET

FIGURE 5b: ROBISON BRIDGE PLANTING PLAN AND SCHEDULE

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

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S-T-R: SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E

HORIZONTAL DATUM: WSP, NAD83, SOUTH ZONE, US FEET
VERTICAL DATUM: NAVD88, FEET

PROPOSED: RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED

PURPOSE: TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD

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COUNTY: PIERCE
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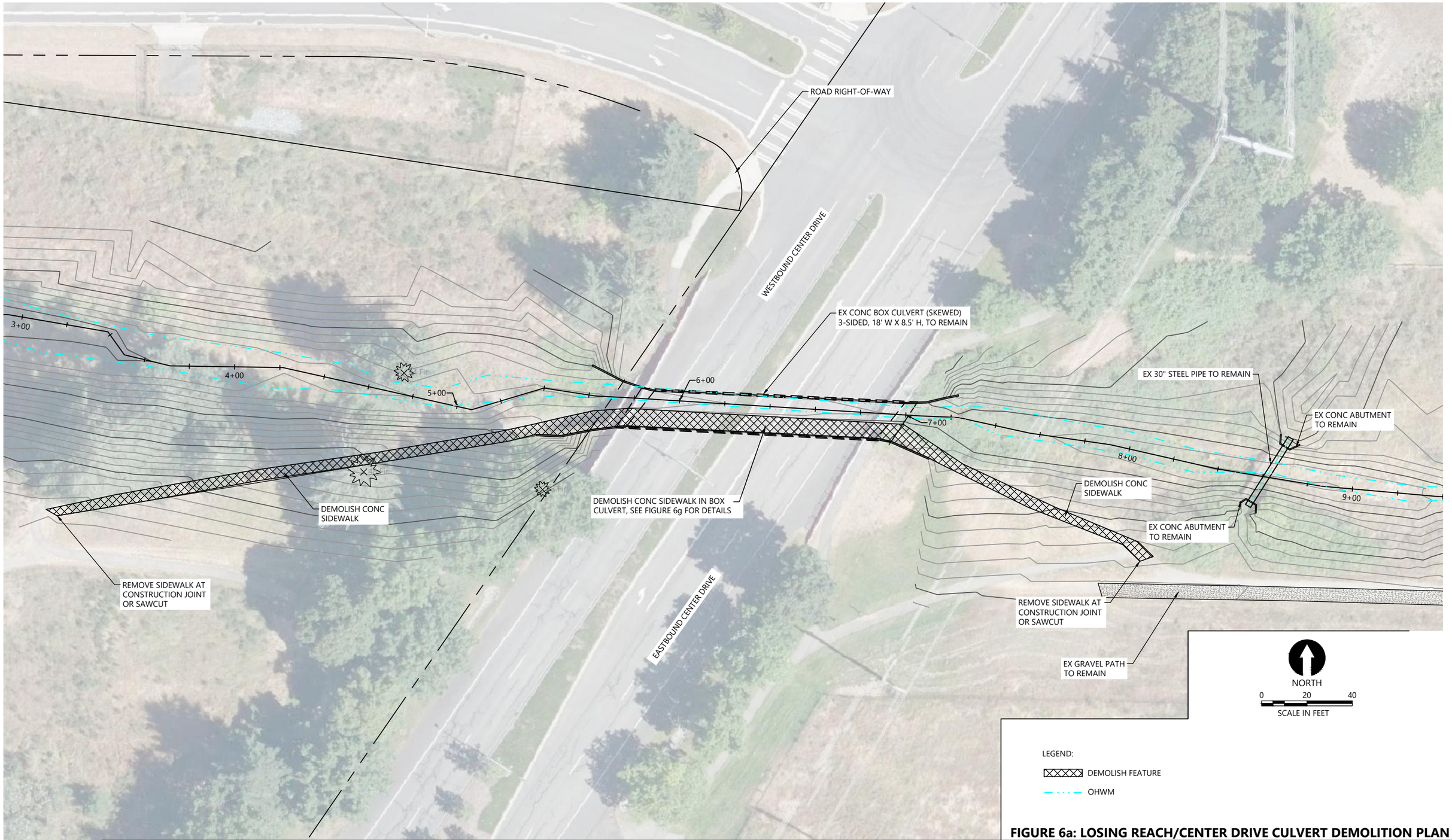

FIGURE 6a: LOSING REACH/CENTER DRIVE CULVERT DEMOLITION PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

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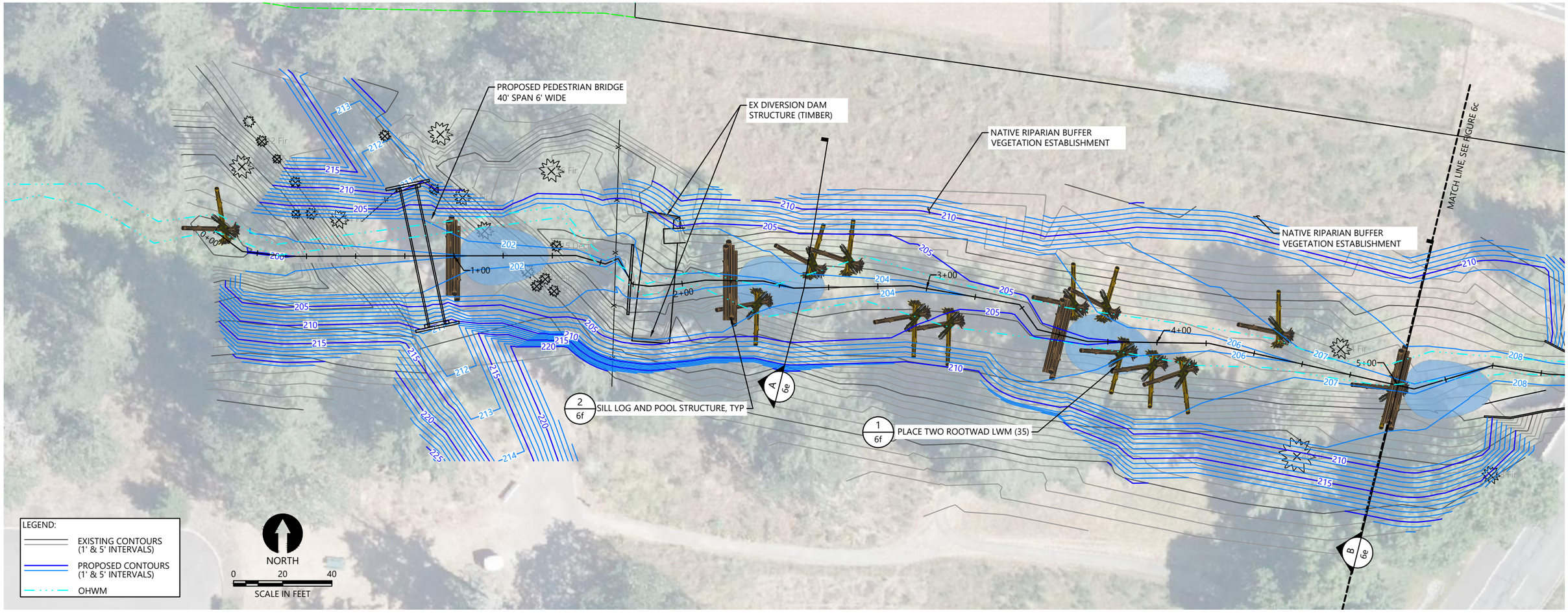

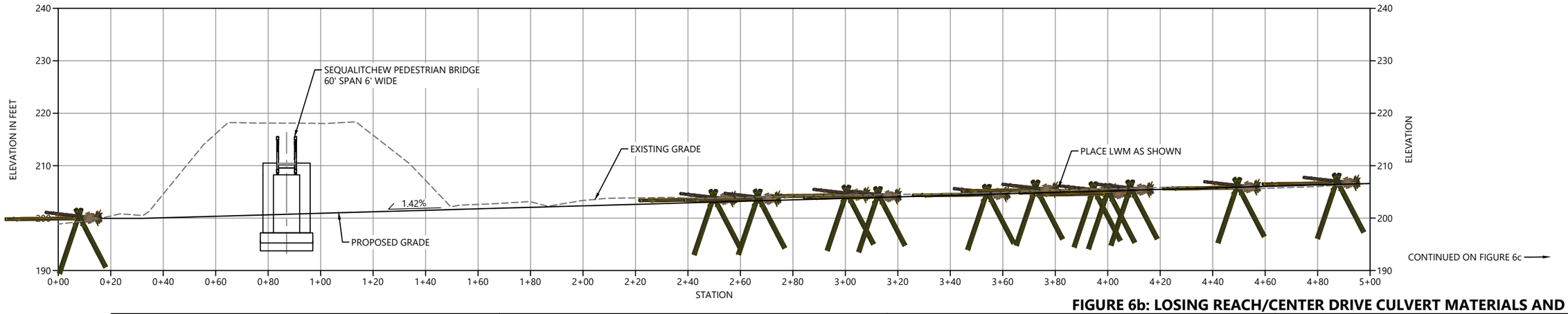

CONTINUED ON FIGURE 6c →

FIGURE 6b: LOSING REACH/CENTER DRIVE CULVERT MATERIALS AND LAYOUT PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

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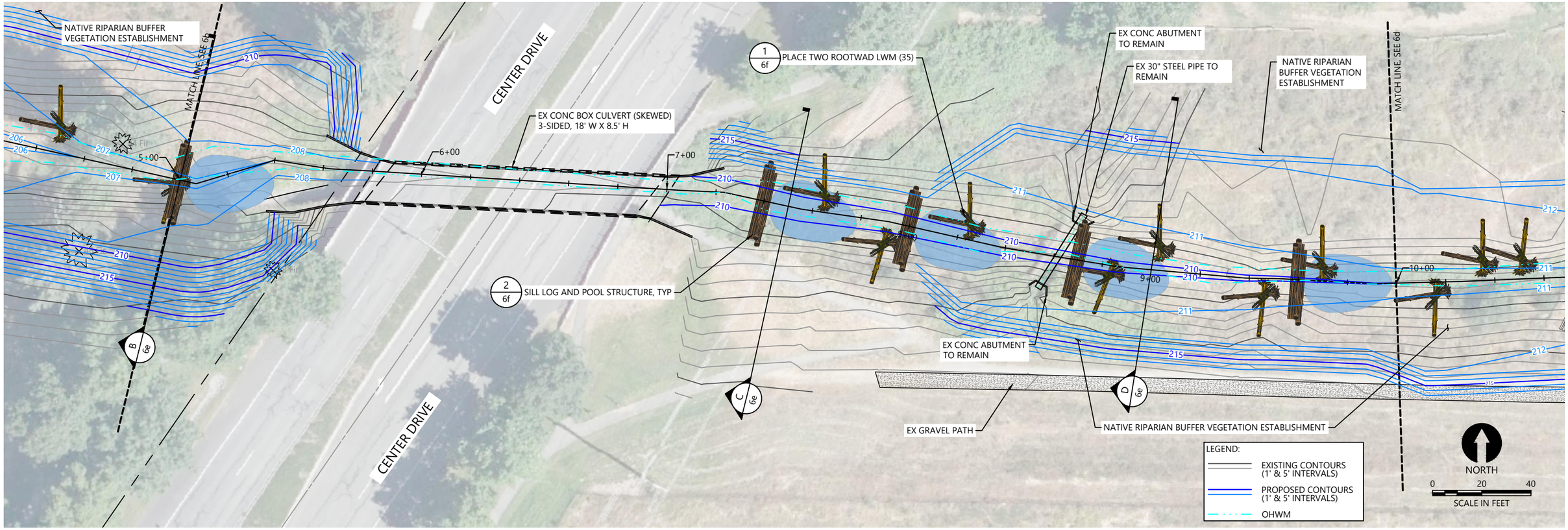

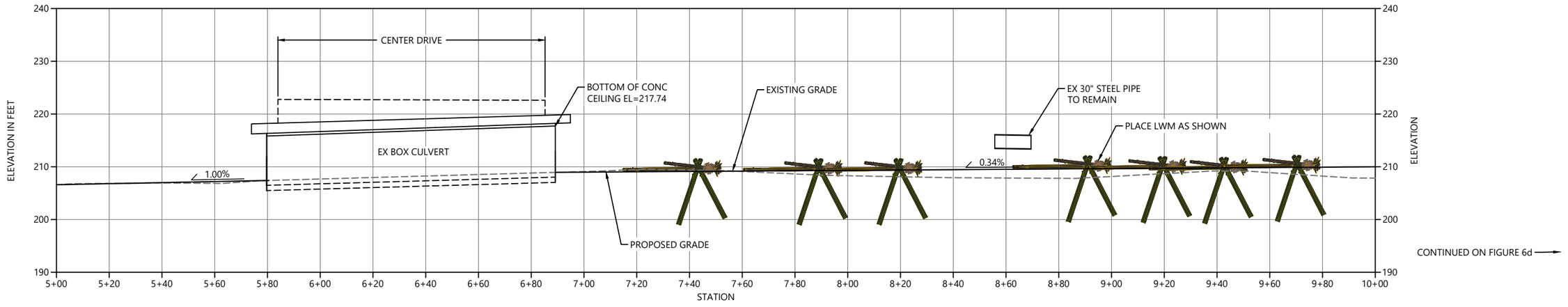

CONTINUED ON FIGURE 6d

FIGURE 6c: LOSING REACH/CENTER DRIVE CULVERT MATERIALS AND LAYOUT PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
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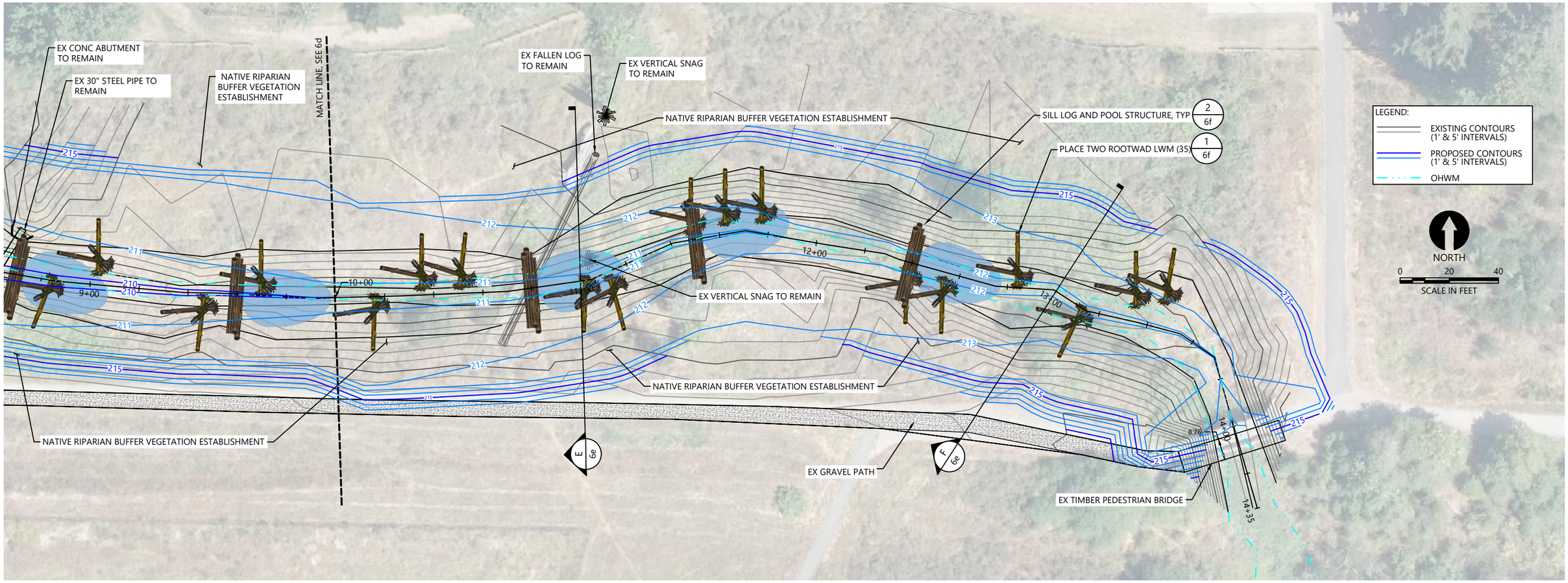

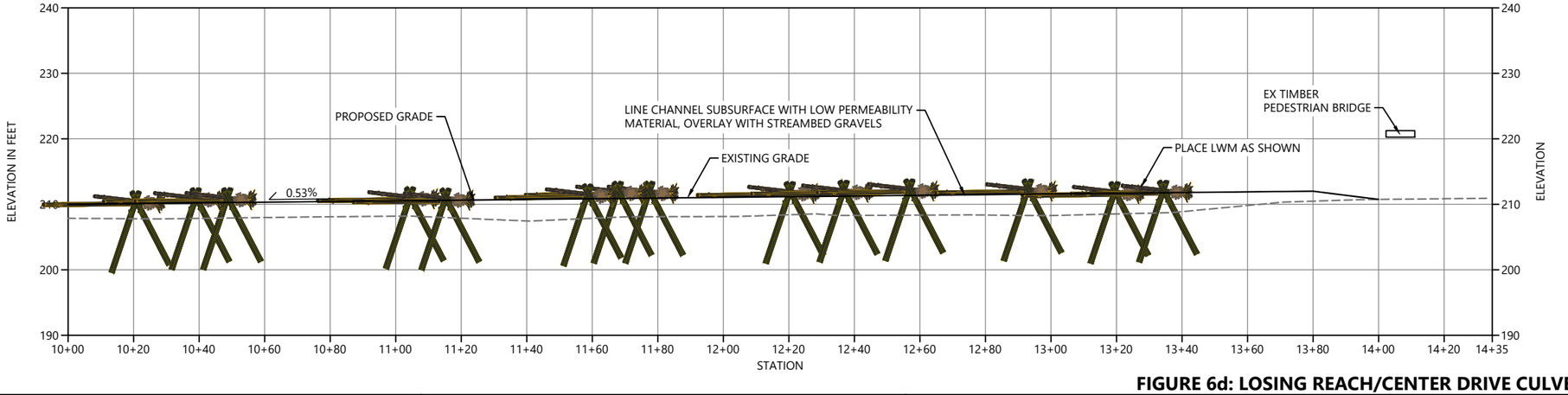

FIGURE 6d: LOSING REACH/CENTER DRIVE CULVERT MATERIALS AND LAYOUT PLAN

REFERENCE #: **APPLICANT:** SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP **ADJACENT PROPERTY OWNERS:** SEE ATTACHMENT C	**LOCATION:** 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010 **LATITUDE:** N 47° 6' 16.09" **LONGITUDE:** W 122° 38' 9.41" **S-T-R:** SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E **HORIZONTAL DATUM:** WSP, NAD83, SOUTH ZONE, US FEET **VERTICAL DATUM:** NAVD88, FEET	**PROPOSED:** RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED **PURPOSE:** TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD	**IN:** EDMOND MARSH AND SEQUALITCHEW CREEK **NEAR/AT:** DUPONT **COUNTY:** PIERCE **STATE:** WASHINGTON **DATE:** JANUARY 2023

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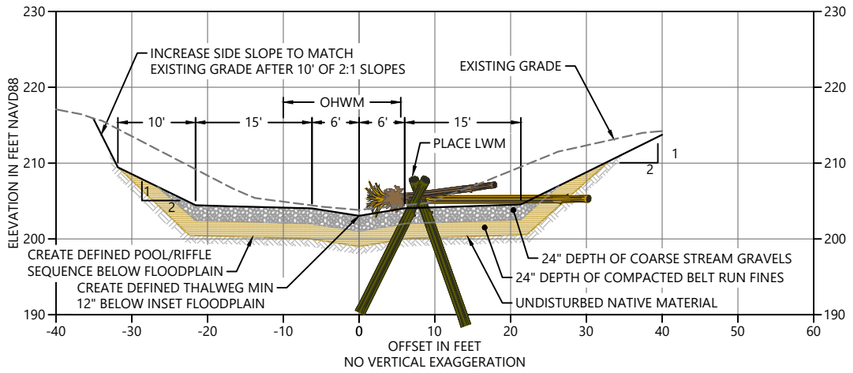

A 6b STA 2+50 LOSING REACH TYPICAL SECTION

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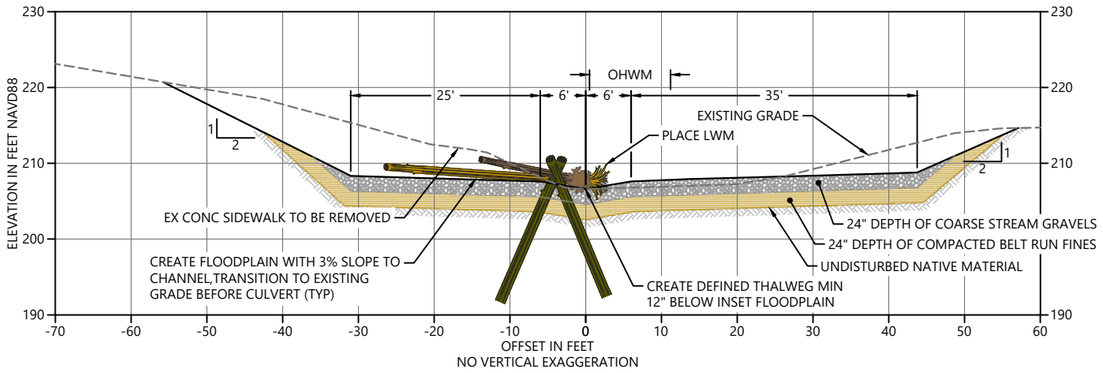
VERT. SCALE: 1" = 10'



B 6b STA 5+00 LOSING REACH TYPICAL SECTION

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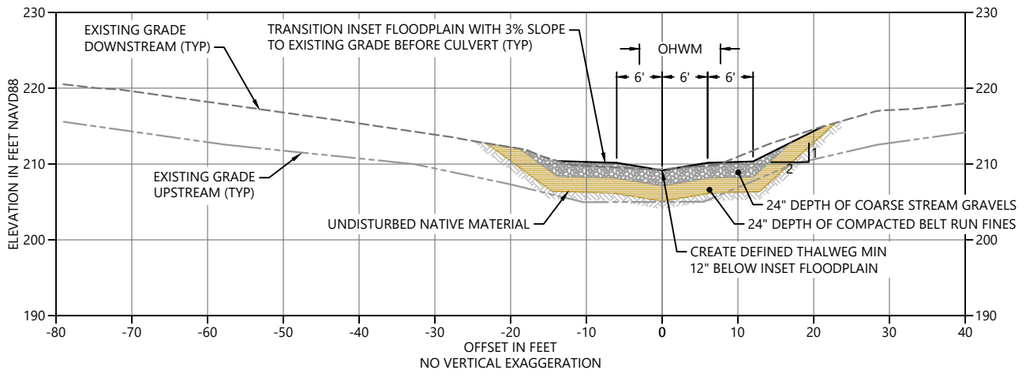
VERT. SCALE: 1" = 10'



C 6c STA 7+50 LOSING REACH TYPICAL SECTION

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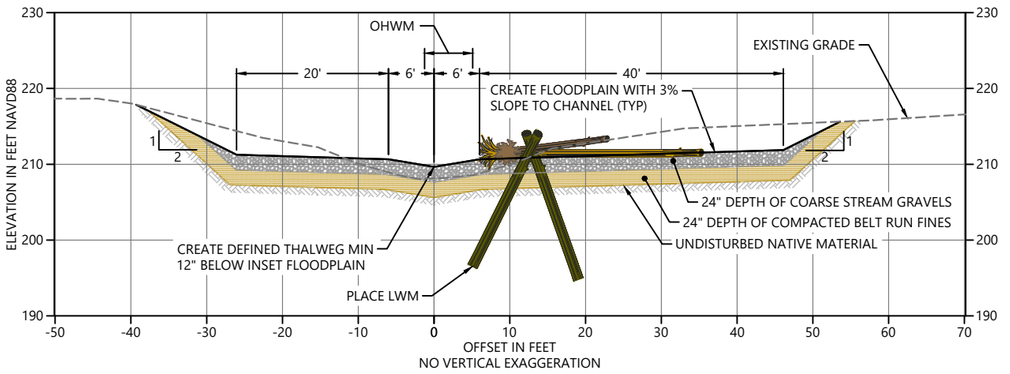
VERT. SCALE: 1" = 10'



D 6c STA 9+00 LOSING REACH TYPICAL SECTION

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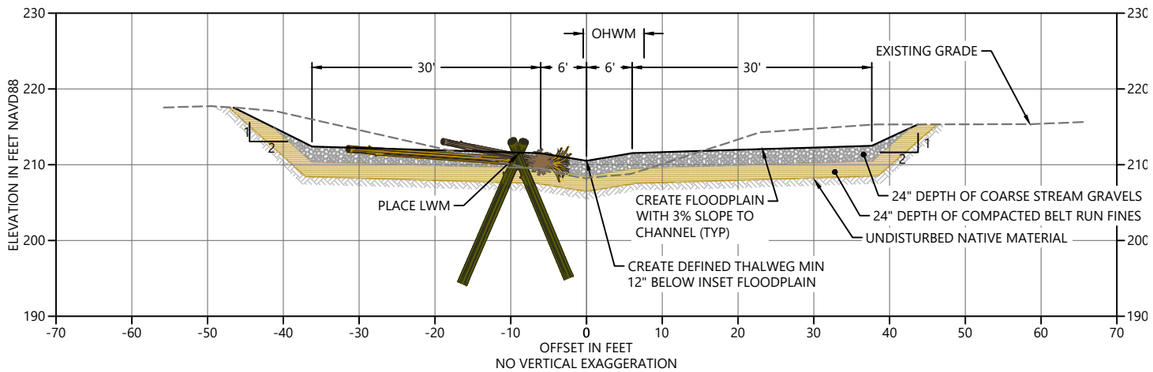

E 6d STA 11+00 LOSING REACH TYPICAL SECTION

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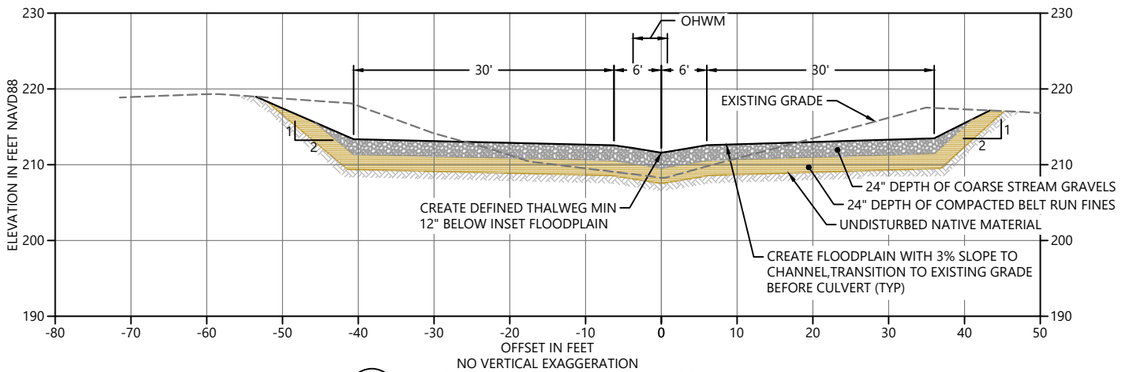

F 6d STA 13+00 LOSING REACH TYPICAL SECTION

HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 10'

FIGURE 6e: LOSING REACH/CENTER DRIVE CULVERT RESTORATION SECTIONS

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

LATITUDE: N 47° 6' 16.09"
LONGITUDE: W 122° 38' 9.41"
S-T-R: SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E
HORIZONTAL DATUM: WSP, NAD83, SOUTH ZONE, US FEET
VERTICAL DATUM: NAVD88, FEET

PROPOSED: RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED

PURPOSE: TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD

IN: EDMOND MARSH AND SEQUALITCHEW CREEK
NEAR/AT: DUPONT
COUNTY: PIERCE
STATE: WASHINGTON

ANCHOR QEA
1201 3rd Ave, Suite 2600
Seattle, WA 98101
206-287-9130

DATE: JANUARY 2023

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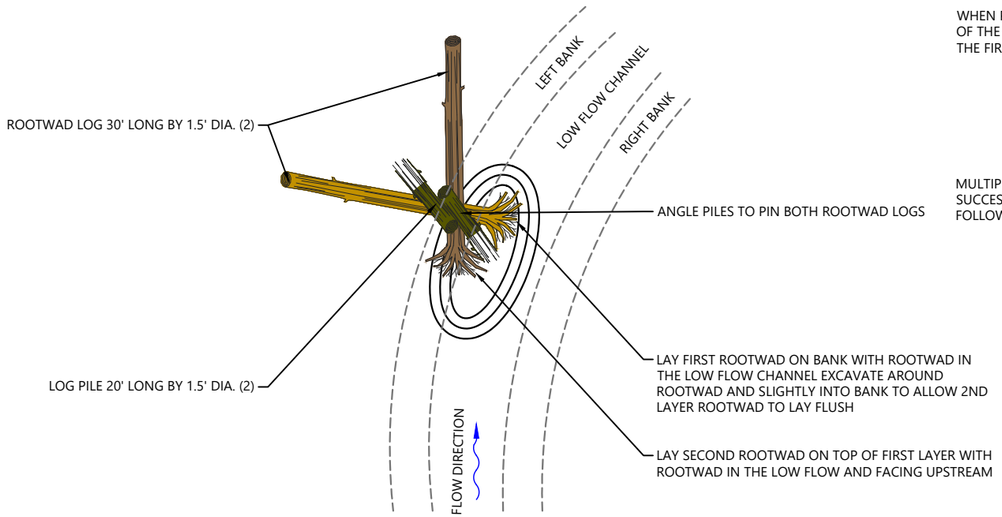
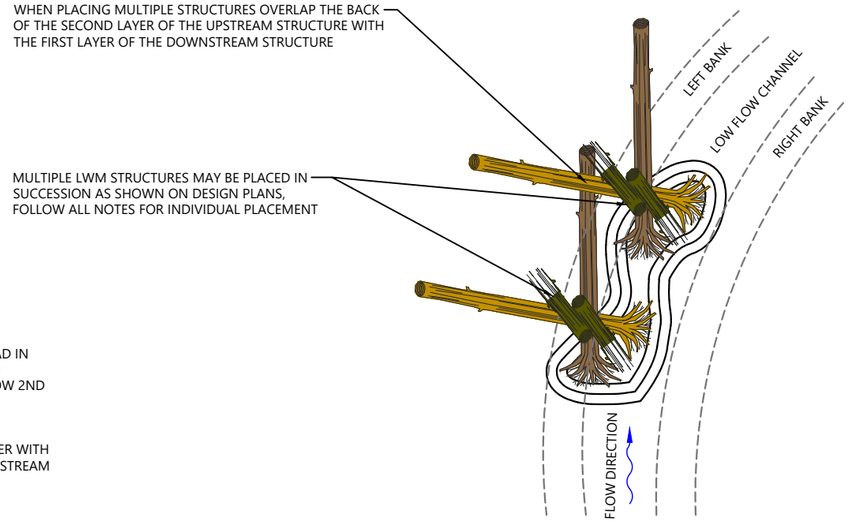


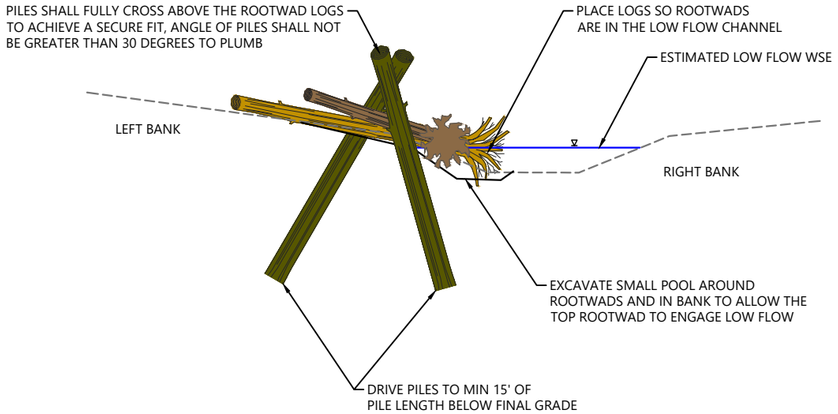
PLAN VIEW



MULTIPLE STRUCTURE PLAN VIEW

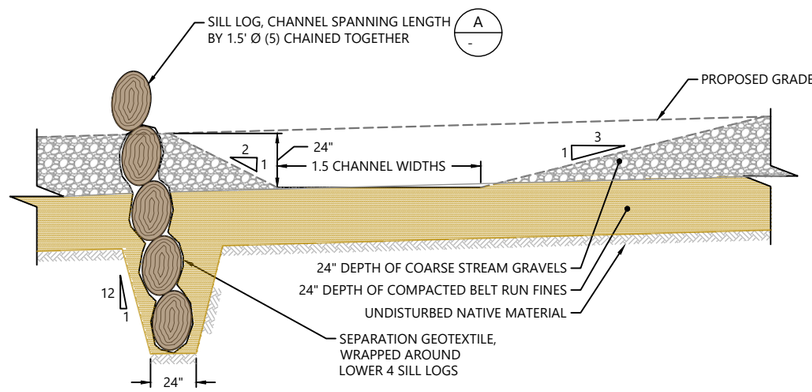
NOTES:

1. LOG DIAMETER TO BE MEASURED 4.5' FROM ROOTWAD COLLAR.
2. LOG PILES AND ROOTWAD LOGS SHALL BE DOUGLAS FIR. OTHER SPECIES MAY BE ALLOWED AT THE DIRECTION OF THE ENGINEER. LENGTHS AND DIAMETERS SHALL BE AS SPECIFIED IN THE TYPICAL.
3. PILES SHALL MEET THE REQUIREMENTS OF ASTM D25 WITH THE EXCEPTION THAT NO PRESSURE TREATMENT OR OTHER CHEMICAL TREATMENT SHALL BE USED.
4. LOW FLOW DEPTH MAY OR MAY NOT BE PRESENT DURING CONSTRUCTION. IF FLOW IS NOT PRESENT LOW FLOW DEPTH SHOULD BE CONSIDERED BELOW THE BANKFULL DEPTH OR AT THE SPECIFICATION OF THE ENGINEER.
5. NO HYDRAULIC MODELING WAS PERFORMED FOR THE DESIGN OF THESE STRUCTURES. STABILITY AND SCOUR REQUIREMENTS ARE ESTIMATED BASED ON ENGINEERS BEST JUDGEMENT AND THE ASSUMPTIONS DETAILED IN THE BASIS OF DESIGN REPORT.



SECTION VIEW

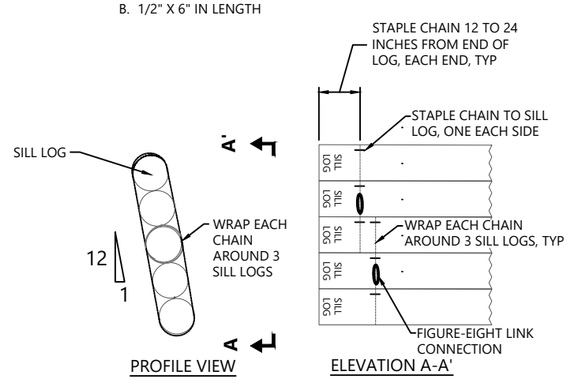
1 / - TYPICAL LWM PLACEMENT
SCALE: NTS



2 / - SILL LOG AND POOL STRUCTURE
SCALE: NTS

NOTES:

1. ALL CONNECTIONS SHALL BE APPROVED BY THE ENGINEER.
2. PRIOR TO FINISHING A CONNECTION REMOVE ALL SLACK FROM THE CONNECTION USING MECHANICAL ADVANTAGE
3. CHAIN MUST MEET THE FOLLOWING SPECIFICATIONS:
   A. 1/2-INCH TRADE SIZE
   B. GRADE 40/43 STEEL
   C. HOT-DIPPED GALVANIZED
   D. WLL NO LESS THAN 9,200 LB
4. CHAIN COUPLING LINKS MUST MEET THE FOLLOWING SPECIFICATIONS:
   A. HAMMERLOCK OR FIGURE EIGHT TWO PIECE - COUPLING TYPE
   B. HOT DIPPED GALVANIZED
   C. GRADE 80 OR 100
   D. FOR TRADE SIZES OF 1/2 INCH
   E. WLL 12,000 LB OR GREATER
7. STAPLES MUST MEET THE FOLLOWING SPECIFICATIONS:
   A. GALVANIZED OR ZINC PLATED STEEL
   B. 1/2" X 6" IN LENGTH



PROFILE VIEW ELEVATION A-A'

A / - SILL LOG CHAIN CONNECTION DETAIL
SCALE: NTS

FIGURE 6f: LOSING REACH/CENTER DRIVE CULVERT LMW TYPICALS

REFERENCE #: **APPLICANT:** SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP **ADJACENT PROPERTY OWNERS:** SEE ATTACHMENT C	**LOCATION:** 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010 **LATITUDE:** N 47° 6' 16.09" **LONGITUDE:** W 122° 38' 9.41" **S-T-R:** SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E **HORIZONTAL DATUM:** WSP, NAD83, SOUTH ZONE, US FEET **VERTICAL DATUM:** NAVD88, FEET	**PROPOSED:** RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED **PURPOSE:** TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD	**IN:** EDMOND MARSH AND SEQUALITCHEW CREEK **NEAR/AT:** DUPONT **COUNTY:** PIERCE **STATE:** WASHINGTON **DATE:** JANUARY 2023

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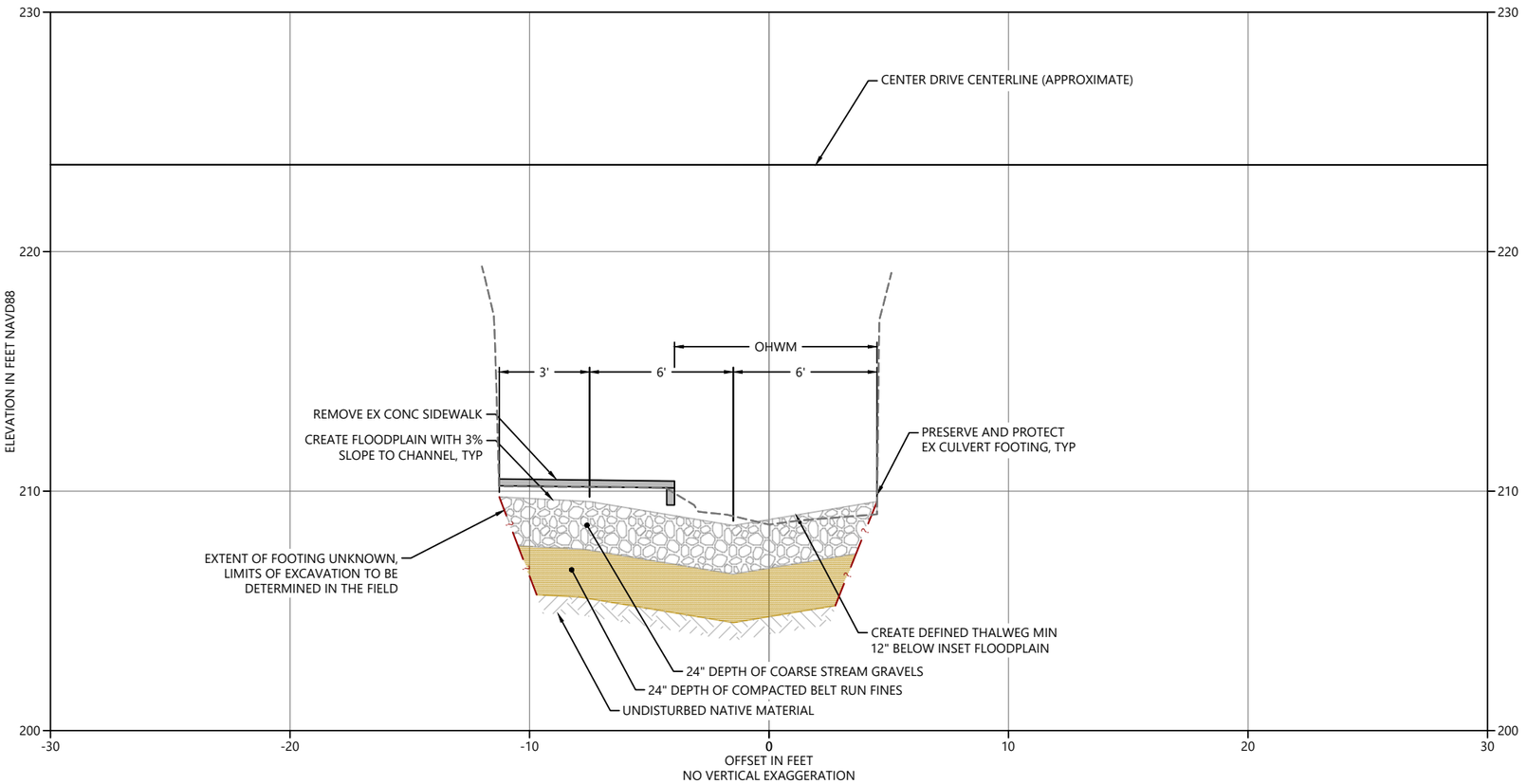
1 / 6a CENTER DRIVE CULVERT SIDEWALK DEMOLITION (WEST END OF CULVERT LOOKING EAST)
SCALE: NTS



2 / 6a STA 6+64 LOSING REACH TYPICAL SECTION
HORIZ. SCALE: 1" = 3'
VERT. SCALE: 1" = 3'

FIGURE 6g: LOSING REACH/CENTER DRIVE CULVERT DETAILS

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

LATITUDE: N 47° 6' 16.09"
LONGITUDE: W 122° 38' 9.41"
S-T-R: SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E
HORIZONTAL DATUM: WSP, NAD83, SOUTH ZONE, US FEET
VERTICAL DATUM: NAVD88, FEET

PROPOSED: RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED

PURPOSE: TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD

IN: EDMOND MARSH AND SEQUALITCHEW CREEK
NEAR/AT: DUPONT
COUNTY: PIERCE
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DATE: JANUARY 2023

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FIGURE 6h: LOSING REACH/CENTER DRIVE CULVERT PLANTING PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

LATITUDE: N 47° 6' 16.09"
LONGITUDE: W 122° 38' 9.41"
S-T-R: SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E
HORIZONTAL DATUM: WSP, NAD83, SOUTH ZONE, US FEET
VERTICAL DATUM: NAVD88, FEET

PROPOSED: RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED

PURPOSE: TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD

IN: EDMOND MARSH AND SEQUALITCHEW CREEK
NEAR/AT: DUPONT
COUNTY: PIERCE
STATE: WASHINGTON

DATE: JANUARY 2023

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FIGURE 6i: LOSING REACH/CENTER DRIVE CULVERT PLANTING PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

LATITUDE: N 47° 6' 16.09"
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S-T-R: SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E
HORIZONTAL DATUM: WSP, NAD83, SOUTH ZONE, US FEET
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PROPOSED: RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED

PURPOSE: TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD

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PLANTING SCHEDULE			
COMMON NAME	SPECIES NAME	SIZE	SPACING
TREES			
CONIFERS			
GRAND FIR	*Abies grandis*	5-6-FT HEIGHT	AS SHOWN
DOUGLAS FIR	*Pseudotsuga menziesii*	5-6-FT HEIGHT	AS SHOWN
WESTERN RED CEDAR	*Thuja plicata*	5-6-FT HEIGHT	AS SHOWN
WESTERN HEMLOCK	*Tsuga heterophylla*	5-6-FT HEIGHT	AS SHOWN
CRYPTOMERIA	*Cryptomeria japonica*	5-6-FT HEIGHT	AS SHOWN
DECIDUOUS			
RED ALDER	*Alnus rubra*	5-6-FT HEIGHT	AS SHOWN
BLACK COTTONWOOD	*Populus trichocarpa*	5-6-FT HEIGHT	AS SHOWN

PLANTING SCHEDULE			
SHRUBS			
UPLAND			
OCEANSPRAY	*Holodiscus discolor*	1 GALLON	5' O.C.
RED FLOWERING CURRANT	*Ribes sanguineum*	1 GALLON	5' O.C.
NOOTKA ROSE	*Rosa nutkana*	1 GALLON	5' O.C.
SNOWBERRY	*Symphoricarpos albus*	1 GALLON	5' O.C.
SASKATOON SERVICEBERRY	*Amelanchier alnifolia*	1 GALLON	5' O.C.
MOCK ORANGE	*Philadelphus lewisii*	1 GALLON	5' O.C.
BEAKED HAZELNUT	*Corylus cornuta*	1 GALLON	5' O.C.
INDIAN PLUM	*Oemleria cerasiformis*	1 GALLON	5' O.C.
WETLAND AND RIPARIAN			
HOOKER WILLOW	*Salix hookeriana*	LIVESTAKE	2' O.C.
SCOULER WILLOW	*Salix scouleriana*	LIVESTAKE	2' O.C.
BLACK TWINBERRY	*Lonicera involucrata*	1 GALLON	5' O.C.
RED OSIER DOGWOOD	*Cornus sericea*	LIVESTAKE	2' O.C.
SALMONBERRY	*Rubus spectabilis*	1 GALLON	5' O.C.

EMERGENT			
RED OSIER DOGWOOD	*Cornus sericea*	LIVESTAKE	2' O.C.
SALMONBERRY	*Rubus spectabilis*	1 GALLON	5' O.C.
COMMON RUSH	*Juncus effusus*	10-CUBIC INCH PLUG	2' O.C.
CREEPING SPIKE-RUSH	*Eleocharis palustris*	10-CUBIC INCH PLUG	2' O.C.
HARDSTEM BULRUSH	*Scirpus acutus*	10-CUBIC INCH PLUG	2' O.C.
SMALL-FRUITED BULRUSH	*Scirpus microcarpus*	10-CUBIC INCH PLUG	2' O.C.
SWITCHGRASS	*Panicum virgatum 'Shenadoah'*	1 GALLON	2' O.C.
SMALL-FRUITED BULRUSH	*Scirpus microcarpus*	10-CUBIC INCH PLUG	2' O.C.
SLOUGH SEDGE	*Carex obnupta*	10-CUBIC INCH PLUG	2' O.C.
STAGING AREA SEEDING			
NORTHWEST MEADOWSCAPES NORTHWEST PRAIRIE MIX OR APPROVED EQUAL, APPLY AS HYDROSEED WITH MULCH, FERTILIZER AND TACKIFIER ACCORDING TO SUPPLIERS RECOMENDATIONS			

FIGURE 6j: LOSING REACH/CENTER DRIVE CULVERT PLANTING SCHEDULE

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

LATITUDE: N 47° 6' 16.09"
LONGITUDE: W 122° 38' 9.41"
S-T-R: SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E

HORIZONTAL DATUM: WSP, NAD83, SOUTH ZONE, US FEET
VERTICAL DATUM: NAVD88, FEET

PROPOSED: RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED

PURPOSE: TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD

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STATE: WASHINGTON

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DEMOLISH EX GATE AND FIXTURE

DEMOLISH EX WIRE FENCE

DEMOLISH EX DIVERSION DAM STRUCTURE (TIMBER)

DEMOLISH EX 56" CMP CULVERT

SEQUALITCHEW CREEK

SEQUALITCHEW CREEK TRAIL

0+00

1+80

2+00

215

210

205

200

225

220

LEGEND:

- EXISTING CONTOURS (1' & 5' INTERVALS)
- DEMOLISH LINEAR FEATURE
- DEMOLISH FEATURE

NORTH

0 10 20

SCALE IN FEET

FIGURE 7a: CITY HALL BRIDGE DEMOLITION PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

LATITUDE: N 47° 6' 16.09"
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PROPOSED 12' WIDE TRAIL

PROPOSED PEDESTRIAN BRIDGE
60' SPAN 6' WIDE

SEQUALITCHEW CREEK

2
6f
SILL LOG AND POOL STRUCTURE, TYP

1
6f
PLACE TWO ROOTWAD LWM (35)

PROPOSED 12' WIDE TRAIL

A
7c

B
7c

LEGEND:

EXISTING CONTOURS
(1' & 5' INTERVALS)

PROPOSED CONTOURS
(1' & 5' INTERVALS)

NORTH

0 10 20

SCALE IN FEET

FIGURE 7b: CITY HALL BRIDGE GRADING PLAN

REFERENCE #:

APPLICANT: SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP

ADJACENT PROPERTY OWNERS:
SEE ATTACHMENT C

LOCATION: 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010

LATITUDE: N 47° 6' 16.09"
LONGITUDE: W 122° 38' 9.41"
S-T-R: SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E

HORIZONTAL DATUM:
WSP, NAD83, SOUTH ZONE, US FEET
VERTICAL DATUM:
NAVD88, FEET

PROPOSED: RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED

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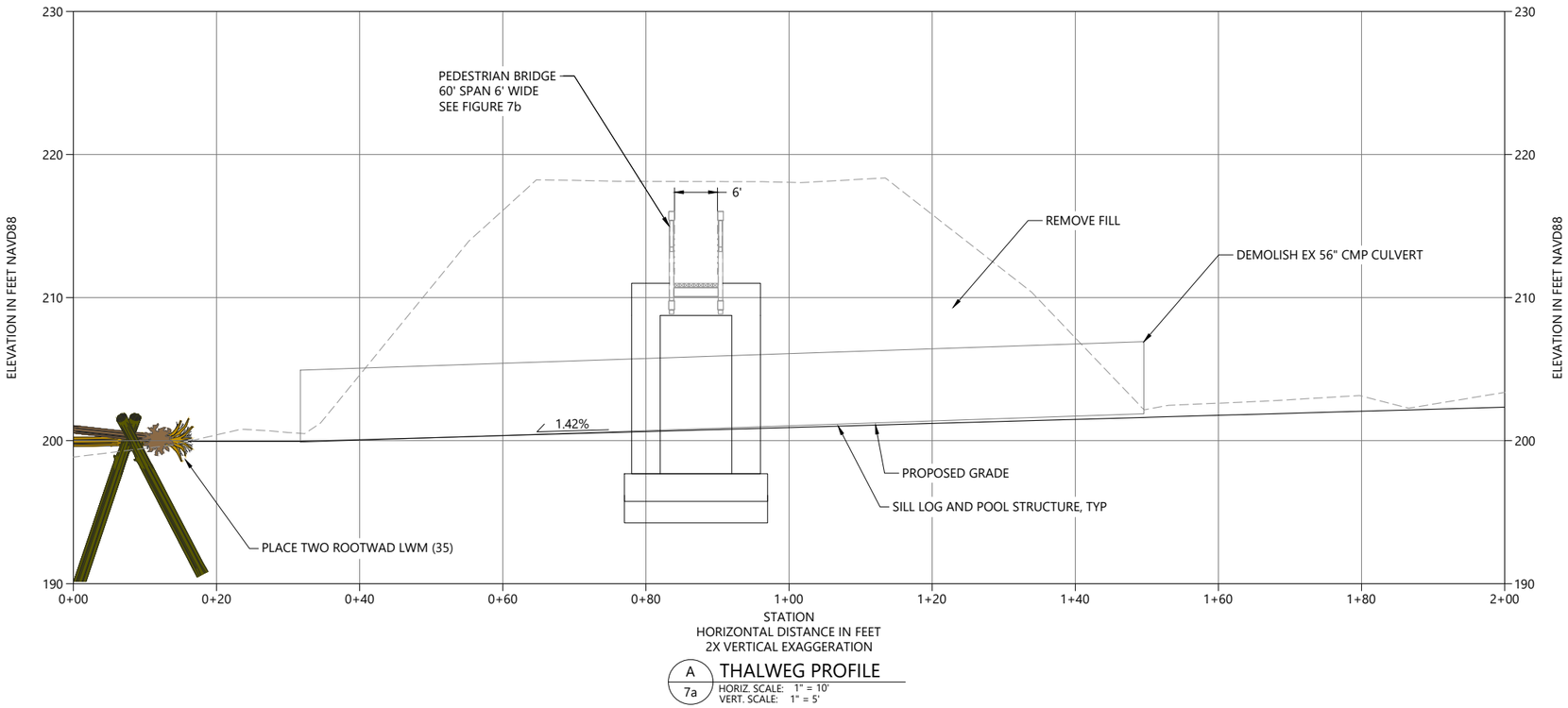
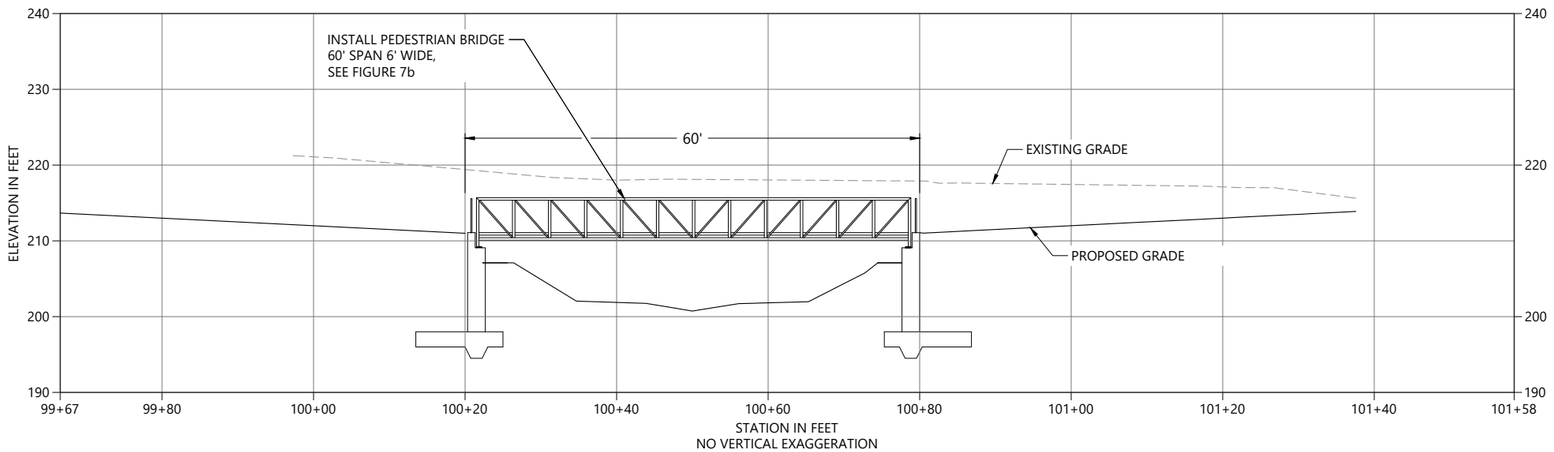


A / 7a THALWEG PROFILE
HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 5'



B / 7a PEDESTRIAN BRIDGE PROFILE
HORIZ. SCALE: 1" = 10'
VERT. SCALE: 1" = 10'

FIGURE 7c: CITY HALL BRIDGE GRADING AND DEMOLITION SECTIONS

REFERENCE #: **APPLICANT:** SOUTH PUGET SOUND SALMON ENHANCEMENT GROUP **ADJACENT PROPERTY OWNERS:** SEE ATTACHMENT C	**LOCATION:** 3000791020, 3000580650, 3001000110, 3000060200, 3000580640, 3000580610, 0119224010 **LATITUDE:** N 47° 6' 16.09" **LONGITUDE:** W 122° 38' 9.41" **S-T-R:** SECTIONS 25 AND 26, TOWNSHIP 19N, RANGE 01E **HORIZONTAL DATUM:** WSP, NAD83, SOUTH ZONE, US FEET **VERTICAL DATUM:** NAVD88, FEET	**PROPOSED:** RESTORE CREEK FLOWS AND AQUATIC HABITAT IN SEQUALITCHEW CREEK WATERSHED **PURPOSE:** TO MAINTAIN FLOOD PROTECTION PROVIDED BY THE LEVEE FOR AGRICULTURAL LANDS AND THE CITY OF STANWOOD	**IN:** EDMOND MARSH AND SEQUALITCHEW CREEK **NEAR/AT:** DUPONT **COUNTY:** PIERCE **STATE:** WASHINGTON **DATE:** JANUARY 2023

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Attachment C

WASHINGTON STATE
Joint Aquatic Resources Permit Application (JARPA) [help]

US Army Corps of Engineers ®
Seattle District

AGENCY USE ONLY

Date received: _____

Agency reference #: _____

Tax Parcel #(s): _____

TO BE COMPLETED BY APPLICANT [help]

Project Name: _____

Location Name (if applicable): _____

Attachment C:
Contact information for adjoining property owners. [help]

Use this attachment only if you have more than four adjoining property owners.

Use black or blue ink to enter answers in white spaces below.

1. Contact information for all adjoining property owners. [help]

Name	Mailing Address	Tax Parcel # (if known)
CITY OF DUPONT	1700 CIVIC DR DUPONT, WA 98327-9603	0119252010, 0119256004, 0119256005, 0119256006, 0119266004, 0119262022, 3000410680, 3000580610, 3000580640, 3000820860, 3001000120, 3001100820
ARCHAEOLOGICAL CONSERVANCY	1717 GIRARD BLVD NE ALBUQUERQUE, NM 87106	0119265002
SALINAS MANUEL DIALA	2042 HAMSTEAD CT VACAVILLE, CA 95687	9005530160
HERNANDEZ CONNIE J & RUSSELL J	1331 ROWAN CT DUPONT, WA 98327-8776	9005530170
METE SHIVANI & TALE SWAPNIL & BABARIYA DAYA P & PRATIK	1335 ROWAN CT DUPONT, WA 98327-8776	9005530180

1. Contact information for all adjoining property owners. [help]		
Name	**Mailing Address**	**Tax Parcel # (if known)**
SINE ERIC D & SUSAN A	CMR 415 BOX 7764 APO, AE 09114	9005530190
JONES ROBERT L	16914 5TH AVE SPANAWAY, WA 98387	9005530200
WALKER KEVIN D	1347 ROWAN CT DUPONT, WA 98327-8776	9005530210
OSBORNE SHELBY	1307 ROWAN CT DUPONT, WA 98327-8776	9005530100
KOENIG MARK A & RENA M	1309 ROWAN CT DUPONT, WA 98327-8776	9005530110
MACK SAMUEL G SR & JO ANN	21022 PROMONTORY CIR SAN ANTONIO, TX 78258-2628	9005530120
POINTON ROBIN E	1401 WALKING TRAIL CT MOUNT PLEASANT, SC 29466	9005530130
THOMAS DEREK M & ALISSA T	1315 ROWAN CT DUPONT, WA 98327	9005530140
POINTON ROBIN E RLT & HUNTLEY JEFFERY S	1401 WALKING TRAIL CT MOUNT PLEASANT, SC 29466	9005530150
BRUTZMAN NICHOLAS D & CAROLINE T K	1260 COOPER ST DUPONT, WA 98327	9005530010
MAJOR MIRIAH K	1262 COOPER ST DUPONT, WA 98327-8778	9005530020
FITZPATRICK ROSADO LAURA	1264 COOPER ST DUPONT, WA 98327-8778	9005530030
BACHMEIER GRETTA	1268 COOPER ST DUPONT, WA 98327	9005530040

1. Contact information for all adjoining property owners. [help]

Name	Mailing Address	Tax Parcel # (if known)
BARLAAN DEMETRI M & YVONNE N UNTALAN	1693 BURNSIDE PL UNIT B DUPONT, WA 98327-8823	9005530050
PATTERSON ANDREW D & HOTT CHRISTINE E	3314 W CHEROKEE AVE TAMPA, FL 33611-3914	9005530060
RAINIER SUNRISE RENTALS LLC	8604 169TH PL NE REDMOND, WA 98052	9005530070
ROELOFSEN MICHAEL J & KATHLEEN R	3136 SHAW ST DUPONT, WA 98327-8763	9005530080
PILIPINA MARILYN V	3243 MEIGS RD WEST POINT, NY 10996	9005530090
SMITH SCOTT ROYAL TTEE OF 1253 GRIGGS STREET TRUST	10810 N TATUM BLVD STE 102 PMB 900 PHOENIX, AZ 85038	3000820510
IH6 PROPERTY WASHINGTON LP	INVITATION HOMES - TAX DEPT 1717 MAIN ST STE 2000 DALLAS, TX 75201	3000790230
REDDY SEGIREDDY SRIDHAR & SUNANDA	14002 NE 63RD CT REDMOND, WA 98052	3000790240
RIEDER ARNOLD F	PO BOX 277 ALTUS, OK 73522-0277	3000790250
QUINBY RIPLEY & AUDREY BENNETT	1239 EVANS CT DUPONT, WA 98327-8756	3000790260
GRAHAM STEVEN	1237 EVANS CT DUPONT, WA 98327-8756	3000790270
BAYLESS ANGELA	1235 EVANS CT DUPONT, WA 98327-8756	3000790280

1. Contact information for all adjoining property owners. [help]

Name	Mailing Address	Tax Parcel # (if known)
AROLA JOHN R & DONNA M ELLIS	1231 EVANS CT DUPONT, WA 98327-8756	3000790290
HPA BORROWER 2016-2 LLC	120 S RIVERSIDE PLZ STE 2000 CHICAGO, IL 60606-6995	3000790300
PARKER JIMMY W & KANNIKAR	1223 EVANS CT DUPONT, WA 98327-8756	3000790310
YOOK SHINSUNG & MISOON	1219 EVANS CT DUPONT, WA 98327-8756	3000790320
NORTHWEST LANDING ROA	1495 WILMINGTON DR STE 110 DUPONT, WA 98327-8807	3000790930
DAMON BRENDEN & ESSY MELINDA S	1185 GRIGGS ST DUPONT, WA 98327-8755	9005230010
WEBB DAVID A & TANYA P	3 HUNT ST FORT BRAGG, NC 28307	9005230020
LIM EDWARD S	1189 GRIGGS ST DUPONT, WA 98327-8755	9005230030
ARELLANO BRENDA	1191 GRIGGS ST DUPONT, WA 98327-8755	9005230040
FRANKLIN DAVID	8837 CAMSHIRE CIR PENSACOLA, FL 32507	9005230050
COLEMAN THERESA	1195 GRIGGS ST DUPONT, WA 98327	9005230060
MARCUS BRADY & KATIE	1163 COSPER ST DUPONT, WA 98327	3000790480
SANDERSON LUKE	12305 523RD ST E EATONVILLE, WA 98328-7432	3000790490

1. Contact information for all adjoining property owners. [help]

Name	Mailing Address	Tax Parcel # (if known)
BAILEY JAMES S & RUTH E	1155 COSPER ST DUPONT, WA 98327-8760	3000790500
ORTEGA MARILYN K & MICHAEL G	1149 COSPER ST DUPONT, WA 98327-8760	3000790510
MILLER CASEY J & JENNA L	1145 COSPER ST DUPONT, WA 98327-8760	3000790520
YAN CHONGBO & GAN LIU	1141 COSPER ST DUPONT, WA 98327-8760	3000790530
EGAN ALEC C & CLAIRE A	1179 GRIGGS ST DUPONT, WA 98327-8755	3000790390
CUPPER ALEXYS E & WAGNER WESLEY S	1175 GRIGGS ST DUPONT, WA 98327-8755	3000790400
POTAPOFF JEROME M & CYNTHIA J	1167 GRIGGS ST DUPONT, WA 98327-8755	3000790410
ZMIJEWSKI KATHERINE & ALEXANDER	1846 JOHNSON AVE DUPONT, WA 98327-8735	3000790420
KAIBIGAN-WISE VENTURA FRANCHESKA & LARRACUENTE VENTURA NICOLAS	1159 GRIGGS ST DUPONT, WA 98327-8755	3000790430
AN LUMIN & YANG LIU	1155 GRIGGS ST DUPONT, WA 98327-8755	3000790440
HENDERSON ANDREA & RONALD D	1151 GRIGGS ST DUPONT, WA 98327-8755	3000790450
FRIPP-BRAXTON NANCY E	1156 COSPER ST DUPONT, WA 98327-8760	3000790460
BRAWLEY SALLY L & DAVID D	1160 COSPER ST DUPONT, WA 98327-8760	3000790470

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA publication number: ORIA-16-014 rev. 10/2016

Attachment D

WASHINGTON STATE
Joint Aquatic Resources Permit Application (JARPA) [help]

US Army Corps of Engineers ®
Seattle District

AGENCY USE ONLY

Date received: _____

Agency reference #: _____

Tax Parcel #(s): _____

_____

TO BE COMPLETED BY APPLICANT [help]

Project Name: _____

Location Name (if applicable): _____

_____

Attachment D:
Construction sequence [help]

Use this attachment only if your project will be constructed in phases or stages. Complete the outline showing the construction sequence and timing of activities, including the start and end dates of each phase or stage.

Use black or blue ink to enter answers in white spaces below.

Phase or Stage	Start Date	End Date	Activity Description
1	January 1, 2024	December 1, 2024	Flow Restoration Phase (beaver management and flow gradient management): • Install beaver exclusion device at Steilacoom-DuPont Road crossing. • Install beaver management techniques at strategic locations across Edmond Marsh. • Install vehicular bridge on Robison Trail. ○ *Coordinated with flow restoration on Joint Base Lewis-McChord that is by others under separate permit.*
2	June 1, 2025	October 1, 2026	Flow Enhancement Phase (increase flows to meet goal thresholds): • Restore losing reach with fine sediment layer to maintain surface flow and habitat log jams/gravel augmentation to improve hyporheic flow.
3	June 1, 2025	October 1, 2026	Habitat Enhancement Phase: • Remove concrete pedestrian trail beneath Center Drive; restore channel under bridge. • Install fish-passable pedestrian bridge over Sequalitchew Creek at City Hall culvert.
4	January 1, 2024	October 1, 2023	Operation and Management Phase: • Implement adaptive management of beaver management techniques.

If you require this document in another format, contact the Governor's Office for Regulatory Innovation and Assistance (ORIA) at (800) 917-0043. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call (877) 833-6341. ORIA publication number: ORIA-16-015 rev. 10/2016

JARPA Supplement Fish Enhancement

Application for Streamlined Processing of
FISH HABITAT ENHANCEMENT PROJECTS
Addition to the Joint Aquatic Resources Permit Application (JARPA)
Page 1

Under RCW 77.55.181 you may qualify for a streamlined permit process if your project is designed to enhance fish habitat. If your project meets the requirements below, you are entitled to the streamlined Hydraulic Project Approval (HPA) process, exemption from the State Environmental Policy Act (SEPA), and exemption from all local government permits and fees except that, pursuant to chapter 86.16 RCW, a local government may impose such requirements, or charge such fees, or both, only as may be necessary in order for local government to administer the national flood insurance program regulation requirements. To apply for the exemption process, you must provide, on the same day, a complete application package to: the Department of Fish and Wildlife (WDFW) and all applicable local government planning and permitting departments. Local governments have 15 days to provide comments to WDFW to aid it in deciding whether your project qualifies (see below for details).

To QUALIFY for the fish habitat enhancement exemption you must check at least one each from A and B and provide a letter of approval from one of the agencies listed in B. It is highly recommended you discuss your proposal with the local Habitat Biologist prior to submitting your application.

A) My project (check all that apply):
- [x] Removes a human-made or caused fish passage barrier.
- [ ] Restores an eroded or unstable stream bank using bioengineering techniques.
- [x] Places woody debris or other in-stream structures that benefit naturally reproducing fish stocks.
- [ ] Restores native kelp or eelgrass beds, or native oysters**.**

B) My project is approved by (check all that apply):
- [ ] WDFW's Salmon Enhancement, or Volunteer Cooperative Fish and Wildlife Enhancement Programs.
- [ ] The sponsor of a watershed restoration plan as provided in chapter 89.08RCW.
- [ ] WDFW, as a department-sponsored fish enhancement or restoration project.
- [ ] A Conservation District, as a Conservation District-sponsored fish habitat enhancement or restoration project.
- [ ] A formal grant program established by the legislature or the Department of Fish and Wildlife for fish habitat enhancement or restoration.
- [ ] A federally recognized tribes as tribally sponsored fish habitat enhancement projects or restoration projects.
- [ ] The Washington State Department of Transportation's environmental retrofit program as a stand-alone fish passage barrier correction project, or the fish passage barrier correction portion of a larger transportation project.
- [ ] A local, state, or federally approved fish barrier removal grant program designed to assist local governments in implementing stand-alone fish passage barrier corrections.
- [x] A city or county for a stand-alone fish passage barrier correction project funded by the city or county.

To APPLY for the Exemption, submit a complete application package consisting of the following documents to the local government planning department and WDFW.

Place a check in each of the following boxes when you have collected each of these required application materials:
- [x] This addition to the JARPA.
- [x] A completed JARPA (use the most recent version of JARPA).
- [x] Project plan drawings (no larger than 11 x 17 format).
- [x] Letter of approval for your specific project from the agency selected in B, above.
- [x] A copy of, or link to an online version of, the watershed restoration plan, if submitting an approved watershed restoration project.

I am sending my application to the following local government planning department: City of DuPont ***on:*** 04/11/2023 ***(Date)*** ***xx/xx/20xx***

Continued on back of page

Application for Streamlined Processing of
FISH HABITAT ENHANCEMENT PROJECTS
Addition to the Joint Aquatic Resources Permit Application (JARPA)
Page 2

PLEASE NOTE:

- In addition to applying for this streamlined processing, you need to apply for all other applicable Federal and State permits identified in the JARPA.
- If WDFW determines that your project meets the fish habitat enhancement exemption criteria, SEPA and all local government permits and fees are waived (with the exception explained above). WDFW will process your HPA within 45 days of receiving your complete application.
- If significant concerns are raised during the 15-day comment period regarding adverse impacts from your project that cannot be addressed through HPA conditions, WDFW may determine that the project does not qualify for the exemption process. If WDFW makes that decision, you may re-apply to WDFW, the applicable local government, and any other applicable permitting agency for approval under the full permitting process. If WDFW determines that your project does NOT qualify for the exemption, or if your application is incomplete, you and the local government planning department will benotified.

Applicant Name: Applicant City of DuPont. Agent Cole Baldino, South Puget Sound Salmon Enhancement Group coleb@spsseg.org.

WASHINGTON FORESTRY CONSULTANTS, INC.
FORESTRY AND VEGETATION MANAGEMENT SPECIALISTS

W F C I

O: 360/943-1723
C: 360/561-4407

9136 Yelm Hwy SE
Olympia, WA 98513

- Tree Assessment -

SESQUALITCHEW CREEK RESTORATION

1700 Civic Drive
DuPont, WA 98327

Prepared for: Anchor QEA

Prepared by: Washington Forestry Consultants, Inc.

Date of Report: March 6, 2023

The project proponent is planning to replace two fish blockage culverts and regrade a portion of Sequalitchew Creek as part of a watershed restoration project in DuPont, WA. The proponent has retained WFCI to:

- Inventory and evaluate all trees that will be impacted by the Sequalitchew Trail project.
- Make recommendations for retention of significant trees, along with any required protection and cultural measures.

Observations

Methodology

WFCI has evaluated all trees ≥6-inches diameter at breast height (DBH) in the project areas identified on site plans provided by Anchor QEA. The subject trees were identified as being impacted by construction activities associated with the Sequalitchew Trail improvements project. This includes three areas of assessment: the Robison Trail Bridge site, the Dry Reach Restoration site, and the City Hall Culvert Removal/Pedestrian Bridge site.

All trees were numbered in the field with a number painted at its base. Healthy trees were numbered with blue paint and unhealthy trees in orange paint.

In all cases, the overall appearance of the tree was considered relative to its ability to add value to the site and the scale of the tree and its proximity to other developments is considered. The

potential for incorporation into the project design is evaluated, as well as potential site plan modifications that may allow the tree(s) to be protected.

Trees that are preserved must be carefully selected to make sure that they can survive construction impacts, adapt to a new environment and perform well in the landscape. Healthy, vigorous trees are better able to tolerate impacts such as root injury, changes in soils moisture regimes, and soil compaction than are low vigor trees.

Structural characteristics are also important in assessing suitability. Trees with significant decay and other structural defects that cannot be treated are likely to fail. Such trees should not be preserved in areas where damage to people or property could occur.

The tree evaluation phase used methodology developed by Nelda Matheny and Dr. James Clark in their 1998 publication Trees and Development: A Technical Guide to Preservation of Trees during Land Development.

Robison Trail Bridge Site

This area of the project is part of an old railroad grade that extends across Edmund Marsh. The rail bed was originally constructed with dirt fill placed over the native vegetation. The planned restoration is to remove a 70-foot section of the grade and replacing it with a bridge to allow more free flowing water through Sequalitchew creek. Minor soil filling will also occur to adequately slope the new bridge approaches.

The trees in this area are all red alder (*Alnus rubra*) growing along the sides of the grade. The tree diameters range in size from 6 to 26 inches in DBH. Tree conditions are mostly 'Fair' with one tree in 'Poor' condition. Tree locations are shown on the site plan in Attachment 1. The growth structure of the trees is stunted because of the poor, wet soils and lots of branches due limited photosynthetic competition from surrounding trees.

The soil removal for the project will damage the root systems of all 8 assessed trees. They will all need to be removed to complete the project. The removed trees will be used to improve fish habitat in Sequalitchew Creek downstream of Edmond Marsh. Branches from overhanging trees approaching the site will need pruning to allow access for the construction equipment.

Table 1. List of Assessed Trees in the Robison Trail Bridge Site.

Tree #	Species	DBH (in.)	Condition	Dripline (ft.)	Project: Save/ Remove	Critical Root Zone (ft.)	Notes
1	Red Alder	12	Fair	12	Remove	7	
2	Red Alder	6,7	Fair	8	Remove	6	
3	Red Alder	26	Fair	20	Remove	16	
4	Red Alder	6	Fair	10	Remove	6	
5	Red Alder	6	Fair	10	Remove	6	
6	Red Alder	7	Fair	10	Remove	6	

Tree #	Species	DBH (in.)	Condition	Dripline (ft.)	Project: Save/ Remove	Critical Root Zone (ft.)	Notes
7	Red Alder	13,16	Poor	30	Remove	12	16" stem is dead
8	Red Alder	12	Fair	15	Remove	7	

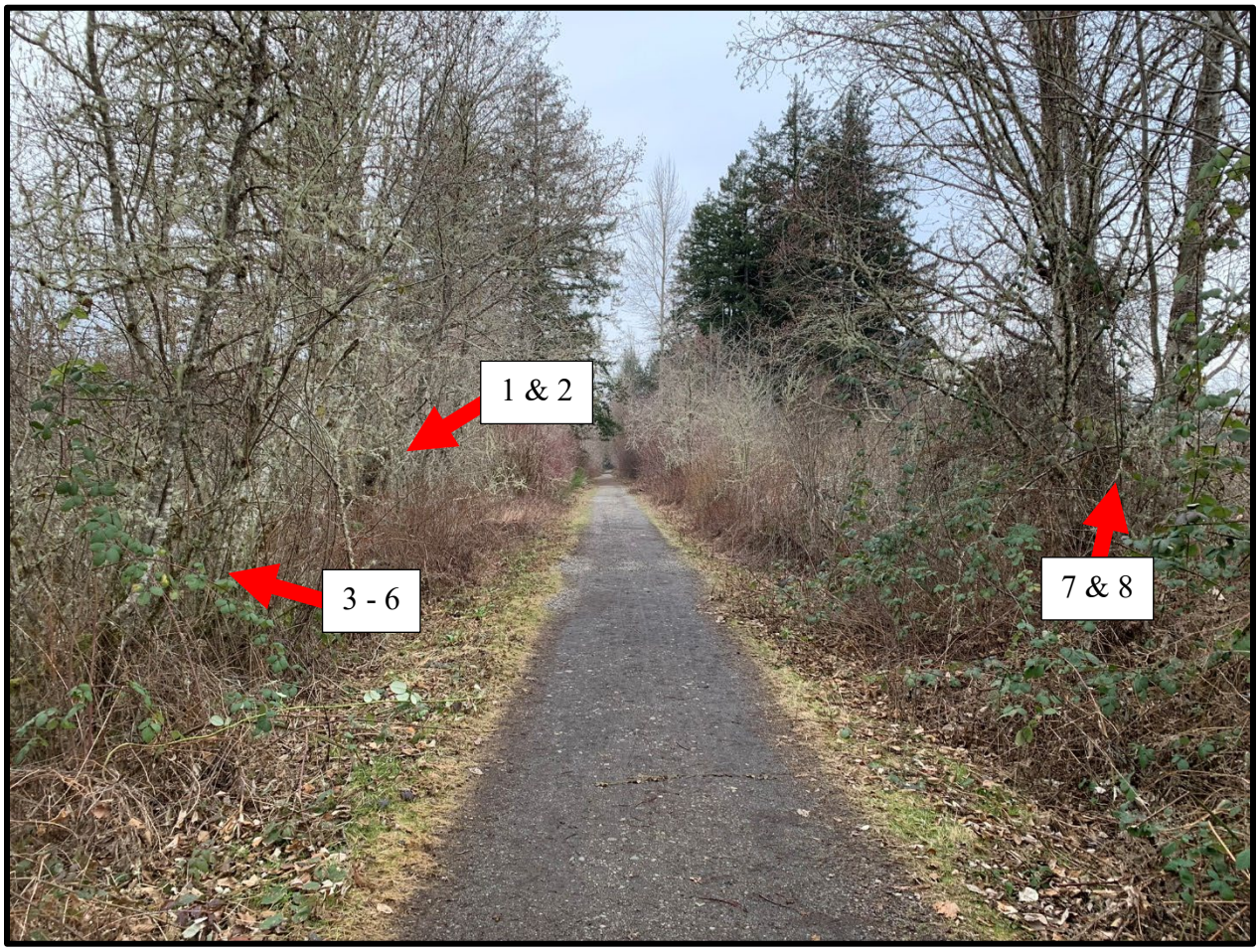


Photo A. View of tree removal trees at Robison Trail Bridge Site.

Dry Reach Restoration Site

The restoration at this site includes clearing and grading the creek bed to provide better water flow through this section of creek. There are three trees in this area of the project that will be impacted. They include one black cottonwood and two Oregon white oaks (*Quercus garryana*) between 7 and 15 inches DBH. The condition of all trees is 'Fair'. Tree locations are shown on the site plan in Attachment 2. The trees are located on the edges of the project boundary and the site plan shows fill grading around the trees. All these trees are young, healthy individuals that should be able to tolerate this small amount of root disturbance and can be retained. The root protection fences should be placed at the distance specified in Table 2.

Table 2. List of Assessed Trees in the Dry Reach Restoration Site.

Tree #	Species	DBH (in.)	Condition	Dripline (ft.)	Project: Save/ Remove	Critical Root Zone (ft.)	Notes
9	Black Cottonwood	15	Fair	15	Save	9	
10	Oregon White Oak	8	Fair	10	Save	15	
11	Oregon White Oak	7	Fair	8	Save	12	

City Hall Culvert Removal/Pedestrian Bridge Site

The proposed restoration at this site is to replace a failing culvert with a new 60-foot bridge to allow fish passage in Sequalitchew Creek. There will be tree and fill removal and the construction of new bridge abutments. Additional grading will occur along the sides of the creek up to Center Drive.

There were 37 trees identified as being impacted by the proposed work. Tree species in this area are Douglas-fir (*Pseudotsuga menziesii*), black cottonwood, Oregon white oak, bigleaf maple (*Acer macrophyllum*), Oregon ash (*Fraxinus latifolia*), and red oak (*Quercus rubra*) growing along the sides and in the streambed of Sequalitchew Creek. The tree diameters range in size from 8 to 55 inches in DBH. All but five trees are suitable for retention based on tree health. There are four Oregon white oak trees that will be removed for the project. Two of the white oak trees are considered a 'Significant' tree, over 12" DBH. The other two trees are 10" DBH. Tree locations are shown on the site plan in Attachment 3.

The soil removal and grading for the project will damage the root systems of up to 35 assessed trees and will require removal to complete the project. Removed trees will be used to improve fish habitat in this reach of Sequalitchew Creek. Two trees outside of the project boundaries will be impacted but can be retained.

Table 3. List of Assessed Trees in the City Hall Culvert Removal/Pedestrian Bridge Site.

Tree #	Species	DBH (in.)	Condition	Dripline (ft.)	Project: Save/ Remove	Critical Root Zone (ft.)	Notes
12	Red Oak	23	Fair	24	Save	14	Will be saved if possible

Tree #	Species	DBH (in.)	Condition	Dripline (ft.)	Project: Save/ Remove	Critical Root Zone (ft.)	Notes
13	Red Oak	22	Good	25	Save	13	Will be saved if possible
14	Black Cottonwood	26	Fair	26	Remove	16	
15	Douglas-fir	51	Fair	25	Remove	31	
16	Douglas-fir	22	Fair	23	Save	13	Will be saved if possible
17	Douglas-fir	41	Fair	28	Save	25	Will be saved if possible
18	Douglas-fir	44	Fair	28	Save	26	impact on north side of tree
19	Oregon White Oak	14	Fair	32	Save	8	no dripline to north
20	Douglas-fir	14	Poor	15	Save	8	Will be saved if possible
21	Douglas-fir	8	Poor	15	Save	5	Will be saved if possible
22	Douglas-fir	55	Fair	30	Save	33	Will be saved if possible
23	Douglas-fir	13	Fair	16	Save	8	Will be saved if possible
24	Douglas-fir	15	Fair	16	Save	9	Will be saved if possible
25	Douglas-fir	18	Dead	0	Remove	11	
26	Douglas-fir	24	Poor	15	Remove	14	
27	Bigleaf Maple	12	Fair	20	Remove	7	
28	Oregon Ash	22	Fair	22	Remove	13	
29	Douglas-fir	45	Fair	30	Save	27	Will be saved if possible
30	Douglas-fir	14	Fair	15	Save	8	Will be saved if possible
31	Douglas-fir	12	Fair	10	Remove	7	
32	Douglas-fir	13	Fair	10	Remove	8	
33	Douglas-fir	11	Fair	10	Remove	7	
34	Douglas-fir	15	Fair	12	Remove	9	
35	Oregon Ash	15	Poor	15	Remove	9	
36	Douglas-fir	35	Fair	25	Remove	21	
37	Douglas-fir	24	Fair	11	Remove	14	
38	Douglas-fir	24	Fair	15	Remove	14	
39	Douglas-fir	13	Fair	15	Remove	8	

Tree #	Species	DBH (in.)	Condition	Dripline (ft.)	Project: Save/ Remove	Critical Root Zone (ft.)	Notes
40	Douglas-fir	40	Fair	19	Remove	24	
41	Oregon White Oak	12	Fair	30	Remove	7	
42	Oregon White Oak	10	Fair	20	Remove	6	
43	Oregon White Oak	10	Fair	20	Remove	6	
44	Douglas-fir	13	Fair	17	Remove	8	
45	Douglas-fir	20	Fair	19	Remove	12	
46	Douglas-fir	11	Fair	10	Save	7	Will be saved if possible
47	Douglas-fir	25	Fair	19	Remove	15	
48	Douglas-fir	15	Fair	15	Remove	9	

Photo B. View trees to be removed at the City Hall Culvert Removal/Pedestrian Bridge Site.

Tree Protection Measures

Trees to be saved must be protected during construction by four-foot-high orange mesh fencing (Attachment 3), located at the edge of the critical root zones (CRZ) described in the tables.

The fence should be erected after logging but prior to the start of clearing. The fences should be maintained until the start of the landscape installation.

There should be no equipment activity (including rototilling) within the CRZ. No irrigation lines, trenches, or other utilities should be installed within the CRZ. Cuts or fills should impact no more than 20% of a tree's root system. If topsoil is added to the root zone of a protected tree, the depth should not exceed 2 inches of a sandy loam or loamy fine sand topsoil and should not cover more than 20% of the root system.

If roots are encountered outside the CRZ during construction, they should be cut cleanly with a saw and covered immediately with moist soil. Noxious vegetation within the critical root zone should be removed by hand. If a proposed save-tree must be impacted by grading or fills, then the tree should be re-evaluated by WFCI to determine if the tree can be saved with mitigating measures, or if the tree should be removed.

Pruning and Thinning

For healthy individual trees that are to be saved near buildings, access roads and parking lots, the trees should have their crowns raised to provide a minimum of 8 feet of ground clearance over sidewalks and landscape areas, 15 feet over parking lots or streets, and at least 10 feet of building clearance.

All pruning should be done according to the ANSI A300 standards for proper pruning, and be completed by an International Society of Arboriculture Certified Arborist®, or be supervised by a Certified Arborist®.

Summary

Three sites on Sequalitchew Creek will be restored to enhance salmon habitat. Forty-eight trees will be impacted from proposed restoration. Thirty-one of the trees will need to be removed to complete the proposed project. Seventeen trees have the potential to be retained and will need tree protection fences placed at the distance specified in associated tables for each site.

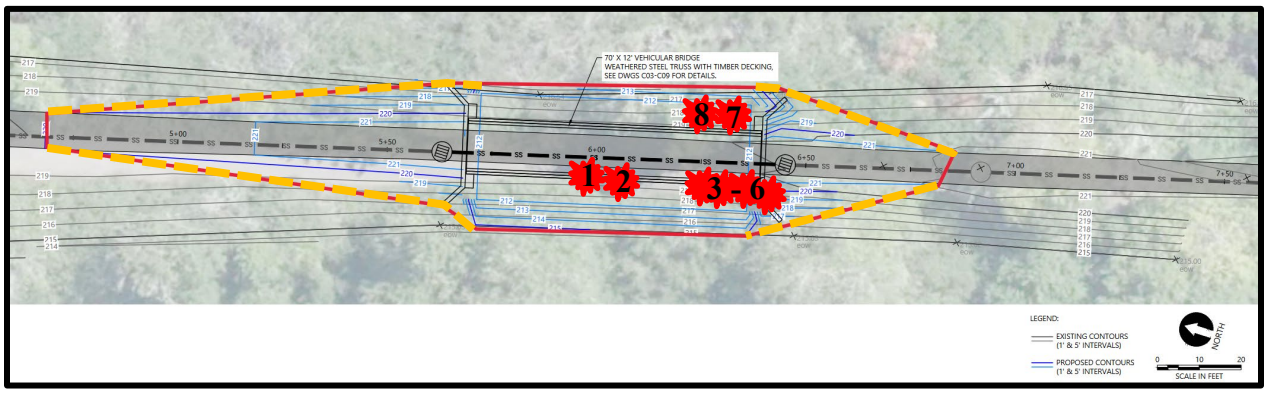
Please give us a call if you have any questions.

Respectfully submitted,

Galen M. Wright, ACF, ASCA
ISA Bd. Certified Master Arborist PN-129BU
Certified Forester No. 44
ISA Tree Risk Assessor Qualified

Joshua Sharpes
Professional Forester
ISA Certified Arborist
Municipal Specialist, PN-5939AM
ISA Tree Risk Assessor Qualified

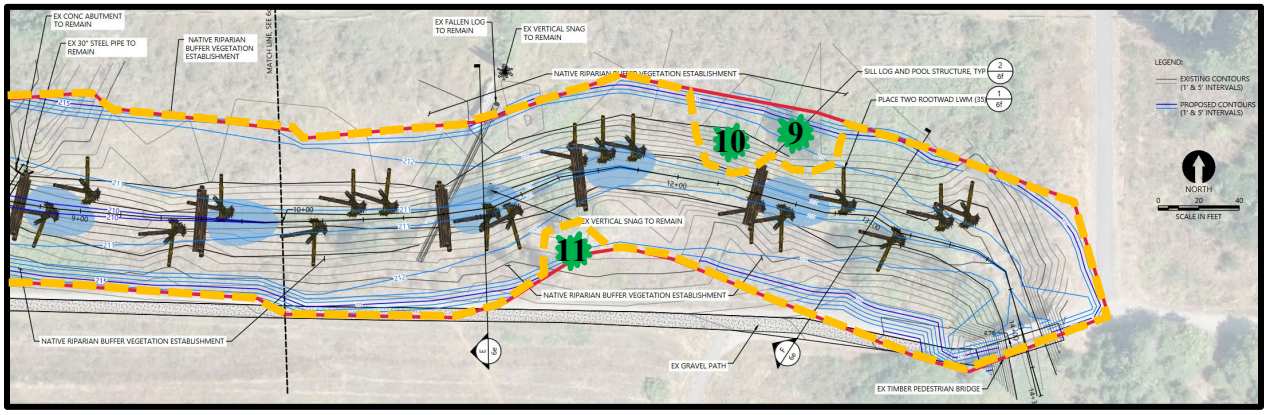
Attachment 1. Robison Trail Bridge Site with Assessed Tree Locations.



Tree to Remove for Project

Tree Protection Fence Location

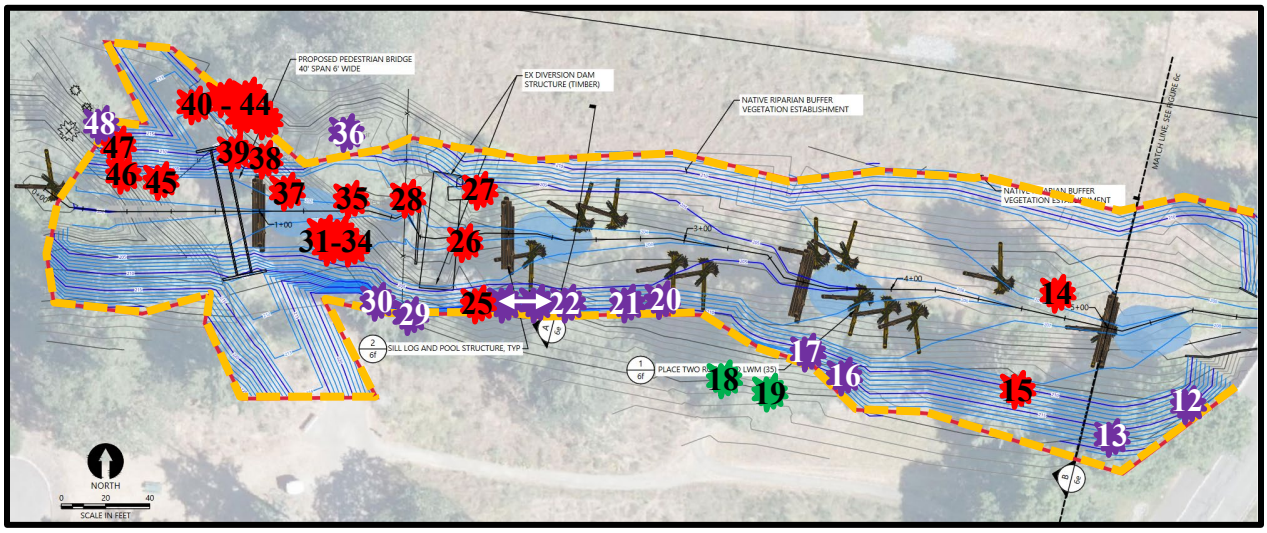
Attachment 2. Dry Reach Restoration Site with Assessed Tree Locations



Tree to Save for Project

Tree Protection Fence Location

Attachment 3. City Hall Culvert Removal/Pedestrian Bridge Site with Assessed Tree Locations



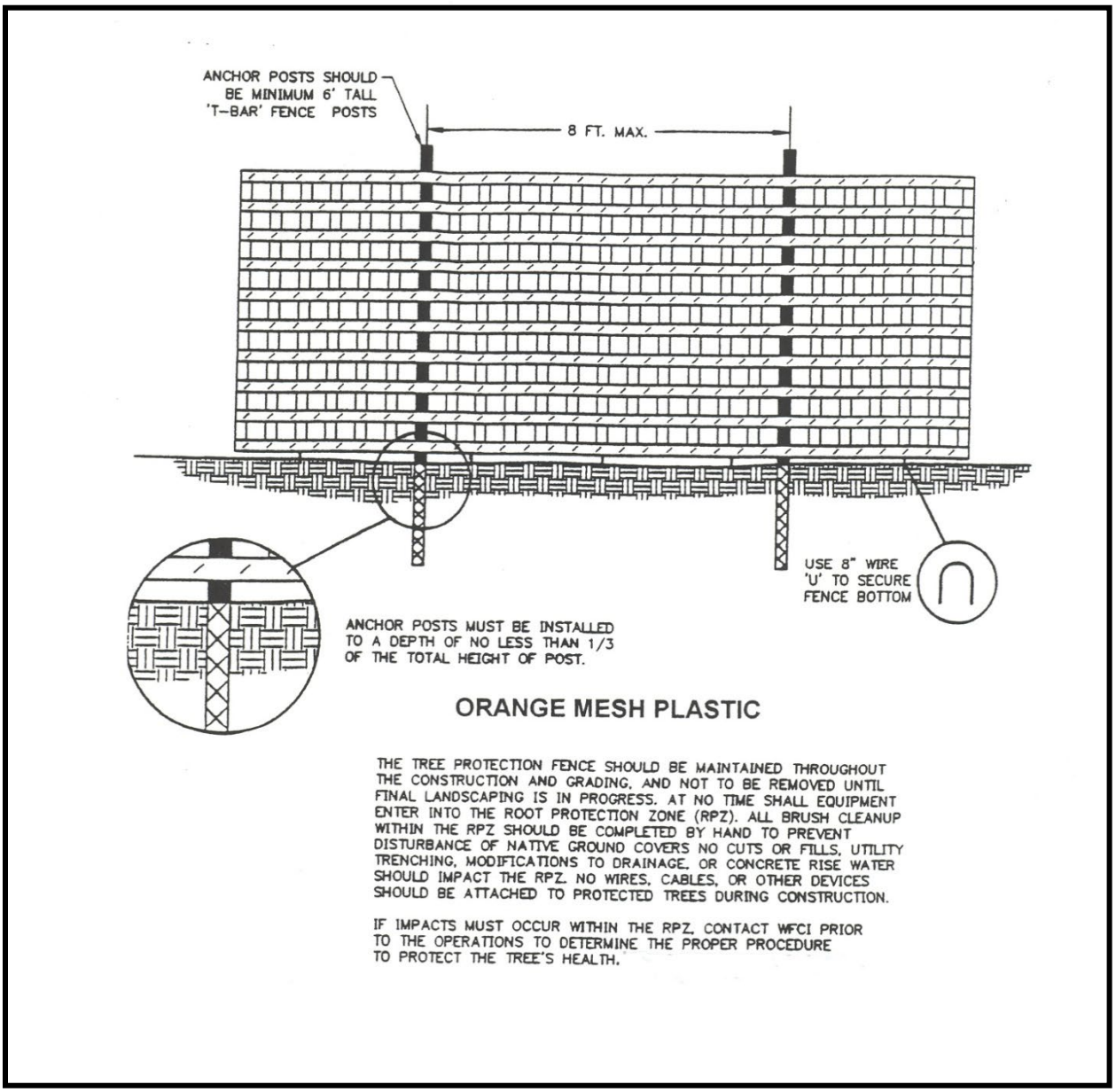
Tree to Save for Project

Tree to Remove for Project

Potential Save Tree – Future design development will focus on avoiding and minimizing impacts to trees to the extent practicable.

Tree Protection Fence Location

Attachment 4. Tree Protection Fence Detail



Attachment 5. Description of Tree Evaluation Methodology

The evaluation of the tree condition on this site included the visual assessment of:

1. Live-crown ratio,
2. Lateral and terminal branch growth rates,
3. Presence of dieback in minor and major scaffold branches and twigs,
4. Foliage color,
5. Stem soundness and other structural defects,
6. Visual root collar examination,
7. Presence of insect or disease problems.
8. Windfirmness if tree removal will expose this tree to failure.

In cases where signs of internal defect or disease were suspected, a core sample was taken to look for stain, decay, and diameter growth rates. Also, root collars were exposed to look for the presence of root disease.

In all cases, the overall appearance of the tree was considered relative to its ability to add value to either an individual lot or the entire subdivision. Also, the scale of the tree and its proximity to both proposed and existing houses was considered.

Lastly, the potential for incorporation into the project design is evaluated, as well as potential site plan modifications that may allow otherwise removed tree(s) to be both saved and protected in the development.

Trees that are preserved in a development must be carefully selected to make sure that they can survive construction impacts, adapt to a new environment, and perform well in the landscape. Healthy, vigorous trees are better able to tolerate impacts such as root injury, changes in soils moisture regimes, and soil compaction than are low vigor trees.

Structural characteristics are also important in assessing suitability. Trees with significant decay and other structural defects that cannot be treated are likely to fail. Such trees should not be preserved in areas where damage to people or property could occur.

Trees that have developed in a forest stand are adapted to the close, dense conditions found in such stands. When surrounding trees are removed during clearing and grading, the remaining trees are exposed to extremes in wind, temperature, solar radiation, which causes sunscald, and other influences. Young, vigorous trees with well-developed crowns are best able to adapt to these changing site conditions.

Attachment 6. Assumptions and Limiting Conditions

1) Any legal description provided to the Washington Forestry Consultants, Inc. is assumed to be correct. Any titles and ownership's to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised or evaluated as though free and clear, under responsible ownership and competent management.

2) It is assumed that any property is not in violation of any applicable codes, ordinances, statutes, or other governmental regulations, unless otherwise stated.

3) Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, Washington Forestry Consultants, Inc. can neither guarantee nor be responsible for the accuracy of information.

4) Washington Forestry Consultants, Inc. shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

5) Loss or alteration of any part of this report invalidated the entire report.

6) Possession of this report or a copy thereof does not imply right of publication or use for any purpose by any other than the person to whom it is addressed, without the prior expressed written or verbal consent of Washington Forestry Consultants, Inc.

7) Neither all or any part of the contents of this report, nor copy thereof, shall be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales or other media, without the prior expressed written or verbal consent of Washington Forestry Consultants, Inc. -- particularly as to value conclusions, identity of Washington Forestry Consultants, Inc., or any reference to any professional society or to any initialed designation conferred upon Washington Forestry Consultants, Inc. as stated in its qualifications.

8) This report and any values expressed herein represent the opinion of Washington Forestry Consultants, Inc., and the fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence neither of a subsequent event, nor upon any finding in to reported.

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CULTURAL RESOURCES REPORT COVER SHEET

DAHP Project Number: 2022-08-05604 (Please contact the lead agency for the project number. If associated to SEPA, please contact SEPA@dahp.wa.gov to obtain the project number before creating a new project.)

Author(s): Jessica E. Morris, Colin Higashi, Nicholas de Vry, Jennifer Chambers, and Sarah J. Amell

Title of Report: Cultural Resource Assessment for the Sequalitchew Creek Watershed Project, DuPont, Pierce County, Washington

Date of Report: 11/17/2022

County(ies): Pierce Section: 22, 25, 26, 27, 39 Township: 19N Range: 01E

Quad: Nisqually

PDF of report submitted (REQUIRED) ☒ Yes

Historic Property Inventory Forms to be Approved Online? ☐ Yes ☒ No

Archaeological Site(s)/Isolate(s) Found or Amended? ☒ Yes ☐ No

TCP(s) found? ☐ Yes ☒ No

Replace a draft? ☐ Yes ☒ No

Satisfy a DAHP Archaeological Excavation Permit requirement? ☐ Yes # ☒ No

Were Human Remains Found? ☐ Yes DAHP Case # ☒ No

DAHP Archaeological Site #:

_____
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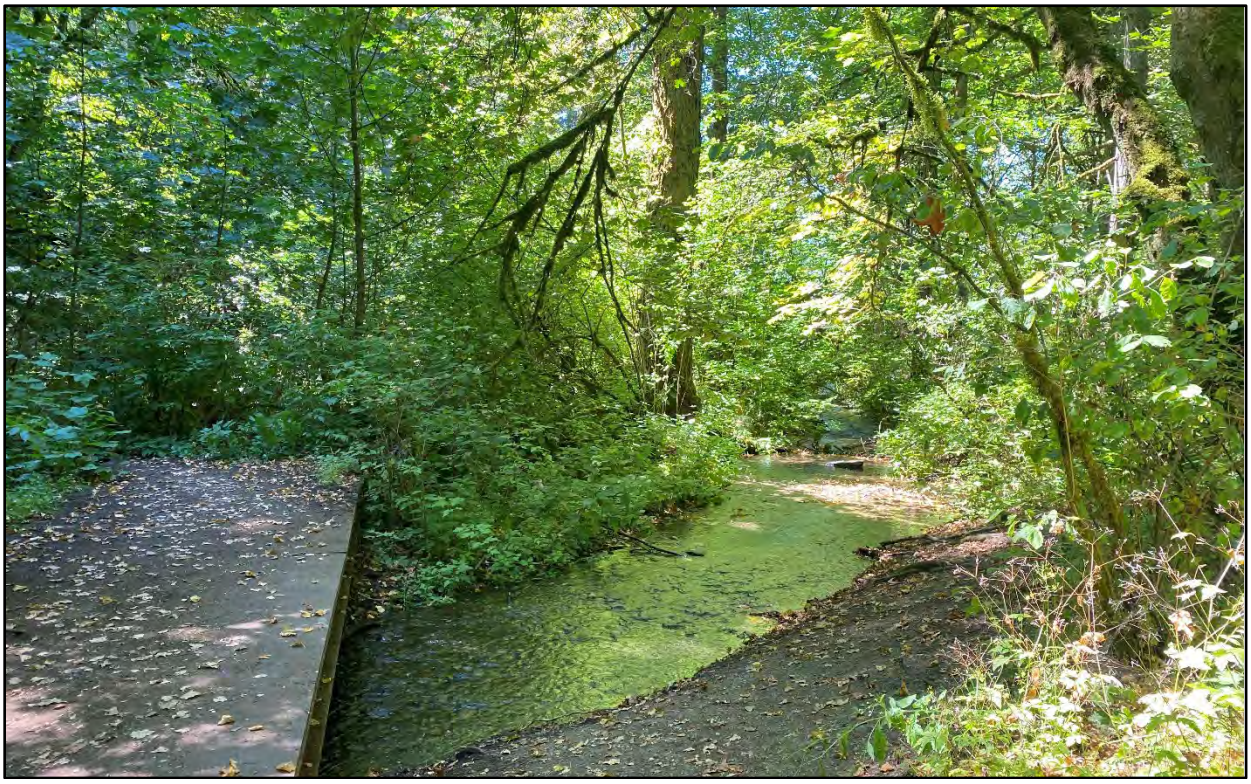
_____

- Submission of PDFs is required.
- Please be sure that any PDF submitted to DAHP has its cover sheet, figures, graphics, appendices, attachments, correspondence, etc., compiled into one single PDF file.
- Please check that the PDF displays correctly when opened.

Cultural Resources Assessment
for the
Sequalitchew Creek Watershed Project
DuPont, Pierce County, Washington



ATCRC Report # TH-05-22
November 17, 2022

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Cultural Resources Assessment
for the
Sequalitchew Creek Watershed Project
DuPont, Pierce County, Washington

INTRODUCTION

Aqua Terra Cultural Resource Consultants (ATCRC) was contracted by the South Puget Sound Salmon Enhancement Group (SPSSEG) to provide a cultural resource assessment for the Sequalitchew Creek Watershed Project located in DuPont, Pierce County, Washington. The project intends to restore year-round surface flow and connectivity for salmon within the Sequalitchew Creek Watershed by reconnecting surface water sources and implementing beaver management projects. The project will implement beaver management projects such as beaver dam analogs, and flexible pond levers, remove barrier culverts, and reconnect surface water that is being diverted from the watershed. The proposed work for this phase will take place from Steilacoom-DuPont Road to roughly 150 meters from the Sequalitchew Estuary. This phase of the project is being completed with funds from the SPSSEG and is subject to compliance with the Governor's Executive Order 21-02 (EO 21-02).

ATCRC's cultural resources assessment consisted of background review, field investigation, and production of this report. Field investigation included pedestrian survey, subsurface testing and monitoring of geotechnical borings. Four historic archaeological sites were identified during the survey: Historic Debris Site (Temporary Site Number: PI2022-0701), DuPont Company's Powder Works Plant Swimming Hole (Temporary Site Number: PI2022-0702), DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0703), and the DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update).

In accordance with the Washington State Department of Archaeology and Historic Preservation (DAHP), each of the sites were inventoried and, in accordance with EO 21-02, each were evaluated for listing on the National Register of Historic Places (NRHP). Of these, two are recommended for listing on the NRHP: DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0703) under Criterion A and DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update) under Criteria A and C.

As part of this project, the portion of the DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0703) located in the project area may be partially excavated to replace the culverts with bridges. However, the western culvert may be replaced with a larger box culvert with little impact to the railroad prism. Considering that roughly one mile of trail exists within the project area and only the prism and alignment currently exist, these actions will not affect NRHP eligibility. Accounts of the DuPont Company's Powder Works Plant Swimming Hole (Temporary Site Number PI2022-0702) indicate a buried historic trestle may be present within the berm in which the culvert is encased.

The remains of the penstock from DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update) sit on the southern slope of the ravine and will not be affected by the project. However, the foundation of the lower powerhouse and its associated dam that sits 1.2 miles upstream may be affected by the renewed waterflow from Sequalitchew Creek. Additionally, ethnographic accounts indicate that longhouses associated with the Sequalitchew Village were located near the lower powerhouse.

As such, ATCRC finds that this project will have an adverse effect to cultural resources. As a result of our study, ATCRC recommends the following conditions to mitigate the adverse effects the project will cause:

1. Archaeological monitoring for all proposed ground-disturbing activities associated with this project;
2. Adopt an Inadvertent Discovery Plan (IDP) in the case that additional cultural resources are identified when there is no cultural resource monitor present (an IDP is attached in Appendix C);
3. Update the site boundaries for 45PI70 on WISAARD to be expanded to the mapped fence line of the DuPont Company's Powder Works Plant;
4. Prepare a nomination form for the DuPont Company's Powder Works Plant be listed as a Historic District; and
5. Conduct an intensive level survey to determine the current condition/status and contributing or non-contributing evaluation of all the previously recorded sites associated with the DuPont Company Powder Works Plant.

REGULATORY

This project was conducted, in part, to satisfy the regulatory requirements of EO 21-02. EO 21-02 requires that all state agencies consult with the DAHP and affected tribes on the potential effects of projects on cultural resources during capital improvement projects (state-funded construction, acquisition, or grants and pass-through funding resulting in construction or acquisition) that may not undergo Section 106 review. Each state agency, or their grantee, will be responsible for initiating consultation early in the project planning process; retain all documentation of the consultation; complete the consultation prior to the expenditure of state funds; complete all appropriate cultural resource surveys or studies as determined during the consultation; and take all reasonable action to avoid, minimize, or mitigate adverse effects on cultural resources in consultation with the DAHP and affected Tribes.

In addition, the State of Washington requires compliance with the cultural resources management laws and regulations under the Revised Code of Washington (RCW) 27.53 Archaeological Sites and Resources, RCW 27.44 Indian Graves and Records, and RCW 68.50.645 Skeletal Human Remains—Duty to Notify. The Archaeological Sites and Resources Act (RCW 27.53) prohibits knowingly disturbing archaeological sites without a permit from the DAHP. The Indian Graves and Records Act (RCW 27.44) prohibits knowingly disturbing Native American or historic graves. RCW 68.50.645 provides a strict process for notification of law enforcement and other interested parties in the event of discovering any human remains, regardless of inferred cultural affiliation.

PROJECT LOCATION AND DESCRIPTION

The project is located in DuPont, Pierce County, Washington within a portion of Township 19 North, Range 01 East within Sections 22, 25, 26, 27, and 39 and concerns Pierce County Tax Parcel Numbers (TPN): 0119224010, 3000791020, and 3001000110 (Figure 1 - Figure 2). The proposed work for this phase will take place from Steilacoom-DuPont Road to roughly 150 meters from the Sequalitchew Estuary; this phase of the project does not include the estuary. The total acreage for this phase of the project is roughly 167 acres. The property is owned by the City of DuPont.

The project intends to implement beaver management projects such as beaver dam analogs and flexible pond levelers, remove barrier culverts, and reconnect valuable surface water currently diverted from the watershed. This project will be part of a significant effort to restore year-round surface flow from Sequalitchew Lake to Puget Sound and connectivity for salmon through phased capital restoration projects. Impacts at the eastern culvert include replacing the culvert, currently creating a pinch point for water flow with a 100-foot bridge to realign and improve flow and fish passage. Impacts at the western culvert include replacing the culvert with a bridge, box culvert, or arch culvert by excavating the berm. The beaver management areas will focus on designs to work with beavers to create grade change and flow throughout the Edmonds Marsh system. The Losing Reach area will be monitored after the above changes are implemented to assess the needs for future projects.

For the purposes of this project, a Direct Impact Area (DIA) and an Area of Potential Impact (API) have been defined (Figure 2). The DIA includes each of the proposed beaver management locations, the culvert replacement area, the Losing Reach area, and all associated staging areas. The API has been defined by the boundaries of the TPNs plus Edmond Marsh, which will be altered by the increased water flow. The areas within the API will not be impacted directly but may be potentially disturbed by the renewed and increased waterflow. API and project area are used here interchangeably.

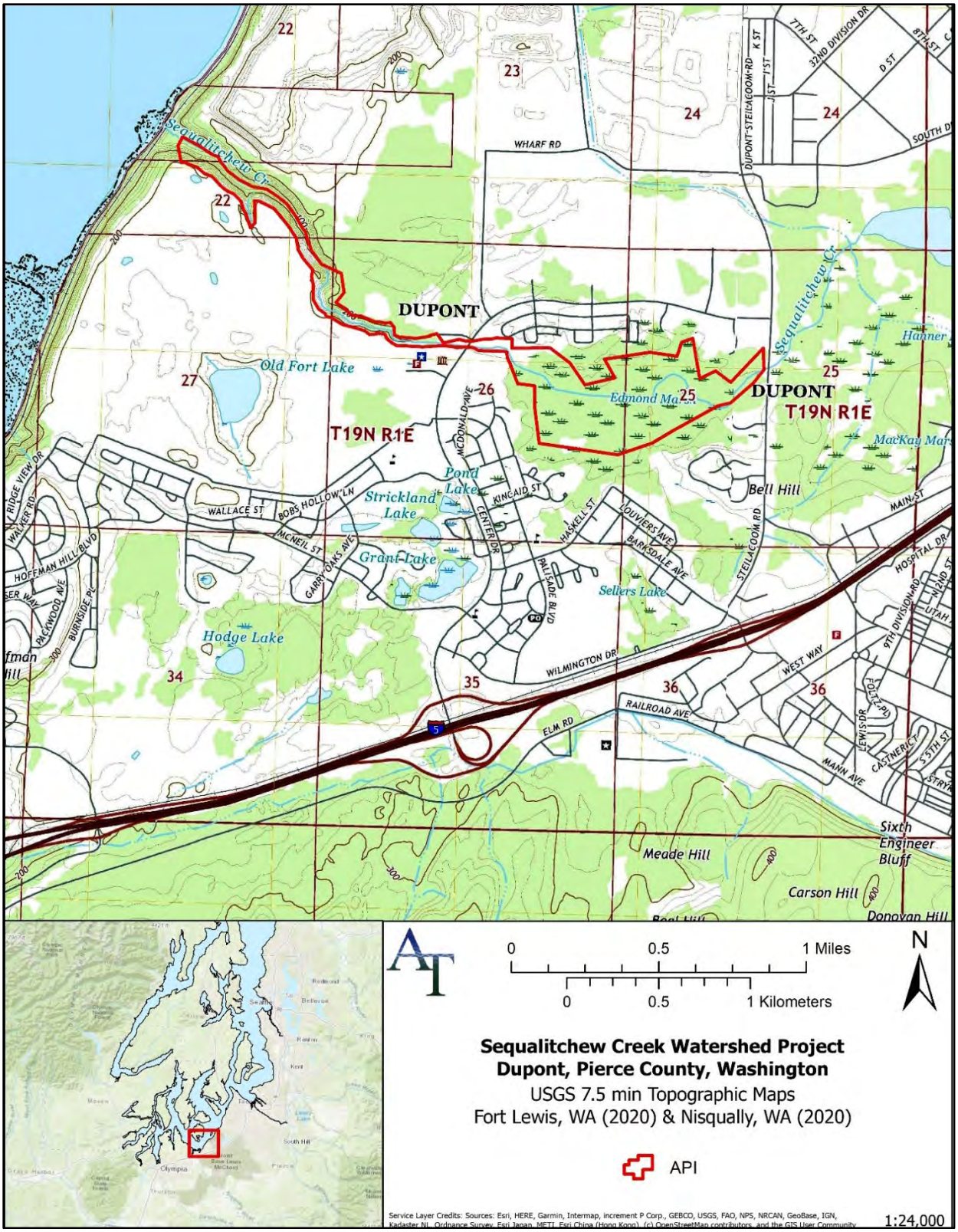

Figure 1. Location of the API on a portion of the USGS Fort Lewis (2020) and Nisqually (2020) 7.5 min topographic maps.

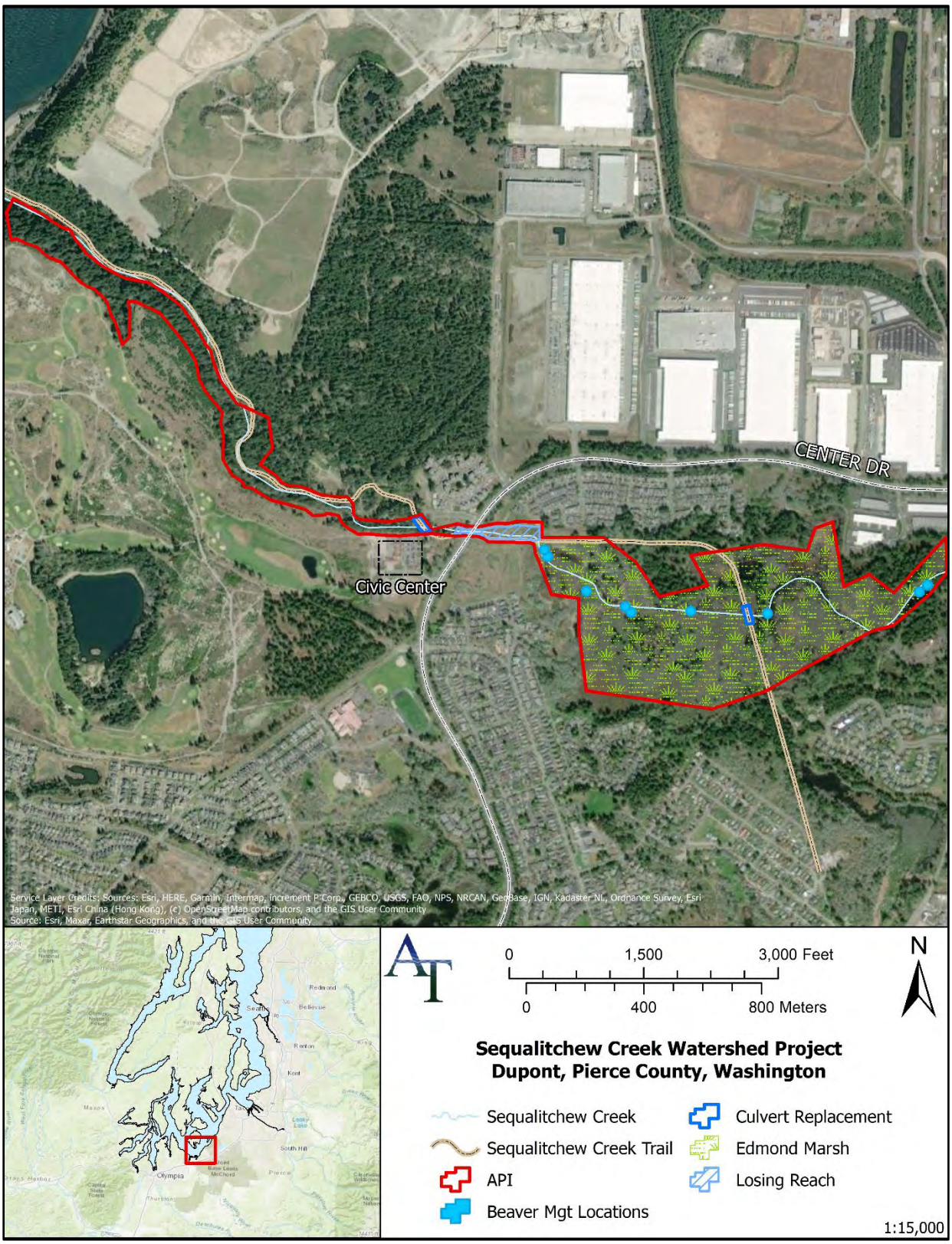

Figure 2. Satellite imagery detailing the location of the API and each type of impact within the DIA.

CORRESPONDENCE

EO 21-02 requires that impacts to cultural resources be considered during the public environmental review process. As part of this project, ATCRC provided notification of the project to the Muckleshoot Indian Tribe, the Nisqually Indian Tribe (NIT), the Puyallup Tribe of Indians (PTOI), the Snoqualmie Indian Tribe, the Squaxin Island Tribe, the Suquamish Tribe, and the Confederated Tribes and Bands of the Yakama Nation on July 21, 2022. At the time this report was prepared, Brad Beach, Tribal Historic Preservation Office (THPO) for the NIT, responded and requested to participate in the survey. ATCRC coordinated with Mr. Beach to have Selah Kalama join the survey efforts on Monday, July 25, 2022. A copy of the correspondence is provided in Appendix A.

BACKGROUND REVIEW

Determining the probability for cultural resources to be located within the API was based largely upon review and analysis of past environmental and cultural contexts and previous cultural resource studies and sites. Consulted sources included project files; local geologic data; archaeological, historic, and ethnographic records; selected published local historic records, and assessor's records. Archaeological, historic, and ethnographic records were reviewed from the Washington Information System for Architectural and Archaeological Records Data (WISAARD) database.

Environmental Setting

The API follows Sequalitchew Creek across the western margins of a broad, relatively flat plain formed by accumulated layers of gravelly outburst flood deposits between the Puyallup River and Puget Sound in Puget Lowland. The Puget Lowland physiographic province is a seismically active forearc basin formed between the Cascade Mountains and coastal ranges of Washington, extending from the San Juan Islands in the north to the convergence of the Washington Southern Cascade Range and the Willapa Hills in the south.

During the Pleistocene, repeated advances of continental ice sheets scoured and redeposited materials within the basin over more than a million years, leaving a layer of widespread but largely discontinuous glacial, fluvial, and marine deposits sometimes exceeding 100 meters in depth and producing the distinctive north-south ridgelines of the area (Easterbrook 2003; Troost 2016). The most recent glacial advance in the Puget Lowland was during the Vashon Stade of the Fraser Glaciation, between approximately 30 and 11 thousand years before present (kBP) when the Cordilleran Ice Sheet (CIS) covered the northern and central regions of the basin in up to 1.8 kilometers (km) of ice and scoured the modern split paths of the Puget Sound (Easterbrook 2003; Troost 2016). The CIS reached its maximum Vashon extent, 25 km south of Olympia, by around 16.9 kBP before retreating northwards, allowing marine waters to enter the Puget Sound around 14.8 kBP and rapidly disintegrating into a collection of floating bergs and stagnant, grounded ice (Easterbrook 1992, 2003; Thorson 1980; Troost 2016). Unburdening of the basin as the ice melted permitted isostatic rebound throughout the remainder of the Fraser Glaciation, which interacted with eustatic sea level rise to produce a complex pattern of terrestrial and marine deposits throughout the province before relative sea level stabilized near the start of the Holocene (Easterbrook 1969, 1992; Thorson 1980). Subsequent glacial stades of the Fraser Glaciation

contributed several beds of glaciomarine sediment to the regional stratigraphic record but did not involve glacial intrusion into the lowlands (Easterbrook 1992, 2003; Thorson 1980). More recent landscape evolution within the Puget Lowland is dominated by mass wasting, fluvial and coastal processes, and sporadic deformation from seismic activity in the multiple associated fault zones (Troost 2016).

During the Vashon Stade retreat, several large proglacial lakes formed within the channels of the Puget Sound and in blocked river valleys, including the Puyallup River Valley, ultimately draining southwards through the ancestral Chehalis River until the unblocking of the Strait of Juan de Fuca allowed them to drain northwards. At various times during the retreat, the lake within the Puyallup River Valley breached the walls of the valley and produced a series of outburst floods (jökulhlaups) which carved channels through the valley walls and flowed over the nearby glacial plains before draining into the larger glacial Lake Russel, in the main channels of Puget Sound. The deposition of sands and larger clasts formed a large plain of coarse outwash materials between the Puyallup and Nisqually Rivers, known as the Steilacoom Gravel and the Steilacoom Gravel Plain, and thick deltaic features at its drainage points near the modern outlets of Chambers Creek and Sequalitchew Creek. More recent landscape evolution within the Puget Lowland is dominated by mass wasting, fluvial and coastal processes, and sporadic deformation from seismic activity in the multiple associated fault zones (Troost 2016; Walsh et al. 2003).

The API stretches west from DuPont-Steilacoom Road across the shoreward margin of the Steilacoom Gravel Plain over the Sequalitchew delta, where outburst floods drained into Puget Sound at the end of the Vashon Stade. Here, the Steilacoom Gravel Plain is very deep over most of the area and exhibits noticeable foreset beds from the original deposition of the delta. Glacial ice contact deposits crop out slightly more than a mile to the north, where a raised coastal ridgeline split the flow of the outburst floods, and several sections of the Steilacoom Gravel Plain to the north and south have been reworked for development: more than 100 acres at the top of the northern valley wall belong to the CalPortland Ready Mix and Pioneer Aggregate Plants, which were established in 1997 to mine and process the Steilacoom Gravel for concrete and building materials after the closure of a larger Lone Star quarry to the north (Center for Land Use Interpretation [CLUI] 2022; Schuster et al. 2015; Walsh et al. 2003).

Native soils in the project area are expected to consist of dense Spanaway gravelly sandy loam in the flatter central, relatively dry section, giving way to sandier Xerochrepts within the incised creek valley and DuPont muck within Edmonds Marsh in the eastern third of the API (USDA Natural Resources Conservation Service [NRCS] 2022). The Edmonds Marsh is an active wetland environment bisected east-west by Sequalitchew Creek and an abandoned DuPont Company's Narrow-Gauge Railway that has been converted for use as a utility passage and community trail (now known as the Sequalitchew Creek Trail). The DuPont muck within the Edmonds Marsh is an organic soil found on till plains that typically consists of at least 60 inches of saturated muck and diatomaceous earth. The Spanaway soils on the central plain are deep and excessively drained, generally forming on outwash terraces and plains. They typically have a very thin O horizon (less than 5 cm thick) over a 25-50 centimeters (cm) A horizon consisting of very dark grayish-brown or black organic-rich gravel and sand. The B horizon will constitute an additional 38-48 cm of dark grayish-brown sandy gravel and cobbles with clean contact with the unmodified Steilacoom

Gravel below. Xerochrepts are a very coarse and well-drained type of soil that usually forms quickly from the alteration of its parent material. In the project area, it usually develops on valley sides from sandy and gravelly glacial outwash or till with a 6-inch A horizon and a 34-inch B horizon of gravelly sandy loam overlying very gravelly sandy loam (in this case, unaltered beds of the Steilacoom Gravel).

Table 1. Soils expected to be present within the API (USDA NRCS 2022).

NAME	SLOPE %	LANDFORM	PARENT MATERIAL	TYPICAL PROFILE
DuPont muck	0 to 1	Till plains	Organic material and diatomaceous earth	H1 - 0 to 13 inches: muck H2 - 13 to 16 inches: diatomaceous earth H3 - 16 to 60 inches: muck
Spanaway gravelly sandy loam	0 to 6	Outwash plains	Volcanic ash over gravelly outwash	H1 - 0 to 14 inches: gravelly medial sandy loam H2 - 14 to 18 inches: very gravelly medial sandy loam H3 - 18 to 60 inches: extremely gravelly sand
Xerochrepts	45 to 70	Valley sides	Sandy and gravelly outwash and/or glacial till	H1 - 0 to 6 inches: gravelly sandy loam H2 - 6 to 40 inches: gravelly sandy loam H3 - 40 to 60 inches: very gravelly sandy loam
Semiahmoo	0 to 1	Lakebeds, depressions	Herbaceous organic material	Oap - 0 to 6 inches: muck Oa1 - 6 to 25 inches: muck Oa2 - 25 to 60 inches: muck

The API is located in the Puget Sound Area of the Western Hemlock Zone of Washington (Franklin and Dyrness 1973). The Western Hemlock region is shielded from both maritime and continental air masses by the coastal and Cascade ranges to the west and east, being slightly drier than areas on the coast with more moderate temperature variations than in the continental interior. The Puget Sound section of the Western Hemlock Zone is within the rain shadow of the Olympic Mountains, producing drier and warmer summers than in other areas of the lowlands and generally limiting annual rainfall to 800-1300 mm instead of the 1500-3000 mm received elsewhere in the zone. More than 75% of this precipitation arrives as rain between October 1 and March 31, with long periods of little to no rainfall from June to August (Franklin and Dyrness 1973).

While the Western Hemlock climate regime is generally neither temperature- nor precipitation-limited and produces the highest biomass accumulations recorded in global temperate zones, moisture stress during the summer months limits the growth of the hardwoods that dominate most other temperate regions, and mild winters favor the year-long growth patterns of coniferous species (Franklin and Dyrness 1973). This pattern produces a very unusual variation in the temperate regime that likely sustains a silvicultural balance initially established during the harsher conditions of the Pleistocene. Like most of the Western Hemlock Zone, forest compositions are dominated by unusually large and long-lived conifers (particularly Douglas fir, western hemlock, and western red cedar), while younger forests and riparian areas are characterized by bigleaf maple, black cottonwood, red alder, and willow. Understories will generally transition from salmonberry (with a large variety of accompanying species) in young stands to a mixture of sword fern, red huckleberry, vine maple, Oregon grape, and salal. Unlike the more mesic regions to the south and west, the Puget Sound Area is also host to prairie ecosystems and several more arid-loving pine

and hardwood species that are rarely found elsewhere in the Western Hemlock Zone (Franklin and Dyrness 1973). Much of the Puget Sound area has been extensively cleared and logged since its initial settlement, often with extensive fires during the dry season, and is now covered by subclimax stands of Douglas-fir more than Western Hemlock (Franklin and Dyrness 1973). Human activities have introduced many invasive species to the region, including knotweed, Himalayan blackberry, common groundsel, knapweeds, European starlings, and house sparrows.

Cultural Setting

Precontact

The earliest evidence of human occupation on the Northwest Coast begins following the retreat of glacial ice across the landscape in the Late Pleistocene. The earliest cultures in the region are thought to have resided in the area beginning approximately 14,000 years before present (YBP) (Matson and Coupland 2009). Subsistence strategies included an adaptation to highly variable climates and a changing environment (Matson and Coupland 2009). Currently, archaeological evidence indicates patterns of high mobility and small groups reliant on large game and seasonably available resources (Ames and Machner 1999; Matson and Coupland 2009). The earliest recognized culture in the Pacific Northwest is the Clovis culture, dated to 12,000 to 11,000 YBP. This culture, named for its distinctive fluted projectile points, was highly mobile and left little evidence of permanent base camps. These large fluted projectile points have been observed on the surface, distributed throughout Puget Sound (Croes et al. 2008).

Between 12,000 and 7,000 years ago, foraging strategies changed to include smaller inland game, aquatic animals, and various plants. Sites from this period are typically encountered on high marine and river terraces (current and abandoned), subalpine meadows, and saltwater shores (Kirk and Daugherty 2007). These site types indicate a continued high mobility pattern, subsisted by terrestrial game. This period provides the first indication of plant processing and the use of aquatic environments (Ames and Machner 1999). Faunal and fish remains dating to this period are rare, but archaeological evidence has been reported (Chatters et al. 2011). Evidence from this period indicates a well-developed land use strategy (Chatters et al. 2011). The artifact assemblage from this period is distinguishable by large leaf-shaped and stemmed points, scrapers, flake tools, and blade cores (Carlson 1990). In the Puget Sound region, as well as regions along the Columbia, the introduction of larger laurel-leaf projectile points indicates a tradition that is part of the Cascade Phase (Matson and Coupland 2009).

After 5000 YBP, populations appear to become larger and more complex as groups utilized a more extensive range of resources, including salmon and shellfish, land mammals, and plant resources such as berries, roots, and bulbs. Subsistence and settlement patterns are archaeologically evidenced to be distinct from those of earlier cultural adaptations (Kopperl et al. 2016). Settlements represent residential base camps with year-round re-occupation and access to multiple environments (Kopperl et al. 2016). Short-term base camps for smaller hunting or gathering groups, concentrating on specialized seasonally available resources, were introduced into the settlement pattern (Kopperl et al. 2016; Thomson 1978). Between 6,000 and 5,000 YBP, these predominantly sedentary lifestyles produced the first evidence of mass processing and storage of salmon and plants (Kopperl et al. 2016). By approximately 3,000 to 2,000 YBP, hunter-gatherer

subsistence settlement patterns became focused on salmon fishing throughout the Puget Sound region and along the Columbia (Blukis Onat 1987; Kopperl et al. 2016). Additionally, ground stone tools, microblades, and cores appear at this time, as well as bone and antler tools, ground shells, and harpoons. Canoe technology most likely developed around 2,000 to 3,000 YBP with the construction of large plank houses (Hebda and Matthews 1984; Donald 2003; Matson and Coupland 2009). Shell middens are also prevalent in this period and continued into the ethnohistoric period (Ames and Maschner 1999).

Ethnohistoric

The project area is located in the traditional territory of the Sequalitchew, one of 13 bands of the Nisqually. Sequalitchew is "meant to describe the sandy beach at the mouth of the creek or long run-out tide (Lyday and DuPont Historical Society 2021).

The Sequalitchew are included in the Coastal Salish linguistic group. These groups were often located along major waterways and at heads of bays or inlets, where abundant resources of coastal and estuarine environments supported a relatively rich, diverse, and reliable subsistence base with a primary focus on shellfish and salmon (Kopperl 2016). Roots, nuts, berries, and other plant sources were also heavily relied upon. Local prairies also would have also been managed through seasonal practices such as controlled burns, compartmentalized ownership, and selective planting and weeding (Lyday and DuPont Historical Society 2021).

Ethnographic and archaeological information indicates that the Sequalitchew and other Nisqually bands established permanent villages near the convergence of protected marine shorelines and freshwater drainage outlets. Nearest the project area, ethnographers documented the Sequalitchew village, *Sčeg^{w}a'liču* (45PI54), located at the mouth of Sequalitchew Creek at Puget Sound (Hilbert et al. 2001; Lyday and DuPont Historical Society 2021). Welch (1989:2.50) notes that the village site is believed to have been located "on a terrace against the bluff a short distance inland from the mouth of Sequalitchew Creek on the south side of the creek." The village, named after the description of the long sandy beach at the mouth of the creek, consisted of two cedar longhouses with around 50 people (Lyday and DuPont Historical Society 2021). Carlsson (1990:53) reports that the lower powerhouse of the DuPont Company's Powder Works Plant was built "near the location of the Sequalitchew-Nisqually longhouses." Smith (1940:13) also identified *Sigwaletcabe* as located where "DuPont Creek enters the Sequalitcu River."

Historic

Non-native exploration and settlement in the Puget Sound region begins in the 1600s with Spanish exploration along the western coast of North America, including Puget Sound. In 1792, English Explorer Captain George Vancouver and his crew investigated Puget Sound. Vancouver subsequently sent Lieutenant Peter Puget and Master Joseph Whidbey on a six-day tour of the Sound in May of the same year. The pair named various landmarks, including Whidbey Island and Puget Sound, as well as Mount Rainier and Hood Canal. The team then returned to Britain, where Vancouver began preparing a report of his findings. Later, from 1802 to 1804, the Lewis and Clark Expedition traveled to the mouth of the Columbia River to explore the lands purchased by the United States from France.

In the early 1800s, the Hudson's Bay Company (HBC), a partnership between the Bay Company and the Northwest Company, two rival fur trading operations in Canada and the United States, established fur trade posts in the Pacific Northwest. The HBC established its first foothold in today's Washington State in 1825 when Chief Factor John McLoughlin moved his operation at Fort George north of the Columbia River to Fort Vancouver. HBC cultivated cattle, hogs, goats, apple trees, grapevines, potatoes, wheat, and other crops throughout the Northwest (Rowe 2018).

Competition from American fur traders increased during the 1830s. In 1833, the HBC and its subsidiary, the Puget Sound Agricultural Company (PSAC), established a temporary post, which they termed the Nisqually House, at the mouth of Sequalitchew Creek (Crooks 2021).

In 1840, Methodist missionaries from Oregon built a mission house about 16 miles from the town of Tacoma, within binocular sight and east of the fort, roughly located near and north of Sequalitchew Creek (DuPont Historical Society [DPHS] 2014). The mission lasted only three years and was abandoned in 1842; the building was burnt down later that year (DPHS 2014). In a 1904 letter, Edward Huggins, the last Factor of Fort Nisqually turned farmer upon its closure, wrote that he could see the mission's foundation and chimney stack still standing from his veranda after the building had burned (DPHS 2014). Archaeologist, Guy F. Moura, believed his fieldwork located the remains of the Mission in 1989, but later excavations by other archaeologists in 2011 found no sign (DPHS 2014; Moura 1989).

In 1841, the Wilkes Exploring Expedition, an American naval endeavor, sailed into Puget Sound and anchored off Fort Nisqually. Its head, Lieutenant Charles Wilkes, credited with naming many Puget Sound locations, constructed an observatory south of the Sequalitchew Creek estuary. The observatory and associated structures (45PI67) were destroyed with the construction of the Union Pacific Railroad, but the remaining clay piles in 1906 marked where the improvements once stood (DPHS 2014).

In 1843, a permanent fort was established further inland, south of the API, now termed Fort Nisqually (Figure 3 - Figure 4). Fort Nisqually acted as a local hub, attracting traders, providing goods, and welcoming the first waves of Euro-American settlers. The Fort was a meeting point between the British, Euro-American settlers, and local Native Americans, especially the Sequalitchew-Nisqually Tribe, who worked and traded with the Fort. The Fort was a stopping point for many settlers traveling from the east or south to settle in the Pacific Northwest. The Fort oversaw the fur and logging trade from the area as well as the PSAC's farmlands surrounding the Fort.

Figure 3. Artist's rendering of the 1843 Fort Nisqually drawn ca. 1850. Image adapted from the DPHS (2014).

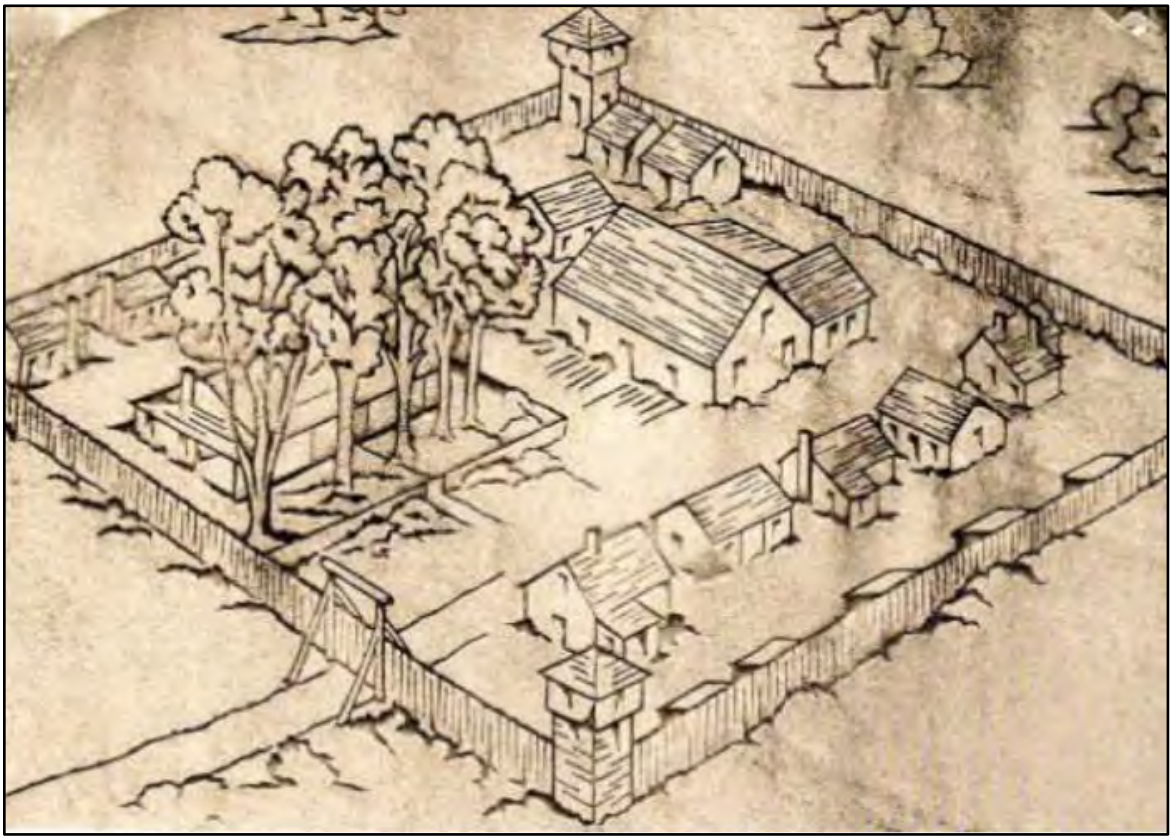

Figure 4. Overview of Fort Nisqually from the interpretive marker in front of the DuPont Museum. Image adapted from the DPHS (2014).

In 1846, the United States and Great Britain settled their dispute over where to draw a boundary between the United States and Canada, settling on the 49th parallel and leaving Fort Nisqually and other HBC properties on lands owned by the United States government. The United States continued to encourage non-native settlement in the region, and waves of migrating Americans arrived. Soon, relationships between Euro-American settlers and native tribes deteriorated, and the fur trade worsened.

While non-native settlement grew and tensions rose, Territorial Governor Isaac Stevens negotiated a series of treaties with the Native Americans (Rowe 2018). Both the Medicine Creek Treaty (1854) and the Point Elliot Treaty (1855) were attempts by the United States government to secure valuable land for settlement and resource use by non-Native peoples (Ruby et al. 2010). In late December 1854, Stevens, General George Gibbs, and local officials met with 600 Native American tribal members, including members of the Nisqually, Puyallup, and Squaxin tribes, near She-na-nam, or Medicine Creek (now known as McAllister Creek), approximately 20 miles southwest of Tacoma, in Nisqually. The Medicine Creek Treaty (1854) removed Native Americans from about 2.2 million acres of their traditional lands and granted three reservations for them to share. The treaty provided rights to fish, hunt, gather roots and berries, and pasture horses; provided rules of conduct, and appropriated $32,500 to be paid to the tribes over 20 years. The treaties forced Native Americans to relocate to several reservations designated in the treaties (Ruby et al. 2010). Of the three initial reservations defined in the Medicine Creek and Point Elliot treaties, the largest was the Nisqually, with 1,280 acres. The Nisqually Reservation was home to people who identified with the Nisqually, Cowlitz, Muckleshoot, and other local area tribal groups (Kirk and Alexander 1990; Smith 1940; Suttles and Lane 1990).

Between 1855 and 1858, what was then called the Puget Sound Indian War (1855-1856) broke out and unsettled Native American and Euro-American relations across Washington Territory, leading many homesteaders to retreat to secure locations like Fort Nisqually and briefly limited settlement in some locations, including Pierce County (Rowe 2018). Fort Nisqually was run by Dr. William Tolmie until 1859, when he left to work for the HBC at Fort Victoria (Crooks and Crooks 2019). Edward Huggins assumed command of the Fort until 1870, when the HBC left the Nisqually area and the fort closed (Crooks and Crooks 2019; DPHS 2014, Nisbet and Nisbet 2011).

Homesteaders inhabited the DuPont-Steilacoom area around Sequalitchew Creek until 1903 when the joint Army-National Guard began holding training exercises by the creek. In 1903, a troop of all Black cavalrymen marched to the site of the Methodist Mission and created Camp Nisqually, a temporary bivouacked army camp, where they trained for three months. While their camp had little effect on the built environment of DuPont, they lent their names to many streets including: Chaffe Avenue, Homan Avenue, Erin Avenue, Evans Court, Griggs Street, Hamilton Avenue, Mitchell Avenue, O'Brien Street, Rowan Court, Wallace Street and Wallace Court (DPHS 2014). The camp, located roughly 55 feet north of the API, has been excavated and recorded as site 45PI455.

In 1906, Huggins sold the land that once was occupied by Fort Nisqually to the E.I. DuPont de Nemours (Crooks 2021). The E.I. DuPont de Nemours Company purchased five square miles to manufacture black powder and explosives. That same year, the DuPont Company began construction of the DuPont Powder Works Plant (Crooks and Crooks 2019). During the initial

construction of the plant, laborers lived in what has come to be known as a “tar paper village” or “Old Town.” The village comprised 50 temporary balloon-frame structures covered in tar to protect from rain (Figure 5) (Crooks 2019; DPHS 2014; Munyan 1972). These structures were often single-room or "shotgun" style homes with front gable roofs (DPHS 2014). The tar paper village became a close community. The village was constructed surrounding the former Huggins home (also the former Fort Nisqually Factor’s House), which was converted into a community center, and by 1908, a 30-foot by 60-foot building containing a cook house and school were added (City of DuPont 2021b). Once the plant began production in 1909, the DuPont Company began the construction of a permanent community roughly a mile east of the plant and 0.6 mile east of the Community Center/ Former Huggins Home (Crooks and Crook 2019; Munyan 1972). The community, now called DuPont Village (45PI69) was completed by 1910 (Crooks 2021). The town was incorporated in 1912, allowing liquor to be sold at the clubhouse, but was unincorporated during prohibition in 1920 (Crooks and Crooks 2019).

Figure 5. Tar Paper school and cook house photographed in 1909 (adapted from DPHS [2014]).

The DuPont Company’s Powder Works Plant had six designated areas of production including an operations area, an acid area, a nitroglycerin area, a powder line, a black powder line, and a magazine area, all within a fenced and heavily guarded facility (Carlsson 1990). During the first 50 years of operation, the DuPont Company produced over one billion pounds of dynamite (Lewis 1983:10).

In 1910, the DuPont Company added a wharf on Puget Sound and a narrow-gauge railroad to help transport explosives from the wharf and around the plant (City of DuPont 2021b). Concurrently, the Union Pacific and Northern Pacific Railroad laid tracks along the shores of Puget Sound,

constructing a trestle over the DuPont Company's tracks. The trestle was later filled in, creating the dike where the culvert now resides (Simpson 2017). The narrow-gauge rail line, classified as a "mountain railroad" for its 2.91% grade, traveled between the DuPont Company's Powder Works Plant and the wharf, with a 1.3-mile climb between sea level to the bluff overlooking the Nisqually reach. The narrow-gauge rail line took a sharp turn just before the Northern Pacific's trestle tunnel as a safety precaution against runaway trains (Simpson 2017). The railway was "added, changed and even removed" over the years in order to satisfy the everchanging needs of the explosives industry (Lewis 1983:37). In August 1937, the main line, plus spurs, sidings, and passing tracks totaled at least 15.77 miles. In the following years, tracks were added to increase the total miles to 16.91 (Lewis 1983:37).

In 1951, the town of DuPont became re-incorporated after the DuPont Company donated water, sewer, electrical, and parks (City of DuPont 2022). Additionally, the company began selling company homes to its residents (City of DuPont 2022).

In January 1976, the Weyerhaeuser Company purchased 3,200 acres of DuPont Company land. Weyerhaeuser greatly expanded the developed the area and, by 1994, it planned the construction of Northwest Landing, a large-scale development estimated to house up to 12,000 residents from its original 601 at the time (City of DuPont 2021b). The development mainly contained minimal traditional, craftsman, or neo-colonial style houses. This development has continued to expand, and newly developed neighborhoods are being added to this day.

In 1999, Lone Star Northwest proposed a 344-acre gravel mine and barge facility at Northwest Landing at the mouth of the Sequalitchew Creek; however, the Nisqually Delta Association convinced the company to move the facility elsewhere to protect the creek. When the plant was planned for expansion in 1997, the company, now CalPortland, agreed to the restoration of Sequalitchew Creek and Edmond Marsh as part of the mitigation efforts (Fogel 2011).

In 1999, Weyerhaeuser, the City of DuPont, and the Washington Department of Ecology (ECY) began discussions about cleaning up the site of the former DuPont Company's Powder Works Plant (Richman 2021). Between 2001 and 2005, Weyerhaeuser, the City of DuPont, ECY, the DAHP, the Nisqually Indian Tribe, and the DuPont Historical Society worked cooperatively to restore the site and remediate remaining hazards (Thompson 2006). Today, the Home Course golf course has been constructed over the footprint of the southern portion of the former DuPont Company's Powder Works Plant where the acid area was once located (Carlsson 1990, Richman 2021).

Land Use History

To identify the land use history of the project area and surroundings, ATCRC reviewed archival records including, but not limited to, local histories, historic maps and photographs, municipal Assessor's records, and newspapers (Table 2).

Table 2. Archival records reviewed to establish land use history.

DATE	TITLE (SCALE)	SOURCE	INFORMATION
1846	Inskip	Daugherty (1993b)	In the center of the API, north of Sequalitchew Creek, several unlabeled buildings are illustrated. Fort Nisqually is mapped as located immediately to the south of the center of the API.
1853	Surveyor General's Office: Township 19 North Range 01 East Plat	Bureau of Land Management - General Lands Office (BLM GLO)	API is within lands labeled as "Claimed by the Puget Sound Agricultural Company (PSAC) under the Treaty of 1846." Fort Nisqually is marked on the map roughly 0.4 mile north of its actual location and no other landmarks are illustrated on the map within the claim.
1855	U.S. Surveyor General: Plan of the Pugets [sic] Sound Agricultural Company's Land Claim at Nisqually Washington Territory. Map is loosely to scale.	Washington Secretary of State - Washington State Archives	API is along Sequalitchew Creek and extends into the Fort Farm. Fort Nisqually is illustrated adjacent to and south of the creek. The losing reach portion of the API appears to be within a structure of the Fort Farm – potentially an illustration of the Fort itself. The culvert replacements and beaver management areas appear to be within the larger farm.
1871	Surveyor General's Office: Township 19 North Range 01 East Plat	BLM GLO (1871)	API is along the south side of the creek. A track, potentially the narrow-gauge railway, is illustrated on the map encircling the creek out to today's Center Dr. where it intersects another track. Fort Nisqually is no longer labeled but the location now bears the name E. Huggins. The farm is no longer illustrated on the map, instead individual structures are illustrated with owner names. The Fort Farm illustrated in the previous map is now illustrated entirely as a swamp – today's Edmond Marsh.
1871	Surveyor General's Office: Township 19 North Range 01 East. Supplemental Plat	BLM GLO (1871)	The westernmost end of the API falls into a claim by Levant F. Thompson.
1878	Section XI: U.S. Coast Survey. Topography of Puget Sound, Wash. Ter. From Nisqually Reach to Totten Inlet, Register No. 1672. (1:20,000)	Puget Sound River History Project, University of Washington	Only the shoreline to roughly 0.3 mile inland are illustrated with steep topography. The westernmost end of the API is within the original estuary. A track is illustrated on the southern ridge line, potentially the narrow-gauge railway.
1889	Plummer Map: Township 19 North, Range 01 East	Historic Map Works	The land has been sub-divided and claimed by several individuals. The API is within lands owned by L.F. Thompson, F. Holden, E. Huggins, and W.H. Mastin.
1906	Old Town map	adapted from Blukis Onat (1977) in Daugherty (1993a)	Flume and dam are illustrated as located near the center of the API and a "standard gauge RR" is present in the northeastern portion of the API. Several roads intersect near the center of the API.

DATE	TITLE (SCALE)	SOURCE	INFORMATION
1937	Map of DuPont Works	Nicklason (1937) on file at the DuPont Historical Museum.	The API is primarily within the Sequalitchew Creek corridor with the eastern half widening around Edmond Marsh. The API follows portions of the narrow-gauge rail line through the Sequalitchew Creek corridor through the ravine. At the western end of the API, two storage tanks are illustrated just north of the API on the northern bluff of the ravine and the penstock and lower powerhouse are located on the south side of the creek traveling up the bluff. The flume is illustrated in its entirety from the top of the penstock traveling east and connecting to the dam located just on the other side of the western culvert. The narrow-gauge railroad illustrated traveling east from the wharf through the ravine toward the western culvert DIA where it shifts to north of the API and continues traveling east/west. A standard-gauge R.R is labeled and illustrated as a double line entering the API just below and east of the losing reach DIA. The standard-gauge R.R. is illustrated traveling east before curving south to the eastern culvert.
1940	Topographic Map: Anderson Island, 15 min (1:62,500)	United States Geological Service (USGS)	One black rectangle, illustrating the dam, extends across Sequalitchew Creek to create the DuPont Company Reservoir that powered the company village as well as the plant (Crooks and Crooks 2019). A spur of the Great Northern Pacific railway travels north into the marsh within the API and terminates. A dirt road is now illustrated traveling east/ west north of Sequalitchew Creek from the Du Pont Dock and a walking trail extends south from the estuary and travels around Old Fort Lake before intersecting today's Center Dr. A portion of today's Center Dr. is illustrated as a "loose surface graded, dry weather road" and terminates just south of Sequalitchew Creek. The Northern Pacific Railroad is illustrated on the map, but the narrow-gauge railway is no longer illustrated. The DuPont company "village" is illustrated on the map south of the API and of the marsh.

DATE	TITLE (SCALE)	SOURCE	INFORMATION
1945	Aerial Photograph	Pierce County PublicGIS	The API is within the corridor of the Sequalitchew Creek ravine and encompasses the marshland around Edmond Marsh. The land surrounding the API is heavily developed with infrastructure pertaining to the DuPont Company's Powder Works Plant. The narrow-gauge railway is visible throughout the ravine and cut alignments for the railroad and other roads are visible throughout the entire plant – north and south of the API. Several roads or tracks run along or meander into and around the API. Four roads appear to cross the ravine with the aid of either bridges, the narrow-gauge rail line, or the DuPont Company's telpher system (45PI1186). The DuPont Company's dock is visible roughly 500 feet north of the mouth of the creek extending from the protruding shoreline and curving slightly southwest for a length of about 500 feet.
1948 (1955 ed.)	Topographic Map: Nisqually, WA, 7.5 min (1:24,000)	USGS	The topography within the Sequalitchew Creek corridor has been mapped. Three structures are illustrated at the westernmost point of the API at the bottom of the ravine. The structures appear to be labeled "Tanks." The west structure is likely the lower powerhouse. A "light-duty" road extends from the DuPont docks into the Sequalitchew Creek ravine, running along the north bank approximately the same location of the narrow-gauge railway. The DuPont company "village" is now labeled DuPont. The road that aligns with today's Center Drive has been extended across Sequalitchew Creek. A road that turns into a track extends across Sequalitchew Creek at one of its widest and steepest points. A railway is illustrated traveling east/west just north of the marsh, south of the losing reach DIA and turns north at the location of the culvert to be replaced to intersect with another railway continuing west.
1948 (1955 ed.)	Topographic Map: Nisqually, WA, 15 min (1:62,500)	USGS	No change to API from 1948 7.5-minute topographic map. Fort Lewis is now labeled on the map east of the API.
1951	Metsker Map: Metsker Map: Township 19 North, Range 01 East	Historic Map Works	A trail labeled "E.I. DUPONT CO." now runs through the L.F. Thompson Donation Land Claim (DLC.). E.I Du Pont De Nemours & Co. has claimed most of the land that encompasses the API. The rail lines discussed in the previous map are still present. The road at Center Dr. illustrated in the previous two maps is illustrated as it was before the extension. It appears the road was extended between 1951 and 1955 (the previous map edition). Edmond Marsh is illustrated only along the creek.

DATE	TITLE (SCALE)	SOURCE	INFORMATION
1955	Aerial Photograph	NETROnline: Historic Aerials	The light duty road beginning at the DuPont dock that runs through the ravine, north of the creek is visible in the aerial photograph. Three structures are visible in a clearing at the westernmost portion of the API, one square south of the creek (likely the lower powerhouse) and two round potentially north of the creek but south of the narrow-gauge railway. Networks of trails and roads are visible north and south of the API. The Northern Pacific railroad and the tunnel that connects the DuPont dock to the canyon are visible west of the API. A structure, perhaps a small train canopy, sits on the tracks just south of the tunnel.
1955	Map of DuPont Works	Davies (1955) on file at the DuPont Historical Museum.	The API follows the Sequalitchew Creek corridor east toward the marsh. Edmond Marsh is labeled Swampy. A bridge is labeled on the map wat the location of the western culvert DIA with another bridge located roughly 750 feet west. The narrow-gauge railroad, labeled "tram to wharf", is illustrated running through the Sequalitchew Creek corridor west of the western culvert then shifts north of the API traveling east/west. A second set of tracks, illustrated with a double line enters the API at the Edmond Marsh area just below and east of the losing reach DIA, traveling east before curving south at the eastern culvert. This double-line track is labeled "N.R. Track," presumably for narrow-gauge R.R., where it was labeled "standard gauge R.R" in the 1937 Map of DuPont Works (Nicklason 1937).
1959 (1967 ed.)	Topographic Map: Nisqually, WA, 7.5 min (1:24,000)	USGS	The three structures at the westernmost portion of the API are still there, but they are no longer labeled. The narrow-gauge railway is illustrated for the first time extending from the DuPont docks into the Sequalitchew Creek ravine, running along the north bank, below the "light-duty" road (lower topographically). The marsh is illustrated in its entirety.
1960	Metsker Map: Metsker Map: Township 19 North, Range 01 East	Historic Map Works	The road extending from the DuPont dock into the ravine is illustrated on the map. One road at the top of the southern ridge above the ravine becomes a single dashed-line trail upon crossing the ravine northeast/ southwest to the northern ridgeline above the ravine. This may be illustrating the telpher system used to transport items overhead across the ravine. Rail lines and roads are illustrated running through the API at the culvert removal and losing reach DIAs. The narrow-gauge railway is illustrated running through the eastern half of the API.
1965	Metsker Map: Metsker Map: Township 19 North, Range 01 East	Historic Map Works	No change in API from 1960 Metsker map.

DATE	TITLE (SCALE)	SOURCE	INFORMATION
1969	Aerial Photograph	NETROnline: Historic Aerials	The “tanks” near the estuary end of the API are no longer visible. The two round tanks have been replaced by trees and the square tank is potentially still present but has been covered by vegetation. No change within the rest of the API. The community of DuPont south of the API has grown.
1981	Aerial Photograph	NETROnline: Historic Aerials	No structures are visible within the API. The train canopy south of the tunnel on the Northern Pacific Railroad is no longer present. The community of DuPont has further expanded. All roads surrounding the API still appear to be dirt roads.
1990	Aerial Photograph	NETROnline: Historic Aerials	The easternmost portion of Center Drive was constructed as a two-lane road with a center divider.
2002	Aerial Photograph	Maxar Technologies: USGS – Google Earth Pro	By September 2002, Center Drive was fully constructed and runs through the API. The city of DuPont has greatly expanded west and north of the original community. The land south of the Sequalitchew Creek ravine and of the API has been stripped of vegetation and topsoils save for the area surrounding Old Fort Lake and tailings piles are visible throughout. This stripping is likely part of the soils remediation project (Maass 2022).

The earliest reviewed map of the API is the Inskip (1846) map, which identifies Sequalitchew Creek and a “swamp” in the vicinity of what is now called Edmond Marsh (Figure 6). At this time, there are several unlabeled buildings on the north side of the creek near the center of the API and just west of the “road to Steilacoom.” Other features identified outside of the API at this time are two “cultivated” areas and an observatory north of the API and Fort Nisqually, several more unlabeled buildings, barracks, Village Nisqually, and a race course south of the API.

In the BLM GLO (1853) map, the API and surrounding land are claimed by PSAC (Hyde and Preston 1853 in BLM GLO 2022). The United States Surveyor General (1855) and BLM GLO (1871) maps illustrate the area's transition from Fort Nisqually to privately owned land. During that time, Edward Huggins, who succeeded William Tolmie as Chief Factor of Fort Nisqually, farmed the area when Fort Nisqually closed in 1870. At that time, the Fort Nisqually Factor’s House became Edward Huggins's personal home (Crooks 2021, Reed 1871 on BLM GLO 2022). In 1906, Huggins sold the land and home to the DuPont Company (Crooks 2021).

In the 1906 Old Town Map, a flume and a dam are illustrated as located near the center of the API and a “standard gauge RR” is present in the northeastern portion of the API; several roads intersect near the center of the API (Figure 7). During this time, the DuPont Company Old Town (45PI57), or “tar paper village,” was occupied by workers and their families of the DuPont Company’s Powder Works Plant (Crooks and Crooks 2019, Munyan 1972). The former Huggins Home (also the former Fort Nisqually Factor’s House) became the community center for the "tar paper village" (Crooks and Crooks 2019). By 1921, the map of DuPont Works illustrates the establishment and extent of the DuPont Company’s Powder Works Plant (DuPont Works-Washington Explosives Dept. Plan / Electrical, E.J. Habarshock, Nov 22, 1921, DPHM, DuPont, Washington [Habarshock 1921]). By 1937, the Map of DuPont Plant illustrates growth of the plant, primarily on the north

side of the API, with the establishment of the Black Powder Area (Map of Du Pont Works, Nicklason, August 30, 1937, DPHM, DuPont, Washington: 15-4-2 [Nicklason 1937]; Figure 8). By 1955, the Black Powder line is gone and the area north of the API is once again reverted to solely a storage area (Map of Du Pont Works, E. Davies March 15, 1955, DPHM, DuPont, Washington [Davies 1955]; Figure 9). The Black Powder area of the plant was reportedly demolished in 1945 after the conclusion of World War II (Carlsson 1990:12). Additionally, a flume for the hydroelectric facility is well mapped on the 1937 Map of DuPont Works (Nicklason 1937) but is missing from the 1921 and 1955 maps of the plant (Haburshock 1921; Davies 1955).

The 1940 USGS 15-minute map (USGS Anderson Island 1940) illustrates the dam, reservoir, and roads associated with the DuPont Company's Powder Works Plant. Maps, from this point forward, begin to illustrate the DuPont Company's infrastructure, development, and expansion until the Metsker Map Company (1965) map. By the 1969 aerial photograph, infrastructure associated with the DuPont Company is no longer visible, and aerial photographs show encroaching vegetation with the API after that. From 1981, the town of DuPont continues to increase in size.

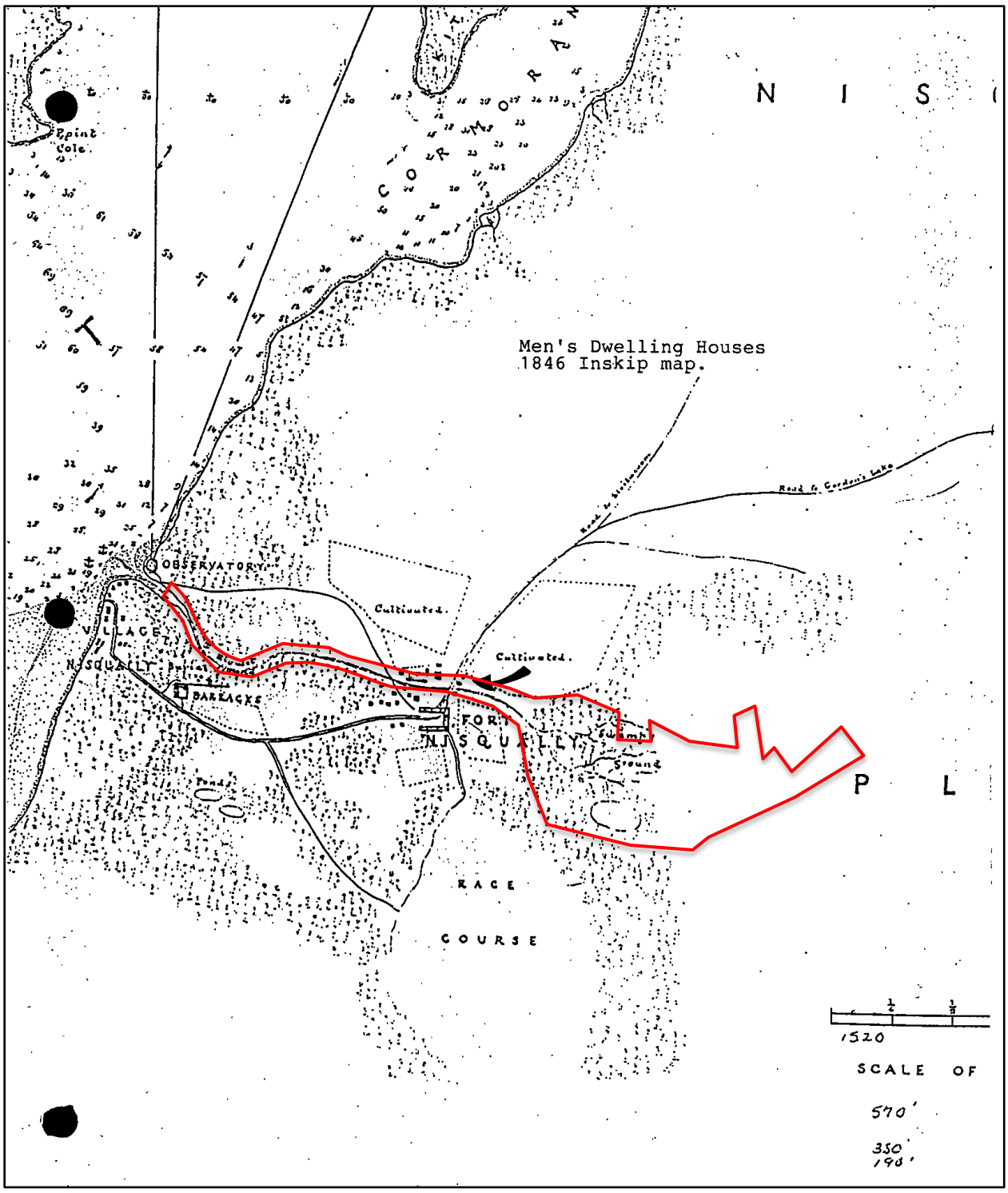

Figure 6. Inskip (1846) map with an approximation of the API (in red) illustrated (adapted from Daugherty 1993b).

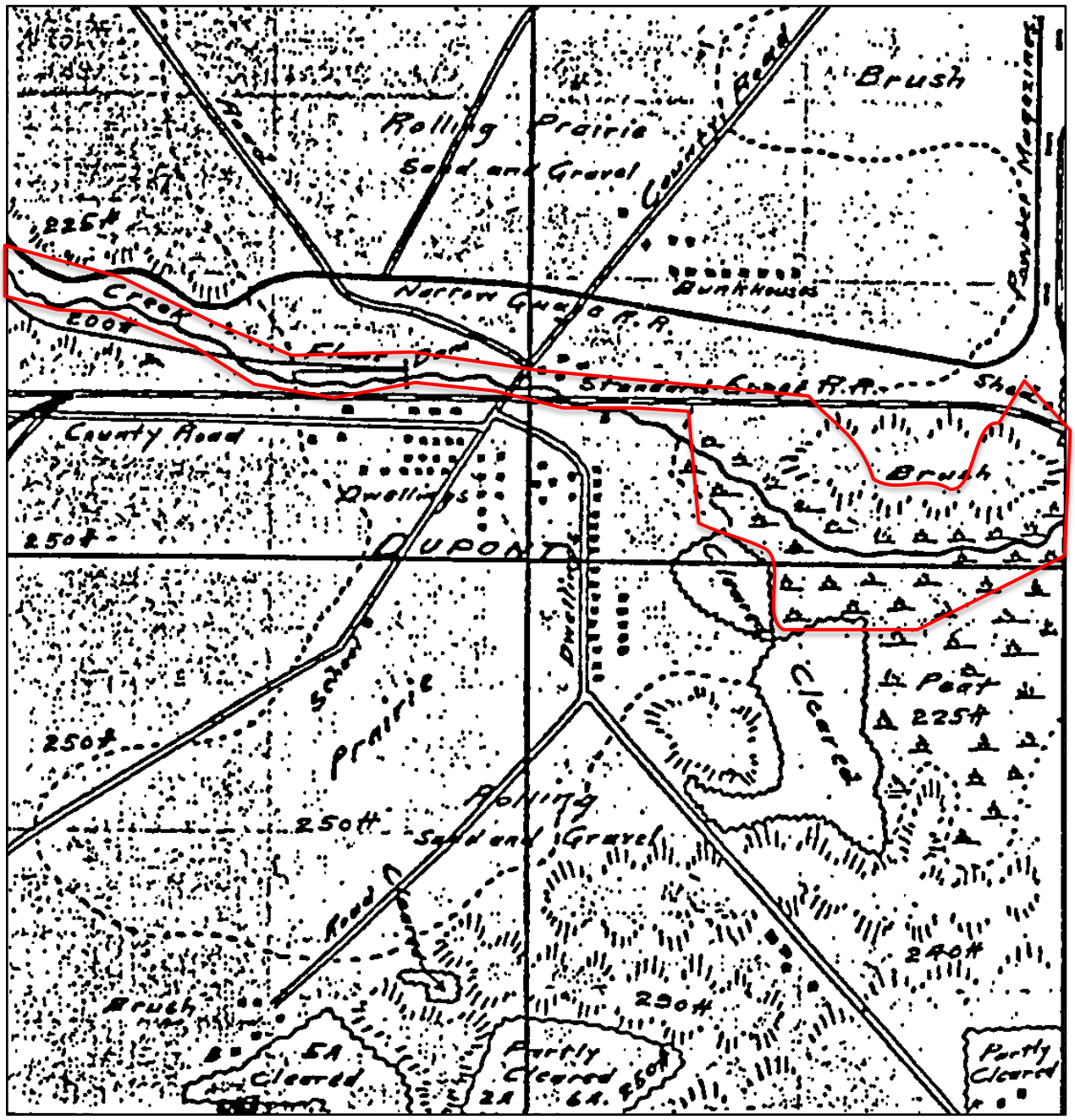

Figure 7. 1906 map of Old Town with an approximation of API (in red) illustrated (adapted from Blukis Onat 1977 in Daugherty 1993a).

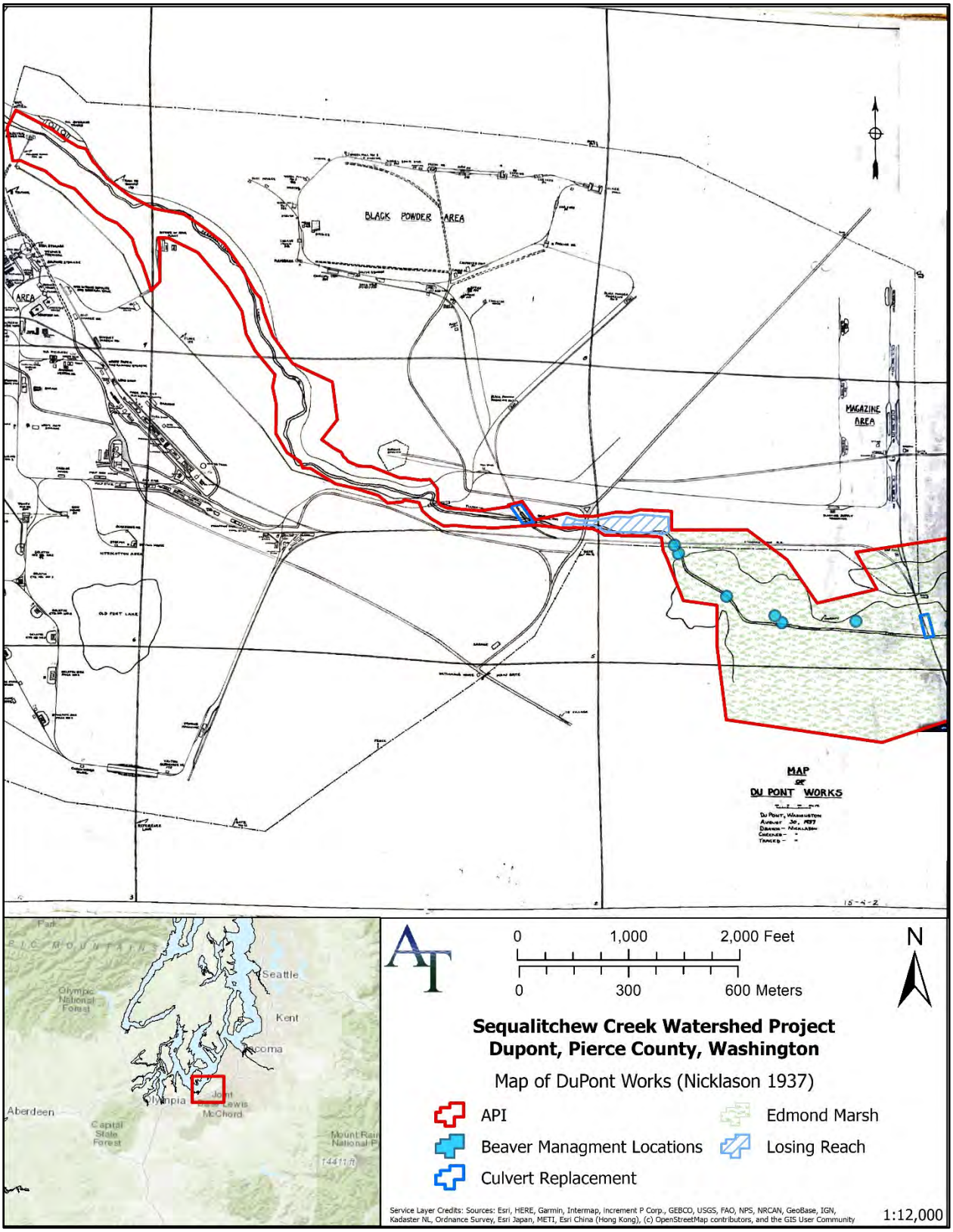

Figure 8. 1937 Map of DuPont Works ([Nicklason 1937] courtesy of the DuPont Historical Museum).

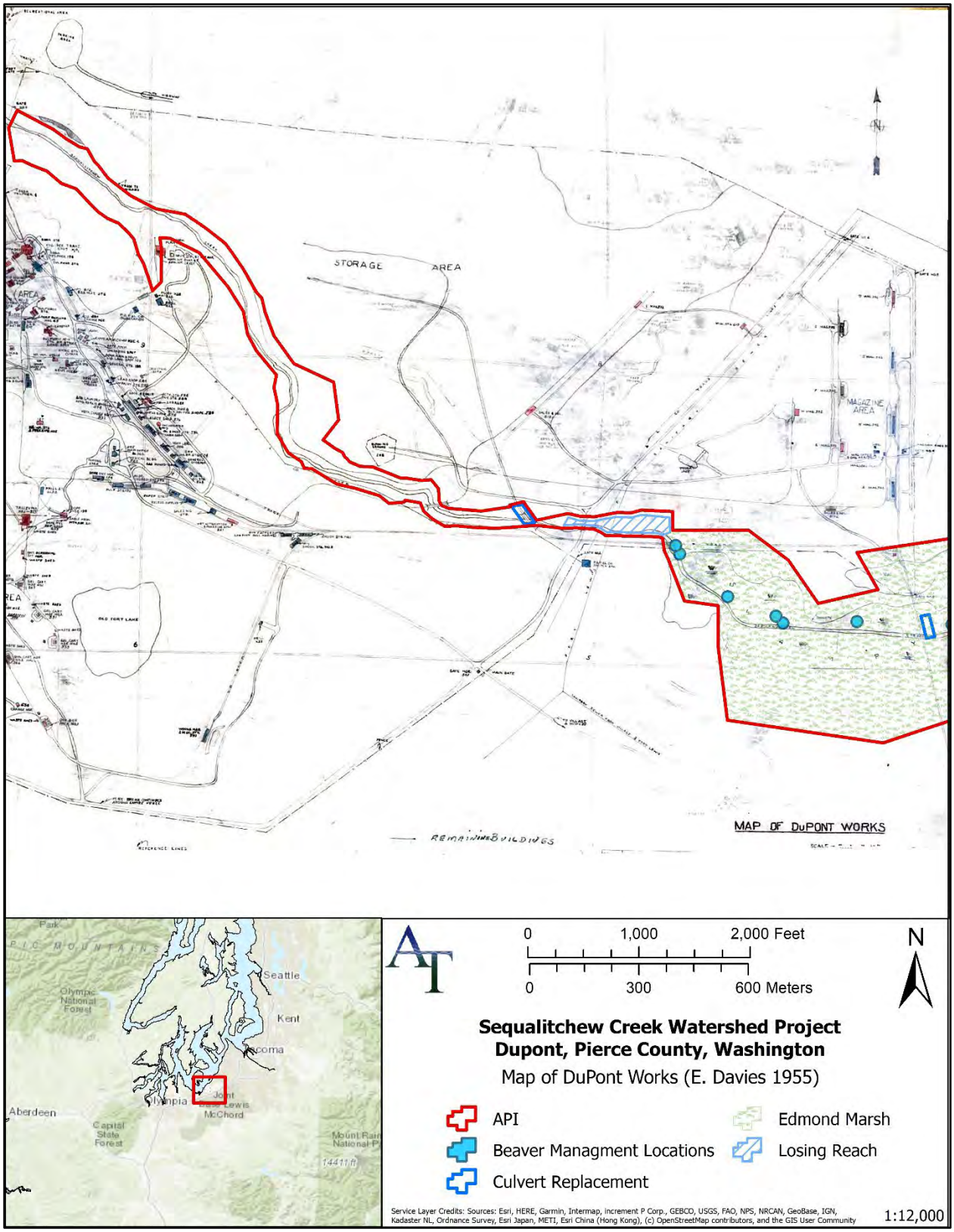

Figure 9. 1955 Map of DuPont Works ([Davies 1955] courtesy of the DuPont Historical Museum).

WISAARD

DAHP's WISAARD database was reviewed to identify cultural resource studies, archaeological site and isolate records, NRHP nominations, cemetery locations, and traditional cultural places (TCPs) that had been previously recorded in, and within a 0.3-mile radius of, the API.

Cultural Resources Studies

According to WISAARD, since 1995, there have been 25 cultural resources studies previously conducted in, and within 0.3-mile of, the API (Table 3). Of these, two have been completed within the subject API. Both Maass (2002) and Thompson (2006) were completed for the purpose of soil remediation within the same area.

Maass (2002) details archaeological monitoring during the soil remediation activities in co-operation with the E.I. DuPont de Nemours & Company and Weyerhaeuser to comply with a court-ordered environmental cleanup project. The remediation project took place primarily atop the plateau south of the API encompassing the entirety of what is today The Home Golf Course and the Civic Center. Monitoring identified archaeological materials at five locations within the monitoring area, all located south and outside of this project's API.

Thompson (2006) compiles all archaeological survey work conducted for remediation activities between June 2001 and September 2005. At the time of remediation, the entire 636-acre parcel was owned by the Weyerhaeuser Company. Today, the eastern portion of the remediation project area, between the northward bend and the Civic Center, is within the parcel owned by the City of DuPont and within the API. The studies conducted between 2001 and 2005 were conducted to "evaluate the extent and magnitude of contamination at the former DuPont Works Site…to design remedial activities, which included the removal of structures, debris, and contaminated soil" (Thompson 2006:4). Additionally, remediation included scraping and excavating contaminated soils and treatment and screening of highly contaminated soils before disposal off-site.

Table 3. Cultural resource studies previously conducted within a 0.3-mile radius of the API.

NADB	AUTHOR (DATE)	TITLE	FINDINGS	DISTANCE FROM API
1348442	Maass (2002)	Interim Archaeological Monitoring Report for the Former DuPont Works Site Parcel 1	Revision of 45PI55, 45PI405, 45PI156	Within API
1348443	Thompson (2006)	Archaeological Implementation Report for Remediation of Soils at the Former DuPont Works Site Parcel 1 City of DuPont	Individual mitigation measures for 22 sites	Within API
1695547	Morris (2021)	Cultural Resource Monitoring Memorandum for the City of DuPont Public Works Building Project, Pierce County, WA	No further recommendations	Adjacent to API
1693689	Berger (2019)	Cultural Resources Assessment for the City of DuPont Public Works Building Project, DuPont, Pierce County, Washington	No further recommendations	Adjacent to API
1686701	Wessen (2008)	Revised Cultural Resources Assessment for the Glacier Northwest North Sequalitchew Creek SEIS Project, City of DuPont	Monitoring recommended	Adjacent to API

NADB	AUTHOR (DATE)	TITLE	FINDINGS	DISTANCE FROM API
1682888	Sikes (2012)	Cultural Resources Monitoring Compliance Report for Creekside DuPont Partners, LLC/Creekside Village Development Project	No further recommendations	Adjacent to API
1680626	Sikes and Arlington (2010)	Cultural Resources Assessment Creekside DuPont Partners, LLC/Creekside Village Development Project DuPont	No further recommendations	Adjacent to API
1680596	Sikes (2011)	Archaeological Survey, Testing and Monitoring at 45PI66, 45PI455 and PI773, DuPont Industrial Partners, LLC, Lot Y Project, DuPont	Identified 45PI1224, 45PI1225, 45PI1226, and 45PI64. No further recommendations	Adjacent to API
1348810	Bialas (2005)	Cultural Resources Assessment for the Glacier Northwest North Sequalitchew Creek SEIS Project, City of DuPont	No further recommendations	Adjacent to API
1346527	Dampf (2004)	Archaeological Monitoring Report for the 2003 and 2004 Field Seasons at the Former DuPont Works Site Parcel 1, City of DuPont	45PI712, 45PI713, 45PI711, 45PI576 Revision of 45PI563, 45PI55, four additional collections, 14 additional isolates	Adjacent to API
1346516	Wessen (2004)	Archaeological Testing at 45PI576 Former DuPont Works Site, City of DuPont	45PI576 (Not Eligible)	Adjacent to API
1342608	Wessen (2003)	Exploring the Boundary and Possible Interpretation of 45PI485 Former DuPont Works Site Parcel 1 City of DuPont	Revision of 45PI485	Adjacent to API
1341776	Historical Research Associates (2002)	Archaeological Investigations At 45-PI-563 Former DuPont Works Site	45PI563	Adjacent to API
1340421	Daugherty (1995)	Archaeological Test Excavations Near the Mouth of Sequalitchew Creek	Two human bone fragments, several faceted blue trade beads (no site number assigned)	Adjacent to API
1686924	Gall (2010)	Archaeological Survey of the Lower Sequalitchew Creek Fence and Re-vegetation Project, DuPont	45PI1186: DuPont Powder Works telpher tower remains	Adjacent to API
1693467	de Vry (2020)	Cultural Resource Survey for the DuPont-Steilacoom Road Improvement Project, DuPont, Pierce County, Washington	No further recommendations	Adjacent to API
1334668	Larson (1995)	To Ms. J.J. McCamet, re: Site 45PI405 Located near the Future Intel-DuPont Campus Located in Northwest Landing	Decayed timbers and nail, burn pit, historic scatter. Associated with 45PI405	Overlapping API
1340385	Solimano (1996)	Intel DuPont Campus Project Cultural Resource Assessment and Monitoring	45PI440, 45PI441	0.07 mile

NADB	AUTHOR (DATE)	TITLE	FINDINGS	DISTANCE FROM API
1340358	Larson (1996)	To Mr. Mike Wright, re: Cultural resource assessment of a soil storage location in the southwest corner of the Intel DuPont Campus	No further recommendations	0.07 mile
1340322	Madson (2000)	Cultural Resource (Archaeological Site) Inventory 1997-1998, Fort Lewis Military Reservation	17 historic period sites and 29 isolates	0.07 mile
1681833	Schultze (2012)	An Archaeological Inventory Survey of 227 Acres, Fiscal Year 2010, Joint Base Lewis-McChord Main	45PI1241 precontact projectile point isolate, 45PI1240 and 45PI1242 historic sites	0.07 mile
1340325	Daugherty (2000)	Archaeological and Historical Investigations, Divisions Six and Seven Northwest Landing, DuPont	Limited evidence of HBC/PSAC presence and Old Town activity. No historical significance.	0.09 mile
1340320	Daugherty (2000)	Hudson Bay Company/Puget Sound Agricultural Company Chest Divisions Six and Seven, Northwest Landing: DuPont, Washington	28 burials found, along with burial chest, historic and precontact documented site 45PI413	0.09 mile
1353157	Thompson (2009)	Archaeological Monitoring at the Western Washington Sheet Metal Site, City of DuPont	45PI969, 45PI921, 45PI922 historical sites and isolates	0.09 mile

Archaeological Sites

Three archaeological sites (45PI70, 45PI74, and 45PI401) have been previously recorded in the API, and twenty-three have been previously recorded within a 0.1-mile radius of the API (Table 4).

Site 45PI70 is the DuPont Company Powder Works Plant. The plant was originally inventoried by Riordan (n.d. [but prior to 1977]) who noted the site as totaling 1.5 square miles and consisting of "over 50 buildings" and railroad tracks. Riordan (n.d.) recommended that the site be "studied extensively before it [was] disturbed" and that the "buildings should be photographed and measured." Riordan (n.d.) also provided a map in which the location of the buildings and structures observed at that time were located.

In 1977, 45PI70 was revisited by Blukis Onat (1977:30-33). At that time, it was noted that the plant consisted of "well over fifty buildings" and that "some of the original structures [were] still standing, while only the foundations of others remain" (Blukis Onat 1977:33). Blukis Onat (1977:33) recommended that the site should be "studied carefully before it [was] further disturbed" and that "a map should be made locating all of the buildings and foundations, all of the tracks and the roads, and all of the other features of the plant" and that the buildings should be photographed

and documented. Blukis Onat (1977:33) further states that "the importance of this site lies in its completeness."

In 1990, an Historic American Buildings Survey (HABS) of 45PI70 was prepared by Carlsson (1990:13). Carlsson (1990) notes that "over 200 structures including repeated designs and auxiliary buildings (over 120 different building designs), plus tanks, standard and narrow-gauge rails, roads, telphers, and utilities […] were spread over a good portion of the 3200 acre site." The site was also recorded as including six functional areas: operation/maintenance/miscellaneous, the acid area, the nitroglycerin area, the powder line area, the black powder plant, and the magazine area (Carlsson 1990:11).

In 2008, the site form for 45PI70 was expanded by Shaw and Silverman (2008) to include the Black Powder portion of the DuPont Company Plant site. According to Shaw and Silverman (2008):

> The Black Powder Plant area [was] located on the northwest portion of site 45PI70, north of Sequalitchew Creek and west of the Fort Lewis Military Reservation. It is undetermined when the Black Powder Plant began, but DuPont began development of the explosives facility in 1906 (Wessen et al. 2005:8). In 1945, DuPont demolished the Black Powder Plant with the conclusion of World War II (Carlsson 1990:12).

Shaw and Silverman (2008) note that the Black Powder Plant area portion of 45PI70 was sized approximately 440 meters (north to south) by 400 meters (east to west) and mainly consisted of architectural remains (ten were recorded). Shaw and Silverman (2008) also illustrated the overall site boundaries of 45PI70. From Shaw and Silverman (2008):

> Little remains of the architecture of the structures in the Black Powder Plant area. Most consist only of a poured concrete foundation with an associated scatter of architectural artifacts. The structures that still stand are those with thick reinforced concrete walls. Piles of reinforced concrete rubble were also observed and recorded in this area. While these rubble piles appear to have once been part of standing structures, little can be said about their original function beyond their association with the Black Powder Plant area and the historic period. Raised railway grades run through the manufacturing area and once interconnected some of the structures. These grades are ≈2m (6ft.) high and ≈8m (25ft.) wide. The grades themselves are difficult to see because of a dense stand of younger trees that has grown along their tops. The railway grades which once formed a linear clearing through this forested area are now characterized by a dense linear growth of small trees.
>
> One similarity that all of the structures and rubble piles share is their weight. Part of this is due to the two construction methods used at the facility. The buildings in the Black Powder facility were designed either to survive an explosion or to be easily rebuilt in the event of an explosion. Examples of this construction philosophy were the wheel houses, which were designed to be easily rebuilt after an explosion, and the [upper] pump house (S4) which had 1-foot-thick walls that supported the working machinery it contained (Carlsson 1990). The roofing materials and curtain-walls that were once part of the structures have been

removed. What remains are those architectural components which are difficult to destroy or remove. The durability of the concrete walled structures once served a practical function, with regard to explosives manufacture. The durability of these architectural components explains in part why they alone remain.

45PI74 was reported as a temporary camp or lodge with shallow deposits of bottle and dish fragments, clay pipe fragments, clam shells, and animal bones (Blukis-Onat 1977; Daugherty 1992). The site was reported to be located along the Sequalitchew Creek Trail just north of the northwest corner of the beaver Management DIA. The site was identified in 1992 through pedestrian survey and has not been relocated since its original documentation. No traces of the site were identified during this cultural resource survey. Nonetheless, due to its recorded location away from direct and indirect impacts, this project will not impact 45PI74.

45PI401 is located on the west side of Center Drive, adjacent to the northern portion of the losing reach DIA. The site has been identified as houses potentially utilized by HBC employees with remains of a dirt-packed floor with metal and ceramic remains. The site was tested for data recovery in 1988 before the construction of Center Drive (Welch 1988). Excavations of the site identified the sills and sill trenches of two structures and over 5,000 artifacts, including wood, bricks, nails, wire, glass, buttons, clothing hooks, beads, jewelry, and pipe fragments, among other items (Daugherty 1993b). The site was destroyed with the construction of Center Drive and, as such, will not be further impacted by this project (Daugherty 1993b). ATCRC performed a visual reconnaissance of the area and did not identify evidence of the site.

Table 4. Archaeological sites previously recorded within a 0.1-mile radius of the API.

SMITHSONIAN	FINDINGS	ELIGIBILITY	DISTANCE FROM API
45PI70	DuPont Company Powder Works Plant	Potentially Eligible	In the API
45PI74	1843 Fort Nisqually (Tolmie designation) / Men's Dwelling Houses. Site includes animal bones, shell, glass, and ceramic debris.	Potentially Eligible	In the API
45PI401	Projectile points, scrapers, adze blade and debitage, ceramic sherds, glass, trade beads, square nails, pendant, etc. Hudson's Bay House site.	Survey/Inventory	In the API
45PI56	Nisqually 1843 Fort	State Register	Adjacent to API
45PI60	Edmond Marsh dump, probable Hudson's Bay Company component	Not Eligible	Adjacent to API
45PI65	Early 1900s domestic debris	Potentially Eligible	Adjacent to API
45PI71	Sawmill. No remains of historic structures or artifacts was noted.	Not Eligible	Adjacent to API
45PI76	Burial	Survey/Inventory	Adjacent to API
45PI78	1843 Fort Nisqually/Huggins Ranch graves	Survey/Inventory	Adjacent to API
45PI405	Remains of two structures occupied by Hudson's Bay Co. personnel: chimney, square nails, metal hinges, clay floors, jewelry, coins, utensils	Potentially Eligible	Adjacent to API

SMITHSONIAN	FINDINGS	ELIGIBILITY	DISTANCE FROM API
45PI413	Historic Native American cemetery. 28 burials, square nails from grave boxes, leather, cloth, decorative brass tacks	Potentially Eligible	Adjacent to API
45PI455	9th U.S. Cavalry bivouac with prehistoric flakes and tools	Potentially Eligible	Adjacent to API
45PI485	1843 Fort Nisqually Complex. Shell midden matrix and historic refuse scatter	Survey/Inventory	Adjacent to API
45PI563	Historic artifact scatter associated with the Hudsons Bay Company employee's house and Fort Nisqually, 1843-1930s	Not Eligible	Adjacent to API
45PI773	Precontact lithic scatter, debitage isolate	Survey/Inventory	Adjacent to API
45PI1226	Bridge Abutment Narrow-Gauge Railway	Potentially Eligible	Adjacent to API
45PI576	Precontact lithic scatter	Survey/Inventory	0.01 mile
45PI1551	Historic debris scatter/concentration	Potentially Eligible	0.01 mile
45PI75	Form states site type as "prehistoric midden". Mentions "artifacts" collected.	Not Eligible	0.05 mile
45PI1552	Historic debris scatter/concentration	Potentially Eligible	0.05 mile
45PI67	Wilkes observatory. Exploring station	Determined Eligible	0.07 mile
45PI453	Inskip observatory constructed and used by R.M. Inskip in 1846 to chart and map the waters of Nisqually area. He arrived aboard HMS Fisgard.	Potentially Eligible	0.07 mile
45PI1186	DuPont telpher tower, structural remains for electric cable system, 12 x 8ft, ca. Mid-20th century	Potentially Eligible	0.07 mile
45PI64	Burning Ground Dump, 1930's plant dump	Not Eligible	0.09 mile
45PI921	Historic scatter, glass, linkage hardware, harmonic plate, wire nail, ca. Early 20th.	Potentially Eligible	0.11 mile
45PI452	Ox Road, historic road feature	Potentially Eligible	0.13 mile
45PI451	Excavated grave site of 4 British subjects, former employees of Hudson’s Bay Co	Potentially Eligible	0.15 mile
45PI922	Historic scatter, glass, ceramic, ca. Early 20th century.	Potentially Eligible	0.15 mile
45PI1224	Narrow-gauge Railroad and berm and short abandoned track	Potentially Eligible	0.17 mile
45PI1225	Narrow-gauge Railroad: concrete loading platform	Potentially Eligible	0.17 mile
45PI1227	1906-1920s railroad spikes	Survey/Inventory	0.17 mile
45PI1228	1906-1920s concrete pieces	Potentially Eligible	0.17 mile
45PI1229	1906-1920s milled lumber	Potentially Eligible	0.17 mile
45PI441	Unimproved dirt road. Roadbed completed in 1852 with help of laborers lent by Hudson’s bay co.	Potentially Eligible	0.17 mile
45PI969	Historic glass druggist bottle isolate, ca. 1900	Survey/Inventory	0.18 mile

SMITHSONIAN	FINDINGS	ELIGIBILITY	DISTANCE FROM API
45PI54	Sequalitchew arch. Site. Bone, charcoal, FCR, numerous hearths, shell midden	National Register	0.2 mile
45PI66	Richmond Methodist Episcopal Mission site	Determined Eligible	0.2 mile
45PI69	Historic Town of DuPont	Potentially Eligible	0.2 mile
45PI454	Henry Williamson homestead. Mid to late 1800's. Concentration of bricks, square nails, glass, Prosser buttons, cartridge case	Potentially Eligible	0.2 mile
45PI484	Hudson's Bay Company cache: buried chest and broken dishes	Potentially Eligible	0.2 mile
45PI510	Historic Debris Scatter/Concentration	Not Eligible	0.2 mile
45PI712	Human remains: 3 bones/fragments of human origin, may be related to historic Fort Nisqually cemetery	Potentially Eligible	0.2 mile
45PI1333	Historic public works, utility vaults, concrete pipe, ca. 1944	Not Eligible	0.2 mile
45PI1358	Historic debris scatter, metal, glass, porcelain, copper, ca. 1915-1960	Potentially Eligible	0.2 mile
45PI1359	Historic debris scatter, glass, ceramic, ca. 1940-1960	Not Eligible	0.2 mile
45PI1361	Historic-period street lamp isolate, ca. Early 20th century	Survey/Inventory	0.2 mile
45PI1524	Precontact and historic culturally modified trees	Survey/Inventory	0.26 mile
45PI57	Old town men's boarding house site	Not Eligible	0.3 mile
45PI73	Indian house or hall site	Potentially Eligible	0.3 mile
45PI209	Precontact isolate and lithic material	Survey/Inventory	0.3 mile
45PI221	Precontact lithic material	Survey/Inventory	0.3 mile
45PI404	Skeletal remains of Native American man and woman	Survey/Inventory	0.3 mile
45PI448	City of DuPont historic dump site	Not Eligible	0.3 mile
45PI77	Indian burial ground	Survey/Inventory	0.3-0.6 mile

Registered Properties

No registered properties (i.e. properties that have been listed on the Washington Heritage Register [WHR] or the NRHP) have been previously identified in the API. Within a one-mile radius of the API, a total of seven registered properties have been recorded (Table 5). The nearest is the Sequalitchew Archaeological site (45PI54) which is located approximately 0.03 mile west of the API and consists of a precontact/ ethnohistoric shell midden that extends roughly 80 meters along the beach containing heavy shell content, faunal bone, charcoal deposits, fire-cracked rock (FCR), and numerous hearths. As 45PI54 is not located in the API, it will not be affected by this project.

Table 5. Registered Properties previously recorded within a 0.3-mile radius of the API.

SMITHSONIAN	NAME	LOCATION	BUILT DATE	REGISTER TYPE	PROXIMITY TO API
45PI56	1843 Fort Nisqually	Address restricted	1843	WHR	150 feet

SMITHSONIAN	NAME	LOCATION	BUILT DATE	REGISTER TYPE	PROXIMITY TO API
45PI54	Sequalitchew Archeological Site	Address restricted	--	NRHP, WHR	0.1 mile
45DT151	DuPont Village Historic District	Penniman St	1906	NRHP, WHR	0.1 mile
45PI55	Fort Nisqually 1833 Site	Address restricted	1833	NRHP, WHR	0.3 mile

Properties

No properties (i.e. historic buildings and/or structures aged at least 50 years old) have been recorded in the API, and a total of twenty-two have been previously recorded within a 0.3-mile radius of the API (Table 6). Due to proximity, none will be impacted by this project.

Table 6. Properties previously recorded within a 0.3-mile radius of API.

PROPERTY ID	COMMON NAME	ADDRESS	ELIGIBILITY	PROXIMITY TO API
28846	DuPont Butcher Shop	207 Barksdale Ave, DuPont, Washington, 98327, USA	Eligible	0.6 mile
41777	Red Shield Inn - Fort Lewis	Building 4320, Main Street, Fort Lewis, WA	Eligible	0.7 mile
85125	Pendleton Avenue OC Bridge	Pendleton Ave, Fort Lewis, WA 98433	Not Eligible	0.72 mile
28945	DuPont School	Barksdale and Steilacoom Rd., DuPont, WA	Eligible	0.78 mile
29217	Building 5302, NCO Family Housing, Greenwood Neighborhood, Fort Lewis	5302 Idaho Ave, Tacoma, Washington, 98433	Eligible	0.83 mile
114474	Joint Base Lewis-McChord, Building 4274, Red Cross Hostess House	Idaho Ave, Tacoma, Washington, 98433	Eligible	0.83 mile
680369	No Data	5301 Perimeter Rd SW, Fort Lewis, WA	Eligible	0.85 mile
705488	WA State Historical Society Hudson Bay Company Monument	XXXX Clark Rd SW, Fort Lewis, WA	Not Eligible	0.86 mile
717249	Fort Lewis Memorial Arboretum - Joint Base Lewis-McChord	Locast Rd, Joint Base Lewis-McChord, Washington	Not Eligible	0.86 mile
718599	Building 4081 - Joint Base Lewis McChord	Clark Rd, Tacoma, WA, 98433, USA	Not Eligible	0.86 mile
719115	Building 4291, JBLM, WA	4291 9th Division Dr, JBLM, WA, 98433, USA	Eligible	0.86 mile
114472	Fort Lewis - Old Post Hospital (Dispensary) - Building 4290	xxx 9th Division Dr , Fort Lewis, WA	Eligible	0.89 mile
680367	Joint Base Lewis-McChord, Building 4201, American National Red Cross Field Office	4176 West Way SW, Fort Lewis, WA	Eligible	0.9 mile

PROPERTY ID	COMMON NAME	ADDRESS	ELIGIBILITY	PROXIMITY TO API
680366	Joint Base Lewis-McChord, Building 4176, Quartermaster Gasoline Filling Station	4176 Locust Rd SW, Fort Lewis, WA	Eligible	0.93 mile
680365	Joint Base Lewis-McChord, Building 4170, Warehouse	4170 West Way SW, Fort Lewis, WA	Eligible	0.94 mile
29218	Building 5303, NCO Family Housing, Greenwood Neighborhood, Fort Lewis	Fort Lewis, Tacoma, WA	Eligible	0.95 mile
29219	Building 5306, NCO Family Housing, Greenwood Neighborhood, Fort Lewis	5306 Idaho Ave, Tacoma, Washington, 98433	Eligible	0.95 mile
29055	Building 5304, NCO Family Housing, Greenwood Neighborhood, Fort Lewis	Fort Lewis, Tacoma, WA	Eligible	0.95 mile
29221	Building 5308, NCO Family Housing, Greenwood Neighborhood, Fort Lewis	Fort Lewis, Tacoma, WA	Eligible	1 mile
114473	Greenwood House 5006	xxx Clattam Ave, Fort Lewis, WA	Eligible	1 mile
717195	Fort Lewis - Bldg. 4174 - The Quartermasters Warehouse	4174 Kaufman Ave, Tacoma, WA, 98433, USA	Eligible	1 mile
29259	Joint Base Lewis-McChord, Building 1010, Headquarters Goldstrike ROTC Region	Liggett Ave, Tacoma, Washington, 98433	Eligible	1 mile

Cemeteries

No cemeteries, burials, or funerary items have been previously recorded in the API. One burial, labeled as the Sequalitchew Graves (45PI76), is recorded adjacent to the API on the north bank of Sequalitchew Creek. In total, there are seven cemeteries previously recorded as located within a 0.3-mile radius of the API (Table 7). Due to proximity, none will be impacted by this project.

Table 7. Cemeteries recorded within a one-mile radius of API.

SMITHSONIAN	NAME	LOCATION	BUILT DATE	PROXIMITY TO API
45PI76	Sequalitchew Graves	DuPont	Unknown	Adjacent
45PI451	Lone Fir grave site	Address Restricted	1832-1850	0.07 mile

SMITHSONIAN	NAME	LOCATION	BUILT DATE	PROXIMITY TO API
45PI413	1843 Fort Nisqually Native American Cemetery	DuPont	1843	0.08 mile
45PI78	Huggins Ranch graves	DuPont	1843	0.14 mile
45PI712	1843 Fort Nisqually Native American Cemetery	Address Restricted	1843	0.2 mile
45PI404	Nisqually Indian Burial Site	Address Restricted	Unknown	0.3 mile
45PI77	Old Fort Lake graves	2300 Golf House Road, DuPont	Unknown	0.3 mile

TCPs

While no designated TCPs have been documented within a mile of the API, the Sequalitchew village site is reported to be located near the API. During a property survey of the DuPont Company's Powder Works Plant, Carlsson (1990:59) wrote that the Sequalitchew band of the Nisqually Indian Tribe lived on the south bank near the mouth of Sequalitchew Creek (along the location of the lower powerhouse until the 1856 internment at the Nisqually Reservation. Several precontact archaeological sites (45PI54, 45PI75, 45PI76, 45PI73, 45PI404) as well as artifacts and human remains that were not documented (Daugherty 1995), have been previously identified along the shoreline, on and above the bluffs, and at the confluence of Sequalitchew Creek and Puget Sound.

Predictive Model

According to WISAARD, the API is located in an area with a variable risk of encountering cultural resources, between very high and moderate probability. However, the majority of the API is within a very high probability area.

OBJECTIVES AND EXPECTATIONS

The objective of this cultural resource assessment was to identify any in-situ cultural resources that may exist within the API and, if so, to determine if the resources are significant and if the proposed project would affect such resources.

Based on ATCRC's background review of environmental and cultural contexts, previously recorded cultural resource studies and sites, and review of the WISAARD state-wide probability model, most of the API is in an area of very high potential for the presence of archaeological resources. In addition to the high probability for the presence of precontact cultural resources, the project area has been historically modified from its precontact setting due to Euro-American settlements from Fort Nisqually and the DuPont Company. Based on the project's location within the traditional territory of the Nisqually peoples, its proximity to Puget Sound and Sequalitchew Creek, and its proximity to Fort Nisqually, it is expected that precontact and historic materials could be present within the API.

From an archaeological perspective, precontact and ethnographic site types that could be encountered within the API include seasonally occupied base camps, short-term field camps, and

seasonally utilized resource-procurement and processing loci. Resource procurement and processing loci represent a wide variety of activities that vary according to resource types present and environmental settings. Activities occurring at such sites were generalized or focused on specific resources such as salmonid procurement, game hunting sites, plant gathering areas, felling trees for planks, canoe building, bark removal, and localities where flaked and groundstone material sources exist. In addition, other site types or features would have been present in the precontact and early contact period cultural landscapes associated with the occupation of upland settings where the API is located. These include trails linking villages or accessing resource procurement loci, rock imagery, culturally modified trees, and burials, among others.

Archaeological sites dating to the historic period result from early/modern Euro-American settlement activities that include the original homesteading infrastructure. In addition, resource exploitation activities that were common to market-driven economies of the mid-to-late 19th century included common commercial activities that revolved around widespread timber harvesting and delivery to sawmills for processing along with harvesting of salmon runs. Sites of this period include farmsteads clustered around highly productive areas in river valleys, railways located throughout and around large swaths of company land to facilitate the transport of products, and road systems linking developing areas to developed areas and areas where resources were being exploited.

FIELD INVESTIGATIONS

Field investigations for this project involved monitoring of geotechnical boring, pedestrian survey, and subsurface testing. Monitoring was completed between May 25 and May 28, 2022. Field surveys involving pedestrian survey and subsurface testing were completed on July 25 and 26, 2022, August 1 and 2, 2022, and September 22, 2022. The ATCRC cultural resource survey crew consisted of Jessica Morris (Project Archaeologist), Colin Higashi (Cultural Resource Specialist), Carson Rouse (Cultural Resource Specialist), Brenna Tennant (Archaeological Technician), and Alyssa Ratcliff (Archaeological Technician). Selah Kalama from the Nisqually Indian Tribe joined the field survey on May 27, 2022.

A total of four geotechnical bores were monitored (Figure 10). Monitoring consisted of analyzing sediment samples from geotechnical bores taken with a 6-inch diameter tube in 5-foot segments. Gravelly flood deposits were encountered almost immediately, and monitoring continued until gleyed materials deposited underwater or thick sand beds from inter-flood periods were observed.

Pedestrian survey consisted of walking transects to inspect the ground surface for evidence of cultural materials or deposits and observe areas of potential disturbance. Ground surface visibility was moderate in the losing reach DIA and poor to moderately poor in the rest of the API. Thick, dry grass that allowed for partial visibility dominated the losing reach DIA. The DIAs at the beaver management areas were not surveyed due to their locations within marshlands. The eastern culvert location was mostly cleared as part of the Sequalitchew Creek Trail alignment but was lined by heavy vegetation on both sides. The western culvert, north of the Civic Center, was also cleared at the Sequalitchew Creek Trail alignment with lighter vegetation on both sides, but a thick layer of duff obscured the ground.

Subsurface testing consisted of excavating shovel probes (SP) in the DIA (Figure 11 - Figure 15). SPs consisted of manually excavating approximately 30 cm diameter holes. Excavated soils were screened and inspected for evidence of cultural materials or deposits. Excavation depths extended to glacial (sterile) soils when possible. If cultural materials or deposits were identified, additional radials were excavated, per survey protocol, to identify the extent of cultural material present. Notes and photographs were taken for each shovel probe. Details for each shovel probe are provided in Appendix B.

The API is currently a recreational area with forested walking trails to Puget Sound. In the past, the same area within the API was utilized as an industrial complex for the DuPont Powder Works Plant. Most locations within the API have been restored to embody a natural state with only traces of the heavy development of the past. In total, four geotechnical probes were monitored, and 71 shovel probes were excavated for the cultural resource survey. In general, sediments observed throughout the project area consisted of brown to light brown silt with sand and gravel with large amounts of cobbles.

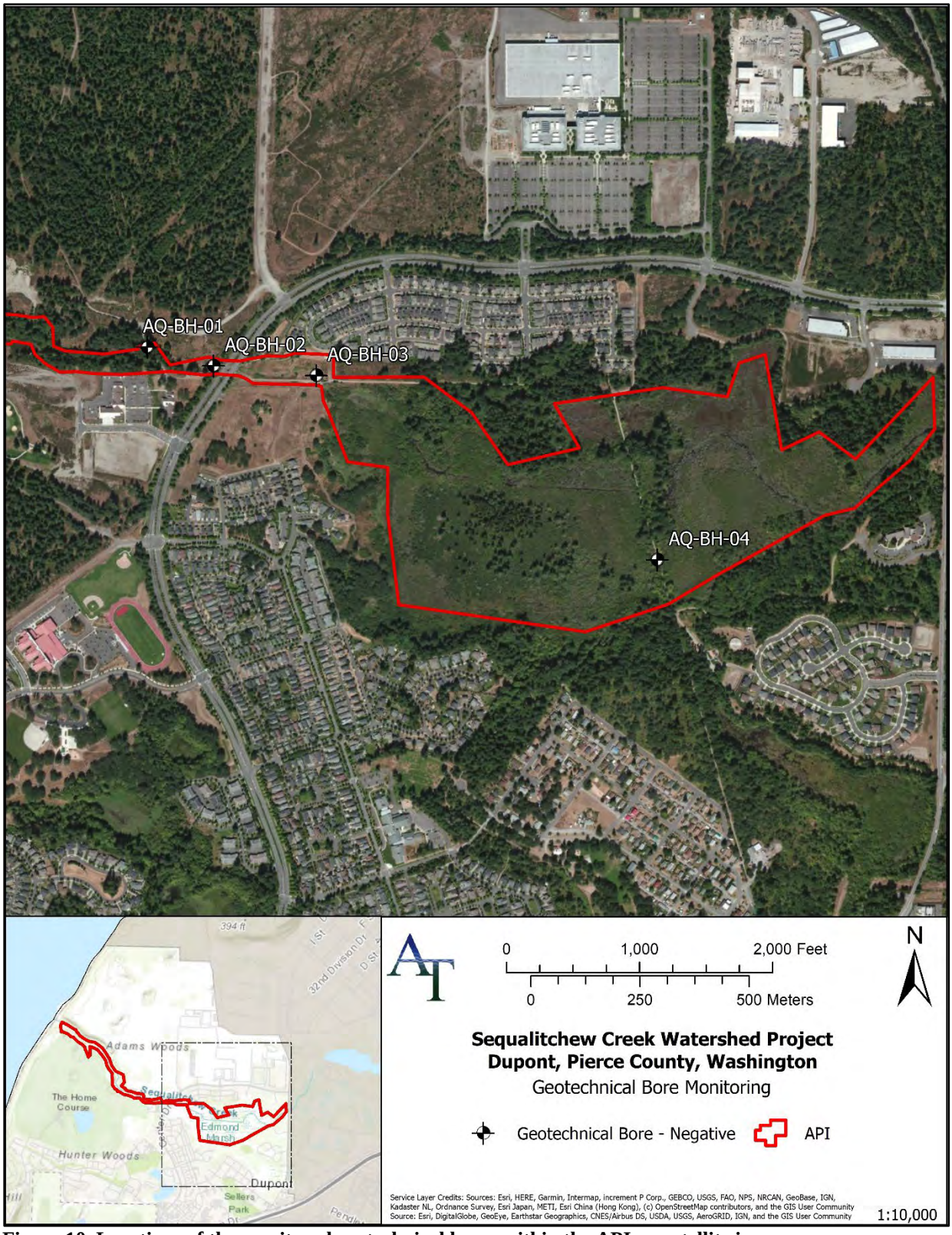

Figure 10. Locations of the monitored geotechnical bores within the API on satellite image.

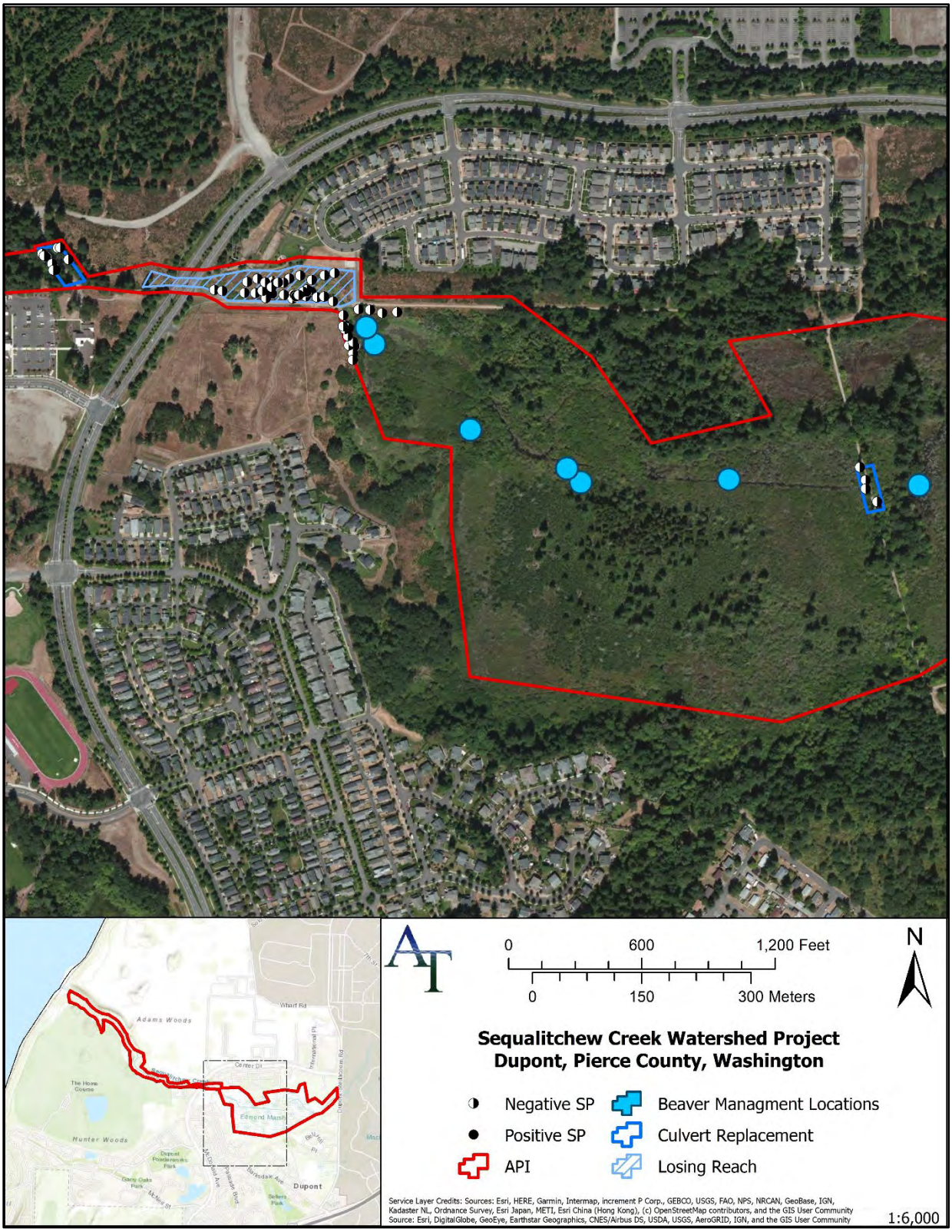

Figure 11. Shovel probe (SP) locations within the API on satellite image.

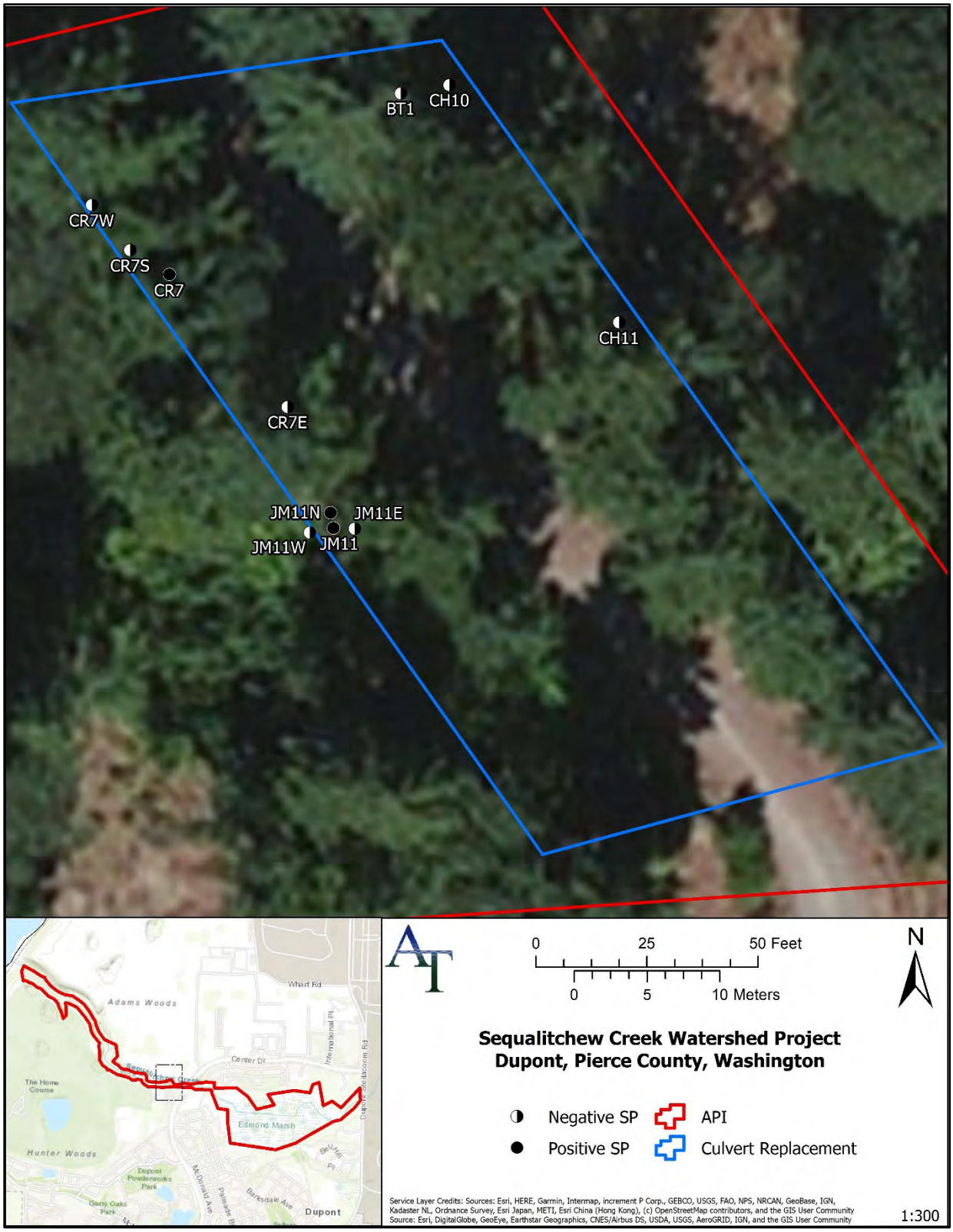

Figure 12. Shovel probes excavated within proposed Civic Center culvert replacement portion of the API north of the Civic Center.

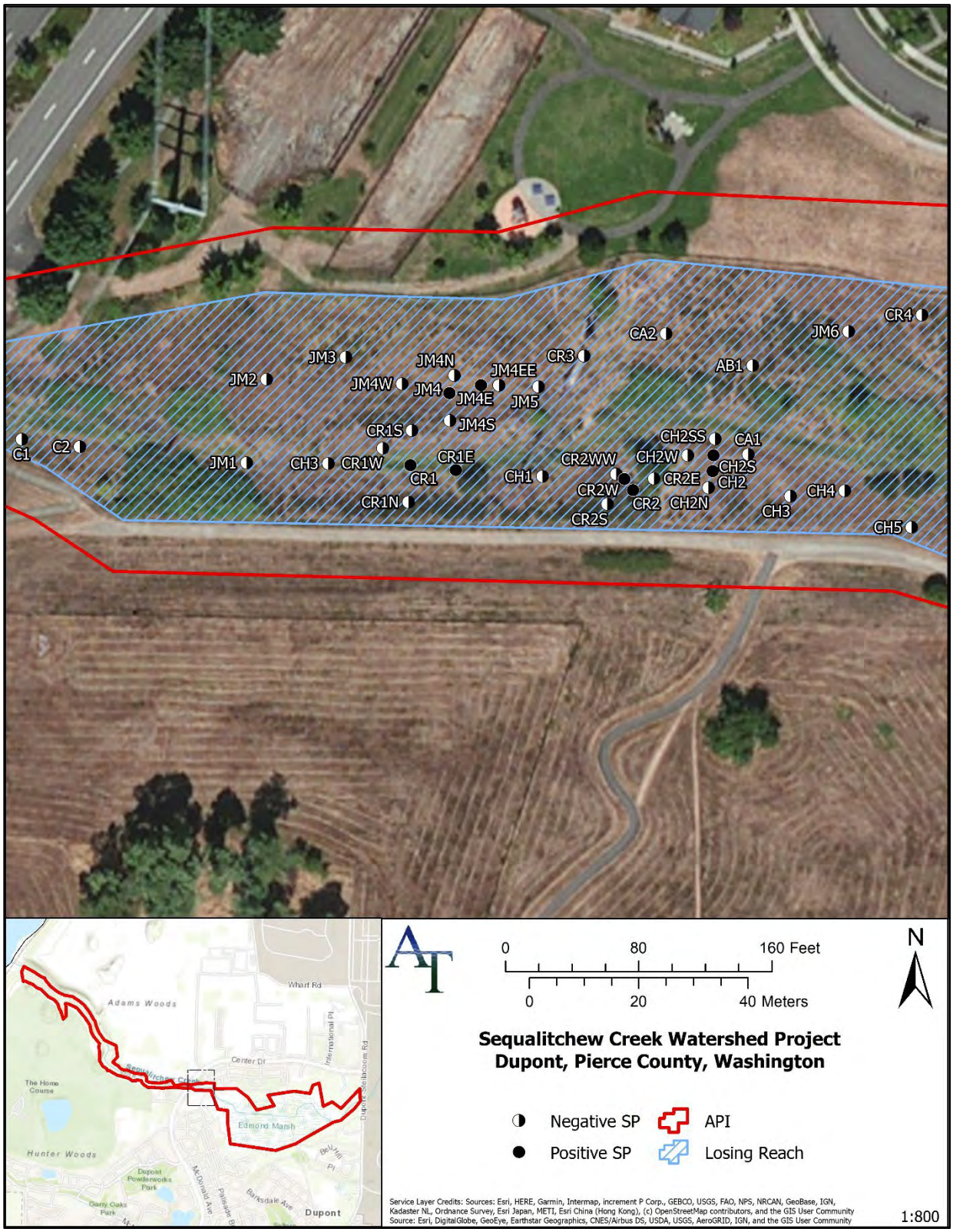

Figure 13. Shovel probes excavated within Losing Reach area portion of the API.

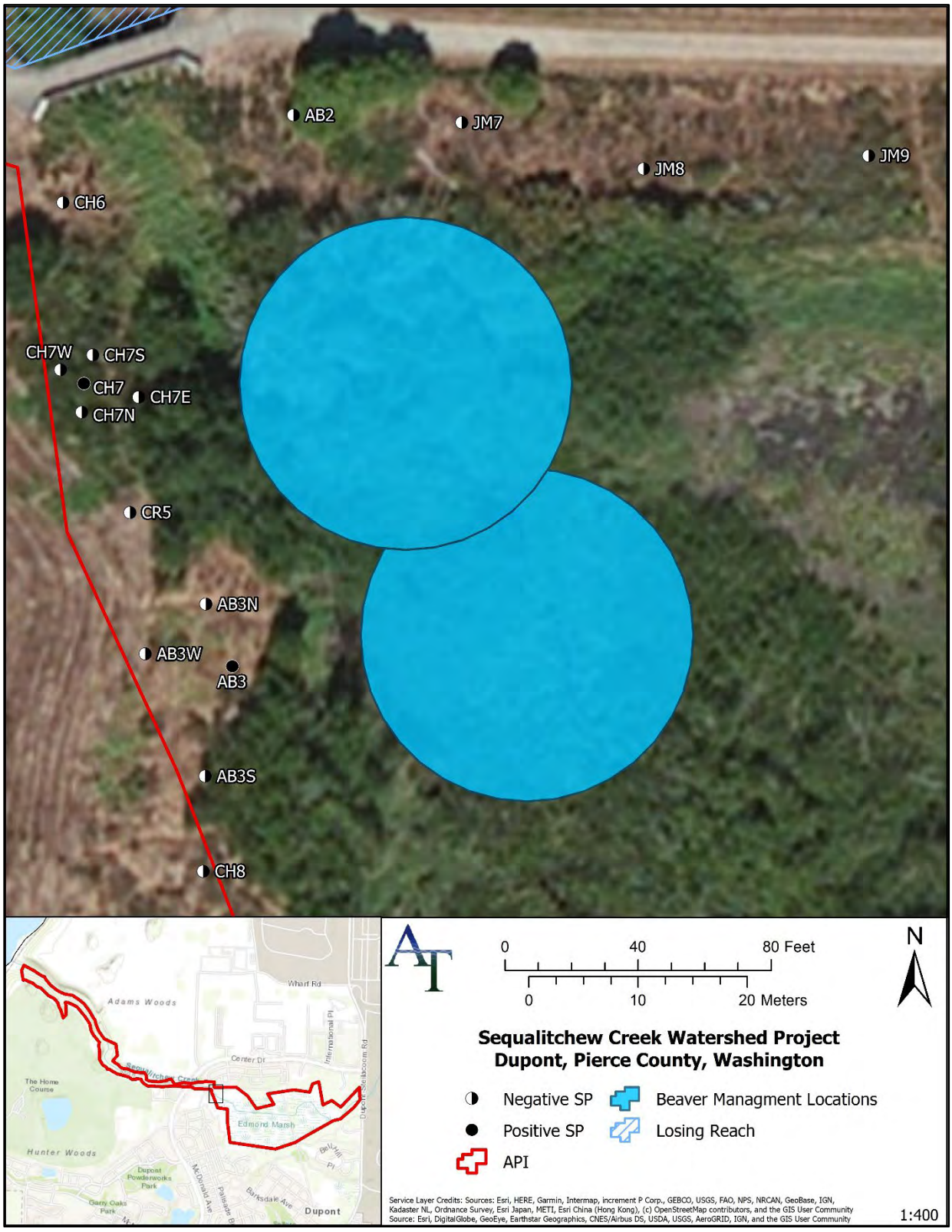

Figure 14. Shovel probes in non-marsh areas of beaver management locations within API.

Figure 15. Shovel probes (SP) excavated within proposed culvert replacement on east end of the API.

Figure 16. Overview of survey area within the losing reach area in the DIA. View is east.

Figure 17. Overview of survey area within eastern culvert portion of the DIA. View is north.

Figure 18. Overview of survey area at Edmond Marsh within the beaver management portion of the DIA. View is southeast.

Figure 19. View of survey area at western culvert DIA. View is east.

Figure 20. Overview of SP JM8 at losing reach DIA. View is north.

RESULTS

Four archaeological sites were identified during the field investigation: Historic Debris Site (Temporary Site Number: PI2022-0701), DuPont Company's Powder Works Plant Swimming Hole (Temporary Site Number: PI2022-0702), DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0703), and DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update) (Figure 21).

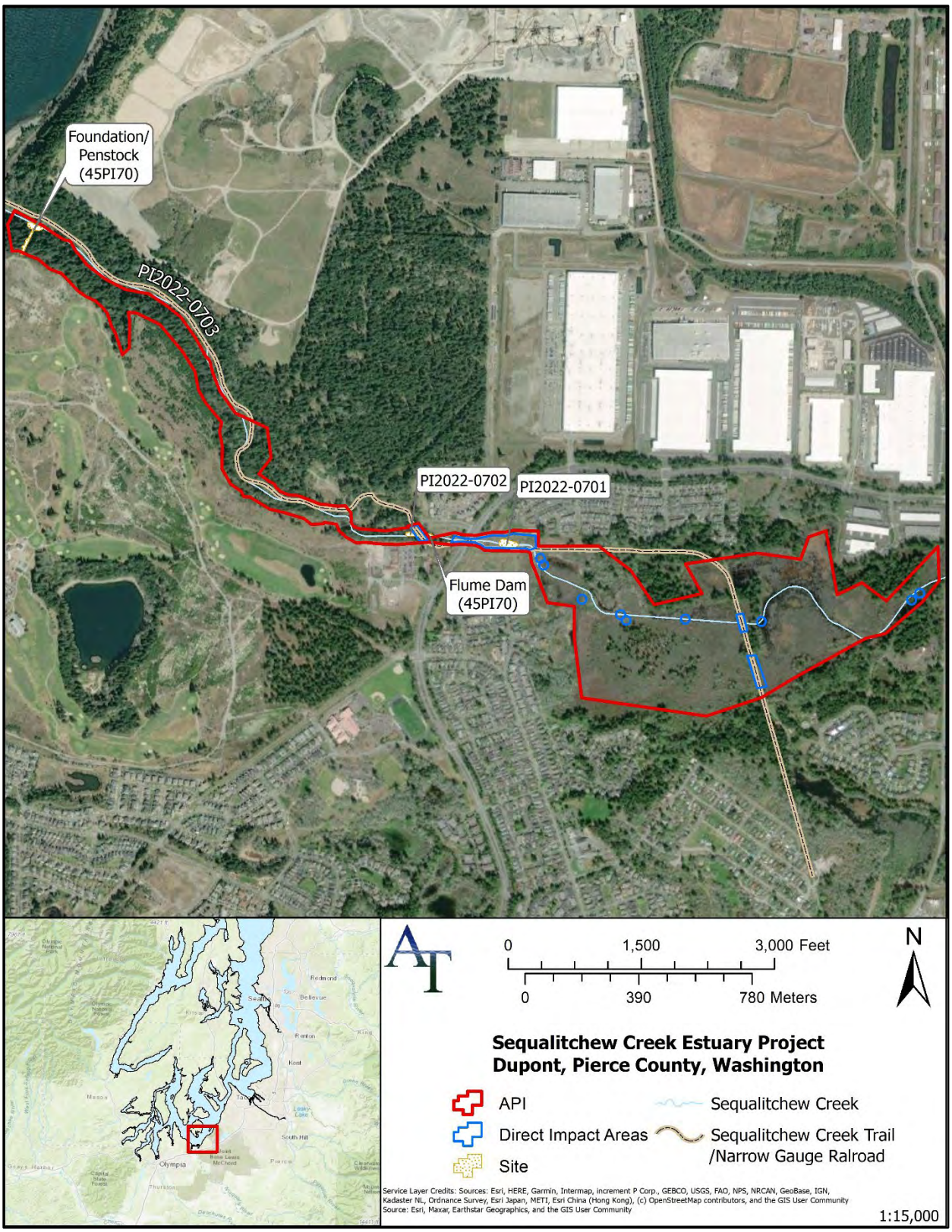

Figure 21. Location of sites identified within the API on a satellite image.

In accordance with DAHP, all cultural resources identified in the API were inventoried on WISAARD and, in accordance with Section 106, all were evaluated for inclusion in the NRHP. Evaluation criteria for NRHP listing was based on the National Register Criteria for Evaluation as summarized in 36 CFR 60.4:

> The quality of significance in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association; and:
>
> (A) are associated with events that have made a significant contribution to the broad patterns of our history; or
> (B) are associated with the lives of persons significant in our past; or
> (C) embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
> (D) have yielded, or may be likely to yield, information important in prehistory or history.

For purposes of this assessment, the guidelines set forth in National Register Bulletin (NRB) #15: How to Apply the National Register Criteria for Evaluation (National Park Service [NPS] 1995) were referenced for proper evaluation of each of the historic-aged resources identified in the API. The recommended sequence for evaluation of a property, as recommended in Section III How to Use This Bulletin to Evaluate a Property (NPS 1995:3) included:

1. Categorizing the property as a district, site, building, structure, or object for inclusion in the National Register;
2. Determining which prehistoric or historic context(s) the property represents (i.e. American history, architecture, archaeology, engineering, or culture);
3. Determining whether the property is significant under the National Register Criteria;
4. Determining if the property represents a type usually excluded from the National Register; and,
5. Determining wither the property retains integrity of location, design, setting, workmanship, materials, feeling, and association.

A description and statement of significance has been prepared for each of the sites identified in the API; this information was also used to prepare the DAHP-required inventories on WISAARD. A copy of the site forms is provided in Appendix D.

Historic Debris Site (Temporary Site Number: PI2022-0701)

Historic Debris Site (Temporary Site Number: PI2022-0701) consists of two loci with several subsurface historic artifacts located outside the banks of both sides of Sequalitchew Creek (Figure 22 - Figure 25). Identified artifacts include nails two round-head nails and three square head nails with a ¼-inch head and a 2-inch long shaft; four brown glass fragments measuring 3/16 inch thick, one clear window glass fragment, and three green-tinted glass fragments; several decaying wood

fragments; several miscellaneous metal fragments; and a railroad spike measuring 5 ½ inches long by ½ inch.

Historic Debris Site (Temporary Site Number: PI2022-0701) is located within the former boundaries of the DuPont Powder Works Company (DuPont Company) and approximately 150 feet north of the Hudson's Bay Company 1843 Fort Nisqually (45PI65). The site measures 325 feet (E/W) and 125 feet (N/S), with Locus 1 to the west measuring 40 feet (E/W) by 70 feet (N/S) and Locus 2 to the east measuring 73 feet (E/W) by 31 feet (N/S). All artifacts were identified within the top 30 cm below ground surface. As no diagnostic artifacts were identified, the site cannot be definitively associated with any individual site.

Statement of Significance

The artifacts associated with the Historic Debris Site (Temporary Site Number: PI2022-0701) are common in the region and do not show diagnostic markings; therefore, the site is not recommended eligible for listing under Criterion A. While the location of the site is associated with persons significant to the development of the town of DuPont, the artifacts that comprise the site do not have a direct association with any particular individual of significance in local, state, or national history. Therefore, the site is recommended not eligible for listing in the NRHP under Criterion B. The loose concentration of artifacts does not derive significance from architectural or artistic distinction or historical importance. The site does not embody the distinctive characteristics of a type, period, method of construction, the work of a master, or possess high artistic values; therefore, the site is recommended not eligible for listing under Criterion C. The location of the site was thoroughly tested with radial probes spaced roughly between 3 and 5 feet from the identified positive probe. It is possible additional historic materials were not identified during the survey; however, it is unlikely that additional testing will provide further information regarding with which enterprise the site is associated. Therefore, the site is recommended not eligible for listing in the NRHP under Criterion D.

Historic Debris Site (Temporary Site Number: PI2022-0701) has likely been shuffled by nearby construction, development, and any possible modifications to Sequalitchew Creek. Therefore, the site does not retain the integrity of location, design, or workmanship. However, the site retains the integrity of materials and feeling due to the minimal development of the site's immediate surroundings. To a lesser extent, the site retains the integrity of association and setting due to the trail's preservation adjacent to the site.

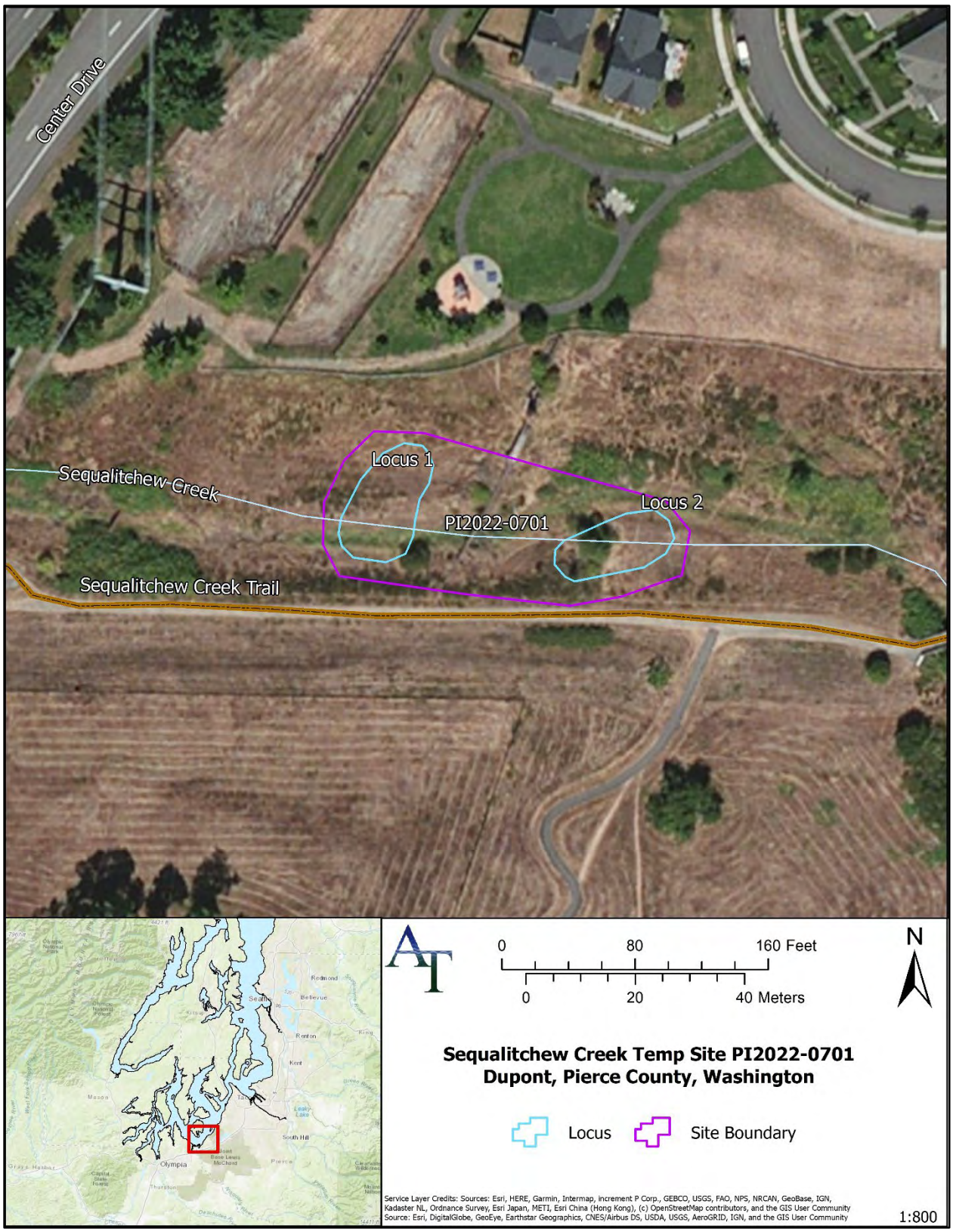

Figure 22. Sketch map of Historic Debris Site (Temporary Site Number PI2022-0701).

Figure 23. Overview of a portion of Historic Debris Site (Temporary Site Number: PI2022-0701) within losing reach DIA. View is west.

Figure 24. Artifacts Identified at Historic Debris Site (Temporary Site Number: PI2022-0701).

Figure 25. Artifacts identified at Historic Debris Site (Temporary Site Number: PI2022-0701).

DuPont Company's Powder Works Plant Swimming Hole (Temporary Site Number: PI2022-0702)

DuPont Company's Powder Works Plant Swimming Hole (Temporary Site Number: PI2022-0702) is located along the north bank of Sequalitchew Creek, south of the Sequalitchew Creek Trail (Figure 26 - Figure 32). Remains of the site include a retaining wall believed to be associated with the swimming hole, which provided a recreation area complete with picnic tables, diving platforms, and dressing rooms (Crooks and Crooks 2019; Carol Estep, DPHM personal communication 2022). The swimming hole provided recreation opportunities between 1910 and 1921 until the DuPont Company "deemed use of the swimming hole as hazardous to the village water supply" and closed the swimming hole and drilled wells within the village limits (Crooks and Crooks 2019: 83; Munyan 1972). Prior to the DuPont Company drilling wells, the DuPont Company town derived its drinking water from springs out of Sequalitchew Creek (Crooks and Crooks 2019; Munyan 1972).

The site measures at least 90 feet in length E/W, 65 feet in width N/S, up to 3 feet in height, and almost 2 feet in depth. The site consists of a 2-foot-tall x 90 foot long wood retaining wall is made up of three 1-inch x 12-inch x 5-foot wood running boards stacked to 2-feet-high, held up and pinned to the embankment by 6-inch x 6-inch x 3-foot posts spaced every five feet. Protruding nails in the posts suggest that the retaining wall was once as tall as the structural posts. North of the retaining wall and up the slope, nine concrete blocks with 0.5 inch diameter rebar stakes set in pairs of two N/S by four E/W were identified. One additional concrete block was identified within the same formation, west of the others and mostly buried. The identification of the ninth block

indicates there are likely additional blocks buried in the slope and within the location of the fallen trees. The concrete blocks were trapezoidal on top with a cubed bottom half. The top of the trapezoid measured 16.5 inches x 16.5 inches, and the cubed lower portion measured 22.5 inches x 22.5 inches. However, due to erosion from the northern slope, visible heights of each block varied greatly, with the tallest block exposed to a height of 17 inches. The first line of blocks was set 18 feet north of the retaining wall, and the line above was set 18 feet north (from center), for a total of 37 feet from the retaining wall to the northernmost block. The positioning of the blocks indicates they were likely the foundation blocks for the changing houses located north of the swimming hole.

Piles of folded, rusted, thin sheet metal were also identified on the surface lying north of and adjacent to the retaining wall. Four square washers measuring 2-inches by 2-inches with an inner diameter of 7/32 inch and 1/2 inch thickness, were uncovered from a subsurface survey conducted on the north bank of the creek. Several clear glass fragments were also identified in shovel probes immediately north of the retaining wall, northwest of the culvert. The thirteen pieces of clear glass, identified as a possible medicine bottle, measured a 1/4-inch in thickness at its thickest point and 3/32-inch at its thinnest. The washers and glass shards were identified in brown, extremely rocky, coarse sand with trace amounts of silt. Finally, one railroad spike was identified roughly 30 feet up the slope adjacent to the former narrow-gauge rail line (now Sequalitchew Creek Trail). All surface-level features were heavily covered in moss.

Statement of Significance

DuPont Company's Powder Works Plant Swimming Hole (Temporary Site Number: PI2022-0702) is described in an account by a former resident of the DuPont Company Village, Burton Foreman, in Munyan (1972:140-141) and is pictured in several historic photographs (Crooks and Crooks 2019; Carol Estep, DPHM, email communication 2022). However, the swimming hole was not illustrated on any of the reviewed historic maps. The swimming hole provided recreation opportunities between 1910 and 1921 until it was closed and replaced with wells.

The retaining wall, the concrete blocks, and the artifacts identified are all associated with the swimming hole used by the youth and adults who resided at the DuPont Company Village and worked at the DuPont Company Powder Works Plant. The site contains few components of the original swimming hole including walkways, a diving board, benches, docks, and change houses. While the swimming hole was directly associated with the DuPont Company Powder Works Plant, the recreation area did not directly contribute to the broad patterns of events that helped shape the town of DuPont. Therefore, the site is recommended not eligible for listing in the NRHP under Criterion A. The site does not have any association with a particular individual of significance in local, state, or national history and, therefore, the site is recommended not eligible for listing in the NRHP under Criterion B. The remains of the wooden retaining wall and concrete blocks do not derive significance from architectural or artistic distinction or historical importance. The site does not embody the work of a master, possess high artistic values, or represent significant distinguishable components. The site does not embody the distinctive characteristics of a type, period, and method of construction. Therefore, the site is recommended not eligible for listing in the NRHP under Criterion C. Further testing of the site may identify additional buried components; however, further testing would likely not provide additional information about the swimming hole

and the recreation activities of the residents. Therefore, the site is not recommended eligible for listing in the NRHP under Criterion D.

Only a portion of the retaining wall along the northern embankment remains, only nine concrete blocks are visible above the surface (the original total number remains unknown), and the artifacts identified are non-diagnostic and appear to have been dumped when the swimming hole was decommissioned. The components of the site do not appear to have been moved from their original location, and the area has not been developed due to the area being converted into a nature trail. The site no longer retains the integrity of design, association, feeling, materials, or workmanship but retains the aspects of location and setting.

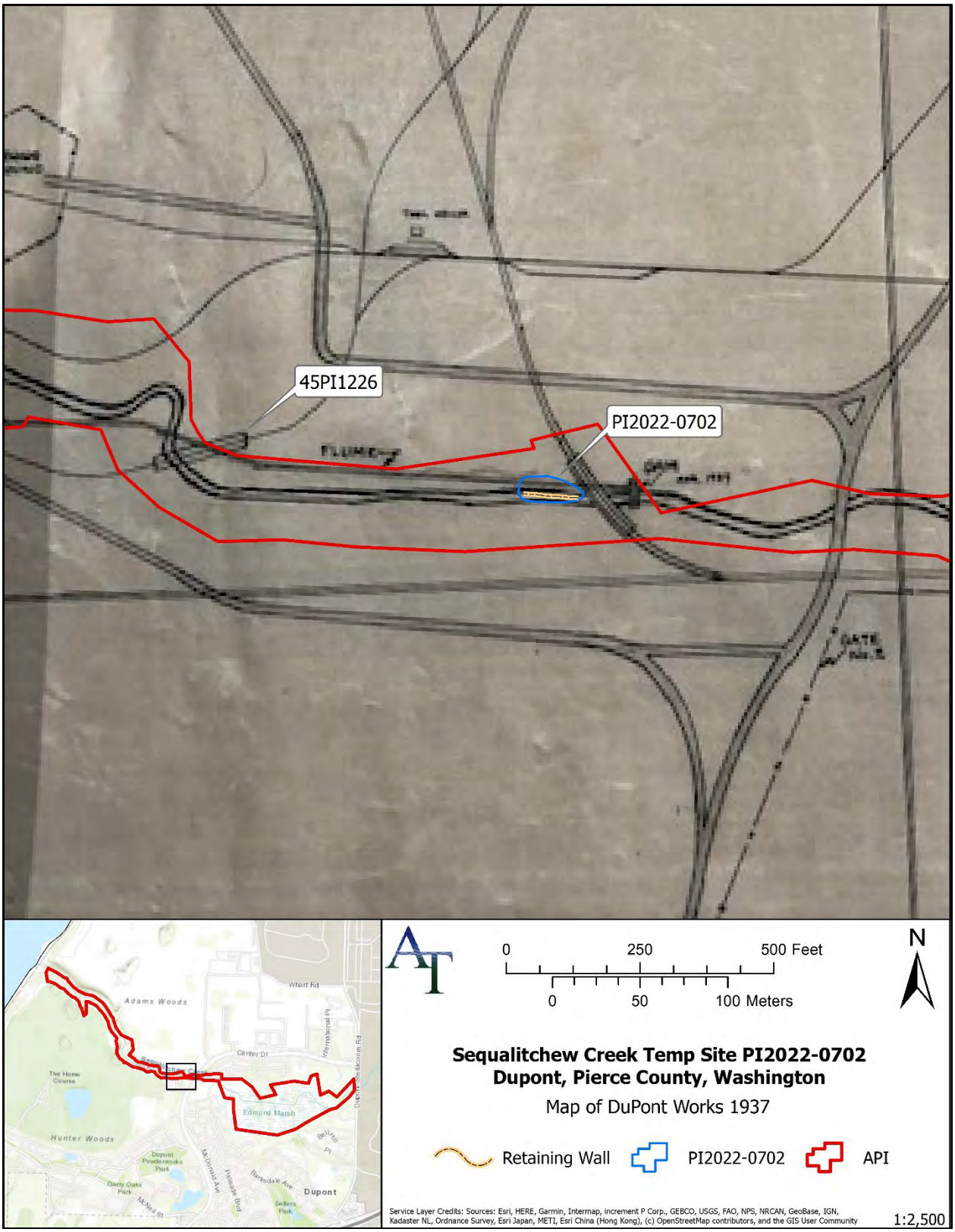

Figure 26. Portion of the DuPont Company's Swimming Hole (Temporary Site Number PI2022-0702) identified in the API.

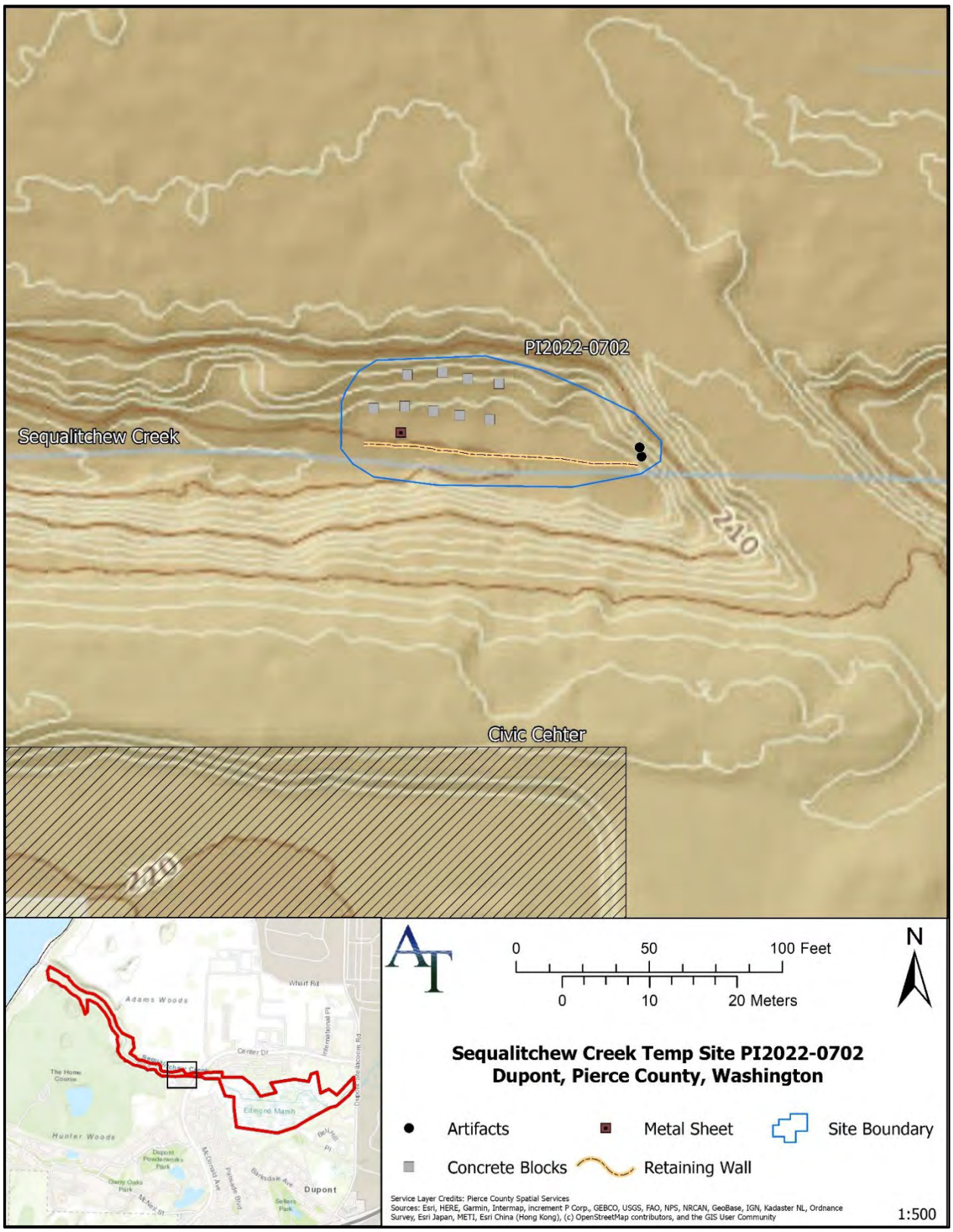

Figure 27. Sketch map of DuPont Company's Swimming Hole (Temporary Site Number PI2022-0702) identified in the API.

Figure 28**. Overview of the DuPont Company's Swimming Hole (Temporary Site Number PI2022-0702) identified on the north bank of Sequalitchew Creek in the API. View is northeast.**

Figure 29. Overview of the DuPont Company's Swimming Hole (Temporary Site Number PI2022-0702) identified against the north embankment of Sequalitchew Creek with concrete platform block in background. View is northwest.

Figure 30. Overview of the DuPont Company's Swimming Hole (Temporary Site Number PI2022-0702) with crew documenting concrete platform blocks and retaining wall in left frame. View is west.

Figure 31**. Detail of square steel washers associated with the DuPont Company's Swimming Hole (Temporary Site Number PI2022-0702) as identified in the API.**

Figure 32. Undated photograph of the DuPont Company's Swimming Hole (Temporary Site Number PI2022-0702) with walkways, diving board, and change houses. Courtesy of DuPont Historical Museum.

DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0703)

A portion of the DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0703) was identified during the survey for this project (Figure 33 - Figure 40). The identified portion of the railroad, now part of the Sequalitchew Creek Trail, primarily consists of the railroad prism measuring between 10 feet and 30 feet across, depending on the trail section. The berm of the railroad prism averaged 4 feet in height.

The DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0704) (also called the dynamite "powder line" or the "dynamite train") provided transportation for materials and crew around the DuPont Company's Powder Works Plant. When the plant closed in 1975, the line totaled approximately 17 miles and extended to a wharf off the shores of Puget Sound, where materials were imported and exported (Crooks and Crooks 2019; DPHS 2014; Simmering 2016). The narrow-gauge rail line was made to accommodate track gauge widths of less than 4 feet 8.5 inches (Lewis 1983:1). This inventory only concerns roughly 2.5 miles of the former narrow-gauge railway that have since been converted into the Sequalitchew Creek Trail (City of DuPont 2012). This portion exists from just north of the estuary, travels within the Sequalitchew Creek ravine, crosses Center Drive under the tunnel, and continues east before turning south into the east side of the Historic DuPont Village.

Construction of the DuPont Company's Powder Works Plant Narrow-Gauge Railway began with the construction of the plant in 1906 (Crooks and Crooks 2019; DPHS 2014). The rail lines were used to safely transport sensitive explosive materials from the wharf to storage sheds and production sheds, including the nitrator house, the dope house, the black powder corning mill, and the acid plant, among others (Crooks and Crooks 2019). Carlsson (1990: 46) notes that the "narrow-gauge tracks were adjacent to all the buildings" as they provided a reliable means of safe transportation around the plant. The rail lines followed and maneuvered around 3,200 acres of the plant with a 220-foot drop to a sharp curve before the tunnel to the wharf (City of DuPont 2021a; Simmering 2016; Simpson 2017). The tracks were in operation until the plant shut down in 1975, with some portions continuing to be operated by Weyerhaeuser from 1977 until 1983 (Lewis 1983; Simmering 2016).

Narrow-gauge railways were a known means of transportation for explosives as they provided a smooth ride compared to trucks or wagons attempting to traverse pot-hots or uneven terrain. Initially, the plant used 20-foot boxcars, or 18-foot flatcars controlled by a two-man crew using a handbrake to slow or stop the cars and horses to pull the cars back up the grade. However, after a run-away incident that killed two workers, the DuPont Company purchased four gasoline-powered internal combustion locomotives in 1910 (Crooks and Crooks 2019; Simmering 2016). To reduce the risk of sparks, spark arrestors were installed on the combustion engine's exhaust stack (Crooks and Crooks 2019). The DuPont Company's trains supplied explosives to some of the largest construction projects, including the Grand Coulee Dam, the Alaska Highway (Alcan Highway), and the Panama Canal (DPHS 2014). Additionally, the railroad helped provide supplies during World War I, World War II, and the Korean War (DPHS 2014; Simmering 2016). Weyerhaeuser purchased the DuPont Powder Works Plant in 1977 after production stopped in 1975 (DPHS 2014; Simmering 2016).

By the 1980s, several sections of the former line were stripped of the tracks and rails (Lewis 1983, Simmering 2016). Today, only 2.5 miles of the original 17-mile long system remains. This 2.5-mile long segment has been stripped of the rails and tracks, and only the roadbed and alignment remains; the segment is currently used as a recreational trail named the Sequalitchew Creek Trail. Although outside the project area investigated here, a small 100-foot long section of the railway was left intact in the tunnel under the BNSF railroad (47.117023, -122.666194) and a roughly 20-foot long intact section was preserved and incorporated into the design of the Home Couse golf course, which was constructed atop the original DuPont Powder Works Plant's acid area and operations area (Carlsson 1990; Richman 2021).

A portion of the Narrow-Gauge Railway, located outside of the areas identified during this survey, was previously inventoried with DAHP by 45PI1224 (Arrington 2010). ATCRC recommends that the entire length of the original narrow-gauge railroad be documented in the future to identify how 45PI1224 and the section identified during this survey align.

Statement of Significance

The site is part of the DuPont Company's Powder Works Plant Narrow-Gauge Railway, which was used to transport delicate explosive materials around the plant and the wharf. Construction of the narrow-gauge railway began in 1906 with the construction of the plant. The railway was

expanded as the plant expanded. When the plant's dam was dismantled sometime after 1944, the narrow-gauge railway was expanded east from where the Civic Center sits toady. The tracks and railroad ties have been removed from the segment recorded here.

The DuPont Company's Powder Works Plant Narrow-Gauge Railway provided transportation for explosives and explosive materials for the DuPont Company that contributed its name and the housing community that would become the City of DuPont. Additionally, the materials the narrow-gauge rail line carried contributed to the Grand Coulee Dam, the Alaskan Highway, World War I, and World War II (DPHS 2014; Simmering 2016). Therefore, the railroad contributed to a pattern of events that made a significant contribution to the development of a community, state, or the nation, and the site is recommended eligible for listing in the NRHP under Criterion A. While the site has a direct association with the DuPont Company, the site does not have any association with a particular individual of significance in local, state, or national history. Therefore, the site is recommended not eligible for listing in the NRHP under Criterion B. The site does not embody the work of a master, possess high artistic values, or represent significant distinguishable components. The narrow-gauge railroad had a clear construction method specific to a localized industrial complex. However, most of the tracks have been removed, and what remains primarily consists of the prism and alignment. Therefore, the site is not recommended eligible under Criterion C. A full survey of the full extent of the original alignment may reveal additional railroad tracks but would likely not yield additional information about the narrow-gauge railway. Therefore, the site is not recommended eligible under Criterion D.

After the decommissioning of the DuPont Company's Powder Works Plant Narrow-Gauge Railway, the tracks and rail lines were removed in all places save a few short, discontinuous segments not in the project area. Overall, the site retains the aspect of location but has lost the aspects of design, association, feeling, workmanship, setting, or materials.

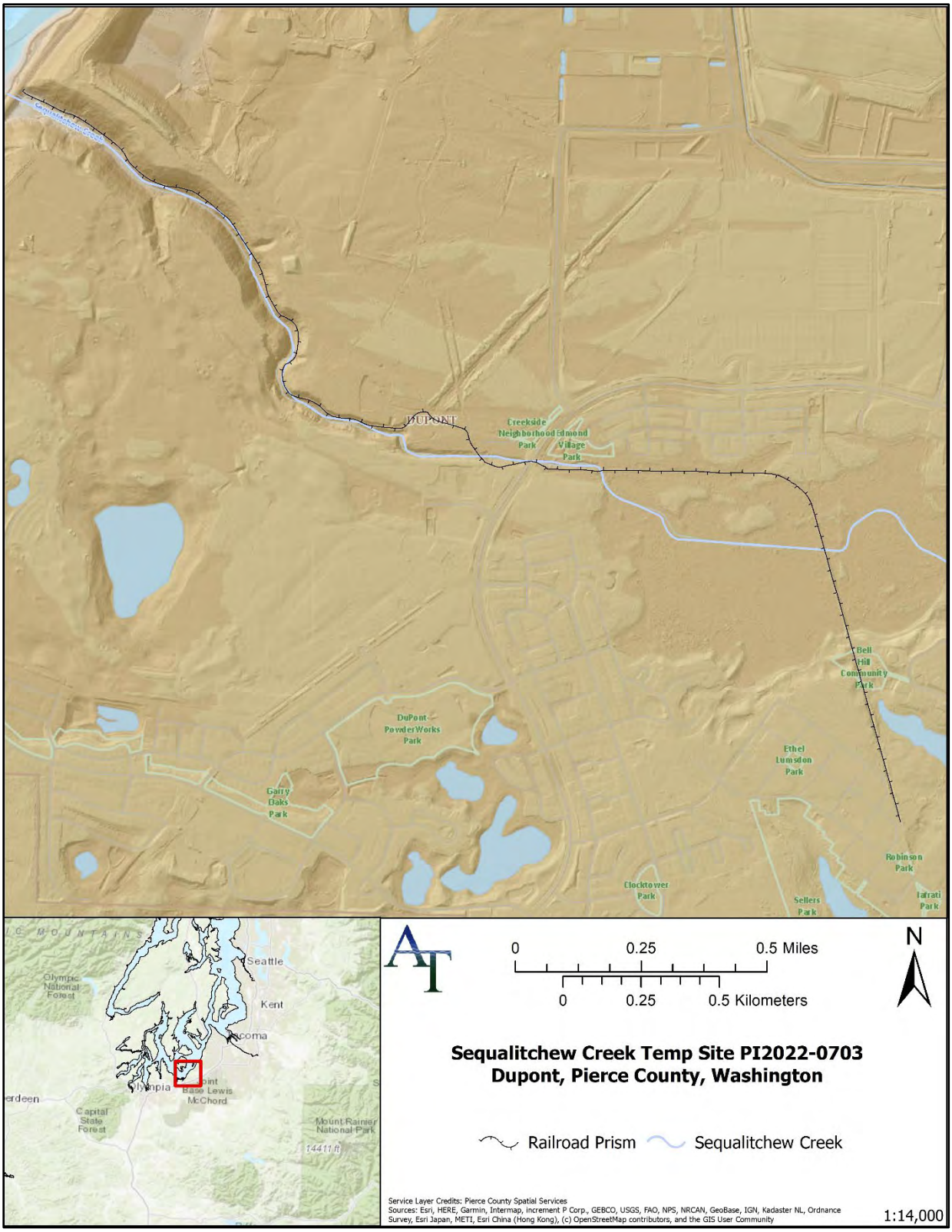

Figure 33. Sketch map of the remaining portions of the DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0703) identified in the API.

Figure 34. Overview of portion of the DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0703) (now Sequalitchew Creek Trail) at Edmond Marsh beaver management DIA. View east.

Figure 35. Overview of a portion of the DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0703) (now the Sequalitchew Creek Trail), at the eastern culvert DIA. View is north.

Figure 36. 1953 photograph of a portion of the DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0703) running through the DuPont Powder Works Plant. Courtesy of the Northwest Room at the Tacoma Public Library (Richards Studio D78241-16).

Figure 37. Undated historic photograph of a portion of the DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0703) running under the Great Northern Railroad trestle. View is west. Photograph from Crooks and Crooks (2019: 33).

Figure 38. Circa 1977 photograph of the former DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0703) on the DuPont wharf as used by Weyerhaeuser, post DuPont Company occupation (City of DuPont 2021a).

Figure 39. Overview of a portion of the DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0703) located outside of API in the BNSF railroad tunnel. View is west.

Figure 40. Undated modern photograph of a section of the DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0703) outside of API at the Home Course golf course (Richman 2021 [Photo by Dennis Roque]).

DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update)

The DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update) is primarily located on the south side of the Sequalitchew Creek Trail with a small portion located on the creek itself (Figure 41 – Figure 54). The DuPont Company's Powder Works Plant Hydroelectric facility was constructed ca. 1906-1910 and brought electricity to the plant and company village. The hydroelectric facility included two powerhouses: the lower powerhouse was located next to Sequalitchew Creek and the upper powerhouse was located just south of the acid production area (Carlsson 1990). Blukis Onat (1977:32) notes that by the 1920s, public electricity was available and a powerline was run into the plant along the flume route, and the flume was removed. Carlsson (1990) notes that the flume, originally constructed of wood, went out of service in the 1930s.

In the project area, two separate loci associated with the DuPont Company's Powder Works Plant Hydroelectric Facility were identified: Locus 1 includes the foundation of the lower powerhouse, and the penstock; Locus 2 includes the wooden flume dam located roughly 1.2 miles upstream of the Locus 1 (Figure 42). These two areas were originally connected by a flume that traveled on top of the southern bluff south of Sequalitchew Creek, as illustrated in Nicklason's (1937) Map of DuPont Works.

Locus 1

Locus 1 is located south of the creek on the toe of the slope, extends up the hill via the penstock and terminates at the top of the ridge. A ½-inch thick iron platform extends across the creek to form a bridge. The metal platform is composed of two steel plates overlaying steel I-beams. The entire platform measures 42 feet long, with each plate measuring 21 feet long by 9.5 feet wide by 1-inch thick. The I-beam measured 8-inches tall with a flange depth of 3-inches. Two metal grips are located roughly 5 feet from each end of both plates. Each grip measures approximately 5 inches in width and has a standard triangular shape for cable hooks.

After crossing the bridge, the site continues southwest to a partially buried concrete platform, once the foundation of the lower powerhouse. The lower powerhouse was included in the original inventory of the DuPont Company Plant, which was noted as consisting of "over 50 buildings" and railroad tracks (Riordan n.d.). In 1990, an architectural survey of 45PI70 was prepared by Carlsson (1990:13) and included the lower powerhouse. Carlsson (1990:13) described the lower powerhouse as:

> 30' by 44'; 12" x 24" footings, 16" foundation walls: 13" solid brick south, west and north walls, steel columns embedded in brickwork at 3rd points supporting two 8-panel fink trusses, the bottom chord 20' above the concrete floor. Purlins at 4'o.c. support gable roof, a 6/12 pitch, 2" wood roof sheathing and mineral asphalt roofing. The east wall: 3" x 6" wood verticals at panel points, 3" x 6" horizontals at 3'oc., 7/8" T&G wood sheathing and 24 gauge corrugated siding. An 8' wide x 6' high clearstory extends the length of the building, nine 3' x 3' fixed wood windows, each with 6 panes, on each side of the clearstory; 6/12 pitch gable roof; seven 8' x 9' windows: 2 double hung windows with a center mullion

each sash with twelve 12" x 16" panes. 2 windows on the north and one on the west elevation have segmental brick arches. Exterior brickwork corbels on the top of the north and south walls, continuing up the rake and clearstory on the west wall. Two 26" diameter openings in the south wall above the windows; one 6' x 8' sliding wood door centered on the north wall; 3' x 7' wood panel door at east and west walls.

A flume extended from the Pump House area and reservoir some 1500' to a surge tank and spillway, then to a 300' long pressure flume pipe to the Powerhouse. The original flume was constructed with wood. On January 26, 1925, a wood trestle and flume were damaged by a washout. A 250' tailrace extended down to the Sequalitchew Creek delta.

About 1930 a gravel slide occurred above the powerhouse, broke thru a window, filled a portion of the interior up to 10' high with gravel and broke a portion of a window on the Sound side of the building, without damaging the structural integrity of the building.

In the project area, the lower powerhouse foundation measures 27 feet by 43 feet. Within the foundation, located roughly 36 feet southwest of the steel bridge, is a circular steel cap covering a buried steel cylinder pipe resembling a well. The steel of the cylinder pipe measures ½-inch thick and is 12-inches in diameter. The steel cap is irregular in shape and is not a machine cut. It also appears to be made up of two half-circles welded together – one half-circle, 8-inches, welded on top of another half-circle, 5-inches, and placed as a covering. In total, the cap measures 13 inches in diameter. The buried cylinder pipe sits upright and protrudes 2.5-inches from the ground without the cap.

Approximately 20 feet west of the capped cylinder, two cement-lined holes, each measuring 50 inches long by 20 inches wide and 48 inches deep, were identified as part of concrete utility boxes placed within the foundation. Each box measured 55 inches long by 23 inches wide. On our first visit, the western buried concrete box was identified partially covered by a 3/8-inch thin steel plate welded together in places to match the length of the opening. On the second visit, the hole had been fully covered by the plate as well as a second plate, also made up of scrap metal, welded together to match the length of the opening. The coverings appear to have been slap-dash put together after the building was dismantled. Both plates measure roughly 50 inches long by 24 inches wide and have legs welded onto each corner measuring 2.5 inches wide by 4.25 inches tall. The eastern cement-lined hole has been filled with dirt and duff.

Roughly 13 feet north of the two openings in the ground, two concrete blocks sat on the surface, one next to each opening. The western block measured roughly 40 inches by 16 inches by 5.5 inches in height and was in good condition. The block had metal 1/2-inch rebar in each corner sticking up by at least 1-inch and an indentation cut in the center of the south edge measuring 1-foot by 6-inches. The eastern block was in poor condition and appeared to be made of cement with a temper of sub-rounded pebbles and small cobbles with a smooth surface. The block also measured 5.5 inches in height but was broken on all sides.

Two metal pipes were also present through the western edge of the site. One pipe, measuring 4 inches in diameter and roughly 20 feet long, ran along the western edge of the site. The second

pipe, measuring 2-inches in diameter and at least 20 feet in length before disappearing into the vegetation, ran north/south and sat on top of the 4-inch pipe. The 2-inch pipe had one connector and was slightly bent from damage just after the connector. These pipes originate from the penstock on the slope.

The base anchor block of the penstock was identified laying on the base of the north-facing slope. The base anchor block consists of a 36-inch pipe encased in a large trapezoidal, stepped cement casing structure laid on the side of the steep north-facing slope. The entire bottom of the anchor block, facing north, is trapezoidal with tiered steps that narrow in size each tier up. The pipe protrudes from the anchor block on the east side at the lowest point, roughly four feet from the bottom. The protruding pipe has been sealed with a 45-inch steel cap and 46 bolts with hexagonal nuts. The anchor block measures 8 feet tall and 20 feet long at its longest point. The up-slope end of the anchor block is squared off, and roughly 6-inches of the 36-inch pipe protrude from the anchor block where it has been cut.

Above the anchor block-encased pipe and set slightly to the west is a valve attached to a buried vertical pipe. The vertical pipe measures 4.5 inches in diameter. The rest of the components of the penstock continue up the slope to the top of the ridge in the form of 15 side blocks, two anchor blocks (one at the base and one at center), a 6-inch diameter pipe, a 2-inch diameter pipe, bracing poles, and the remains of the electrical poles that ran alongside the penstock. The 36-inch pipe has been removed, and the side blocks remain. Currently, the 2-inch pipe sits on the ground running the length of the remains of the penstock. However, a 1977 photograph of the penstock and powerhouse shows the 2-inch pipe sitting on top of the penstock sustained by top-mounted and side braces. Of the 15 side blocks, 6 are concrete from the center anchor block north toward the bottom of the slope, and from the center anchor block up the slope, the side blocks are constructed of wood. Only the base of the side blocks remained, cut in shape for the 36-inch diameter pipe to rest. All but one of the top-mounted braces have been removed or are buried in the duff - one was identified partially buried in the duff. The 6-inch pipe appears to have run parallel with the 36-inch pipe, and remains in its original location, resting on the west side of the side blocks with angle joints to curve it around the center anchor block.

All concrete side blocks and anchor blocks were connected by a 12-inch wide partially buried concrete brace that ran the length of the penstock. All concrete side blocks between the base and center anchor blocks were set 19 feet (230 inches) apart, and all wood side blocks were set 13.33 feet (160 inches) apart. The final remaining side block at the top of the ridge is slightly angled southwest and is not in proper alignment with the rest of the side blocks. The very top of the ridge in the 1977 photographs is blurry; however, based on the components of a traditional penstock, the very top would have had a head gate, a water intake, and a connecting flume that have since been removed. These portions were likely removed during the remediation of the Weyerhaeuser property between 2001 and 2005 (Thompson 2006). Only one electrical pole remains standing, and two others were identified laying on the ground. The poles had railroad spikes stuck to the sides for climbing. All concrete on site, including the side and anchor blocks, the platforms blocks near the foundation, and the plater-style box, were made of concrete with aggregates of small to medium rounded pebbles and cobbles.

Carlsson (1990:53), during a property survey of the DuPont Company's Powder Works Plant, reported that the lower powerhouse was situated near the location of the Sequalitchew Village longhouses.

Locus 2

Locus 2 includes the remains of the dam located roughly 40 feet east of the culvert north of the Civic Center within the Sequalitchew Creek ravine. The dam measures roughly 85 feet NW/SE by 55 feet SW/NE (Figure 41). The dam has been impacted by age, weathering, fallen trees, erosion, and vegetation, among other things. The remains consist of a 12- to 15-foot section of the 4-foot wide wooden flume covered in sheet metal panels, the reservoir diversion channel, fallen portions of the reservoir gate buried under duff, side channel braces against the north and south embankments of the creek, and miscellaneous metal scraps. Additionally, one corner of the safety guardrails, made of welded metal poles painted yellow, is visible above ground, with the rest buried under ground, suggesting that parts of the site are heavily impacted by erosion.

The foundation of the dam consists of a floating deck supported by concrete blocks measuring 16 inches across with an average height of 12 inches exposed from the creek bed. The frame of the deck consists of 2-inch by 8-inch lumber, and the walking surface consists of 2-inch by 12-inch lumber. A debris gate rested on the northern slope against the diversion gate. Twelve 8-inch by 4-inch bracing posts in two rows were located at near the top of the ravine on the north side. The rows were set just over 4 feet apart, one row higher on the slope and the other lower, presumable bracing posts for the flume as seen on the furthest left-frame of Figure 52.

The wall making up the southern side channel brace leans at roughly a 50-degree angle against the south bank of the creek in fairly good condition and mostly intact. The wall brace is constructed in the same fashion as the foundation. The wall on the north side of the embankment remains mostly upright just north of the diversion channel. The rest of the dam is in ruins, with lumber of various lengths and sizes scattered throughout the creek.

Statement of Significance

The DuPont Company's Powder Works Plant Hydroelectric Facility consists of several components including the remains of the lower powerhouse (built 1907), its penstock (built 1907 and renovated 1925), and the flume dam (built 1906 and renovated 1925) (Carlsson 1990; Crooks and Crooks 2019). While the powerhouse was removed sometime between 1990 and 1998 (Carlsson 1990; Pierce County PublicGIS 2022), the foundation and features remain. The penstock remains almost in its entirety. Although the penstock no longer has the headgate or intake tank, and the 36-inch steel pipe has been cut and hauled away, the support blocks and braces, the 6-inch pipe, the 2-inch pipe, the lower valve, and electrical poles remain in place running up the slope to the top of the ridge. Although the flume dam is in ruins, most of the components remain within the creek, and the City of DuPont has placed a trail marker along the trail at the location of the dam. All components of the site can be definitively associated with the DuPont Company's Powder Works Plant and supported by maps and photographs.

The DuPont Company's Powder Works Plant Hydroelectric Facility is recommended eligible for listing in the NRHP under Criterion A due to the significant of the site to local, state, and national history. The site does not have a direct association with any particular individual of significance, therefore, is recommended not eligible for listing in the NRHP under Criterion B. The site does not embody the work of a master, possess high artistic values, or represent significant distinguishable components but does embody the distinctive characteristics of a type, period, and method of construction. Therefore, the site is also recommended eligible for inclusion into the NRHP under Criterion C. Further testing of the foundation and penstock may identify additional buried components; however, further testing would likely not provide additional information of the hydroelectric workings of the powerhouse or flume. Therefore, the site is not recommended eligible for listing in the NRHP under Criterion D.

The DuPont Company's Powder Works Plant Hydroelectric Facility no longer retains integrity of design or association but retains the aspects of location, feeling, and setting. To a certain extent, the site, particularly the penstock, retains the integrity of materials and workmanship; however, the foundation and dam do not.

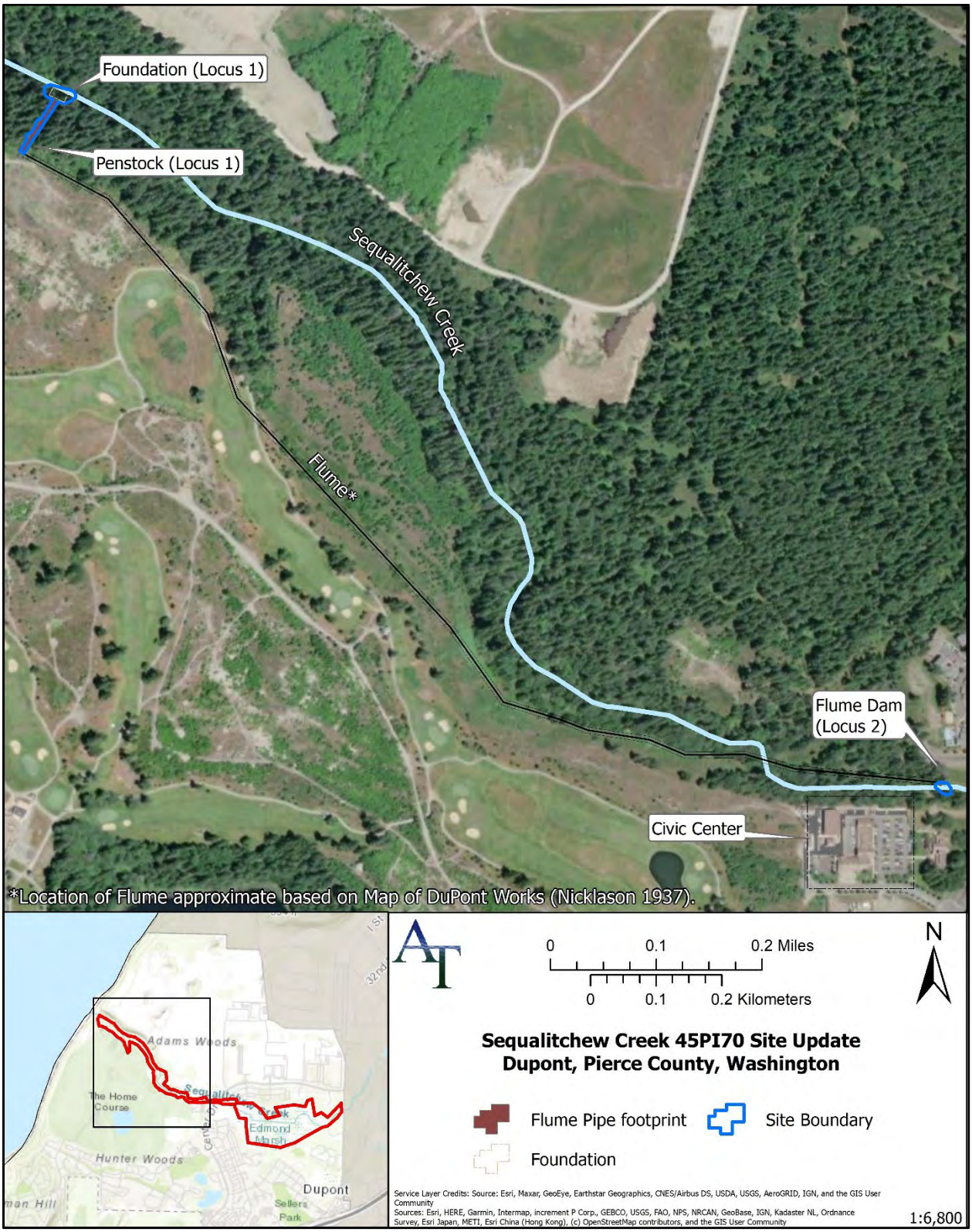

Figure 41. Location of Loci 1 and 2 of the DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update) with approximate location of connecting flume based on Map of DuPont Works (Nicklason 1937).

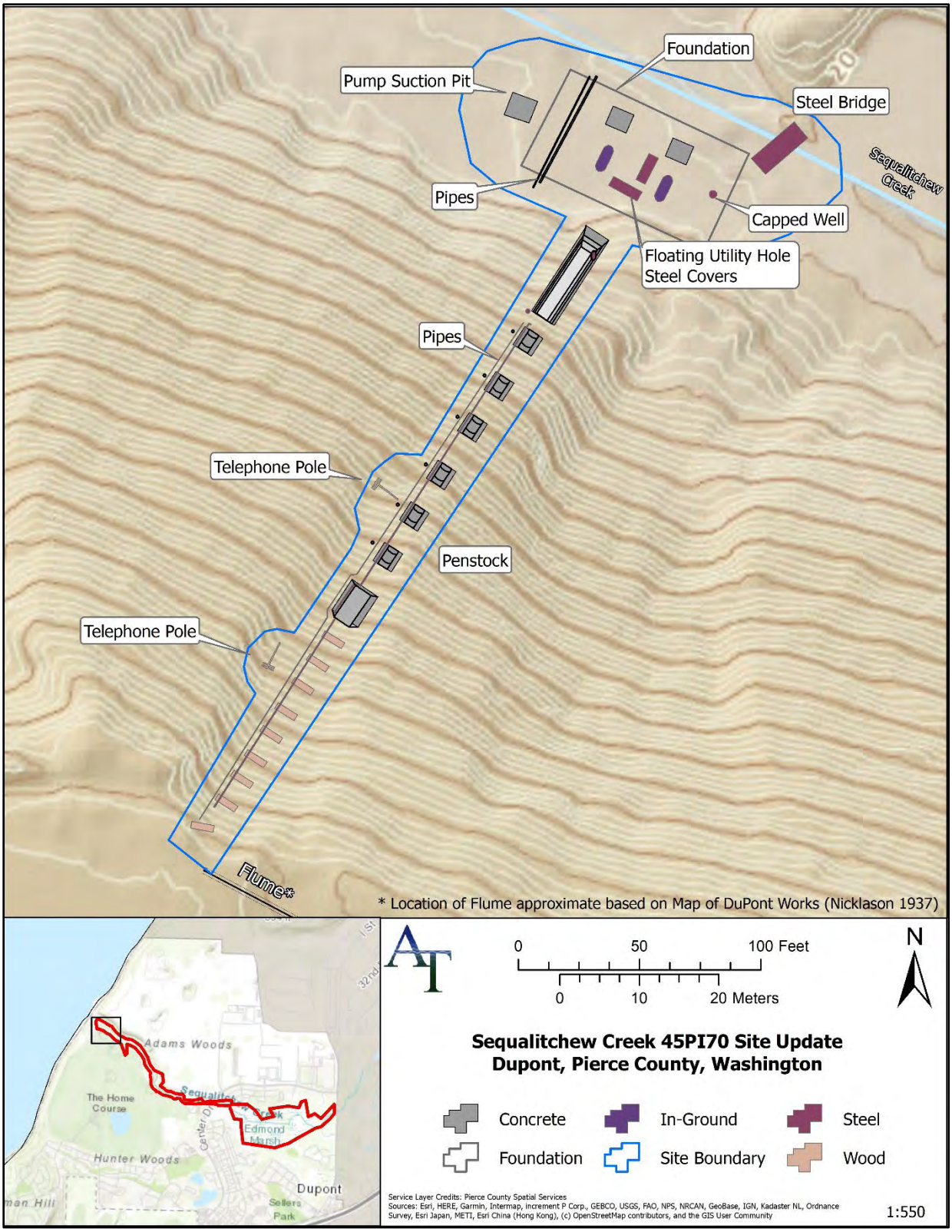

Figure 42. Sketch map of the penstock and lower powerhouse foundation associated with the DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update).

Figure 43. Overview of the steel bridge across Sequalitchew Creek associated with the DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update). View is south.

Figure 44. Overview of the lower powerhouse foundation from the DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update). View is north.

Figure 45. Overview of the lower powerhouse foundation from the DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update) Note exposed concrete in lower frame (arrow). View is west.

Figure 46. 1990 photograph of the lower powerhouse from the DuPont Company's Powder Works Plant Hydroelectric Facility, view southeast (Carlsson 1990:15).

Figure 47. Overview of the penstock from the DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update). View is south.

Figure 48. Overview of the penstock from the DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update). View is northeast.

Figure 49. 1926 photograph of the penstock south of center anchor block with lower powerhouse in background associated with the DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update). View is northwest. Photograph courtesy of the DuPont Historical Museum.

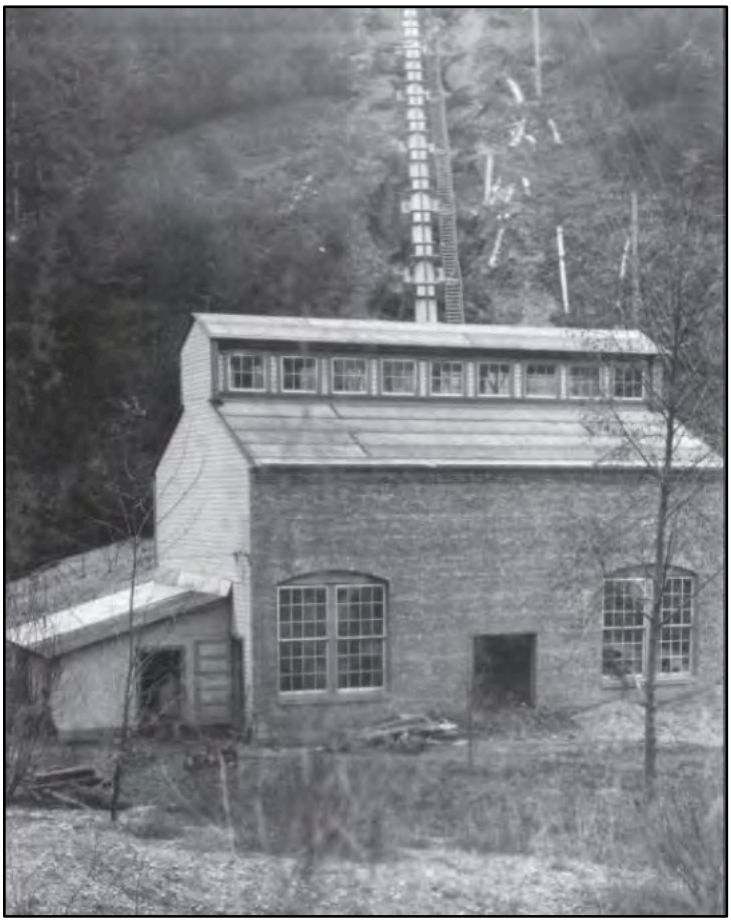

Figure 50. Undated photograph of the lower powerhouse and penstock from the DuPont Company's Powder Works Plant Hydroelectric Facility (Crooks and Crooks 2019:42).

Figure 51. Overview of remains of the flume dam across Sequalitchew Creek. View east.

Figure 52. Overview of flume dam on north side of Sequalitchew Creek. View north.

Figure 53. 1926 photograph of the dam at head of flume. Likely facing northeast. Photograph courtesy of the DuPont Historic Museum.

Figure 54. Undated historic photograph of the dam at the head of flume, likely facing east. Photo adapted from City of DuPont (2010).

DISCUSSION

During the survey for this project, three historic archaeological sites associated with the DuPont Company's Powder Works Plant were identified: the DuPont Company's Swimming Hole (Temporary Site Number PI2022-0702), the DuPont Company's Narrow-Gauge Railroad

(Temporary Site Number PI2022-0703) and the DuPont Company's Hydroelectric Facility (update for 45PI70). At least ten additional sites that have been previously documented in association with the DuPont Company's Powder Works Plant were also identified on WISAARD (Table 8).

ATCRC recommends expanding the site boundaries of 45PI70 to encompass the entire footprint of the DuPont Company's Powder Works Plant. Currently, the site boundaries for 45PI70 are defined as two disarticulate areas devoid and separated by Sequalitchew Creek and, as such, does not the capture the full complexity of this site. Nicklason (1937) and Davies (1955) define the site boundaries by the fence line of the plant at the time (Figure 55). Carlsson (1990:9) also defines the site boundaries by the plant's fence line. Hart Crowser (1990: Figure 1-2, in Carlsson 1990; Figure 56) defined the site boundaries by the "consent decree boundary."

ATCRC would also like to see that 45PI70 be nominated as a Historic District and that all the other associated sites included, but not limited, to those in Table 8 be fully inventoried and evaluated as either contributing or non-contributing elements to the district.

Table 8. Archaeological sites documented in association with the DuPont Company's Powder Works Plant.

SMITHSONIAN	FINDINGS	ELIGIBILITY
Temporary Site Number (TSN) PI2022-0702	DuPont Company's Swimming Hole	Undetermined
TSN PI2022-0703	DuPont Company's Narrow-Gauge Railroad	Undetermined
45PI57	Old town men's boarding house site	Not Eligible
45PI60	Edmond Marsh dump, probable Hudson's Bay Company component	Not Eligible
45PI64	Burning Ground Dump, 1930's plant dump	Not Eligible
45PI69	Historic Town of DuPont	Potentially Eligible
45PI70	1906 munitions factory and shipping point	Potentially Eligible
45PI70 Update	DuPont Company's Hydroelectric Facility	Undetermined
45PI448	City of DuPont historic dump site	Not Eligible
45PI921	Historic scatter, glass, linkage hardware, harmonic plate, wire nail, ca. Early 20th.	Potentially Eligible
45PI1186	DuPont telpher tower, structural remains for electric cable system, 12 x 8ft, ca. Mid-20th century	Potentially Eligible
45PI1224	Historic railroad properties: narrow-gauge railroad and berm and short abandoned track	Potentially Eligible
45PI1225	Historic railroad properties: concrete loading platform	Potentially Eligible
45PI1226	Bridge Abutment Narrow-Gauge Railway	Potentially Eligible

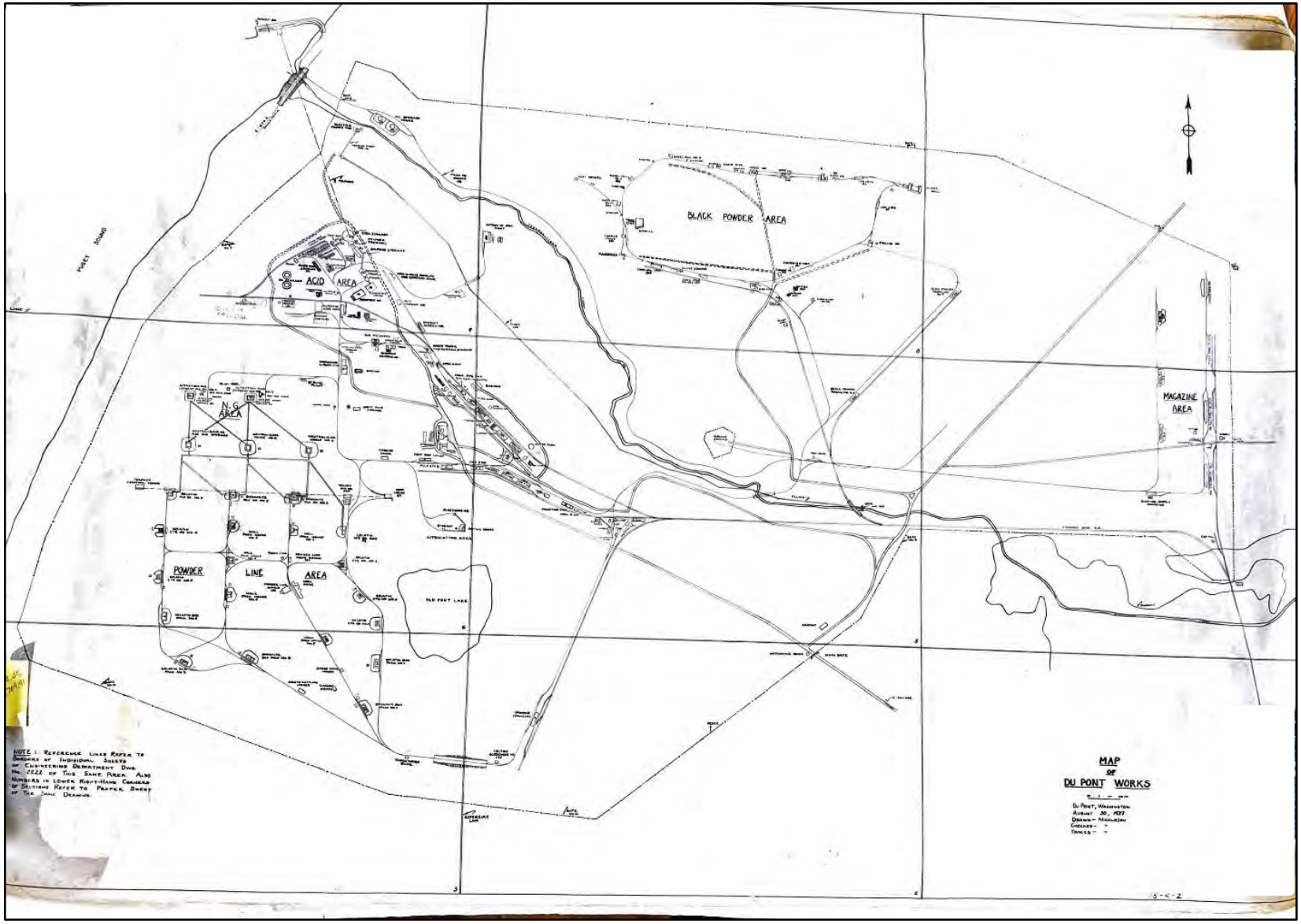

Figure 55. Map of DuPont Works (Nicklason 1937) illustrating the footprint of the DuPont Company's Powder Works Plant.

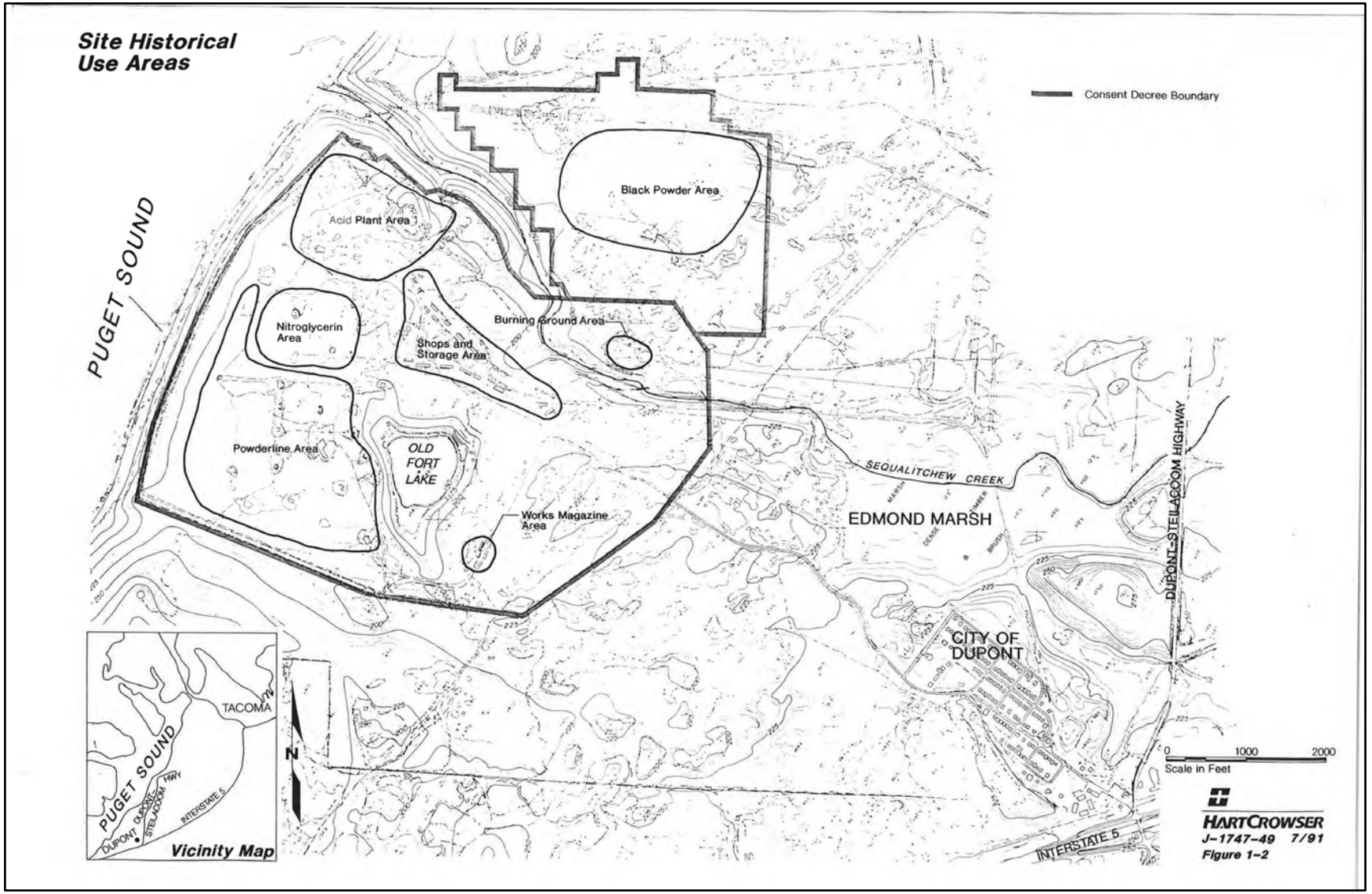

Figure 56. Map from HartCrowser (1991) Remedial Investigation/ Feasibility Study report identifying the six functional areas of DuPont Company's Powder Works Plant.

CONCLUSIONS AND RECOMMENDATIONS

ATCRC's cultural resources assessment consisted of background review, field investigation, and production of this report. Field investigation included pedestrian survey, subsurface testing and monitoring of geotechnical borings. Four historic archaeological sites were identified during the survey: Historic Debris Site (Temporary Site Number: PI2022-0701), DuPont Company's Powder Works Plant Swimming Hole (Temporary Site Number: PI2022-0703), DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0704), and DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update).

In accordance with the DAHP, each of the sites were inventoried and, in accordance with EO 21-02, were evaluated for listing on the NRHP. Of these, two are recommended for listing on the NRHP: DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0704) under Criterion A and DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update) under Criteria A and C.

As part of this project, the portion of the DuPont Company's Powder Works Plant Narrow-Gauge Railway (Temporary Site Number: PI2022-0704) located in the project area may be partially excavated to replace the culverts with bridges. However, the western culvert may be replaced with a larger box culvert with little impact to the railroad prism. Considering that roughly one mile of trail exists within the project area and only the prism and alignment currently exist, these actions will not affect NRHP eligibility. Accounts of the DuPont Company's Powder Works Plant Swimming Hole (Temporary Site Number PI2022-0702) indicate a buried historic trestle may be present within the berm in which the culvert is encased.

The remains of the penstock from DuPont Company's Powder Works Plant Hydroelectric Facility (45PI70 Site Form Update) sit on the southern slope of the ravine and will not be affected by the project. However, the foundation of the lower powerhouse and its associated dam that sits 1.2 miles upstream may be affected by the renewed waterflow from Sequalitchew Creek. Additionally, ethnographic accounts indicate that longhouses associated with the Sequalitchew Village were located near the lower powerhouse.

As such, ATCRC finds that this project will have an adverse effect to cultural resources. As a result of our study, ATCRC recommends the following conditions to mitigate the adverse effects the project will cause:

1. Archaeological monitoring for all proposed ground-disturbing activities associated with this project;
2. Adopt an Inadvertent Discovery Plan (IDP) in the case that additional cultural resources are identified when there is no cultural resource monitor present (an IDP is attached in Appendix C);
3. Update the site boundaries for 45PI70 on WISAARD to be expanded to the mapped fence line of the DuPont Company's Powder Works Plant;
4. Prepare a nomination form for the DuPont Company's Powder Works Plant be listed as a Historic District; and,

5. Conduct an intensive level survey to determine the current condition/status and contributing or non-contributing evaluation of all the previously recorded sites associated with the DuPont Company Powder Works Plant.

No cultural resources study can wholly eliminate uncertainty regarding the potential for prehistoric sites, historic properties, or TCPs associated with a project. The information presented in this report is based on professional opinions derived from our analysis and interpretation of available documents, records, literature, and information identified in this report and on our reconnaissance-level field investigation and observations as described herein. Conclusions and recommendations presented apply to project conditions existing at the time of our study and those reasonably foreseeable. The data, conclusions, and interpretations in this report should not be construed as a warranty of subsurface conditions described in this report. They cannot necessarily apply to project changes of which ATCRC is not aware of and has not had the opportunity to evaluate.

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APPENDIX A: CORRESPONDENCE

Jessica Morris <morrisj@aquaterracrc.com>

CR Assessment - Sequalitchew Creek Watershed Project

4 messages

Jessica Morris <morrisj@aquaterracrc.com> Thu, Jul 21, 2022 at 8:10 AM
To: Brad Beach <Beach.Brad@nisqually-nsn.gov>
Cc: Sarah Amell <sarah@aquaterracrc.com>, Dave.Caudill@rco.wa.gov

Good Afternoon Mr. Beach,

I am writing to provide a technical notification and request information regarding the Sequalitchew Creek Watershed Project in DuPont, Pierce County, Washington. Aqua Terra Cultural Resource Consultants (ATCRC) has been contracted to conduct a cultural resource survey within the project footprint consisting of up to 50 shovel probes and a pedestrian survey along a portion of the Sequalitchew Creek corridor. The survey is scheduled for Monday, July 25th through Wednesday, July 27th, beginning at 7:30 am.

The project proposes to implement beaver management systems such as beaver dam analogs and flexible pond levelers, remove barrier culverts, and re-connect surface water that is being diverted from the watershed. The project is part of a significant effort to restore year-round surface flow from Sequalitchew Lake to Puget Sound and connectivity for salmon through phased capital restoration projects. The project will occur along Sequalitchew Creek. I have included two maps and a Google Maps link for your reference.

https://goo.gl/maps/M2t4SxvB2Fzf8hHP7

If there is any additional information about cultural resources or culturally sensitive areas that we should be aware of, we would greatly appreciate any information you can provide.

Please let me know if you have any questions or concerns.

Thank you,

Jessica E. Morris, M.S., RPA (she/ her)
Project Archaeologist

Aqua Terra Cultural Resource Consultants
MorrisJ@AquaTerraCRC.com
(c) 360.819.7008
(d) 360.754.2208
www.AquaTerraCRC.com

Office Hours: Monday - Thursday, 7:00 - 5:00

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2 attachments

SequalitchewSurvey_Aerial.pdf
2372K

SequalitchewSurvey_24K.pdf
3860K

Brad Beach <beach.brad@nisqually-nsn.gov> Thu, Jul 21, 2022 at 9:03 AM

To: Jessica Morris <morrisj@aquaterracrc.com>
Cc: Sarah Amell <sarah@aquaterracrc.com>, "Dave.Caudill@rco.wa.gov" <Dave.Caudill@rco.wa.gov>, Annette Bullchild <bullchild.annette@nisqually-nsn.gov>, Sela Kalama <kalama.sela@nisqually-nsn.gov>

Good morning, Ms. Morris,

Thank you for reaching out for information; unfortunately, I don't have any specific information about the APE/ADI that isn't more widely known.

We would appreciate the opportunity to monitor/participate in this survey when you begin next week, could you let me know where you plan to mobilize your crew on Monday morning?

Thank you,

Brad Beach, THPO

Nisqually Tribe

c: 360-528-1084

p: 360-456-5221 x 1277

[Quoted text hidden]

Jessica Morris <morrisj@aquaterracrc.com> Thu, Jul 21, 2022 at 9:33 AM
To: Brad Beach <beach.brad@nisqually-nsn.gov>
Cc: Sarah Amell <sarah@aquaterracrc.com>, "Dave.Caudill@rco.wa.gov" <Dave.Caudill@rco.wa.gov>, Annette Bullchild <bullchild.annette@nisqually-nsn.gov>, Sela Kalama <kalama.sela@nisqually-nsn.gov>

Of course. We are planning to meet at the cul-de-sac just south of the new Creekside Village DuPont complex, where there is an entrance to the Sequalitchew Creek Trail. We are meeting at 7:30 am for a brief safety tailgate meeting in hopes of beating at least some of the heat next week. From there, we will be working on both sides of Center Drive: just south of the cul-de-sac on the west side of Center Dr. and along the creek just south of Edmond Village Park on the east side of Center Dr. I'm hoping we will be pretty visible, but please feel free to call my cell phone when you or Sela arrive if you need to track me down.

https://goo.gl/maps/eH9Eo1FMXXpykQ6f9

Please let me know if you have any questions.

Than you,

Jessica E. Morris, M.S., RPA (she/ her)
Project Archaeologist

Aqua Terra Cultural Resource Consultants
MorrisJ@AquaTerraCRC.com
(c) 360.819.7008
(d) 360.754.2208

www.AquaTerraCRC.com

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[Quoted text hidden]

Jessica Morris <morrisj@aquaterracrc.com> Mon, Jul 25, 2022 at 7:40 AM
To: Brad Beach <Beach.Brad@nisqually-nsn.gov>
Cc: Annette Bullchild <bullchild.annette@nisqually-nsn.gov>, Sarah Amell <sarah@aquaterracrc.com>, Sela Kalama <kalama.sela@nisqually-nsn.gov>

Good morning all,

I wanted to let you know of a slight change of plans. We are now parking at the Sequalitchew Creek trailhead in the City of DuPont Civic Center parking lot due to parking restrictions at the Cul-de-sac.

Thank you,

Sequalitchew Creek Trail Head
https://goo.gl/maps/btfMakhzyzXuPwf67
[Quoted text hidden]
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Sent from my iPhone

Jessica Morris, M.S., RPA
Project Archaeologist
Aqua Terra CRC

(c) 530.307.1332
(d) 360.754.2208

Jessica Morris <morrisj@aquaterracrc.com>

CR Assessment - Sequalitchew Creek Watershed Project

1 message

Jessica Morris <morrisj@aquaterracrc.com> Thu, Jul 21, 2022 at 8:16 AM
To: laura.murphy@muckleshoot.nsn.us
Cc: Sarah Amell <sarah@aquaterracrc.com>, Dave.Caudill@rco.wa.gov

Good Morning Ms. Murphy,

I am writing to provide a technical notification and request information regarding the Sequalitchew Creek Watershed Project in DuPont, Pierce County, Washington. Aqua Terra Cultural Resource Consultants (ATCRC) has been contracted to conduct a cultural resource survey within the project footprint consisting of up to 50 shovel probes and a pedestrian survey along a portion of the Sequalitchew Creek corridor. The survey is scheduled for Monday, July 25th through Wednesday, July 27th, beginning at 7:30 am.

The project proposes to implement beaver management systems such as beaver dam analogs and flexible pond levelers, remove barrier culverts, and re-connect surface water that is being diverted from the watershed. The project is part of a significant effort to restore year-round surface flow from Sequalitchew Lake to Puget Sound and connectivity for salmon through phased capital restoration projects. The project will occur along Sequalitchew Creek. I have included two maps and a Google Maps link for your reference.

https://goo.gl/maps/M2t4SxvB2Fzf8hHP7

If there is any additional information about cultural resources or culturally sensitive areas that we should be aware of, we would greatly appreciate any information you can provide.

Please let me know if you have any questions or concerns.

Thank you,

Jessica E. Morris, M.S., RPA (she/ her)
Project Archaeologist

Aqua Terra Cultural Resource Consultants
MorrisJ@AquaTerraCRC.com
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2 attachments

SequalitchewSurvey_Aerial.pdf
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SequalitchewSurvey_24K.pdf
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Jessica Morris <morrisj@aquaterracrc.com>

CR Assessment - Sequalitchew Creek Watershed Project

1 message

Jessica Morris <morrisj@aquaterracrc.com> Thu, Jul 21, 2022 at 8:08 AM
To: Brandon Reynon <brandon.reynon@puyalluptribe-nsn.gov>

Good Afternoon Mr. Reynon,

I am writing to provide a technical notification and request information regarding the Sequalitchew Creek Watershed Project in DuPont, Pierce County, Washington. Aqua Terra Cultural Resource Consultants (ATCRC) has been contracted to conduct a cultural resource survey within the project footprint consisting of up to 50 shovel probes and a pedestrian survey along a portion of the Sequalitchew Creek corridor. The survey is scheduled for Monday, July 25th through Wednesday, July 27th, beginning at 7:30 am.

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Please let me know if you have any questions or concerns.

Thank you,

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Jessica Morris <morrisj@aquaterracrc.com>

CR Assessment - Sequalitchew Creek Watershed Project

1 message

Jessica Morris <morrisj@aquaterracrc.com> Thu, Jul 21, 2022 at 8:13 AM
To: Steve@snoqualmietribe.us
Cc: Sarah Amell <sarah@aquaterracrc.com>, Dave.Caudill@rco.wa.gov

Good Morning Mr. Mullen-Moses

I am writing to provide a technical notification and request information regarding the Sequalitchew Creek Watershed Project in DuPont, Pierce County, Washington. Aqua Terra Cultural Resource Consultants (ATCRC) has been contracted to conduct a cultural resource survey within the project footprint consisting of up to 50 shovel probes and a pedestrian survey along a portion of the Sequalitchew Creek corridor. The survey is scheduled for Monday, July 25th through Wednesday, July 27th, beginning at 7:30 am.

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Please let me know if you have any questions or concerns.

Thank you,

Jessica E. Morris, M.S., RPA (she/ her)
Project Archaeologist

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Jessica Morris <morrisj@aquaterracrc.com>

CR Assessment - Sequalitchew Creek Watershed Project

1 message

Jessica Morris <morrisj@aquaterracrc.com> Thu, Jul 21, 2022 at 8:07 AM
To: Shaun Dinubilo <sdinubilo@squaxin.us>
Cc: Sarah Amell <sarah@aquaterracrc.com>, Dave.Caudill@rco.wa.gov

Good Afternoon Mr. Dinubilo,

I am writing to provide a technical notification and request information regarding the Sequalitchew Creek Watershed Project in DuPont, Pierce County, Washington. Aqua Terra Cultural Resource Consultants (ATCRC) has been contracted to conduct a cultural resource survey within the project footprint consisting of up to 50 shovel probes and a pedestrian survey along a portion of the Sequalitchew Creek corridor. The survey is scheduled for Monday, July 25th through Wednesday, July 27th, beginning at 7:30 am.

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Thank you,

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Jessica Morris <morrisj@aquaterracrc.com>

CR Assessment - Sequalitchew Creek Watershed Project

1 message

Jessica Morris <morrisj@aquaterracrc.com> Thu, Jul 21, 2022 at 8:09 AM
To: dlewarch@suquamish.nsn.us
Cc: Sarah Amell <sarah@aquaterracrc.com>, Dave.Caudill@rco.wa.gov

Good Afternoon Mr. Lewarch,

I am writing to provide a technical notification and request information regarding the Sequalitchew Creek Watershed Project in DuPont, Pierce County, Washington. Aqua Terra Cultural Resource Consultants (ATCRC) has been contracted to conduct a cultural resource survey within the project footprint consisting of up to 50 shovel probes and a pedestrian survey along a portion of the Sequalitchew Creek corridor. The survey is scheduled for Monday, July 25th through Wednesday, July 27th, beginning at 7:30 am.

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Jessica Morris <morrisj@aquaterracrc.com>

CR Assessment - Sequalitchew Creek Watershed Project

1 message

Jessica Morris <morrisj@aquaterracrc.com> Thu, Jul 21, 2022 at 8:15 AM
To: Casey_Barney@yakama.com, kate@yakama.com
Cc: Sarah Amell <sarah@aquaterracrc.com>, Dave.Caudill@rco.wa.gov

Good Morning Mr. Barney and Ms. Valdez,

I am writing to provide a technical notification and request information regarding the Sequalitchew Creek Watershed Project in DuPont, Pierce County, Washington. Aqua Terra Cultural Resource Consultants (ATCRC) has been contracted to conduct a cultural resource survey within the project footprint consisting of up to 50 shovel probes and a pedestrian survey along a portion of the Sequalitchew Creek corridor. The survey is scheduled for Monday, July 25th through Wednesday, July 27th, beginning at 7:30 am.

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APPENDIX B: SHOVEL PROBE LOG

Shovel Probe	Depth (cm)	Description	Inclusions/Notes	Termination
AB1	0-2	Sod cap, organics layer, dead grass and rootlets, minimal gravels, SA pebbles 5%, animal feces on surface, rotting wood, light brown-gray, sandy soil		100 cm
	2-54	Brown-gray loam, darker in color than previous layer, SA gravels to small cobbles, 35%, few roots and rootlets	2 pieces of decaying wood	
	54-100	Large SA cobbles, 25%, brown-gray sandy soil		
AB2	0-10	Organics layer, abundant rootlets, light brown, soft, dry, very powdery sandy soil, small R pebbles, 10%		Sidewall Refusal
	10-30	Light brown, powdery sand, 40% R medium cobbles, minimal roots		
	30-48	Compacted, light gray, medium coarse sand, loose sidewalls with 40% pebbles to cobbles, white-gray compacted soil inclusions in N wall of SP		
AB3	0-8	Organics layer, abundant dead roots and rootlets, light brown, soft, dry, very powdery sandy soil, small R pebbles, 10%	2, shotgun casings uncovered in this layer, "Western Super X" Made in US, cotton wadding intact, rusted on outer casing, documented, and returned (1931-1960)	Sidewall Refusal
	8-39	Gray-brown, powdery, silty sand, large to medium tree roots, minimal grass rootlets, gravels SA, SR, 25%		
	39-60	Compacted at bottom, loose in sidewalls, brown to orangey-brown inclusion in gray-brown sand	Charcoal pieces found throughout the SP	
AB3-S	0-20	Organics layer, abundant roots, lighter brown-gray, pebbles to small cobbles, 20%, powdery silty sand		Sidewall Refusal
	20-60	Cobbles, SA, 25%, lighter brown-gray, powdery silty sand		
AB3-W	0-30	Majority cobbles, small to large, <60%	1 piece of thick (3/16" thick), clear, glass with rippled design embossed	Sidewall Refusal

			on, no identifying marks found	
	30-49	Loose sidewall soils, extremely compacted at bottom		
AB3-N	0-30	Organics layer, abundant roots and rootlets, sandy loam, gravels to pebbles 10%		Cobble Impasse
	30-50	No roots, large cobbles 10%		
	50-64	Cobbles decrease in size, small cobbles, no roots, loose, powdery, silty, no charcoal or artifacts	Radial AB3- E cancelled due to unsafe and steep terrain	
AB4	0-12	Organics layer, dead grass, dead grass rootlets abundant, compacted fill, 50% gravels		Groundwater
	12-43	Brown-gray sands with fill, 40% gravels		
	43-81	Saturated brown-gray sands with fill, 40% gravels		
BT1	0-9	Forest duff, dead grass, dead grass rootlets abundant		Sidewall Refusal
	9-41	Orange-brown fill material, roots, and rootlets, >50% gravels, SR, R, sidewalls bowing out		
CR1	0-10	Brown/dark organic topsoil, trace amounts of silt	Uncovered rusted railroad spike (5.5” in length, 1/2" width)	Inhibitive cobbles
	10-33	Beige soil, fine to coarse sand w/ trace (<5% silt) SR, 40% gravel		
	33-35	Tan to beige, fine to coarse sand w/ trace (<5% silt) SR, 40% gravel		
CR1-W	0-2	Brown/dark organic topsoil, trace amounts of silt	Modern debris (paper label)	Dug to depth of artifact found in CR-1
	2-10	Beige soil, fine to coarse sand, SR, 40% gravel, trace amounts of silt		
CR1-N	0-10	Brown soil, loam to medium coarse sand, no gravel, very easy to dig through, organic matter		Dug to depth of artifact found in CR-1
CR1-E	0-20	Tan very fine to medium sand with 5% silt and 15% rounded to subrounded 0.3-5 cm gravel		Inhibitive cobbles
	20-25	Tan mixed sands with 3% silt and 45% rounded 0.3-15 cm gravel		
	25-40	Beige mixed sands with 3% silt and 45% rounded 0.3-15 cm gravel		

CR1-S	0-30	Tan very fine to coarse sands with 3% silt and 45% rounded 0.3-10 cm gravel		Inhibitive density
CR2	0-60	Brown soil, fine to medium sand, trace silt (<5%), gravel >40% SR	20 cm down, uncovered glass (modern), trash food wrapper, iron piece (3.5 cm long @ 50 cm), modern looking screw, and a metal object	cobble or root impasse
CR2-W1	0-10	Black w/ dark beige topsoil		
	10-23	45% gravel, fine to medium sand, 3% silt small to large	Stopped b/c large boulder impasse, moved hole to CR2-W2	
CR2-W2	0-11	Black-beige topsoil, very fine to medium (95%) 5% silt, 20% gravels (size ranging small to very large)		Compaction impasse
	11-60	Tan, 35-45% gravels, 3% silt, rest is fine to very coarse sand		
CR2-E	0-60	Beige soil, fine to coarse sand w/ 5% silt (~3%) gravel, 45% multiple large rocks	Hit large rocks/unable to continue further Concrete fragments at 40cm	
CR2-S	0-15	Beige topsoil w/ abundant roots, fine to coarse sand w/ ~3% silt, gravel 30% SR		Cobble impasse
	15-53	Beige soil, fine to coarse sand w/ ~3% silt, gravel 45% SR		
CR3	0-10	Abundant roots, compacted, very little soil		Sidewall refusal
	10-25	Brown w/ moderately coarse silt and gravels, 35%		
	25-35	Lighter brown silt w/ sand, gravels 10%, cobbles		
	35-80	Orangish brown, silty sand, gravel 20%, larger cobbles 5%	Charcoal at 50cm	
CR4	0-5	Duff w/ silt		Sidewall refusal
	5-70	Silt w/ fine to moderate sand, 25-30% gravel, SR, brown		
CR5	0-10	Duff w/ brown-gray soil, silt w fine to moderate sand, gravels 35%	Concrete fragment	Root Impasse
	10-40	Lots of roots, beige, fine to coarse sand w/ silt, 40% gravels, SR	Concrete fragments, 1 piece of charcoal	
	40-60	Light gray, moderate to coarse sand, large rocks, and cobbles, 35% gravels, SR	Concrete fragments, multiple charcoal (burnt log)	
	60-80	Brown, silty, fine to coarse sand, SR, 35%	Concrete fragments, multiple charcoal	
CR6	0-5	Topsoil, roots, silt w/ fine sand, 45% gravels, SR		100cm
	5-45	Light gray, silty w/ fine sand, 40% gravels to cobbles, SR		

	45-100	Brown, fine to coarse sand, 40% gravels to cobbles, SR	Glass fragment @ 65cm Water @ 98-100cm	
CR7	0-7	Topsoil, moderate to coarse sand w/ silt (<3%), dark brown	Found rail spike in E wall	Sidewall Refusal
	7-30	Dark brown, moderate to coarse sand w/ silt (<3%), gravels to cobbles, SR, 45%	Charcoal fragments throughout	
	30-70	Light brown-tan moderate to coarse sand w/ silt (<3%), gravels to cobbles (45%), SR	Charcoal fragments throughout	
CR7-S	0-15	Topsoil, dark brown organic material, fine to moderate sand w/ silt (<5%), gravels 30%, SR	Charcoal fragments throughout	Sidewall Refusal
	15-50	Beige w/ moderate to coarse sand w/ silt (<3%), gravels to cobbles, SR, 45%	Charcoal fragments throughout	
	50-70	Beige, moderate to coarse sand w/ silt (<3%), gravels to cobbles, SR, 45%	Charcoal fragments throughout, CR7-N cancelled due to unsafe terrain	
CR7-W	0-16	Forest duff, dead grass, dead grass rootlets abundant		Sidewall Refusal
	16-61	Orange-brown fill material, roots, and rootlets, >50% gravels, SR, R, sidewalls bowing out		
CR7-E	0-19	Loose brown loam w/ 30 % R-SR, 0.3-5cm gravel and very small to medium roots		Root and Cobble Impasse
	19-52	Loose, tan, vf-f sand w/ 5% silt, 45% R-SR, 0.3-1 cm gravel, some medium to large roots		
C1	0-18	Beige very fine to fine sand, trace medium sand, with 5% silt and 10-15% rounded to subrounded 0.3-6 cm gravel		Inhibitive cobbles
	18-40	Beige mixed sands with 45% rounded 0.3-14 cm gravel	~30 cm: 3 chunks concrete	
C2	0-1	Beige mixed sands with 5% silt and 15% rounded to subrounded gravel		Inhibitive cobbles
	1-42	Beige fine to very coarse sand with 3% silt and 45% rounded to subangular 0.3-18 cm gravel	20-30 cm: 5 chunks cement	
C3	0-20	Tan mixed sands with 3% silt and 45% rounded to subrounded 0.3-12 cm gravel		

	20-40	Beige mixed sands with 3% silt and 45% rounded to subrounded 0.3-12 cm gravel		Inhibitive cobbles
CA1	0-18	Dark beige very fine to medium sand with 5% silt and 30% rounded 0.3-20 cm gravel	5 cm: 3/16" thickness brown glass fragment 10-15 cm: three 3/16" brown glass fragments	
	18-38	Beige very fine to medium sand with 3% silt and 40% rounded to subangular 0.3-4 cm gravel		Terminated in undisturbed Steilacoom Gravel
	38-56	Light gray mixed sands with 45% rounded to subrounded 0.3-5 cm gravel	Steilacoom Gravel	
CA2	0-18	Dark beige very fine to medium sand with 5% silt and 40% rounded to subrounded 0.3-10 cm gravel		
	18-40	Beige very fine to coarse sand with 45% rounded 0.3-12 cm gravel		Inhibitive cobbles
	40-65	Brown sandy loam with 15% rounded to angular 0.3-6 cm gravel	Buried imported topsoil with roots, decayed red wood fragments	
	65-80	Beige very sandy loam with 15% rounded to angular 0.3-6 cm gravel	Buried imported soil layer with decayed red wood fragments	
CH1	0-20	Beige mixed sands with 3% silt, 45% rounded to subrounded 0.3-12 cm gravel, and abundant rootlets		Inhibitive cobbles
	20-40	Beige mixed sands with 3% silt and 45% rounded to subrounded 0.3-12 cm gravel		
CH2	0-15	Dark beige very fine to coarse sand with 5% silt and 25% rounded to subrounded 0.3-10 cm gravel	5 cm: two fragments white chalk	
	15-27	Dark beige mixed sands with 3% silt and 45% rounded to subrounded 0.3-8 cm gravel	~25 cm: 2 round head iron nails, 1 iron fragment, 1 charcoal fragment, several old, desiccated wood fragments	Inhibitive compacted cobbles
	27-40	Beige mixed sands with 3% silt and 45% rounded to subrounded 0.3-10 cm gravel		
CH2-N	0-18	Black very fine to fine sand with 5% silt and 30% 18-25 cm boulders		
	18-36	Beige very fine to coarse sand with 5% silt and 40% rounded to subrounded 0.3-54 cm boulders		

	36-56	Compact tan very fine to medium sand with 2% silt and 50% rounded 0.3-5 cm gravel		
CH2-S	0-9	Dark beige fine to coarse sand with 5% silt and 20% rounded to subrounded 0.3-5 cm gravel		Inhibitive compaction
	9-17	Tan fine to very coarse sand with 3% silt and 45% rounded to subrounded 0.3-13 cm gravel		
	17-35	Compact peach to off-white fill: 50% rounded to angular gravel, 48% very fine to medium sand, 2% silt	Compacted fill slope	
CH2-S1	0-17	Dark beige fine to medium sand with 5% silt and 35% rounded to subrounded 0.3-6 cm gravel		Inhibitive compaction
	17-27	Compact off-white fill: 50% rounded to angular gravel, 48% very fine to medium sand, 2% silt	Compacted fill slope	
CH2-W	0-18	Black very fine to medium sand with 3% silt and 30% rounded to subrounded 0.3-18 cm gravel		Terminated in undisturbed Steilacoom Gravel
	18-30	Beige very fine to medium sand with 3% silt and 40% rounded to subrounded 0.3-18 cm gravel		
	30-54	Light gray mixed sands with 45% rounded 0.3-6 cm gravel		
CH3	0-15	Beige very fine to medium sand with 3% silt and 35% rounded to subrounded 0.3-8 cm gravel		Inhibitive compaction
	15-27	Compact peach to tan fill: 60% rounded to subrounded gravel, 37% fine to medium sand, 3% silt		
CH4	0-20	Dark beige fine to coarse sand with 5% silt and 35% rounded 0.3-6 cm gravel		Inhibitive compaction
	20-40	Compact beige fill: 50% rounded 0.3-6 cm gravel, 48% fine to coarse sand, and 2% silt		
CH5	0-38	Brown sandy loam with 25% rounded to subrounded 0.3-7 cm gravel		Inhibitive compaction
	38-47	Compact light gray fill: 50% rounded 0.3-6 cm gravel and 50% fine to coarse sand		

CH6	0-18	Loose, beige, sandy silt w/ 30%, R-SR gravel, and abundant rootlets		Cobble Impasse
	18-47	Compact tan fill, 50% R-SA, 0.3-18cm gravel and cobbles w/ 5% silt 45% vf-m sand		
CH7	0-13	Light brown loam w/ 30% R, 0.3-6cm gravel, abundant rootlets		Compaction Refusal
	13-47	Compact tan fill, 50% R-A, 0.3-14cm rocks w/ 5% silt 45% vf-m sand	3 fragments, 3/16", brown glass, 15-20cm	
	47-74	Compact off-white fill, 50% R-SR, 0.3-14cm rocks w/ 15% silt 35% vf-f sand		
CH7-E	0-12	Light brown vf-m sand w/ abundant rootlets and 35% R-SR 0.3-6cm gravel, 5% sit		Compaction Refusal
	12-64	Compact, beige, vf-m sand w/ 3% silt, 45% R-SR, 0.3-14cm gravel		
CH7-N	0-6	Brown-gray, rocky, gravels to cobbles, 50%, grass rootlets and few roots, organics layer	Green glass shard at 5cm, 4 cm length	Cobble Impasse
	6-52	White-gray, rocky, SA 50% no roots	Clear glass shard at 40cm	
CH7-W	0-10	Topsoil, beige-brown, fine to moderately coarse sand w/ silt (10%) gravel (20%) SR	Concrete fragments	
	10-36	Beige-tan, fine to moderately coarse sand w/ 10% silt, gravels 50%	Concrete fragments	
CH7-S	0-20	Light brown to brown silt w/ lots of dried rootlets, large rocks, and cobbles		Compaction and Rock Refusal
	20-50	Light brown to tan very compacted silt w/ gravels and large cobbles, ~40%		
CH8	0-22	Loose, gray, vf-m sand w/ 3% silt, 35% R-SR, 0.3-6cm gravel		Sidewall Refusal
	22-63	Loose, tan vf-c sands w/ 3% silt, 50% R-SR, 0.3-13cm gravel		
	63-76	Loose, yellowish gray mixed sands (all sizes) w/ trace silt, 50+%, R-SR, 0.3-15cm, gravel		
CH9	0-26	Compact light gray fill: 50% A-R, 0.3-7 cm gravel, 40% f-m sand 10% silt		Compaction Refusal
	26-40	Compact, brown fill: 50% A-R, 0.3-7 cm gravel, 50% f-m sand		

	40-58	Loose, reddish-brown fill: 60% crushed slag, 30% A-SR gravel, 10% f-c sand		
	58-85	Loose, brown fill: 5% crushed slag, 45% R-SR, 0.3-7cm gravel, 50% f-c sand		
CH10	0-24	Loose, beige, vf-f sand w/ 10% silt, 20%, 0.3-4 cm, R-A gravel, abundant small to medium roots		Sidewall Refusal
	24-74	Loose tan mixed sands with 45% R-SR 0.3-7cm gravel		
CH11	0-15	Loose light brown f-m sand w/ 10% silt, 30% R-SR, 0.3-4cm gravel, some small roots		Cobble Impasse
	15-57	Loose beige sandy loam w/ 40% R-SR, 0.3-7cm gravel		
JM1	0-10	Brown silt w/ gravels, A	Thick mat of roots	Sidewall Refusal
	10-50	Brown silt w/ gravels, SA, R cobbles 10cm, river gravels/sediments		
JM2	0-20	Brown silt w/ root mat ~10% SA gravels		Sidewall Refusal
	20-40	Light brown to tans it w/ ~10% R gravels to cobbles		
	40-65	Light brown to tan very fine silt w/ ~20% river cobbles		
JM3	0-15	Brown silt w/ ~10% SR gravels	Thick root mat	Rock Refusal
	15-30	Compacted light brown silt w/ <10% gravel to cobbles		
	30-60	Light brown to tan silt w/ cobbles, very fine silt		
	60-70	Tan to yellowish-brown very fine silt w/ R gravels and some cobbles		
JM4	0-20	Brown silt w/ ~10% R gravels	Thick root mat	Rock Refusal
	20-40	Brown silt w/ cobbles ~30% w/ R gravels	Handmade square nail, w/i 20-30 cm, 2” long square 1/4“head Window glass 3/32”	
	40-50	Light brown to brown silt w/ large cobbles and R gravels		
	50-60	Light brown to tan, very fine, compacted silt, large cobbles		
JM4-N	0-70	Brown silt w/ ~10% SR gravels		Rock Refusal
JM4-E	0-70	Brown silt w/ ~10% SR gravels		Boulder Impasse
JM4-E1	0-50	Brown silt w/ ~10% SR gravels		Rock Refusal
JM4-W	0-10	Brown silt w/ ~10% R gravels	Root mat	

	10-35	Light brown silt w/ ~30% cobbles to gravels, 2 small boulders	2 square nails, 1 fragment, 1 complete	Root Impasse
	35-55	Light brown silt w/ coarse sand, large cobbles, and small boulders		
JM4-S	0-20	Brown silt w/ thick root mat, large cobbles		Rock Refusal
	20-45	Brown silt w/ ~40% cobbles to gravels		
	45-60	Light brown silt w/ coarse sand, small boulders		
JM5	0-15	Brown silt w/ some gravel	Thick root mat	Rock Refusal
	25-30	Light brown silt w/ cobbles and large cobbles	Thinner root mat	
	30-40	Brown silt w/ moderately coarse sand w/ large cobbles		
	40-65	Light tan, whiteish silty, mod-coarse sand, very compacted, very few cobbles		
	65-70	Tan silty sand, mod-coarse w/ large cobbles		
JM6	0-25	Brown silt w/ gravel	Lots of rootlets	Sidewall Refusal
	25-60	Brown silt w/ ~20% cobbles to gravels, some large cobbles		
	60-75	Yellowish-brown, loose silt w/ sand gravels, cobbles, and small boulders, mod-poorly sorted	Large rocks at bottom of hole, causing it to widen	
JM7	0-20	Brown silt w/ gravel and 20% cobbles		Sidewall Refusal
	20-30	Brown silt w/ 40% cobbles and 2 small boulders		
	30-55	Light brown silt w/ gravel 60+% cobbles, very little sediment, poorly sorted gravel, larger boulders		
JM8	0-20	Compacted gravels in silt w/ thick mat of dried rootlets		Rock Refusal
	20-35	Light brown silt w/ very gravelly sand, poorly sorted, very large rocks		
	35-50	White silt w/ very gravelly sand, poorly sorted, large rocks, very compact		
	50-55	Gray, extremely gravelly sand w/ silt, very poorly sorted, Steilacoom gravels		
JM9	0-20	Brown to light brown silt w/ very gravelly sand and cobbles, poorly sorted		Compaction Refusal

	20-45	White to gray, brown, very gravelly sand w/ silt, large rocks, extremely compacted		
JM10	0-60	Modern fill material used for berm/trail embankment construction		
	60-65	Same material with reddish hue		
JM11	0-50	River gravel and cobbles and alluvial deposits from top of embankment, potentially redistributed at culvert construction		
	50-70	Native, undisturbed river gravel w/ cobbles and small boulders	Several fragments of broken, square, clear glass, medicine jar, thickest fragment almost 1/4", thinnest 3/32"	
JM11-N	0-50	River gravel and cobbles and alluvial deposits from top of embankment, potentially redistributed at culvert construction		
	50-80	Native, undisturbed river gravel w/ cobbles and small boulders	4 square washers between 10 & 30cm	
JM11-E	0-51	Brown, medium to coarse sand, pebbles to cobbles, >50%	Charcoal found throughout SP, Metal wire in S sidewall at 45cm, roughly length of SP	Sidewall Refusal
JM11-W	0-16	Loose, gray, very sandy loam w/ 30% R-A, 0.3-8cm gravel and abundant small to medium roots		Groundwater
	16-30	Lose dark gray f-c sand w/ 40% R-SR, 0.3-10cm gravel and some small roots		
	30-76	Loose dark brown, f-vc sand w/ 50% R-SR, 0.3-10cm gravel	Wet below 60cm	

APPENDIX C: INADVERTENT DISCOVERY PLAN (IDP)

PLAN AND PROCEDURES FOR THE INADVERTENT DISCOVERY OF CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS

1. Introduction

The following Inadvertent Discovery Plan (IDP) outlines the procedures to be implemented, in accordance with state and federal laws, if National Register of Historic Places (NRHP) potentially-eligible and ineligible cultural resource materials are discovered during construction. The separate protocol for discovery of human skeletal remains is described below, in Section 4.

2. RECOGNIZING CULTURAL RESOURCES

A cultural resource is an item of historical, traditional, or cultural importance e. The item could be prehistoric or historic. Examples include:

- A multi-species accumulation of shell (shell-midden) with associated bone, stone, antler or wood artifacts, burned rocks or charcoal.
- Bones that appear to be human or animal bones associated with a shell-midden (i.e. with associated artifacts or cooking features).
- An area of charcoal or very dark stained soil with associated artifacts,
- Artifacts made of chipped or ground stone (i.e. an arrowhead, adze or maul) or an accumulation (more than one) of cryptocrystalline stone flakes (lithic debitage),
- Basketry, cedar garments, fish weir stakes or items made of botanical materials,
- Clusters of tin cans or bottles, logging or agricultural equipment that appear to be older than 50 years,
- Buried railroad tracks, decking, or other industrial materials.

Not all cultural resource material encountered will be potentially-eligible for listing on the NRHP. To be eligible for the NRHP cultural resources identified during construction must be 50 years of age or older, meet one or more of the four criteria listed below, and retain sufficient physical integrity to convey historical significance (36 CFR 60.4). A building, site, object, or structure may be considered for inclusion in the NRHP if it meets at least one of the following criteria:

1. The property is associated with events that have made a significant contribution to the broad patterns of our history.
2. The property is associated with the lives of persons significant in our past.
3. The property embodies the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components might lack individual distinction.
4. The property has yielded, or might be likely to yield, information important in

prehistory or history.

The following archaeological resources will indicate potentially NRHP-eligible deposits and will be assumed NRHP-eligible until determined otherwise by the State Historic Preservation Officer (SHPO).

- Pre-contact deposits (such as midden deposits) associated with Native American use or occupation.
- Historic era non-Native American artifacts from NRHP-eligible (or potentially NRHP eligible) deposits (native soil or surfaces that were stable and exposed either between fill episodes, or after the conclusion of historic filling).
- Historic features consisting of stratified deposits with artifact concentrations that appear to be spatially or temporally distinct. This includes refuse deposits, privies, or other discrete accumulations.
- Courses of brick or other architectural materials that are part of a building foundation or pavement in their original position.
- Historic era non-Native American artifacts from non-eligible contexts, only if they are diagnostic or have educational value.

Examples of deposits that will not be considered NRHP eligible include:

- Isolated or loose construction materials (brick, mortar, window glass), bottles, cans, located within fill sediments (not located in primary context).
- Mass deposits of lumber, concrete, granite, coal, etc.
- Pilings, decking, trestle, and railroad track, unless of clearly unusual construction.
- Historic-era artifacts not associated with a feature or stable surface.

Artifacts or deposits that are not potentially eligible, as described above, will be noted in daily field logs, photographed and documented on scaled site plans if possible. The protocol for Inadvertent Discovery, including the stop-work clause noted in the procedure below will not be implemented for artifacts or deposits that are not potentially eligible for listing in the National Register.

3. ON-SITE RESPONSIBILITIES

- STOP WORK

If any contractor or subcontractor believes that he or she has uncovered any cultural resource during construction of the project, all work adjacent to the discovery must stop. The discovery location should not be left unsecured at any time. Cultural resources encountered during an archaeological survey are intentional discoveries and are not covered under this plan.

- NOTIFY DAHP

Contact the DAHP Cultural Resource staff-
State Archaeologist
Rob Whitlam, Ph.D.
email: Rob.Whitlam@dahp.wa.gov

(360) 586-3080
(360) 890-2615 – Cell

The DAHP will review the eligibility criteria above, make a recommendation to the artifact or deposits potential eligibility, and will proceed with agency and tribal notification as necessary (so long as the artifact or deposit is determined eligible).

After consultation DAHP will complete a written plan of action describing the disposition of cultural resources pursuant to 43 CFR Part 10 and will execute their prescribed duties within that plan of action.

4. PROTOCOL FOR DISCOVERY OF HUMAN SKELETAL REMAINS

Washington State law requires immediate notification of known or suspected human remains whenever they are uncovered by investigation or construction activities to county and/or municipal law enforcement agencies, county medical examiner or coroner's offices, DAHP, and federal and local agencies involved directly with the project or having jurisdiction over the subject properties.

If human remains are discovered or exposed in backhoe trench spoils or sidewalls, and/or any other excavations performed during the excavation of the project all excavation will cease and the site will be secured. The remains will be covered with a tarp or other materials (not soil or rocks) temporarily. The Coroner will be notified regarding the discovery. The Coroner will determine if the remains are human, whether the discovery constitutes a crime scene, and will notify the Washington State Department of Archaeology and Historic Preservation (DAHP). The DAHP will be responsible for informing the affiliated tribes regarding the discovery.

Construction may continue at the discovery location after the DAHP determine the boundaries of the discovery location and compliance with state and federal law requirements are complete.

5. Discovery Protocol Contact Information

Karen Cline-Parhamovich, Chief Medical Examiner Pierce County Medical Examiner Office 3619 Pacific Avenue Tacoma, WA 98418 (p) 253-798-6494
Guy Tasa, State Physical Anthropologist Department of Archaeology and Historic Preservation PO Box 48343 Olympia, WA 98504-8343 (p) 360-586-3534

APPENDIX D: ARCHAEOLOGICAL SITE FORMS

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. Background [HELP]

1. Name of proposed project, if applicable: **Sequalitchew Creek Restoration Plan**

2. Name of applicant: **South Puget Sound Salmon Enhancement Group**

3. Address and phone number of applicant and contact person: **Cole Baldino, Salmon Habitat Project Manager, 360-464-0004, coleb@spsseg.org, 6700 Martin Way E Olympia, WA 98516**

4. Date checklist prepared: **31 December 2022**

5. Agency requesting checklist: **City of DuPont Community Development**

6. Proposed timing or schedule (including phasing, if applicable): **Implementation of the work is planned to take place following the award of all necessary permits which a timeline is unknown. It is expected that all permits will be notified within 2-years of submission. With this anticipation, one could expect construction to occur between July 15, 2024 and Dec 31, 2026 for beaver management and capital projects. Adaptive management and monitoring will take place in the years following implementation to insure proper functioning of the practices.**

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. **Yes, adaptive management will be necessary for the beaver management and long-tern maintaince or construction of techniques may be needed. Also, contigent projects such as ravine habitat may be necessary in later phases.**

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. **All environmental information can be found within the Sequalitchew Creek Restoration Plan and Sequalitchew Creek Restoration Plan Design, and Sequalitchew Creek Restoration Plan Basis of Design Report.**

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. **No**

10. List any government approvals or permits that will be needed for your proposal, if known. **Hydrualic Project Approval (HPA) from the Washington Department of Fish and Wildlife, Programmatic Permit (Likely NWP 27 Phased) from the Amry Corps of Engineers Seattle Branch Division and Critical Areas Permit from City of DuPont.**

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.) **This project is geared to restore year-round flows in Sequalitchew Creek from Sequalitchew Lake to the mouth as well as restore full fish passage throughout the system to support natural life history stages of native salmonids. This will be done using beaver management techniques (see Scope of Work for design details) across the 167-acre Edmonds Marsh, a series of fish passage capital porjects from the Sequalitchew Creek Trailhead to Steilacoom-DuPont Rd. The total stream miles are X and acres are X.**

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or

boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. **This project will take place across the entiety of Edmonds Marsh in the City of DuPont. Projects will range from Steilcoom-DuPont Road downstream to the Seqaulitchew Creek Trailhead crossing at DuPont City Hall. See Attachment 1 in Scope of Work for map of projects, exact locations and GPS coordinates.**

B. Environmental Elements [HELP]

1. *Earth* [help]

a. General description of the site:

(circle one): **Flat**, rolling, hilly, steep slopes, mountainous, other _____

b. What is the steepest slope on the site (approximate percent slope)? **The steepest slope on the site is less than 1%. This system is very flat.**

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. **Generaly, wetland soils are found within the site since most of the soil is saturated year round.**

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. **There is no history or signs of unstable soils.**

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill. **The filling and grading proposed has a minimal footprint and will be confined to the Losing Reach project found in the planset. The fill will be fine material brough in from within the watershed curtosiy of CalPortland. The goal of thios fill and grading approach will be to retain surface water flows and connection through the reach. Currently, all surface water is lost underground and the goal is to keep this water on the surface to allow fish passage and year round surface flows.**

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. **No**

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? **0%**

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: **An approved Erosion and Sediment Cpontrol Plan will be submitted and followed during construction.**

2. Air [help]

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. **None**

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. **None**

c. Proposed measures to reduce or control emissions or other impacts to air, if any: **None**

3. Water [help]

a. Surface Water: [help]

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. **Yes, the project is proposed to take place within boundaries of Sequalitchew Creek, more specifically Edmonds Marsh and Sequalitchew Creek mainstem.**

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. **Yes, please see Scope of Work for design concepts. These practies are in-stream techniques to restore wetland/stream function, fish passage, water quality and improve salmon life histories.**

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. **Anywhere from 1,000 to 8,000 CY of fill will be placed in the Losing Reach (Design page #).**

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. **Sections of the channel are currently dry year-round. Those with surface water flows will have a temporary bypass to allow for construction to occur in the channel during an approved work window. All bypass/diversion will be temporary and only for construction.**

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. **Yes, the proposal is within the 100-year floodplain.**

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. **None**

b. Ground Water: [help]

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. **None**

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. **None**

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe. **This project will occur in state open waters and therefore have no stormwater management. No water will leave the system and will remain in Sequalitchew Creek. There will be no external source of runoff caused by the project.**

2) Could waste materials enter ground or surface waters? If so, generally describe. **No**

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe. **No**

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any: **No impacts will occur to surface, ground, and runoff water or drainage patterns during the project.**

4. Plants [help]

a. Check the types of vegetation found on the site:

__X_deciduous tree: alder, maple, aspen, other
__X_evergreen tree: fir, cedar, pine, other
__X_shrubs
____grass

____pasture
____crop or grain
____ Orchards, vineyards or other permanent crops.
__X_ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
__X_water plants: water lily, eelgrass, milfoil, other
____other types of vegetation

b. What kind and amount of vegetation will be removed or altered? **A minimal footprint of vegetation will be impacted during construction of the fish passable structures. Please see the attached Arborist Report for further details.**

c. List threatened and endangered species known to be on or near the site. **None**

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: **None**

e. List all noxious weeds and invasive species known to be on or near the site.
Reed Canary Grass and Japanese Knotweed

5. Animals [help]

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. **Beavers, deer, heron, coyote, nutria, otter, mink and western waterfowl and songbirds.**

Examples include:

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

b. List any threatened and endangered species known to be on or near the site. **None**

c. Is the site part of a migration route? If so, explain. **The site is part of the Pacific Flyway, a migratory cooridor for waterfowl and other avain species. The watershed currently doe not have a salmon population, but historically was home to natal coho and chum salmon, in which this project is geared towards restoring.**

d. Proposed measures to preserve or enhance wildlife, if any: **The entirety of the project will enhance wildlife through improved year-round flow and full fish passage through Sequalitchew Creek. All projects will benefit beavers, salmon, and all other wildlife.**

e. List any invasive animal species known to be on or near the site. **None**

6. Energy and Natural Resources [help]

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. **None**

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. **No**

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any: **None**

7. Environmental Health [help]

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe. **None**

1) Describe any known or possible contamination at the site from present or past uses. **None**

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity. **None**

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project. **None**

4) Describe special emergency services that might be required. **None**

5) Proposed measures to reduce or control environmental health hazards, if any: **None**

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? **None**

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. **None**

3) Proposed measures to reduce or control noise impacts, if any: **None**

8. Land and Shoreline Use [help]

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe. **The current use of the site is open space-critical areas as it is a wetland/stream channel. The surrounding area is R5 – Residential 5**

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use? **No**

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how: **No**

c. Describe any structures on the site. **None**

d. Will any structures be demolished? If so, what? **No**

e. What is the current zoning classification of the site? **Open Space**

f. What is the current comprehensive plan designation of the site? **178 Open Space**

g. If applicable, what is the current shoreline master program designation of the site? **Sequalitchew Creek has mean annual flows too low to be considered part of the City's shoreline jurisdiction, but it plays an important role in the nearshore environment of the Nisqually Reach, providing fresh water and sediment inputs, and supporting runs of non-natal anadromous fish.**

h. Has any part of the site been classified as a critical area by the city or county? If so, specify. **This area has been designated as critical area by Pierce County due to its designation as a wetland.**

i. Approximately how many people would reside or work in the completed project? **0**

j. Approximately how many people would the completed project displace? **0**

k. Proposed measures to avoid or reduce displacement impacts, if any: **None**

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: **None**

m. Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any: **None**

9. Housing [help]

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. **None**

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. **None**

c. Proposed measures to reduce or control housing impacts, if any: **None**

10. Aesthetics [help]

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? **No structures will be built.**

b. What views in the immediate vicinity would be altered or obstructed? **None**

b. Proposed measures to reduce or control aesthetic impacts, if any: **None**

11. Light and Glare [help]

a. What type of light or glare will the proposal produce? What time of day would it mainly occur? **None**

b. Could light or glare from the finished project be a safety hazard or interfere with views? **No**

c. What existing off-site sources of light or glare may affect your proposal? **None**

d. Proposed measures to reduce or control light and glare impacts, if any: **None**

12. Recreation [help]`

a. What designated and informal recreational opportunities are in the immediate vicinity?
Walking trails are throughout the project area.

b. Would the proposed project displace any existing recreational uses? If so, describe. **No**

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: **None. The proposed practices will improve recreation and help protect the integrity and flooding of the trail systems.**

13. Historic and cultural preservation [help]

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers ? If so, specifically describe. **None**

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. **None**

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc. **None**

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required. **None**

14. Transportation [help]

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any. **None**

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop? **No**

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? **None**

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). **None**

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. **Yes, this will occur within water.**

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates? **None**

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe. **No**

h. Proposed measures to reduce or control transportation impacts, if any: **None**

15. Public Services [help]

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. **No**

b. Proposed measures to reduce or control direct impacts on public services, if any. **None**

16. Utilities [help]

a. Circle utilities currently available at the site: **None**
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system,

other _____

c. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. **None**

C. Signature [HELP]

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____ Cole Baldino Digitally signed by Cole Baldino Date: 2023.06.21 10:27:06 -07'00'

Name of signee _____

Position and Agency/Organization _____

Date Submitted: _____

D. Supplemental sheet for nonproject actions [HELP]

(**IT IS NOT NECESSARY** to use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

Proposed measures to avoid or reduce such increases are: **N/A**

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

Proposed measures to protect or conserve plants, animals, fish, or marine life are: **This project will greatly benefit plants, animals, and marine life by restoring year-round flow from Sequalitchew Lake to the Puget Sound.**

3. How would the proposal be likely to deplete energy or natural resources?

Proposed measures to protect or conserve energy and natural resources are: **N/A**

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

Proposed measures to protect such resources or to avoid or reduce impacts are: **This project would improve, restore, and proptect the environmentally sensitive area such as the Edmonds Marsh wetland and Sequalitchew Creek.**

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Proposed measures to avoid or reduce shoreline and land use impacts are: **N/A**

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Proposed measures to reduce or respond to such demand(s) are: **N/A**

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment. **N/A**