
DRAFT
ENVIRONMENTAL ASSESSMENT

Volume 2: Appendices
(Appendix A – Appendix F)

FRIDAY HARBOR REGIONAL AIRPORT
SOUTHWEST DEVELOPMENT AREA PROJECT
Unique Documentation Number: EAXX-021-12-ARP-1776174556

Friday Harbor Regional Airport
San Juan County, Washington

Prepared for:

PORT OF FRIDAY HARBOR

**U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

As lead Federal Agency pursuant to the National Environmental Policy Act of 1969

Prepared by:

Environmental Science Associates

September 2026

Appendix A

References

References

- AirNav. 2026. *KFHR – Friday Harbor Airport*. Available:
<https://www.airnav.com/airport/KFHR#:~:text=Lights:,RWY%2016/34%20%2D%20CTAF>.
Accessed April 2026.
- Census (United State Census Bureau). 2024a. *Washington State*.
<https://data.census.gov/profile/Washington?g=040XX00US53#populations-and-people>. Accessed
February 2026.
- Census (United State Census Bureau). 2024b. *San Juan County*.
https://data.census.gov/profile/San_Juan_County,_Washington?g=050XX00US53055#populations-and-people. Accessed February 2026.
- Census (United States Census Bureau). 2204c. Block Group 2; Census Tract 95604: San Juan County;
Washington.
https://data.census.gov/profile/Block_Group_2;_Census_Tract_9604;_San_Juan_County;_Washington?g=1500000US530559604002. Accessed February 2026.
- Coffman and PAE (Coffman Associates and Precision Approach Engineering). 2020. *Airport Master Plan for Friday Harbor Airport – Airport Master Plan*. Prepared for the Port of Friday Harbor. Available: <https://www.portfridayharbor.org/wp-content/uploads/2020/09/FHRFinalMPApril2020.pdf>. Accessed April 2026.
- Ecology (Washington State Department of Ecology). 2022. *Stormwater Treatment of Tire Contaminants Best Management Practices (BMP) Effectiveness*.
<https://apps.ecology.wa.gov/publications/documents/2310001.pdf>. Accessed April 2026.
- Ecology (Washington State Department of Ecology). 2024. *Ecology Stormwater Management Manual for Western Washington (SWMMWW)*.
https://fortress.wa.gov/ecy/ezshare/wq/SWMMs/2024SWMMWW/2024_SWMMWW.htm.
Accessed August 2025.
- Ecology 2026a (Washington State Department of Ecology). *What's in My Neighborhood: Toxics Cleanup*. <https://apps.ecology.wa.gov/neighborhood/?lat=47.500000&lon=-121.000000&zoom=7&radius=false>. Accessed April 2026.
- Ecology (Washington State Department of Ecology). 2026b. *Contaminated Sites List*.
<https://apps.ecology.wa.gov/cleanupsearch/reports/cleanup/contaminated>. Accessed April 2026.
- EPA (U.S. Environmental Protection Agency). 2025a. *Inventory of U.S. Greenhouse Gas Emissions and Sinks*. <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks>. Accessed April 2026.
- EPA (U.S. Environmental Protection Agency). 2025b. *Inventory of U.S. Greenhouse Gas Emissions and Sinks by State: 1990-2021*. <https://www.epa.gov/ghgemissions/methodology-report-inventory-us-greenhouse-gas-emissions-and-sinks-state-1990-2021>

- EPA (U.S. Environmental Protection Agency) 2026a. *NEPAssist website*.
<https://www.epa.gov/nepa/nepassist>. Accessed April 2026.
- EPA (U.S. Environmental Protection Agency). 2026b. *Sole Source Aquifers Online Map*.
<https://experience.arcgis.com/experience/1bfab371d71e4b868fc9ae7df62a16fe>. Accessed April 2026.
- Federal Aviation Administration (FAA), 2006. *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*. FAA Order 5050.4B. Federal Aviation Administration. April 28, 2006.
- FAA (Federal Aviation Administration) 2024.a. *National Plan of Integrated Airport Systems*.
https://www.faa.gov/airports/planning_capacity/npas/current. Accessed April 2026.
- FAA (Federal Aviation Administration). 2024b. *Aviation Emissions and Air Quality Handbook Version 4*.
https://www.faa.gov/regulations_policies/policy_guidance/envir_policy/airquality_handbook/files/airquality_handbook_version_4.pdf. Accessed April 2026.
- FAA (Federal Aviation Administration). 2025. *FAA Order 1050.1 Desk Reference*.
https://www.faa.gov/about/office_org/headquarters_offices/apl/envir_policy_guidance/policy/faa_nepa_order/desk_ref. Accessed April 2026.
- LWCF (Land and Water Conservation Fund Coalition). 2026. *Map of LWCF*.
<https://lwcfcoalition.org/map>. Accessed April 2026.
- McIntyre, J.K., J.W. Davis, C. Hinman, K.H. Macneale, B.F. Anulacion, N.L. Scholz, J.D. Stark. 2015. *Soil bioretention protects juvenile salmon and their prey from the toxic impacts of urban stormwater runoff*. Chemosphere, Volume 132, 2015, Pages 213-219.
<https://www.sciencedirect.com/science/article/pii/S0045653514014805>.
- NMFS (National Marine Fisheries Service). 2022. *Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Salish Sea Nearshore Programmatic Consultation (SSNP)*. Seattle, Washington. <https://www.fisheries.noaa.gov/feature-story/salish-sea-biological-opinion-provides-path-nearshore-projects-while-safeguarding>.
- NRCS (Natural Resources Conservation Service). 2026. *Web Soil Survey*.
<https://websoilsurvey.nrcs.usda.gov/app/>. Accessed April 2026.
- NPS (National Park Service). 2026. *Nationwide Rivers Inventory*.
<https://www.nps.gov/maps/full.html?mapId=8adbe798-0d7e-40fb-bd48-225513d64977> Accessed April 2026.
- Port of Friday Harbor. 2026. *Port of Friday Harbor – About the Airport*.
<https://www.portfridayharbor.org/airport/#:~:text=The%20airport%20offers%20a%20well,rental%20cars%2C%20and%20shuttle%20buses>. Accessed April 2026.
- PAE (Precision Approach Engineering). 2025. *Southwest Development Area Post-Construction Stormwater Management Plan*. Prepared for Port of Friday Harbor. February 2025.

- SJC (San Juan County). 2025. *San Juan County Comprehensive Plan 2025-2045*.
<https://www.sanjuancountywa.gov/510/Comprehensive-Plan>. Accessed April 2026.
- SJC (San Juan County). 2026. *San Juan County Polaris Property Search*.
<https://gis.sanjuancountywa.gov/polaris/>. Accessed April 2026.
- Stern, Bernhard J. 1969. *The Lummi Indians of Northwest Washington*. Reprinted ed. AMS Press, New York. Originally published 1934. Columbia University Press, New York.
- Suttles, Wayne Prescott. 1974. *Economic Life of the Coast Salish of Haro and Rosario Straits*. Ph.D. dissertation, University of Washington, Seattle.
- Suttles, Wayne Prescott. 1990. Central Coast Salish. In *Northwest Coast*, edited by Wayne Suttles, pp 453-475. Handbook of North American Indians, Vol. 7, William C. Sturtevant, general editor.
- Tremaine, David G. 1975. *Indian & Pioneer Settlement of the Nooksack Lowland, Washington, to 1890*. Center for Pacific Northwest Studies Occasional Paper No. 4. Western Washington State College, Bellingham.
- United States Census Bureau. 2020. *2020 Census Tract Identifier Online Database*. https://mtgis-portal.geo.census.gov/arcgis/apps/experiencebuilder/experience/?id=bc7d5cafd5e94dfb875ac36df0deaf77#data_s=id%3AdataSource_13-19151897ed9-layer-2-8~dataSource_14-19151897ed9-layer-2-8%3A72561. Accessed February 2026.
- USFWS (U.S. Fish and Wildlife Service). 2026a. *Information for Planning and Consultation (IPaC)*.
<https://ipac.ecosphere.fws.gov/>. Accessed April 2026.
- USFWS (U.S. Fish and Wildlife Service). 2026b. National Wetlands Inventory.
<https://www.fws.gov/program/national-wetlands-inventory/wetlands-mapper>. Accessed April 2026.
- WDFW (Washington Department of Fish and Wildlife). 2013. *Water Crossing Design Guidelines*.
<https://wdfw.wa.gov/sites/default/files/publications/01501/wdfw01501.pdf>. Accessed April 2026.
- WDFW (Washington Department of Fish and Wildlife). 2026. *Priority Habitats and Species (PHS) on the Web*. <https://geodataservices.wdfw.wa.gov/hp/phs/>. Accessed April 2026.
- WDNR (Washington Department of Natural Resources). 2026. *Forest Practices Application Mapping Tool (FPAMT)*. Available: https://fpamt.dnr.wa.gov/2d-view#activity?-14567348,-12817246,5467611,6580534?WADNR_PUBLIC_Public_Land_Survey!4!8!0!,WADNR_PUBLIC_FP_Misc!1!4!0!,WADNR_PUBLIC_FP_Trans!2!1!0!,WADNR_PUBLIC_FP_Water_Type!1!,WADNR_PUBLIC_FP_Hydro!3!1!,WADNR_PUBLIC_OCIO_Parcels!0!. Accessed April 2026.
- WSDOT (Washington State Department of Transportation). 2008. Aviation Stormwater Design Manual. December 2008. <https://wsdot.wa.gov/sites/default/files/2021-10/Airport-Stormwater-Manual-2009.pdf>. Accessed April 2026.
- WSDOT (Washington State Department of Transportation). 2019. *Highway Runoff Manual*. April 2019.
<https://wsdot.wa.gov/engineering-standards/all-manuals-and-standards/manuals/highway-runoff-manual>

Appendix B

Biological Resources

B1 NMFS Biological Assessment

Final

FRIDAY HARBOR AIRPORT SOUTHWEST DEVELOPMENT AREA PROJECT

Biological Assessment (NMFS)

Prepared for
Port of Friday Harbor

June 2025



Final

FRIDAY HARBOR AIRPORT SOUTHWEST DEVELOPMENT AREA PROJECT

Biological Assessment (NMFS)

Prepared for
Port of Friday Harbor

June 2025

204 Front Street,
Friday Harbor, WA 98250

2801 Alaskan Way
Suite 200
Seattle, WA 98121
206.789.9658
esassoc.com



Bend	Pasadena	San Francisco
Irvine	Pensacola	San Jose
Los Angeles	Petaluma	Santa Barbara
Mobile	Portland	Sarasota
Oakland	Rancho Cucamonga	Seattle
Orlando	Sacramento	Tampa
Palm Beach County	San Diego	Thousand Oaks

EXECUTIVE SUMMARY

The Port of Friday Harbor (Port), owner and operator of the Friday Harbor Regional Airport (FHR), proposes to develop approximately 65 acres on the southwest portion of the airport called the Southwest Development Area (SWDA) (Proposed Project) to meet design standards and safety requirements established by the Federal Aviation Administration (FAA). Key elements of the Proposed Project include the following: constructing taxiways, building new hangars, constructing a snow removal equipment (SRE) building, building a new vehicle access road and parking lot, upgrading the existing stormwater treatment and detention facilities, and a partial realignment of the Clark McAlpine Trail to continue public access.

The Proposed Project will require funding from the FAA, creating a federal nexus. The Endangered Species Act (ESA) requires federal agencies to ensure that their actions do not jeopardize the continued existence of threatened or endangered species or their Critical Habitats. Environmental Science Associates prepared this Biological Assessment on behalf of the Port to assess the effect of the proposed airport improvements on species under the jurisdiction of the National Marine Fisheries Service (NMFS) that are listed or proposed for listing as endangered or threatened under the federal ESA. This document also addresses the potential effects of the Proposed Project on designated or proposed Critical Habitat and on Essential Fish Habitat (EFH) as designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Analyses of potential effects were made based on a review of Project plans, on-site evaluation of existing habitat conditions, and a data review of the current and historic distributions of each species.

The Proposed Project will include approximately 4.5 acres of new asphalt and concrete pavement and 3.3 acres of new and replaced access roads and vehicle parking, for a total increase of 7.8 acres of new and replaced pollution-generating impervious surfaces (PGIS). However, new stormwater treatment facilities will be constructed in the SWDA that are designed to meet NMFS stormwater management criteria for projects involving new or redeveloped impervious surfaces to avoid and minimize impacts on species and habitats protected under the federal ESA. The pollutants of concern that may be discharged from aircraft operating surfaces are particulates such as trace metals (e.g., copper or zinc) and petroleum-related products (polycyclic aromatic hydrocarbons – PAHs) or general sediment consisting of dirt, dust, and grit. There is also the potential for 6PPD-quinone (6PPD-q) from tire wear. The extent of 6PPD-q discharge from airports continues to be evaluated. There are currently multiple stormwater treatment facilities at the FHR but no treatment facilities in the SWDA. The general stormwater facility design is to treat pollution-generating impervious areas for water quality flows at or close to the source, then convey flows through various open-channel swales or pipes to the southeast detention area and detain stormwater volume to release at controlled rates. The bioinfiltration techniques utilized for this Proposed Project will include infiltration, sorption, filtration, and sedimentation, which follows current best management practices (BMPs) for the removal of 6PPD-q from stormwater runoff prior to discharge to surface waters, per the 2024 Stormwater Management Manual for Western Washington (SWMMWW). Linear type pavements

will be treated using Compost-Amended Vegetated Filter Strips (CAVFS), and runoff from other paved areas will be routed to bioretention swales. The water quality treatment facilities are expected to treat between 91 and 99 percent of stormwater before it is discharged into North Bay and have been designed to meet NMFS standards for water quality. The proposed stormwater flow control will include constructing two open storage stormwater detention facilities that will use a combination of orifice and weir control structures to provide the NMFS design flow control.

Stormwater from the airport ultimately discharges to North Bay through two stormwater outfalls approximately 1,000 feet from FHR. Federally listed Puget Sound Chinook salmon (*Oncorhynchus tshawytscha*), Puget Sound steelhead (*O. mykiss*), yelloweye rockfish (*Sebastes ruberrimus*), bocaccio rockfish (*S. paucispinis*), Pacific eulachon (*Thaleichthys pacificus*), and Southern Resident killer whale (*Orcinus orca*) may occur in North Bay. Additionally, North Bay is designated Critical Habitat for Puget Sound Chinook salmon, yelloweye rockfish, bocaccio rockfish, and Southern Resident killer whale. The stormwater treatment technologies feasible at the site are not 100 percent effective at removing a number of stormwater pollutants that are persistent and mobile in the aquatic environment. Given that recognized stormwater treatment will occur, stormwater effects to listed aquatic species will be reduced but not eliminated. Therefore, the Proposed Project's effects determination is “**may affect, likely to adversely affect**” for the six species present in North Bay (**Table ES-1**).

North Bay is designated Critical Habitat for Puget Sound Chinook salmon, yelloweye rockfish, bocaccio rockfish, and Southern Resident killer whale, and a determination of “**may affect, likely to adversely affect**” Critical Habitat will also occur.

In addition to ESA-listed species, the Proposed Project **will adversely affect** EFH protected under the MSA for Pacific salmon (juvenile and adult), coastal pelagic species (all life stages), and ground fish (all life stages). The Proposed Project will reduce the quality of EFH from increased stormwater runoff for each of these groups.

Table ES-1 summarizes the ESA effect determinations for listed species made for the Friday Harbor Airport Southwest Development Area.

TABLE ES-1
SUMMARY OF LISTED SPECIES, EFFECT DETERMINATIONS, AND CRITICAL HABITAT IN THE ACTION AREA

Common Name	ESA Status	Critical Habitat in the Action Area	Impacts Analysis Determination
Chinook Salmon Puget Sound ESU ¹	Threatened	Yes	May Affect, Likely to Adversely Affect May Affect, Likely to Adversely Affect Critical Habitat
Steelhead Puget Sound DPS ²	Threatened	No	May Affect, Likely to Adversely Affect No Critical Habitat present
Yelloweye Rockfish Puget Sound/Georgia Basin DPS	Threatened	Yes	May Affect, Likely to Adversely Affect May Affect, Likely to Adversely Affect Critical Habitat
Bocaccio Rockfish Puget Sound/Georgia Basin DPS	Endangered	Yes	May Affect, Likely to Adversely Affect May Affect, Likely to Adversely Affect Critical Habitat
Pacific Eulachon Southern DPS	Threatened	No	May Affect, Likely to Adversely Affect No Critical Habitat present
Southern Resident Killer Whale	Endangered	Yes	May Affect, Likely to Adversely Affect May Affect, Likely to Adversely Affect Critical Habitat

NOTES:

1. ESU- Evolutionarily Significant Unit.
2. DPS- Distinct Population Segment.

CONTENTS

Friday Harbor Airport Southwest Development Area Project – Biological Assessment (NMFS)

	<u>Page</u>
Executive Summary	ES-1
Acronyms and Abbreviations	iii
Chapter 1 Introduction.....	1-1
1.1 Project Location and Setting	1-2
1.2 Existing Stormwater Facilities	1-2
Chapter 2 Project Description.....	2-1
2.1 Proposed Project	2-1
2.2 Proposed Stormwater Management	2-2
2.3 Wetland Impacts	2-6
2.4 Construction Activities and Schedule.....	2-6
2.5 Impact Avoidance and Minimization Measures	2-8
Chapter 3 Action Area.....	3-1
3.1 Terrestrial Action Area	3-1
3.2 Aquatic Portion of the Action Area	3-2
Chapter 4 Status/Presence of Listed Species and Designated Critical Habitat.....	4-1
4.1 Listed Species with the Potential to Occur in the Action Area.....	4-1
Chapter 5 Environmental Setting.....	5-1
5.1 Terrestrial Habitat Conditions in the Action Area	5-1
5.2 Aquatic Habitat Conditions in the Action Area	5-1
Chapter 6 Consequences of the Action	6-1
6.1 Direct Effects	6-1
6.2 Indirect Effects	6-2
6.3 Effects from Interrelated and Interdependent Actions	6-4
6.4 Cumulative Effects	6-4
Chapter 7 Effect Determinations.....	7-1
7.1 Effects on Listed Species.....	7-1
7.2 Effects on Critical Habitat.....	7-4
Chapter 8 Essential Fish Habitat Assessment	8-1
8.1 Description of the Proposed Project	8-2
8.2 Potential Adverse Effects of Proposed Project	8-2
8.3 Potential Effects on Essential Fish Habitat	8-2
8.4 Conservation Measures for Essential Fish Habitat	8-3
8.5 Conclusions	8-3
Chapter 9 References	9-1

Figures

Figure 1	Project Location	1-3
Figure 2	Project Elements	2-3
Figure 3	Wetland Impacts	2-7
Figure 4	Action Area.....	3-3

Tables

Table ES-1	Summary of Listed Species, Effect Determinations, and Critical Habitat in the Action Area.....	ES-3
Table 1	Design Summary of Proposed Water Quality Treatment Facilities.....	2-5
Table 2	Stormwater Pre-Developed vs. Mitigated Discharges	2-5
Table 3	Construction Schedule	2-8
Table 4	ESA-Listed Species with Potential for Occurrence in the Action Area	4-2
Table 5	Species and Life-Stages with EFH in the Action Area.....	8-2

Appendices

- A. Southwest Development Post-Construction Stormwater Management Plan
- B. NMFS Species List
- C. Species Life History
- D. Representative Photographs

Acronyms and Abbreviations

Abbreviation	Definition
µg/L	micrograms per liter
6PPD-q	6PPD-quinone
ASOS	Automated Surface Observing System
BA	Biological Assessment
BMPs	best management practices
CAVFS	Compost-Amended Vegetated Filter Strips
CFR	Code of Federal Regulations
CIP	Capital Improvement Plan
dB	decibel
dBA	A-weighted decibel
DPS	Distinct Population Segment
Ecology	Washington State Department of Ecology
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FAA	Federal Aviation Administration
FHR	Friday Harbor Regional Airport
FMP	Fishery Management Plan
FR	Federal Register
GIS	geographic information system
LID	Low-Impact Development
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NWIFC	Northwest Indian Fisheries Commission
PAE	Precision Approach Engineering
PAHs	polycyclic aromatic hydrocarbons
PBF	physical or biological feature
PCE	primary constituent element
PGIS	pollution-generating impervious surface
PHS	Priority Habitats and Species

Abbreviation	Definition
Port	Port of Friday Harbor
SPCC Plan	Spill Prevention, Control, and Countermeasure Plan
SRE	snow removal equipment
SSNP	Salish Sea Nearshore Programmatic Consultation
SWDA	Southwest Development Area
SWIFD	Statewide Integrated Fish Distribution
SWMMWW	Stormwater Management Manual for Western Washington
SWPCP	Stormwater Pollution Control Plan
TESC Plan	Temporary Erosion and Sediment Control Plan
USFWS	United States Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation
WWHM	Western Washington Hydrology Model

CHAPTER 1

Introduction

The Port of Friday Harbor (Port), owner and operator of the Friday Harbor Regional Airport (FHR), proposes to develop approximately 65 acres of an approximately 115-acre portion of the airport, identified as the Southwest Development Area (SWDA), for airport maintenance and improvements to accommodate future airport operations (Proposed Project). The planned development is located within the mostly undeveloped southwest portion of the airport property.

This Biological Assessment (BA) evaluates the potential effects of the Proposed Project on species listed as threatened or endangered under the federal Endangered Species Act (ESA) of 1973, as amended. The Proposed Project requires approval from the Federal Aviation Administration (FAA), which is the lead federal agency for ESA Section 7 consultation. Section 7 of the ESA requires that, through consultation (or conferencing for proposed species) with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS), federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species or result in the destruction or adverse modification of Critical Habitat. This BA was developed using existing data from species lists and information from the NMFS website, literature reviews, coordination with NMFS, stormwater management design methods, and recent field studies conducted for the Proposed Project. Species under the jurisdiction of USFWS are being addressed in a separate BA.

In addition, this BA addresses the Proposed Project in compliance with the Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996. The objective of the Essential Fish Habitat (EFH) assessment is to determine whether the Proposed Project may adversely affect designated EFH for relevant federally managed commercial fish species potentially occurring within the Action Area (as defined in Chapter 3 of this BA). For the purpose of this assessment, the Proposed Project for the EFH assessment and BA incorporates the same elements.

This evaluation has the following objectives:

- To review and compile information on species that may be found within and near the Proposed Project.
- To describe impacts of the Proposed Project and effects to species and habitats.
- To identify expected permit conditions and additional impact avoidance and minimization measures.
- To provide a recommendation with regard to effect determinations.

1.1 Project Location and Setting

FHR is located on the southeast side of San Juan Island in San Juan County, Washington in Sections 14 and 23 of Township 35 North, Range 3 West, of the Willamette Meridian (**Figure 1**). The southern approximately 115-acre portion of the airport property where the Proposed Project is located, known as the SWDA, is in unincorporated San Juan County. The airport is bordered by Mullis Street and Cattle Point Road on the east, Cattle Point Road on the south, and private and publicly owned properties on the west and north. The majority of the land west of the airport property is forested. The Clark McAlpine Trail runs through the airport property, south and west of the runway.

1.2 Existing Stormwater Facilities

FHR is situated within three primary drainage basins: Basin 1, which drains the northern portion of the airport and drains to the existing Mullis Detention Pond; Basin 2, which drains the southern portion; and Basin 3, which drains the remaining airport property, including airport support infrastructure, minor access roads, and small developments (PAE 2025, **Appendix A, Figure 2**). Within the three primary basins, subbasins have been identified. The proposed improvements occur within Subbasins 2B, 3A, 3B, and 3D. Stormwater runoff from Basin 1 drains across the northern portion of the airport in a southerly and easterly direction, discharging to a constructed stormwater detention pond on the east side of Mullis Street (Mullis Pond). In addition to airport runoff, Mullis Pond receives runoff from the adjacent fire station and areas upstream. Discharges from Mullis Pond are conveyed approximately 0.25 mile to North Bay, part of the Salish Sea, and east of the airport through a series of pipes, ditches, and three constructed ponds on private property.

Existing impervious runoff from Basin 2 and Basin 3 leaves the airport property without passing through a stormwater system specifically designed for quantity or quality treatment; however, sediment and pollutants are filtered and settled to a degree as the stormwater is conveyed primarily through the existing vegetated shoulders and open channel swales and ditches. Stormwater from the basins ultimately discharges into North Bay (Reid Middleton 2012).

Aircraft operating surfaces discharge various pollutants of concern. They primarily include particulates such as trace metals (e.g., copper or zinc) and petroleum-related products (polycyclic aromatic hydrocarbons – PAHs) or general sediment consisting of dirt, dust, and grit. There is also the potential for 6PPD-quinone (6PPD-q) from tire wear. However, the extent of 6PPD-q discharge from airports continues to be evaluated.

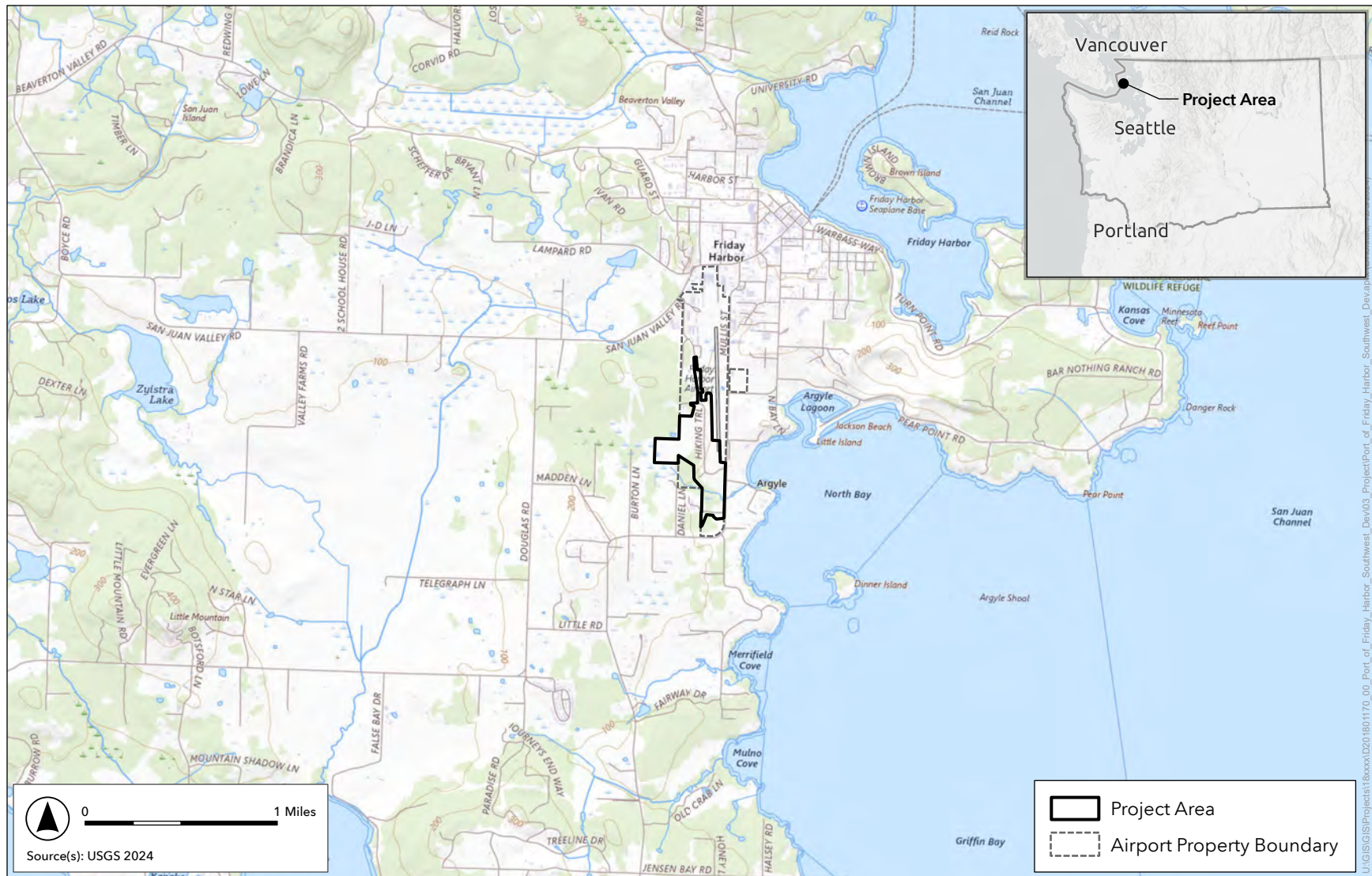


Figure 1
Project Location

CHAPTER 2

Project Description

2.1 Proposed Project

The Proposed Project involves the development of various Aircraft Operations Areas, aircraft storage and parking facilities, and supporting infrastructure on an approximately 115-acre site, the SWDA, on the southwest portion of the airport property (**Figure 2**) Additional details are shown in **Appendix A, Figure 1**. The Proposed Project includes:

- Construction of three approximately 12,000-square-foot T-hangars, and five box hangars with a maximum size of approximately 10,000 square feet each.
- Construction of taxilanes and aircraft parking apron to support approximately 10 aircrafts per FAA Airplane Design Group I (up to 49-foot wingspan) standards.
- Construction of approximately 9 acres of Aircraft Operations Area pavement, aircraft operational support areas, and vehicle pavement. Includes approximately 4,200 linear feet of vehicle roadway and approximately 35 vehicle parking stalls for aircraft hangars and airport operations support. Roadway would connect to Cattle Point Road at the existing Store More Way intersection, resulting in improvements to the existing Store More Way roadway, and includes crossing an existing stream. Vehicle parking would be located on the northwestern portion of the Proposed Project site.
- Construction of one 2,000-square foot snow removal equipment (SRE) building.
- Relocation of the existing FAA-owned Automated Surface Observing Systems (ASOS) aircraft weather station, including associated utilities.
- Removal of the existing Shelter Road access to airport property, which eliminates an incompatible use in the existing Runway 34 Runway Protection Zone.
- Installation of new security fencing, vehicle gates, and pedestrian gates around the perimeter of the proposed Aircraft Operations Area.
- Installation of pole-mounted and/or building-mounted exterior lights for vehicle parking lots, and aircraft parking apron.
- Installation of appropriate airfield lights, retroreflective markers, and signage for the aircraft parking apron and taxilanes.
- Land clearing, demolition of existing facilities, excavation, embankment, grading, and retaining wall construction.
- Extension of utilities to the Proposed Project site, including electrical power. A utility corridor will be provided to allow for the future installation of utilities not installed during this Proposed Project, which may include water, sanitary sewer, communications, fiber, and other related utility infrastructure.

- Installation of stormwater collection, conveyance, treatment, flow control systems, and associated infrastructure.
- Realignment of a portion of the existing Clark McAlpine Trail that crosses the Proposed Project site, resulting in approximately 3,500 linear feet of realigned trail.
- Landscaping and permanent soil stabilization measures.

The Proposed Project improvements include approximately 4.5 acres of new asphalt and concrete pavement and 3.3 acres of new and replaced access roads and vehicle parking, for a total of 7.8 acres of new and replaced pollution-generating impervious surfaces. Hangar and airport operations support building impervious area developments total approximately 1.3 acres.. When combined with the existing contributing impervious area to remain, the total new, replaced, and existing impervious surfaces within subbasins 2B, 3A, 3B, and 3D (the contributing Project basin area) is approximately 15.7 acres. The remaining 83.2 acres of the contributing Project basin area will remain pervious, vegetated, open space.

2.2 Proposed Stormwater Management

As discussed with NMFS prior to design, the *Southwest Development Area Post-Construction Stormwater Management Plan (Appendix A)* for the Proposed Project has been designed to meet NMFS stormwater management criteria for projects involving new or redeveloped impervious surfaces to avoid and minimize impacts on species and habitats protected under the federal ESA. The NMFS design criteria have been documented in various programmatic agreements; however, because the FAA is the lead federal agency for this consultation, none of the available programmatic agreements apply directly. Although the Proposed Project does not directly apply to the covered categories of activities, the Salish Sea Nearshore Programmatic Consultation (SSNP; NMFS 2022), which is employed on routine construction projects regulated by the U.S. Army Corps of Engineers within the Salish Sea nearshore area, has activity categories that align in scope and design criteria that correspond to this Proposed Project. Accordingly, the post-construction stormwater treatment and flow control for this Proposed Project are designed to meet NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management of the SSNP (NMFS 2022; PAE 2025). These facilities are non-proprietary (manufactured). Per the SSNP, proprietary stormwater facilities will only be considered if site constraints preclude the implementation of low-impact development (LID) methods or the alternative can demonstrate improvement in ecosystem health and function commensurate with identified LID practices.

The general stormwater facility design is to treat pollution-generating impervious surface (PGIS) for water quality flows at or close to the source, then convey flows through various open-channel swales or pipes to a detention area in the southeast portion of the Proposed Project site and detain stormwater volume to release at controlled rates. The controlled release will cross Cattle Point Road through an existing 36-inch culvert crossing, which then flows via overland and piped conveyance into the bay approximately 1,000 feet east of the airport property.

The Washington Department of Ecology (Ecology) Western Washington Hydrology Model (WWHM) software was utilized for stormwater modeling (Ecology 2024a). The stormwater basins were input into the modeling software for each stormwater facility design. Results are included in **Appendix A**.

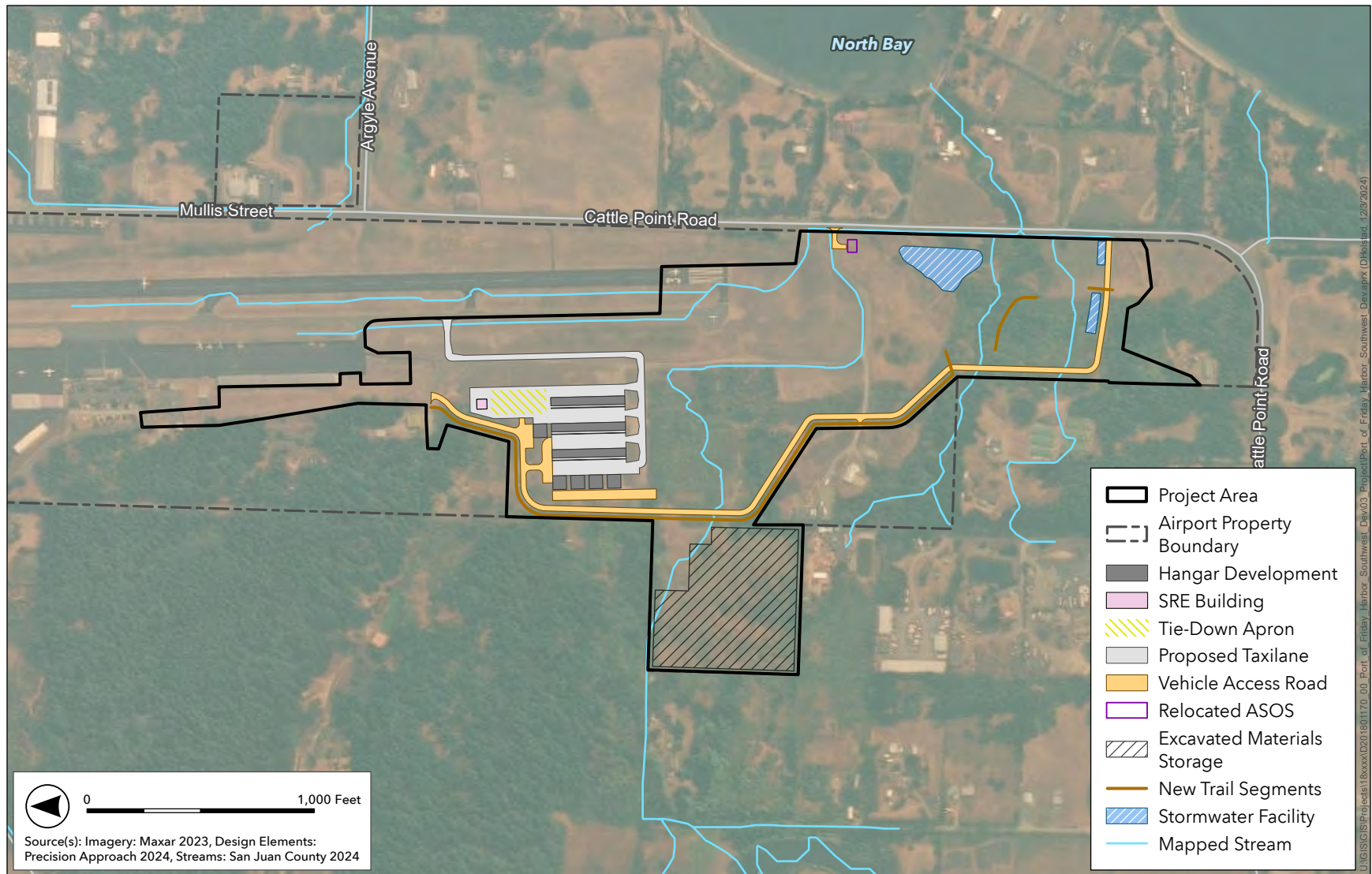


Figure 2
Project Elements

2.2.1 Water Quality Treatment Design

Water quality treatment facilities will be designed following two primary guidelines depending on the impervious area shapes. Linear type pavements will be treated utilizing four Compost-Amended Vegetated Filter Strips (CAVFS). The other intersection and parking areas will be conveyed to a series of six bioretention swales (**Appendix A, Figure 3**). Both types of facilities are considered LID treatment techniques, with the primary treatment occurring as the runoff is filtered through the soil medium. Stormwater from storms smaller than or equal to the water quality storm for the contributing basins will flow through the treatment facilities, and the pollutants are filtered out before discharging downstream and ultimately into the detention (flow control) facilities. The design of both types of water quality treatment facilities utilizes criteria outlined in the 2024 Ecology Stormwater Management Manual for Western Washington (SWMMWW; Ecology 2024b).

Additionally, per SSNP Section 1.3.1.C.13.e, all stormwater quality treatment practices and facilities are designed to accept 50 percent of the cumulative rainfall from the 2-year, 24-hour storm (the water quality design storm) utilizing LID treatments. The bioretention swales are composed of an 18-inch layer of the amended water quality soil blend placed on top of a gravel layer and an underdrain collection system (**Appendix A, Figure 4**). Higher volumes of runoff (flows greater than the water quality design storm) will be allowed to bypass through a riser structure, and then conveyed with the treated runoff to the detention ponds (described below). Although the detention facility's primary purpose is for flow control, the ponds will also provide opportunity for sediment to settle out before discharging off-site. According to the 2024 SWMMWW, flow control and runoff treatment best management practices (BMPs) that utilize infiltration, sorption, filtration, and sedimentation may have potential to reduce some 6PPD-q from stormwater (Ecology 2024b).

All water quality treatment facilities will be vegetated with a minimum of a low-mow grass mixture and modified as recommended in the 2008 Washington State Department of Transportation (WSDOT) *Aviation Stormwater Design Manual*. This is recognized as an accepted design standard to reduce the wildlife attractant nature of surface stormwater infrastructure, a critical element of the Proposed Project, and an FAA requirement for stormwater facility design for airport safety per FAA Advisory Circular 150/5320-5D (FAA 2013). A summary of water quality treatment facility design geometry is included in **Table 1**. See **Appendix A** for more detail.

The on-site stormwater quality treatment facilities, designed using the SWMMWW BMPs, meet the design standards for water quality treatment identified in the section above.

2.2.2 Flow Control Design

Flow control facilities are manmade stormwater detention and treatment ponds used to capture and hold stormwater runoff for a specific period of time before it is ultimately discharged. Flow control facilities will be designed using a combination of orifice and weir control structures to provide the NMFS design flow control, per SSNP Section 1.3.1.C.13.f. The Proposed Project will create two flow control facilities in the form of open storage detention ponds. The site terrain is relatively steep, which lends itself to deeper ponds. Including a 1-foot freeboard above the design storage volume, the ponds are designed at a 10-foot depth. The proposed Basin 2B and 3A detention pond will be approximately 24,000 square feet, which stores a maximum of 320,000 cubic feet. The smaller Basin 3B detention pond is designed at a

4-foot depth, requires approximately 2,000 square feet, and detains a maximum of 9,000 cubic feet of storage. Per SSNP Section 1.3.1.C.13.f, post-construction stormwater flow control methods shall demonstrate that the post-construction stormwater runoff is equal to, or less than, the predevelopment stormwater runoff for all storm events between the 50 percent of the 2-year, 24-hour and the 10-year storm events. **Table 2** presents stormwater discharge peak flow rates and volumes for pre-development and post-development conditions for each basin, which meet these requirements.

TABLE 1
DESIGN SUMMARY OF PROPOSED WATER QUALITY TREATMENT FACILITIES

Facility	Length (ft)	Width (ft)	Slope (%)	Percent Treatment (>91%)
Bioretention Swale 1	14	14	0%	91.3%
Bioretention Swale 2	12	14	0%	92.1%
Bioretention Swale 3	12	14	0%	92.1%
Bioretention Swale 4	8.5	8	0%	91.5%
Bioretention Swale 5	7	5	0%	91.3%
Bioretention Swale 6	9	8	0%	91.1%
CAVFS 1 (Taxilane)	350	10	25%	92.9%
CAVFS 2 (Apron/Taxilane)	1,600	5	25%	98.5%
CAVFS 3 (Roadway)	3,200	2	25%	94.8%
CAVFS 4 (Roadway)	3,420	2	25%	99.2

TABLE 2
STORMWATER PRE-DEVELOPED VS. MITIGATED DISCHARGES

24-hour Storm	Basin 2B & 3A		Basin 3B		Basin 3D	
	Pre-Dev Flow (cfs)	Mitigated Flow (cfs)	Pre-Dev Flow (cfs)	Mitigated Flow (cfs)	Pre-Dev Flow (cfs)	Mitigated Flow (cfs)
2-year ¹	1.573	1.077	0.022	0.016	0.006	0.004
5-year ¹	2.412	1.753	0.034	0.027	0.009	0.007
10-year ¹	2.864	2.310	0.040	0.037	0.011	0.010
25-year ¹	3.321	3.153	0.047	0.052	0.013	0.015
50-year ¹	3.592	3.890	0.050	0.065	0.014	0.020
100-year ¹	3.814	4.728	0.053	0.081	0.015	0.026

NOTES:

1. year flood.
cfs – cubic feet per second.

Similar to the water quality treatment facilities, the open storage detention pond bottoms will be vegetated with a minimum of a low-mow grass mixture and plantings as recommended in WSDOT (2008) and will also implement BMPs that utilize infiltration, sorption, filtration, and sedimentation, which may reduce some GPPD-q from stormwater (Ecology 2024b). Additionally, wildlife hazard mitigation measures are incorporated into the detention pond design, and primarily include the layout of the open storage areas

generally being in a linear form, steepened side slopes, non-vegetated side slopes, and perimeter fencing to reduce attracting waterfowl and other animals.

2.3 Wetland Impacts

A wetland delineation of the SWDA identified five wetland features (Wetlands A through E) totaling 3.1 acres. The wetlands are generally seasonally saturated grass fields that are maintained by mowing. All five wetlands are dominated by palustrine emergent cover, with two of them also containing a scrub-shrub class. Four of the five wetlands have a hydrogeomorphic class of Slope, with the fifth wetland being Depressional. All of the identified wetland features are considered to have a low ecological function and were classified as Category IV wetlands using the Wetland Rating System for Western Washington (Hruby and Yahnke 2023). Three of the five wetland features will be permanently impacted by the Proposed Project. Permanent wetland impacts total approximately 36,629 square feet (0.84 acre), and another 2,334 square feet within their buffers, and will result from the construction of the stormwater ponds, widening of the access roads, and the storage of excavated material (**Figure 3**).

2.4 Construction Activities and Schedule

Staging will occur within the limits of Port property, primarily on existing unpaved surfaces consisting mostly of pasture grasses and weedy herbaceous species. Construction equipment will include but is not limited to excavators, dump trucks, rollers/compactors, pavers, pavement marking trucks, hydroseeder, and slurry seal truck/crack sealers. No highly disturbing construction activities such as impact pile-driving or blasting will occur.

Construction of the Proposed Project would be phased according to the following schedule, based on the following eligible and justified SWDA projects for Airport Improvement Program and Bipartisan Infrastructure Law funding, per the January 11, 2024, FAA 2024-2028 Capital Improvement Plan (CIP) memorandum:

- 2025 – SWDA (New Hangar Taxilanes, Relocate Access Road) – Phase 1 Design. (This project was shifted to 2026 in conjunction with the 2024 FAA CIP update.)
- 2027 – SWDA (New Hangar Taxilanes, Relocate Access Road) – Phase 2 Final Design and Construction. (This project was shifted to 2028 in conjunction with the 2024 FAA CIP update.)
- 2027 – Snow Removal Equipment Building – Phase 2 Design and Construction. (This project was shifted to 2028/9 in conjunction with the 2024 FAA CIP update.)
- 2028 – SWDA - New Hangar Taxilanes, Relocate Access Road) – Phase 3 Design and Construction. (This project was moved beyond 2030 in conjunction with the 2024 FAA CIP update.)

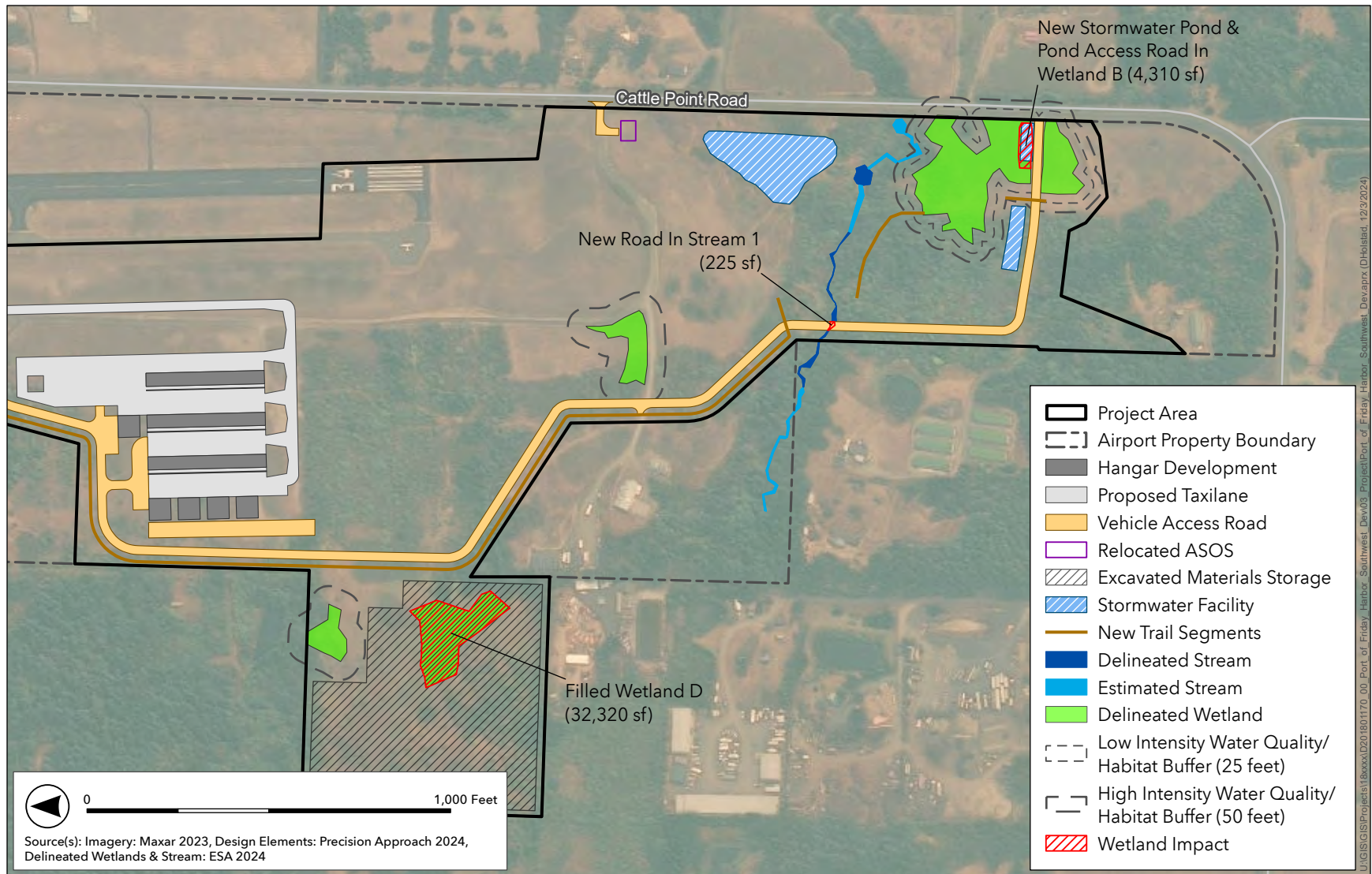


Figure 3
Wetland Impacts

Construction of the Proposed Project would occur over the course of approximately 20 months between 2028 and 2031. Construction would begin in May 2028 and operation of the Proposed Project would begin in late 2031. As shown in **Table 3**, Phase 2 construction would start with site preparation activities (i.e., vegetation clearance, including removal/realignment of the Clark McAlpine Trail) and grading (i.e., cut/fill of land) occurring first, followed by paving (i.e., placement of concrete and/or asphalt) and infrastructure improvements (i.e., installation of water, wastewater, storm drain, electrical, telecommunications facilities, hangars, etc.), followed by the construction of the SRE building. The construction of Phase 3 taxilanes and roadways would be the final phase of construction.

TABLE 3
CONSTRUCTION SCHEDULE

Phase	Estimated Start Date (Month/Year)	Estimated End Date (Month/Year)
Site Preparation	5/2028	6/2028
Grading	6/2028	7/2028
Realignment of Clark McAlpine Trail	6/2028	8/2028
Installation of Stormwater System and Associated Infrastructure	6/2028	8/2028
Paving (Construction of Taxilanes and Aircraft Parking Apron)	7/2028	10/2028
Paving (Vehicle Roadways, Parking)	8/2028	10/2028
Infrastructure Improvements	8/2028	1/2029
Construction of SRE Building	5/2029	9/2029
Construction of Taxilanes – Phase 3	7/2031	10/2031
Paving (Vehicle Roadways) – Phase 3	8/2031	10/2031
Infrastructure Improvements – Phase 3	8/2031	10/2031

SOURCE: Information provided by Port of Friday Harbor

NOTE: If construction phases can reasonably be combined, they will be consolidated.

2.5 Impact Avoidance and Minimization Measures

Measures to avoid and minimize impacts on the environment and ESA-listed species and habitats during construction and post-construction include the following:

- Work areas will be confined to the minimum area needed to complete the work.
- Haul routes will use the existing road system to the extent feasible.
- Stormwater runoff from the completed Proposed Project impervious surfaces during airport operation will be collected and treated in accordance with NMFS criteria as defined in the SSNP.
- Vegetated filter strips will be amended with medium compost to accommodate the removal of 6PPD-q, as per the 2024 SWMMWW.
- A Temporary Erosion and Sediment Control (TESC) Plan will be developed and implemented in accordance with the National Pollutant Discharge Elimination System (NPDES) 1200-C Permit requirements for construction stormwater discharges. TESC measures may include sediment fencing, inlet protection, use of designated construction entrances, and/or other measures to minimize erosion of site soils and sediment transport to downstream receiving waters.

- Industrial stormwater discharges on airport property will continue to be managed under the airport's Stormwater Pollution Control Plan (SWPCP) and NPDES 1200-Z Permit.
- A Spill Prevention, Control, and Countermeasure (SPCC) Plan will be developed and implemented to ensure the appropriate storage, handling, and use of petroleum products and other potential pollutants on-site during construction. The SPCC Plan will include measures for preventing and responding to spills or other releases of potential pollutants, such as fuel, motor oil, and hydraulic fluid.
- Construction vehicles and equipment will be stored, fueled, and maintained on designated areas on-site or on nearby paved areas adjacent to the site.

CHAPTER 3

Action Area

The ESA requires that potential effects on listed and proposed endangered and threatened species be evaluated in relation to the complete extent of the area influenced by a project (the Action Area) (50 Code of Federal Regulations [CFR] Part 402.02). The Action Area (**Figure 4**) encompasses the area where measurable direct and indirect effects resulting from the Proposed Project are foreseeable and are reasonably certain to occur. Work activities will include ground disturbance, generate airborne noise, and increase PGIS; therefore, the Action Area includes both terrestrial and aquatic elements.

3.1 Terrestrial Action Area

The terrestrial portion of the Action Area includes all areas directly affected by physical ground disturbance from construction activities. This includes all areas of the Proposed Project that will be temporarily or permanently impacted by vegetation removal, grading, and pavement rehabilitation, as well as construction access and staging areas.

The Action Area includes the area surrounding the Proposed Project that will be subject to increased noise from construction equipment and activities during Project work. This area of noise impact was determined using a noise analysis methodology and model developed by WSDOT and outlined in its *Biological Assessment Preparation Manual for Transportation Projects* (WSDOT 2024).

The three loudest pieces of construction equipment expected for the Proposed Project (and their associated average maximum sound levels at 50 feet from the equipment) are an excavator [87 A-weighted decibels (dBA)], concrete paver (84 dBA), and an asphalt paver (82 dBA). Based on the rules of decibel (dB) addition outlined in the WSDOT BA Manual (2024), the estimated equipment noise level for the Proposed Project is 89 dBA. This estimate assumes these three pieces of equipment are operating at the same time. For the purposes of this assessment, an average daytime background noise level for the airport of 50 dBA is estimated, based on Friday Harbor's population density of 1,000 – 3,000 people per square mile. Land cover in the surrounding area consists largely of natural cover and is representative of "soft site" conditions with regard to sound attenuation.

WSDOT's *Noise Attenuation Table* (WSDOT 2024) was used to estimate the distance that construction noise from the Proposed Project will travel before it attenuates to the background sound levels. Based on the noise values identified above, construction noise will travel approximately 1,690 feet before attenuating to background sound levels. Therefore, the area of terrestrial noise impact for the Proposed Project may extend, on average, approximately 1,690 feet from the Proposed Project in all directions.

3.2 Aquatic Portion of the Action Area

The aquatic portion of the Action Area encompasses all downstream waterbodies that receive stormwater runoff from stormwater discharge, and airport stormwater during daily operations. Stormwater discharge from the airport ultimately discharges into North Bay; therefore, the aquatic portion of the Action Area includes the area where runoff meets with North Bay.

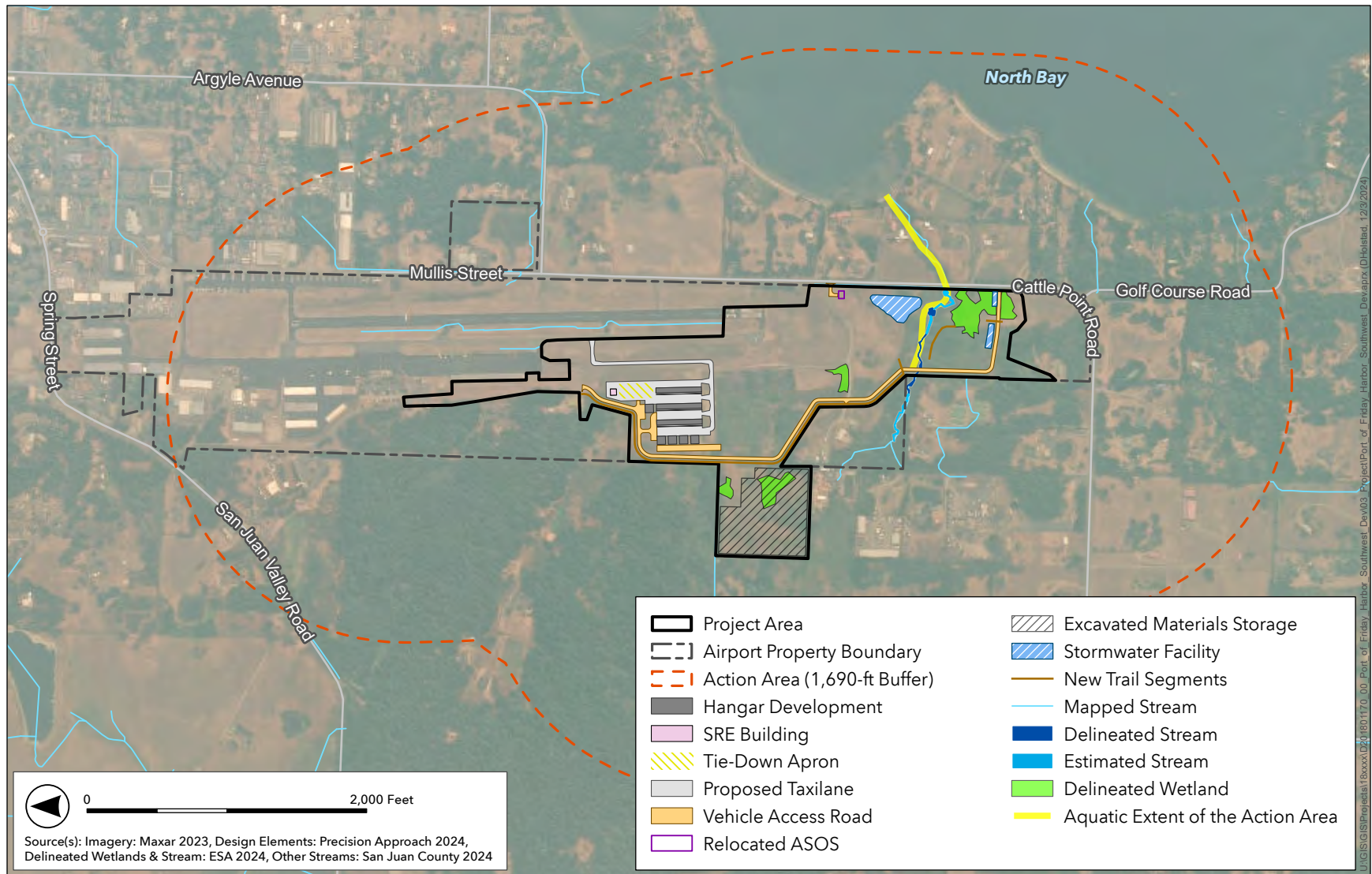


Figure 4
Action Area

CHAPTER 4

Status/Presence of Listed Species and Designated Critical Habitat

4.1 Listed Species with the Potential to Occur in the Action Area

A list of Endangered Species Act-protected species under NMFS jurisdiction was obtained using the NMFS website. This list is attached in **Appendix B**. The Statewide Integrated Fish Distribution (SWIFD) Database and Map Viewer (NWIFC 2024), National Oceanic and Atmospheric Administration (NOAA) Critical Habitat Mapper (NOAA 2024b), and Federal Register (FR) indicate that the federally listed species and designated Critical Habitats listed in **Table 4** may occur in the Action Area. The Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) database mapping tool was also used to identify the known or presumed distribution of listed species within the immediate vicinity (WDFW 2024).

4.1.1 Puget Sound ESU of Chinook Salmon

NMFS issued a ruling in May 1999 listing the Puget Sound Evolutionarily Significant Unit (ESU) of Chinook salmon (*Oncorhynchus tshawytscha*) as threatened (NMFS 1999). Primary factors contributing to declines in Chinook salmon in the Puget Sound ESU include habitat blockages, hatchery introgression, urbanization, logging, hydropower development, harvests, and flood control (NMFS 1999).

Life History

The life history of Chinook salmon is described in detail in NOAA Technical Memorandum NMFS-NWFSC-35 *Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California* (Myers et al. 1998) and is included herein by reference. This information has been summarized to assist in the analysis of effects related to the Proposed Project, and is included in **Appendix C**.

TABLE 4
ESA-LISTED SPECIES WITH POTENTIAL FOR OCCURRENCE IN THE ACTION AREA

Species Common Name (Scientific Name)	Agency	Federal ESA Listing and Critical Habitat Status
Chinook Salmon (<i>Oncorhynchus tshawytscha</i>) Puget Sound ESU	NMFS	Listed as Threatened in March 1999 (64 FR 14308), with Threatened status reaffirmed June 2005 (70 FR 37159). Updated April 2014 (79 FR 20802). Critical Habitat was Designated in September 2005 and includes North Bay in the Action Area (70 FR 52488).
Steelhead (<i>Oncorhynchus mykiss</i>) Puget Sound DPS	NMFS	Listed as Threatened in May 2007 (72 FR 26722). Updated April 2014 (79 FR 20802). Critical Habitat was Designated in February 2016 but is not present in the Action Area (81 FR 9252).
Yelloweye Rockfish (<i>Sebastes ruberrimus</i>) Puget Sound/Georgia Basin DPS	NMFS	Listed as Threatened in April 2010 (75 FR 22276). Critical Habitat was Designated in November 2014 and includes North Bay within the Action Area (79 FR 68042).
Bocaccio Rockfish (<i>Sebastes paucispinis</i>) Puget Sound/Georgia Basin DPS	NMFS	Listed as Endangered in April 2010 (75 FR 22276). Critical Habitat was Designated in November 2014 and includes North Bay within the Action Area (79 FR 68042).
Eulachon (<i>Thaleichthys pacificus</i>) Southern DPS	NMFS	Listed as Threatened in March 2010 (75 FR 13012). Critical Habitat was Designated in October 2011 but excludes the San Juan Islands (76 FR 65323).
Killer Whale (<i>Orcinus orca</i>) Southern Resident DPS (J, K, and L pods)	NMFS	Listed as Endangered in November 2005 (70 FR 69903). A five-year review completed by NMFS in January 2011 concluded this species should remain listed as Endangered. Critical Habitat was Designated in November 2006 (71 FR 69054) Revision that maintains previously designated Critical Habitat and expands Critical Habitat to coastal waters of Washington, Oregon, and California on August 2, 2021 (86 FR 41668).

NOTES:

DPS – Distinct Population Segment; ESU – Evolutionarily Significant Unit; FR – Federal Register

Environmental Baseline

The San Juan Islands provide essential nearshore rearing and foraging habitat for juvenile Chinook salmon. Juvenile Chinook salmon found in these nearshore habitats are composed of fish from several geographic regions in Washington. These stocks include but are not limited to: Whidbey Basin, Strait of Juan de Fuca, Hood Canal, and Olympic Peninsula. Juveniles originating from Canadian Chinook salmon stocks also utilize the islands, which include Vancouver Island, Fraser River, and Thompson River fish (WRIA 2 2022). Adult Chinook salmon are most likely to migrate through the San Juan Islands from June–August during migration to their natal rivers. Both juvenile and adult Chinook salmon rely on forage fish, which are prevalent in the diverse nearshore habitats found in the San Juan Islands. Forage fish species of importance include Pacific herring (*Clupea pallasii*), surf smelt (*Hypomesus pretiosus*), and Pacific sand lance (*Ammodytes hexapterus*).

Distribution in the Action Area

It is assumed that juvenile Chinook salmon are present year-round in North Bay, and adults may also be present from June–August before their spawning migration. The habitat surrounding the airport’s stormwater discharge location is a shoreline that contains feeder bluffs. Feeder bluffs, which are eroding coastal bluffs that deliver sand and gravel to a beach over time, are features that support juvenile Chinook salmon and forage fish (Ecology 2024c; Whitman et al 2012). However, a portion of the shoreline where discharge from FHR occurs contains hard armor, which negatively impacts the quality of feeder bluffs.

Critical Habitat

On September 2, 2005, NMFS designated Critical Habitat for 12 salmon and steelhead ESUs in California and the Pacific Northwest (70 FR 170). As part of the designation of Critical Habitat, NMFS (2005) has defined specific primary constituent elements (PCEs) for Chinook salmon. These are considered essential to the conservation of the species. While the new Critical Habitat regulations (NMFS 2016) replaced the term PCE with physical or biological features (PBFs), the shift in terminology does not change the approach used in assessing potential effects on Critical Habitat. These features in marine waters include the following:

- Nearshore marine areas free of obstruction and excessive predation with water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.

Specific PBFs in the Action Area for the Puget Sound ESU of Chinook salmon are “water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.” (NMFS 2016) Water quality in North Bay will be affected by increased stormwater runoff from the airport. North Bay also provides spawning and rearing habitat for forage fish, which are essential forage for juvenile Chinook salmon. Forage fish habitats in North Bay include sand and gravel beaches and eelgrass beds (WRIA 2 2022). Prey species that are exposed to stormwater contaminants can accumulate toxins, which can be passed onto feeding Chinook salmon (NMFS 2022).

4.1.2 Puget Sound DPS of Steelhead

On June 11, 2007, NMFS listed Puget Sound Distinct Population Segment (DPS) of steelhead (*Oncorhynchus mykiss*) as threatened under the ESA (72 FR 91). The listing was based on the estimated effects of the following factors on the continued existence of the species: (1) present or future destruction,

modification, or curtailment of its habitat or range; (2) overfishing for various purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; or (5) other natural or human-made factors.

Life History

The life history of Puget Sound steelhead is described in the *Proposed Endangered Status for Five ESUs of Steelhead and Proposed Threatened Status for Five ESUs of Steelhead in Washington, Oregon, Idaho, and California* (61 FR 155). This information has been summarized to assist in the analysis of effects related to the Proposed Project and is included in **Appendix C**.

Environmental Baseline

After rearing in freshwater for up to 2 years, steelhead smolts spend very little time in Puget Sound before migrating to the Pacific Ocean. High juvenile mortality in marine waters caused by marine mammal predation is one of several limiting factors for the decline of Puget Sound steelhead (NMFS 2019). Steelhead typically spend 2–3 years in the Pacific Ocean before returning to their natal streams as adults to spawn.

Distribution in the Action Area

There are no streams in the San Juan Islands that support Puget Sound steelhead, and juvenile steelhead are unlikely to be found in North Bay. Juveniles may be present during their migration from Puget Sound rivers to the Pacific Ocean, but these fish leave Puget Sound rapidly and are unlikely to be present in North Bay for any extended period of time. Prey species in North Bay that are exposed to stormwater contaminants can accumulate toxins, which can be passed onto feeding steelhead (NMFS 2022).

Critical Habitat

On February 24, 2016, NMFS designated Critical Habitat for Puget Sound steelhead (81 FR 9251), which encompasses approximately 2,031 miles of freshwater and estuarine habitats in Puget Sound. No Critical Habitat has been designated within the San Juan Islands or San Juan archipelago; thus, no Critical Habitat is present within the Action Area for this BA.

4.1.3 Yelloweye Rockfish Puget Sound/Georgia Basin DPS

The yelloweye rockfish (*Sebastes ruberrimus*) was listed as Threatened on April 28, 2010 (75 FR 22276). The Puget Sound/Georgia Basin DPS distribution includes Puget Sound and the Georgia Basin within the State of Washington and the province of British Columbia, Canada (75 FR 81).

Life History

The life history of the Puget Sound/Georgia Basin DPS is described in the *Status Review of Five Rockfish Species in Puget Sound* (NMFS 2010) and is included herein by reference. This information has been summarized to assist in the analysis of effects related to the Proposed Project, and is included in **Appendix C**.

Environmental Baseline

Yelloweye rockfish occur in waters between 100 and 1,800 feet deep but are most commonly found between 300 and 590 feet in depth. Their range extends from northern Baja California to the Aleutian Islands. They are one of the largest rockfish species and can reach 3 feet in length and 27 pounds in weight (NMFS 2010). Larvae are born and released into Puget Sound during early spring to late summer after the female's eggs are fertilized internally during the winter to summer months (NMFS 2010). Puget Sound yelloweye rockfish are believed to spawn one or two times per year, possibly more (NMFS 2010). Yelloweye rockfish DPS are federally designated as "overfished," meaning that the population size is at a level below its prescribed biological threshold (NMFS 2010). The main challenges that this species faces for recovery are a life history in which they have long lives (approximately 150 years), slow growth, late maturity, and a low survival rate among young fish, which then combine with the threats they face, including degraded water quality and habitat, contaminants, and derelict fishing gear (NMFS 2024a).

Distribution in the Action Area

Depths in North Bay near the airport stormwater discharge locations vary from 5 feet to 20 feet along the nearshore, to a maximum of 64 feet in the bay. Depths increase up to 250 feet in the main channel between San Juan Island and Lopez Island; however, stormwater contaminants will be confined to the nearshore areas. Adult and juvenile yelloweye rockfish can occupy sites as shallow as 100 feet and may be found in the deepwater areas between both islands but are unlikely to be found in the nearshore of North Bay. Larval yelloweye rockfish may still occupy sites between the shoreline and 100 feet deep (NMFS 2022) and may be present in North Bay.

Critical Habitat

Friday Harbor is contained within the San Juan/Strait of Juan de Fuca Basin Critical Habitat basin for this species. Approximately 200 square miles of Deepwater Critical Habitat was designated in the San Juan/Strait of Juan de Fuca Basin for adult and juvenile yelloweye rockfish (NMFS 2014a). North Bay is within Nearshore Critical Habitat (NMFS 2014a), which supports larval yelloweye rockfish. PBFs essential to the conservation of adult and juvenile yelloweye rockfish include benthic habitats or sites deeper than 100 feet that possess:

- Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities.
- Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.
- The type and amount of structure and rugosity that support the feeding opportunities and predator avoidance.

PBFs essential to juvenile and adult yelloweye rockfish are not present in the Action Area. Depths in North Bay near the discharge locations vary from 5 feet to 20 feet along the nearshore, to a maximum of 64 feet in the bay.

4.1.4 Bocaccio Rockfish Puget Sound/Georgia Basin DPS

The bocaccio rockfish (*Sebastes paucispinis*) was listed as endangered on April 28, 2010 (75 FR 22276). The Puget Sound/Georgia Basin DPS distribution includes Puget Sound and the Georgia Basin within the State of Washington and the province of British Columbia, Canada (75 FR 81).

Life History

The life history of the Puget Sound/Georgia Basin DPS is described in the *Status Review of Five Rockfish Species in Puget Sound* (NMFS 2010) and is included herein by reference. This information has been summarized to assist in the analysis of effects related to the Proposed Project, and is included in **Appendix C**.

Environmental Baseline

Bocaccio rockfish are most common in waters between 160 and 820 feet in depth but may be found as deep as 1,560 feet (NMFS 2014a). Their range extends from central Baja California to the Gulf of Alaska. They are often on rocky reefs or other hard substrata (NMFS 2010) and can reach 3 feet in length (NMFS 2014a). They become sexually mature between 3 and 8 years of age, give birth to live young after reproducing via internal fertilization, and are thought to live upwards of 50 years (NMFS 2014a). In Washington, larvae are born and released into the water from January through April (NMFS 2010).

WDFW conducts yearly trawl surveys for bocaccio rockfish in Puget Sound, and the most recent confirmed bocaccio was near Orcas Island in the San Juan Islands in 2018 (NMFS 2024a). While once common on steep walls of Puget Sound (NMFS 2010), bocaccio rockfish are federally designated as, “overfished” (NMFS 2014a). Research indicates that small amounts of artificial habitat structures (e.g., oil platforms) are highly valuable as nursery grounds and could contribute to the survivorship and sustainability of the overfished species (NMFS 2014a).

Distribution in the Action Area

Depths in North Bay near the airport stormwater discharge locations vary from 5 feet to 20 feet along the nearshore, to a maximum of 64 feet in the bay. Depths increase up to 250 feet in the main channel between San Juan Island and Lopez Island; however, stormwater contaminants will be confined to the nearshore areas. Juvenile bocaccio rockfish can occupy sites between the shoreline and 100 feet, while adults are found in the deepwater areas deeper than 100 feet. Juvenile bocaccio rockfish may be present in the Action Area between the shoreline and 100 feet deep (NMFS 2022).

Critical Habitat

The Action Area is within the San Juan/Strait of Juan de Fuca Critical Habitat basin (NMFS 2014a) for the bocaccio rockfish. Approximately 350 square miles of Nearshore Critical Habitat was designated in the San Juan/Strait of Juan de Fuca Basin for juvenile bocaccio, while approximately 200 square miles of Deepwater Critical Habitat was designated for adult bocaccio (NMFS 2014a). PBFs in North Bay essential to the conservation of bocaccio rockfish include benthic habitats or nearshore sites:

- Quantity, quality, and availability of prey species to support individual growth, survival, reproduction, and feeding opportunities.

- Water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.
- The type and amount of structure and rugosity that supports the feeding opportunities and predator avoidance (NMFS 2010).

PBFs in the Action Area that may be affected by increased stormwater discharge from the airport include water quality and sufficient levels of dissolved oxygen to support growth, survival, reproduction, and feeding opportunities.

4.1.5 Eulachon Southern DPS

The eulachon (*Thaleichthys pacificus*) was listed as threatened on March 18, 2010 (75 FR 13012). The Southern DPS distribution includes all eulachon within the states of Washington, California, and Oregon, with its northern boundary the Skeena River in British Columbia, and the Mad River in California the southern boundary of this DPS (NMFS 2022).

Life History

The life history of the Southern DPS eulachon is described in the *Status Review of Eulachon (Thaleichthys pacificus) in Washington, Oregon, and California* (Gustafson et al. 2010) and is included herein by reference. This information has been summarized to assist in the analysis of effects related to the Proposed Project, and is included in **Appendix C**.

Environmental Baseline

Eulachon, also known as smelt or candlefish, are anadromous fish found from British Columbia to central California (Gustafson et al. 2010). Eulachon utilize a saltwater environment for 3 to 5 years after birth before returning to their freshwater natal streams to spawn.

Distribution in the Action Area

There are no rivers or estuaries in the San Juan Islands that support eulachon, and this species is rarely observed in the San Juan Islands and is unlikely to be present in North Bay.

Critical Habitat

Critical Habitat was designated on October 20, 2011 (76 FR 65324) for 16 specific areas within the states of California, Oregon, and Washington. The designated areas are a combination of freshwater creeks and rivers and their associated estuaries, comprising approximately 539 km (335 miles) of habitat. The nearest Critical Habitat to the Proposed Project is the Elwha River, approximately 40 miles south, and no Critical Habitat has been designated within the San Juan Islands or San Juan archipelago; thus, no Critical Habitat is present within the Action Area for this BA.

4.1.6 Killer Whale Southern Resident DPS (J, K, and L pods)

NMFS listed the Southern Resident Population killer whale (*Orcinus orca*), a portion of the killer whale population that may be found in Washington waters, as endangered in 2005 (70 FR 222).

Life History

The life history and habitat requirements of killer whales are described in the *Washington State Status Report for the Killer Whale* (Wiles 2004), which is included herein by reference. This information has been summarized to assist in the analysis of effects related to the Proposed Project, and is included in **Appendix C**.

Environmental Baseline

Killer whales are found in all oceans (NMFS 2024b). The Southern Resident killer whale DPS includes the J, K, and L pods. Whales in these pods are generally found in the coastal Pacific Northwest, although sometimes as far south as Central California (NMFS 2015). Killer whales can live in the wild on average 30 (males) to 50 (females) years of age, but males can live at least to 60 years of age and females to 90+ years of age (NMFS 2024b). Breeding and calving occur year round, with three to five calves per female in her lifetime. Main food sources for the Southern Resident killer whale include Chinook salmon, chum salmon (*Oncorhynchus keta*), and groundfish (NMFS 2014b).

Several factors may be limiting recovery, including the quantity and quality of prey, exposure to bioaccumulating toxic chemicals and other contaminants, oils spills, entanglement with fishing gear, and disturbance from sound and vessels (NMFS 2015, 2024b). Multiple threats are likely acting in concert to impact Southern Resident killer whales. Although it is not clear which threat or threats are most significant to the survival and recovery of the Southern Resident killer whale DPS, all of these threats are potential limiting factors in the population (NMFS 2008). The preferred prey for the Southern Resident kill whale DPS is Chinook salmon, which is also a threatened species (NMFS 2024b).

Distribution in the Action Area

Killer whales spend considerable time in the Salish Sea, mostly around the San Juan Islands, from late spring to early fall. Although the entire DPS can occur along the outer coast at any time of the year, occurrence along the outer coast is more likely from late fall to early spring. A review of sighting data compiled by the Orca Network in 2024 record that Southern Resident killer whale sightings as recent as August 2024 have been reported in the North Bay and in the San Juan Channel (Orca Network 2024).

As of 2023, there were 25 whales in J pod, 16 whales in K pod, and 34 whales in L pod, for a total of 75 whales (Center for Whale Research 2024). One of the delisting criteria in the Southern Resident killer whale recovery plan is an average growth rate of 2.3 percent for 28 years (NMFS 2008). The population growth rate between 2008 and today has not reached that benchmark rate. The Puget Sound Partnership's Vital Sign Target is to get to 1.25 percent growth rate by 2030, which will increase population size from 75 to 86 whales (Southern Resident Orca Recovery 2018). Other factors limiting the growth rate of the population include the small number of breeding males, particularly in J and K pods, reduced fecundity, decreased sub-adult survivorship in L pod, and the total number of individuals in the population (Wiles 2004).

Critical Habitat

Friday Harbor is within the Critical Habitat Summer Core Area of Haro Strait and San Juan Islands (NMFS 2024b). Critical Habitat includes approximately 2,560 square miles of Puget Sound, excluding areas with water less than 20 feet deep relative to extreme high water. Stormwater-related water quality

effects from new impervious surfaces are expected to be limited to that portion of North Bay within 100 feet of the stormwater outfalls, accounting for dilution.

PBFs for the Southern Resident killer whale include the following:

- Water quality to support growth and development.
- Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth.
- Passage conditions to allow for migration, resting, and foraging conditions.

All of the PBFs listed above are found in the Action Area. Southern Resident killer whales have been sighted in all months of the year in the Summer Core area; however, the occurrence is more consistent and concentrated in the summer months of June through August (71 FR 229). Water quality in North Bay will be impacted by increased stormwater runoff from the airport, which can accumulate in Chinook salmon prey species and ultimately be passed to the whales. Occurrence of Southern Resident killer whale coincides with concentrations of salmon. The Summer Core area also provides adequate passage conditions to allow for migration, feeding, and foraging conditions. The water quality PBF has been degraded by industrialization and is often associated with areas of higher human population.

CHAPTER 5

Environmental Setting

5.1 Terrestrial Habitat Conditions in the Action Area

Vegetation at the airport is managed to discourage wildlife use and consists predominantly of non-native grasses and herbs that are frequently mowed. General vegetation cover types surrounding the airport include upland forest, open woodlands, riparian forest, grassland and shrub habitat, and emergent and forested wetlands. Habitat on airport property consists of grassy fields, scrub-shrub, and forested areas. In addition to the five wetlands that were delineated in the southern half of the SWDA, San Juan County geographic information system (GIS) data identify several isolated wetlands within the Action Area, south and west of the airport (San Juan County 2024).

Habitat adjacent to the managed airfield is a mix of forested woodlots, grassland, and shrubland with low-density residences nearby. The vegetation in the north and central portions of the airport consists of mixed Douglas-fir – madrone forest over oceanspray, salal, and swordfern. Subdominant trees include western red-cedar and red alder. At the south end of the Action Area (south of the end of the runway), wooded areas consist primarily of Douglas-fir over snowberry, oceanspray, salal, and swordfern (WDNR 2024). A narrow riparian forest encompasses a small, intermittent unnamed stream that flows across the southern portion of the Action Area between the end of the runway and Cattle Point Road (San Juan County 2024). The site is primarily upland or developed for airport use.

5.2 Aquatic Habitat Conditions in the Action Area

San Juan County identifies one fish-bearing (Type F) stream that discharges into North Bay within the Action Area. The stream originates near Daniel Lane south of the airport and flows west to east. Some riparian vegetation will likely be cleared during the construction of the access road; however, this stream does not contain ESA-listed fish species presented in this BA (NWIFC 2024).

The shoreline along North Bay is relatively undeveloped, with scattered rural residential properties. North Bay includes the Argyle Lagoon tidelands, 12.3 acres classified as “oysterlands” including part of a tidal creek. The University of Washington manages Argyle Lagoon as one of the five WDFW fisheries preserves established in 1990, known collectively as the “San Juan Islands Biological Preserves” (University of Washington 2016). The adjacent beaches (North Bay Beach and Jackson Beach) are owned by the Port and see extensive recreational use.

Depths in North Bay near the airport stormwater discharge locations vary from 5 feet to 20 feet along the nearshore, to a maximum of 64 feet in the bay. Depths increase up to 250 feet in the main channel between San Juan Island and Lopez Island. Floating kelp, other submerged aquatic vegetation, and rocky

shorelines within the San Juan/Strait of Juan de Fuca Basin are of beneficial use as settlement sites for larval and juvenile bocaccio rockfish (NMFS 2014a), and prey species for juvenile Chinook salmon.

Forage fish spawning has historically occurred in North Bay along Jackson Beach County Park for smelt, approximately 2,800 feet northeast of the airport's stormwater discharge location in the Argyle Lagoon (WDNR 2024). Eelgrass is also found along the Jackson Beach County Park. Decreasing water quality by increasing stormwater discharge at the airport could cause a decline in kelp and other aquatic vegetation along nearshore areas essential for Juvenile Chinook salmon, bocaccio rockfish, and forage fish species (NMFS 2022). Negative long-term effects to juvenile Chinook salmon can also cause a decline in killer whale populations.

CHAPTER 6

Consequences of the Action

Under the ESA, when a discretionary federal action may adversely affect listed species or Critical Habitat, federal agencies must analyze consequences caused by a project, including those effects that used to be referred to as “direct” and “indirect” effects and “interrelated” or “interdependent” activities (50 CFR 402). These effects are now rolled up into “consequences of the action” and are described in the following subsections.

Chinook salmon, steelhead, yelloweye and bocaccio rockfish, and Southern Resident killer whale may be present near the airport stormwater discharge location in North Bay at various times of the year. The Proposed Project has the potential to decrease the overall water quality in North Bay by increasing the total impervious surfaces at the airport. Decreasing the water quality in North Bay has the potential to reduce foraging opportunities for Chinook salmon, and if fewer Chinook salmon were present, it would reduce foraging opportunities for Southern Resident killer whale.

6.1 Direct Effects

6.1.1 Construction Noise

The Proposed Project will generate terrestrial noise from the operation of heavy equipment and trucks, which is expected to attenuate to background levels in the terrestrial environment within 1,690 feet of the construction areas. No highly intensive noise activities, such as blasting or pile driving, will occur in the terrestrial environment, and there will be no underwater noise. Since there is no underwater noise component, there will be no impacts on listed fish species from construction noise. Therefore, there are no expected direct effects to listed terrestrial or aquatic species from construction-related noise activities (WSDOT 2024).

6.1.2 Construction-Related Turbidity and Water Quality

There is no suitable habitat for the species described in this BA on airport property that would be directly affected through ground-disturbing activities. Habitat on airport property consists of grassy fields, scrub-shrub, and forested areas. Additionally, one stream and five wetlands were delineated on-site.

Excavation activities within or near streams and wetlands can cause temporary negative impacts on water quality. However, implementing construction BMPs, an SWPCP, and an SPCC Plan is expected to eliminate the potential effects to these species. Ground-disturbing activities associated with construction will increase the short-term potential for erosion from the site. The potential for sediment inputs to leave the site will be minimized through the implementation of site-specific erosion and sediment control measures, such as the use of sediment fencing and limiting soil-disturbing activities to the minimum area necessary to complete the Proposed Project. It is highly unlikely that erosion-generated sediment from

construction activities will reach North Bay. Vegetated areas that are temporarily disturbed will be stabilized, and groundcover will be reestablished upon completion of construction.

6.2 Indirect Effects

The Proposed Project will result in a net addition of approximately 7.8 acres of new and replaced PGIS for paving the new Aircraft Operations Area, aircraft operational support areas, and new access roads. The new PGIS will be accompanied by an increase in use from planes and airport vehicles, which may increase the amount of contaminants discharged into the surrounding stormwater treatment facilities. Stormwater at the airport ultimately discharges through a network of ponds, pipes, and ditches from the airport east to North Bay. The nearshore areas of North Bay may be used by ESA-listed species including Chinook salmon, steelhead, yelloweye and bocaccio rockfish, and Southern Resident killer whale. Stormwater pollutants can discharge year-round and are a source of potentially adverse effects to fish, even at ambient levels (NMFS 2011). As part of the Proposed Project, the airport is adding stormwater facilities that treat PGIS for water quality flows at or close to the source, then convey flows through various open-channel swales or pipes to a detention area. The detention area will provide additional treatment, as well as detain stormwater volume to be released at a controlled rate. These water quality and water detention facilities have been designed per NMFS requirements in the SSNP (NMFS 2022). Water quality facilities will include bioretention swales and CAVFS and are capable of treating between 91 percent (bioretention swales) and 99 percent (CAVFS) of stormwater before reaching North Bay.

With respect to salmonids, the primary constituents of concern in stormwater generated by roadways include all contaminants including dissolved metals and 6PPD-q. Dissolved copper and zinc discharge can adversely affect olfactory sensory responsiveness and cause behavioral changes, including decreased predator avoidance at relatively low concentrations (2.0 micrograms per liter [$\mu\text{g/L}$] above background concentrations of 3.0 $\mu\text{g/L}$ or less) (WSDOT 2019). Emerging research indicates that urban runoff mortality syndrome can be caused by the organic compound 6PPD-q, with adult and juvenile coho salmon (*Oncorhynchus kisutch*) being particularly vulnerable to lethal effects of exposure to 6PPD-q. The parent compound (6PPD), which becomes 6PPD-q through oxidation, is a tire additive that enhances tire longevity and is found in almost all automobile and plane tires (Ecology 2022). The assumed primary method of 6PPD-q transport is via runoff from roads and parking areas with tire wear to surface waters. Concentrations of 6PPD-q may be higher in streams in urbanized areas, and potentially lower in more rural areas. BMPs identified with the highest potential to reduce 6PPD and 6PPD-q are infiltration, dispersion, and some biofiltration combined with sorption (particularly BMPs that contain bioretention soil media or compost) (Ecology 2022).

Some contaminants accumulate in both the prey of and tissues of juvenile salmon where, depending on the level of exposure, they cause a variety of lethal and sublethal effects on salmon and steelhead, including disrupted behavior, reduced olfactory function, immune suppression, reduced growth, disrupted smoltification, hormone disruption, disrupted reproduction, cellular damage, and physical and developmental abnormalities (NMFS 2011). Heavy metals, such as copper, zinc, cadmium, and mercury, can have a range of acute and chronic physiological and behavior effects on fish. Recent literature demonstrates that exposure to stormwater pollutants such as petroleum-based hydrocarbons and metals can affect salmonids, with effects ranging from avoidance to mortality depending on pollutant concentrations and synergistic effects (NMFS 2022).

Juvenile Chinook salmon may be present year-round in North Bay and may be exposed to stormwater contamination through exposure in the Action Area, through bioaccumulation in their prey, and may have decreased foraging opportunities in North Bay caused by a decline in water quality supporting forage fish and nearshore vegetation.

Juvenile steelhead migrate rapidly through Puget Sound and there are no streams in the San Juan Islands where steelhead spawn or rear, so juvenile presence in the marine areas is unlikely (see Section 4.1.2). However, there is a low possibility for juvenile steelhead to be found in the nearshore area of North Bay where they could be exposed to stormwater contaminants, or bioaccumulate these contaminants from prey.

Larval yelloweye rockfish and larval and juvenile bocaccio rockfish may be present in North Bay from the shoreline to a depth of about 100 feet (NMFS 2022). Adult yelloweye and adult bocaccio rockfish utilize deep water habitats exceeding 100 feet, and are unlikely to be found in the nearshore areas of North Bay. Juvenile rockfish in North Bay could be exposed to stormwater contamination through direct exposure in the Action Area, through bioaccumulation in their prey, and may have decreased foraging opportunities in North Bay caused by a decline in water quality.

There are no rivers or estuaries in the San Juan Islands that support eulachon, and this species is rarely observed in the San Juan Islands and is unlikely to be present in North Bay. However, eulachon could pass through North Bay and be exposed to stormwater contamination.

Southern Resident killer whales are found in the San Juan Islands year-round and may use the areas inside North Bay for feeding. Chinook salmon are the primary prey for Southern Resident killer whales, and Southern Resident killer whales may bioaccumulate toxins through Chinook salmon from North Bay. Killer whales in North Bay may also be exposed to stormwater runoff from the airport, and a decline in Chinook salmon can lead to a decrease in foraging opportunities.

Measures to reduce the concentration of metals, 6PPD-q, and other pollutants in stormwater include filtration, adsorption, and bioaccumulation in plants. The Proposed Project would provide water quality treatment and flow control for 15.7 acres of new, replaced, and existing impervious surfaces. The proposed water quality treatment facilities include CAVFS and vegetated swales, sized to treat the water quality design storm for the contributing impervious surfaces. The proposed ponds are sized to maintain pre-development flows for the 10-year, 24-hour storm, and the predevelopment stormwater runoff for all storm events between the 50 percent of the 2-year, 24-hour and the 10-year storm events.

Because the Proposed Project includes water quality treatment for impervious surfaces that currently do not receive treatment, it may reduce the amount of pollutants delivered to North Bay through stormwater. However, no treatment is 100 percent effective, and there is some inherent uncertainty in how post-Project pollutant levels (with increased impervious surface) will compare with pre-Project pollutant levels. Infiltration through a bioretention system designed with a soil mixture has been shown to reduce or eliminate toxicity to juvenile coho salmon caused by pollutants in stormwater (McIntyre et al. 2015). Effective treatment of 6PPD-q, other organic compounds, and heavy metals occurs from applying infiltration, sorption, or filtration techniques (Ecology 2024b). The Proposed Project would install six bioretention swales and four CAVFS, both of which are designed for infiltration and/or filtration of stormwater, in addition to constructing detention ponds that would provide additional opportunity for

pollutant settling/removal for higher flows (PAE 2025). The existing vegetated stormwater drainage ditches would also continue to provide some level of treatment.

6.3 Effects from Interrelated and Interdependent Actions

An interdependent activity is an activity that has no independent utility apart from a proposed project (50 CFR 402.02). An interrelated activity is an activity that is part of a larger action and depends on the larger action for its justification (50 CFR 402.02). There are no interrelated or interdependent actions that are not considered in this BA. No other airport projects depend on this Proposed Project or will become necessary because of it.

6.4 Cumulative Effects

Cumulative effects are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the Action Area of the federal action subject to consultation (50 CFR 402.02). According to the Friday Harbor Regional Airport Master Plan, additional development will likely be proposed in the future and includes additional roads, parking, commercial space, and a new terminal building (Coffman & PAE 2020). Additionally, according to the County's Comprehensive Plan (2022), San Juan Island's population is projected to increase by 5 percent between 2025 and 2036. Development activities in the Action Area and watershed will likely increase with population growth. However, the majority of the Action Area has a land use designation of either Agricultural Resource, Rural Farm Forest, or Rural Residential, and therefore development will be limited. Regulations governing land development—including development near wetlands and streams—have become more protective over time, but development activities still present potential for adverse environmental effects through land clearing and increases in impervious surfaces, which can adversely affect listed species and their habitat, particularly through water quality degradation. When considered together, the cumulative effects are likely to have a negligible negative effect on ESA-listed species due largely to degraded water quality conditions. Effects on Critical Habitat are expected to be similar.

CHAPTER 7

Effect Determinations

7.1 Effects on Listed Species

7.1.1 Puget Sound Chinook Salmon ESU

The Proposed Project warrants a **“may affect, likely to adversely affect”** determination for Chinook salmon because:

- Adult and sub-adult Chinook salmon may be present along the nearshore areas of North Bay throughout the year.
- The Proposed Project will increase the total PGIS in the SWDA by 7.8 acres, and airport stormwater is ultimately discharged into North Bay.
- BMPs cannot treat 100 percent of all stormwater pollutants, and treated runoff will ultimately drain into North Bay.
- Stormwater pollutants have the potential to bioaccumulate in the prey of Chinook salmon that are present in North Bay.
- Stormwater pollutants have the potential to decrease water quality in North Bay and reduce the amount of forage fish found in the Action Area, reducing feeding opportunities for Chinook salmon.

However, impacts on Chinook salmon will be mitigated and limited by the following:

- Flow control and runoff treatment BMPs that utilize infiltration, sorption, filtration, and sedimentation will be added to treat between 91 and 99 percent of SWDA stormwater before it reaches North Bay.
- All stormwater generated from construction will be treated in accordance with the NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management, of the SSNP.

7.1.2 Puget Sound Steelhead DPS

The Proposed Project warrants a **“may affect, likely to adversely affect”** determination for Puget Sound steelhead because:

- Juvenile steelhead may be present in the nearshore habitats of North Bay where treated stormwater is discharged.
- The Proposed Project will increase the total PGIS in the SWDA by 7.8 acres, and airport stormwater is ultimately discharged into North Bay.
- BMPs cannot treat 100 percent of all stormwater pollutants, and treated runoff will ultimately drain into North Bay.

- Stormwater pollutants have the potential to decrease water quality in North Bay and reduce the amount of forage fish found in the Action Area, reducing feeding opportunities for steelhead.

However, impacts on steelhead will be mitigated and limited by the following::

- After leaving their natal streams, juvenile steelhead spend little time in the marine nearshore and generally move quickly to deeper offshore waters, and are unlikely to be occupying the nearshore environment of North Bay.
- Steelhead do not spawn or rear within the San Juan Islands.
- Flow control and runoff treatment BMPs that utilize infiltration, sorption, filtration, and sedimentation will be added to treat between 91 and 99 percent of SWDA stormwater before it reaches North Bay.
- All stormwater generated from construction will be treated in accordance with the NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management, of the SSNP.

7.1.3 Yelloweye Rockfish

The Proposed Project warrants a **“may affect, likely to adversely affect”** determination for yelloweye rockfish because:

- Larval yelloweye rockfish may be present in North Bay.
- The Proposed Project will increase the total PGIS in the SWDA by 7.8 acres, and airport stormwater is ultimately discharged into North Bay.
- Not all stormwater pollutants are treated through stormwater BMPs, and treated runoff will ultimately drain into North Bay.

However, impacts on yelloweye rockfish will be mitigated and limited by the following:

- Although larval yelloweye rockfish could occur within North Bay, the concentration or probability of presence of larvae in any one location is extremely small.
- Flow control and runoff treatment BMPs that utilize infiltration, sorption, filtration, and sedimentation will be added to treat between 91 and 99 percent of SWDA stormwater before it reaches North Bay.
- All stormwater generated from construction will be treated in accordance with the NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management, of the SSNP.

7.1.4 Bocaccio Rockfish

The Proposed Project warrants a **“may affect, likely to adversely affect”** determination for bocaccio rockfish because:

- Juvenile bocaccio rockfish may be present in North Bay.
- The Proposed Project will increase the total PGIS in the SWDA by 7.8 acres, and airport stormwater is ultimately discharged into North Bay.
- Not all stormwater pollutants are treated through stormwater BMPs, and treated runoff will ultimately drain into North Bay.

However, impacts on bocaccio rockfish will be mitigated and limited by the following:

- Although larval bocaccio rockfish could occur within North Bay, the concentration or probability of presence of larvae in any one location is extremely small because they are readily dispersed by currents after they are born (NMFS 2014a).
- Flow control and runoff treatment BMPs that utilize infiltration, sorption, filtration, and sedimentation will be added to treat between 91 and 99 percent of SWDA stormwater before it reaches North Bay.
- All stormwater generated from construction will be treated in accordance with the NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management, of the SSNP.

7.1.5 Eulachon Southern DPS

The Proposed Project warrants a “**may affect, likely to adversely affect**” determination for eulachon southern DPS because:

- Eulachon may be present in North Bay.
- The Proposed Project will increase the total PGIS in the SWDA by 7.8 acres, and airport stormwater is ultimately discharged into North Bay.
- Not all stormwater pollutants are treated through stormwater BMPs, and treated runoff will ultimately drain into North Bay.

However, impacts on eulachon will be mitigated and limited by the following:

- There are no rivers or estuaries in the San Juan Islands that support eulachon; this species is rarely observed in the San Juan Islands and is unlikely to be present in North Bay.
- Flow control and runoff treatment BMPs that utilize infiltration, sorption, filtration, and sedimentation will be added to treat between 91 and 99 percent of SWDA stormwater before it reaches North Bay.
- All stormwater generated from construction will be treated in accordance with the NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management, of the SSNP.

7.1.6 Southern Resident Killer Whale

The Proposed Project warrants a “**may affect, likely to adversely affect**” determination for Southern Resident killer whale because:

- Chinook salmon are present in North Bay and may be adversely affected by increases in stormwater runoff into North Bay. Therefore, the Proposed Project may affect Southern Resident killer whale.

However, impacts on killer whales will be mitigated and limited by the following:

- Flow control and runoff treatment BMPs that utilize infiltration, sorption, filtration, and sedimentation will be added to treat between 91 and 99 percent of SWDA stormwater before it reaches North Bay.
- All stormwater generated from construction will be treated in accordance with the NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management, of the SSNP.

7.2 Effects on Critical Habitat

7.2.1 Puget Sound Chinook Salmon ESU Critical Habitat

The Proposed Project warrants a “**may affect, likely to adversely affect**” determination for Critical Habitat for the Puget Sound Chinook Salmon ESU:

- The PBF for water quality will be permanently changed through increased PGIS. New stormwater runoff can degrade water quality by increasing contaminants into the nearshore habitats in North Bay.
- Designated Critical Habitat boundaries within the Action Area for the Proposed Project include areas around North Bay, which includes nearshore marine areas

However, impacts on Chinook salmon will be mitigated and limited by the following minimization measure:

- All stormwater generated from construction and operation of the facility will be treated in accordance with the NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management, of the SSNP.

7.2.2 Yelloweye Rockfish Critical Habitat

The Proposed Project warrants a “**may affect, likely to adversely affect**” determination for yelloweye rockfish Critical Habitat because:

- PBFs essential to the conservation of larval and juvenile yelloweye benthic habitats are nearshore areas for juvenile rearing sites with sand, rock and/or cobbles to support forage and refuge (NMFS 2014a) which are present in North Bay.
- The PBF for water quality will be permanently changed through increased PGIS. New stormwater runoff can degrade water quality by increasing contaminants into the nearshore habitats in North Bay.

However, impacts on yelloweye rockfish Critical Habitat will be mitigated and limited by the following minimization measures:

- Flow control and runoff treatment BMPs that utilize infiltration, sorption, filtration, and sedimentation will be added to treat between 91 and 99 percent of SWDA stormwater before it reaches North Bay.
- While some new impervious surface will be added to the basin, all stormwater generated from construction and operation of the facility will be treated in accordance with the NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management, of the SSNP.

7.2.3 Bocaccio Rockfish Critical Habitat

The Proposed Project warrants a “**may affect, likely to adversely affect**” determination for bocaccio rockfish Critical Habitat because:

- PBFs essential to the conservation of larval and juvenile bocaccio benthic habitats are associated with sites between the shoreline and 100 feet in depth, which are present in North Bay.

- The PBF for water quality will be permanently changed through increased PGIS. New stormwater runoff can degrade water quality by increasing contaminants into the nearshore habitats in North Bay.

However, impacts on bocaccio rockfish will be mitigated and limited by the following minimization measures:

- Flow control and runoff treatment BMPs that utilize infiltration, sorption, filtration, and sedimentation will be added to treat between 91 and 99 percent of SWDA stormwater before it reaches North Bay.
- While some new impervious surface will be added to the basin, all stormwater generated from construction and operation of the facility will be treated in accordance with the NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management, of the SSNP.

7.2.4 Southern Resident Killer Whale Critical Habitat

The Proposed Project warrants a “**may affect, likely to adversely affect**” determination for Critical Habitat for the southern resident killer whale because:

- PBFs for the Southern Resident killer whale in North Bay include water quality to support growth and development; and prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth.
- Introduction of contaminants from stormwater can accumulate in prey species, and reduce the quality and quantity of prey species in the Action Area.
- The Proposed Project is likely to adversely affect Chinook salmon, the primary prey of Southern Resident killer whales and a PBF for Critical Habitat, which may adversely affect killer whales by reducing the amount of salmon available for forage.

However, impacts on killer whales will be mitigated and limited by the following minimization measures:

- Flow control and runoff treatment BMPs that utilize infiltration, sorption, filtration, and sedimentation will be added to treat between 91 and 99 percent of SWDA stormwater before it reaches North Bay.
- All stormwater generated from construction will be treated in accordance with the NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management, of the SSNP.

CHAPTER 8

Essential Fish Habitat Assessment

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297), requires federal agencies to consult with NMFS on activities that may adversely affect Essential Fish Habitat (EFH). The Pacific Fisheries Management Council (PFMC) has designated EFH for the Pacific salmon fishery, federally managed groundfishes, and coastal pelagic fisheries (PFMC 2025).

The EFH designation for the Pacific salmon fishery includes all those streams, lakes, ponds, wetlands, and other water bodies, currently or historically accessible to salmon in Washington, Oregon, Idaho, and California, except above the impassable barriers identified by the PFMC. The EFH designation for the Pacific salmon fishery in marine environments extends from near-shore and tidal submerged environments within state territorial waters out to the full extent of exclusive economic zone offshore of Washington, Oregon and California (PFMC 2024a). The Pacific salmon management unit includes Chinook, coho and pink salmon, although the only designated Pacific salmon EFH found in the San Juan Islands is for coho salmon.

The EFH designation for the west coast groundfish management unit includes 86 species that typically live on or near the bottom of the ocean. Species groups include sharks and skates, rockfishes (55 species), flatfishes (12 species) and groundfishes (PFMC 2024b). EFH has been designated for west coast groundfish and is generally defined as the aquatic habitat from the mean higher high-water line, and the upriver extent of saltwater intrusion in river mouths seaward.

The Coastal Pelagic Species Fishery Management Plan manages all life stages of five pelagic species: Northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinops sagax*), Pacific (chub) mackerel (*Scomber japonicus*), jack mackerel (*Trachurus symmetricus*) and market squid (*Doryteuthis opalescens*) (PFMC 2024c). The Coastal Pelagic Species Fisheries Management Plan also manages all krill and euphausiid species found on the West Coast which are most likely to be targeted by fishing: krill – (*Thysanoessa apinifera*) and krill – *Euphausia pacifica*. Combined, these four finfish, market squid, and krill are treated as a single species complex because of similarities in their life histories and habitat requirements. EFH for coastal pelagic species is generally defined as all marine and estuarine waters from the shoreline offshore above the thermocline (PFMC 2024c). The objective of this EFH assessment is to determine whether or not the Proposed Project “may adversely affect” designated EFH for relevant commercially, federally managed fisheries species within the Action Area. It also describes BMPs and minimization measures to avoid, minimize, or otherwise offset potential adverse effects to designated EFH resulting from the Proposed Project.

The Action Area of the Proposed Project (Friday Harbor and North Bay) has been identified as EFH for: Pacific salmon (juvenile and adult coho salmon), groundfish (all life stages), and coastal pelagic species (all life stages) (NOAA 2024a).

8.1 Description of the Proposed Project

For the purpose of this assessment, the Proposed Project for the EFH assessment and BA incorporates the same elements. A detailed description of the Proposed Project is included in Chapter 2 of the BA. **Table 5** indicates the relevant commercially, federally managed fisheries species that are potentially present within the Action Area.

TABLE 5
SPECIES AND LIFE-STAGES WITH EFH IN THE ACTION AREA

Species	Eggs	Larvae	Young Juvenile	Juvenile	Adult	Spawning
Pacific Salmon (Coho)			X	X	X	
Groundfish	X	X	X	X	X	X
Coastal Pelagic	X	X	X	X	X	X

8.2 Potential Adverse Effects of Proposed Project

Potential impacts of the Proposed Project on ESA-listed fish species and habitats are described in Chapters 6 and 7 of this BA and are expected to be similar for all federally managed EFH that occurs within the Action Area. Stormwater from the airport ultimately discharges to North Bay through two stormwater outfalls approximately 1,000 feet from FHR. Given that recognized stormwater treatment will occur, stormwater effects to EFH will be reduced but not eliminated.

8.3 Potential Effects on Essential Fish Habitat

8.3.1 Adverse Effects on Essential Fish Habitat for Pacific Salmon

The Proposed Project will result in a net addition of approximately 7.8 acres of new and replaced PGIS for paving the new Aircraft Operations Area, aircraft operational support areas, and new access roads. The new PGIS will be accompanied by an increase in use from planes and airport vehicles, which may increase the amount of contaminants discharged into the surrounding stormwater treatment facilities. Stormwater at the airport ultimately discharges through a network of ponds, pipes, and ditches from the airport east to North Bay. The Proposed Project would provide water quality treatment and flow control for 15.7 acres of new, replaced, and existing impervious surfaces. The proposed water quality treatment facilities include CAVFS and vegetated swales, sized to treat the water quality design storm for the contributing impervious surfaces. The proposed ponds are sized to maintain pre-development flows for the 10-year, 24-hour storm, and the predevelopment stormwater runoff for all storm events between the 50 percent of the 2-year, 24-hour and the 10-year storm events.

The discharge of pollutants and runoff from point and non-point sources (including but not limited to industrial discharges, urbanization, and road surfaces) can affect water quality and sediment of EFH habitat. Exposure to stormwater contaminants such as 6PPD-q has been shown to be especially lethal to coho salmon both as adults and juveniles. Other metals, such as copper, may disrupt behavior and immune system functions, may reduce overall growth and productivity of fishes, and may be lethal to various life stages of each species (PFMC 2024b). Excess nutrient input can also reduce dissolved oxygen to lethal levels at the discharge locations.

8.3.2 Adverse Effects on Essential Fish Habitat for Groundfish

Potential adverse effects on EFH for groundfish would be similar to those described above for federally managed Pacific salmon. While effects of 6PPD-q on groundfish is less studied, groundfish are still susceptible to other metals found in airport stormwater, such as copper, may disrupt behavior and immune system functions, may reduce overall growth and productivity of fishes, and may be lethal to various life stages of each species (PFMC 2024b). Excess nutrient input can also reduce dissolved oxygen to lethal levels at the discharge locations.

8.3.3 Adverse Effects on Essential Fish Habitat for Coastal Pelagic Species

Potential adverse effects on EFH for coastal pelagic species would be similar to those described above for federally managed Pacific salmon and groundfish. While effects of 6PPD-q on coastal pelagic species is less studied, these species are still susceptible to other metals found in airport stormwater, such as copper, may disrupt behavior and immune system functions, may reduce overall growth and productivity of fishes, and may be lethal to various life stages of each species (PFMC 2024b). Excess nutrient input can reduce dissolved oxygen to lethal levels at the discharge locations.

8.4 Conservation Measures for Essential Fish Habitat

The measures implemented for the Proposed Project in relation to the conservation of ESA-regulated species described in Chapter 2 of the BA will similarly avoid or minimize the potential adverse effects to designated EFH described above.

8.5 Conclusions

The Proposed Project “**will adversely affect**” EFH for Pacific salmon (juvenile and adult), groundfish (all life stages), and coastal pelagic species (all life stages), based on the fact that EFH for each of these groups is found in North Bay, and the Proposed Project will reduce the water quality by increasing stormwater discharged from the airport.

CHAPTER 9

References

- Center for Whale Research. 2024. *About killer whales*. Accessed February 8, 2024. Available: <http://www.whaleresearch.com/#!/about-orcas/c1qa8>.
- Coffman Associates, Inc. & Precision Approach Engineering. 2020. *Airport Master Plan for Friday Harbor Airport*. Prepared for the Port of Friday Harbor. April 2020. Accessed February 2025. Available: <https://www.portfridayharbor.org/master-plan/FHRFinalMPApril2020-123mb.pdf>.
- Ecology (Washington State Department of Ecology). 2022. *Stormwater Treatment of Tire Contaminants Best Management Practices (BMP) Effectiveness*.
- Ecology (Washington State Department of Ecology). 2024a. *Western Washington Hydrology Model (WWHM)*. Available: <https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/stormwater-permittee-guidance-resources/stormwater-manuals/western-washington-hydrology-model>.
- Ecology (Washington State Department of Ecology). 2024b. *Ecology Stormwater Management Manual for Western Washington (SWMMWW)*. Available: https://fortress.wa.gov/ecy/ezshare/wq/SWMMs/2024SWMMWW/2024_SWMMWW.htm.
- Ecology (Washington State Department of Ecology). 2024c. *Puget Sound feeder bluffs*. Accessed February 2024. Available: <https://ecology.wa.gov/research-data/monitoring-assessment/coastal-monitoring-assessment/projects/puget-sound-feeder-bluff>.
- FAA (Federal Aviation Administration). 2013. *FAA Advisory Circular 150/5320-5D – Airport Drainage Design*. Accessed February 2024. Available: https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5320-5.
- Gustafson, R.G., M.J. Ford, D. Teel, and J.S. Drake. 2010. *Status review of eulachon (Thaleichthys pacificus) in Washington, Oregon, and California*. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-105, 360 p.
- Hruby, Thomas, PhD, and Amy Yahnke. 2023. *Washington State Wetland Rating System for Western Washington. 2014 Update, Version 2.0*. Publication 23-06-009. Shorelands and Environmental Assistance Program, Washington State Department of Ecology, Olympia, Washington October 2014 (updated July 2023).
- McIntyre, J.K., J.W. Davis, C. Hinman, K.H. Macneale, B.F. Anulacion, N.L. Scholz, J.D. Stark. 2015. *Soil bioretention protects juvenile salmon and their prey from the toxic impacts of urban stormwater runoff*. *Chemosphere*, Volume 132, 2015, Pages 213-219. Available: <https://www.sciencedirect.com/science/article/pii/S0045653514014805>.

- Myers, J., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grand, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. *Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California*. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-NWFSC-35.
- NMFS (National Marine Fisheries Service). 1999. *Endangered and threatened species; threatened status for three Chinook salmon evolutionarily significant units (ESUs) in Washington and Oregon, and endangered status for one Chinook salmon ESU in Washington*. Final Rule. March 24, 1999. Federal Register 64(56):14308-14328.
- NMFS (National Marine Fisheries Service). 2005. *Endangered and Threatened Species: Final Listing Determinations for 16 ESUs of West Coast Salmon, and Final 4(d) Protective Regulations for Threatened Salmonid ESUs* (70 FR 37160).
- NMFS (National Marine Fisheries Service). 2008. *Recovery Plan for Southern Resident Killer Whales* (*Orcinus orca*). National Marine Fisheries Service, Northwest Region, Seattle, Washington. Available: <https://www.fisheries.noaa.gov/resource/document/recovery-plan-southern-resident-killer-whales-orcinus-orca>.
- NMFS (National Marine Fisheries Service). 2010. *Status Review of Five Rockfish Species in Puget Sound, Washington: Bocaccio* (*Sebastes paucispinis*), *canary rockfish* (*S. pinniger*), *yelloweye rockfish* (*S. ruberrimus*), *greenstriped rockfish* (*S. elongatus*), and *redstripe rockfish* (*S. proriger*). Accessed February 2024. Available: <https://repository.library.noaa.gov/view/noaa/3777>.
- NMFS (National Marine Fisheries Service). 2011. *Endangered Species Act Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Roseburg Regional Airport Taxiway Separation Project, Newton Creek* (HUC 6: 171003021305), Douglas County, Oregon. May 25, 2011.
- NMFS (National Marine Fisheries Service). 2014a. *Endangered and Threatened Species: Designation of Critical Habitat for the Puget Sound/Georgia Basin Distinct Population Segments of Yelloweye Rockfish, Canary Rockfish and Bocaccio*. Accessed February 2024. Available: <https://www.federalregister.gov/documents/2014/11/13/2014-26558/endangered-and-threatened-species-designation-of-critical-habitat-for-the-puget-soundgeorgia-basin>.
- NMFS (National Marine Fisheries Service). 2014b. *Southern Resident Killer Whales: 10 Years of Research and Conservation*. Accessed February 2024. Available: http://komonews.s3.amazonaws.com/140625_orca_report_quality.pdf.
- NMFS (National Marine Fisheries Service). 2015. *Listing Endangered or Threatened Species: Amendment to the Endangered Species Act Listing of the Southern Resident Killer Whale Distinct Population Segment* (50 CFR, Docket No. 130321272-5109-03, RIN 0648-XC589). Final rule. Accessed February 2024. Available: <https://www.federalregister.gov/documents/2015/02/10/2015-02604/listing-endangered-or-threatened-species-amendment-to-the-endangered-species-act-listing-of-the>.
- NMFS (National Marine Fisheries Service). 2016. *Endangered and Threatened Species: Designation of Critical Habitat for Threatened Lower Columbia River Coho Salmon and Puget Sound Steelhead*. Final Rule. Federal Register. Volume 81, Number 36. February 24, 2016.

- NMFS (National Marine Fisheries Service). 2017. *Rockfish recovery plan Puget Sound/Georgia Basin: yelloweye rockfish (Sebastes ruberrimus) and bocaccio (S. paucispinis)*. Accessed February 2024. Available: <https://repository.library.noaa.gov/view/noaa/16866>.
- NMFS (National Marine Fisheries Service). 2019. *Steelhead Recovery Plan*. Accessed February 2024. Available: <https://www.fisheries.noaa.gov/species/steelhead>.
- NMFS (National Marine Fisheries Service). 2022. *Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Salish Sea Nearshore Programmatic Consultation (SSNP)*. Seattle, Washington. Available: <https://www.fisheries.noaa.gov/feature-story/salish-sea-biological-opinion-provides-path-nearshore-projects-while-safeguarding>.
- NMFS (National Marine Fisheries Service). 2024a. *Bocaccio (Sebastes paucispinis)*. Accessed February 2024. Available: <https://www.fisheries.noaa.gov/species/bocaccio-protected>.
- NMFS (National Marine Fisheries Service). 2024b. *Killer Whale (Orcinus orca)*. Accessed February 2024. Available: <https://www.fisheries.noaa.gov/species/killer-whale>.
- NOAA (National Oceanic and Atmospheric Administration). 2024a. *National EFH Habitat Mapper*. Available: <https://noaa.maps.arcgis.com/apps/webappviewer/index.html?id=68d8df16b39c48fe9f60640692d0e318>.
- NOAA (National Oceanic and Atmospheric Administration). 2024b. *National ESA Critical Habitat Mapper*. Available: <https://noaa.maps.arcgis.com/apps/webappviewer/index.html?id=68d8df16b39c48fe9f60640692d0e318>.
- NWIFC (Northwest Indian Fisheries Commission). 2024. *Statewide Integrated Fish Distribution Database (SWIFD) and Map Viewer*. Includes data from the Northwest Indian Fisheries Commission and Washington Department of Fish and Wildlife. Accessed February 2024. Available: <https://geo.nwifc.org/swifd/>.
- Orca Network. 2024. *Recent Whale Sightings*. Accessed February 2024. Available: <https://www.orcanetwork.org/recent-sightings>.
- PAE (Precision Approach Engineering). 2025. *Southwest Development Area Post-Construction Stormwater Management Plan*. Prepared for Port of Friday Harbor.
- PFMC (Pacific Fishery Management Council). 2024a. *Pacific Coast Salmon Fishery Management Plan for Commercial and Recreational Salmon Fisheries off the coasts of Washington, Oregon, and California as revised through Amendment 24*. February 2024.
- PFMC (Pacific Fishery Management Council). 2024b. *Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery*. December 2024.
- PFMC (Pacific Fishery Management Council). 2024c. *Coastal Pelagic Species Fishery Management Plan As Amended Through Amendment 21*. April 2024.
- PFMC (Pacific Fishery Management Council). 2025. *Essential Fish Habitat on the West Coast*. Available at: <https://www.fisheries.noaa.gov/west-coast/habitat-conservation/essential-fish-habitat-west-coast>

- Reid Middleton. 2012. *Friday Harbor Airport Drainage Study*. Prepared for the Port of Friday Harbor.
- San Juan County. 2022. *San Juan County Comprehensive Plan*. Accessed February 2025. Available: <https://www.sanjuancountywa.gov/510/Comprehensive-Plan>
- San Juan County. 2024. *Friday Harbor Marina Artificial Habitats – ArcGIS Map*. San Juan County Assessor’s Office. Accessed March 14, 2024. Available: http://www.arcgis.com/apps/OnePane/basicviewer/index.html?appid=5def95e3511d42e68a702095e1040f50_
- Southern Resident Orca Recovery. 2018. *Progress webpage*. Accessed February 2024. Available: <https://orca.wa.gov/progress/>.
- University of Washington. 2016. *The Friday Harbor Laboratories*. Accessed February 2024. Available: <https://depts.washington.edu/fhl/about.html>.
- WDFW (Washington Department of Fish and Wildlife). 2024. *Priority Habitats and Species (PHS) on the Web*. Accessed March 1, 2024. Available: <http://apps.wdfw.wa.gov/phsontheweb/>.
- WDNR (Washington Department of Natural Resources). 2024. *Natural Heritage Rare Plants and High Quality Ecosystems GIS Data*, revised August 2024. <https://test-fortress.wa.gov/dnr/adminsaqa/dataweb/dmmatrix.html>.
- Whitman, T., A. MacLennan, P. Schlenger, J. Small, S. Hawkins, and J. Slocumb. 2012. *Strategic salmon recovery planning for San Juan County Washington: the pulling it all together (PIAT) project*. Report to the San Juan County Lead Entity for Salmon Recovery and the Washington State Salmon Recovery Funding Board RCO #10-1789.
- Wiles, G.J. 2004. *Washington State status report for the killer whale*. Washington Department Fish and Wildlife, Olympia. 106 pp.
- WRIA 2 (Water Resource Inventory Area 2). 2022. *San Juan Islands Watershed*. Salmon Recovery Chapter Update and Multi-Species Conservation Plan. Accessed February 2024. Available: <https://pspwa.app.box.com/s/uc8xy37a8g1moz0wi46tivglhh6bm6qs>.
- WSDOT (Washington State Department of Transportation). 2008. *Aviation Stormwater Design Manual*. Managing Wildlife Hazards near Airports.
- WSDOT (Washington State Department of Transportation). 2019. *Highway Runoff Manual*. April 2019. Available: <https://wsdot.wa.gov/engineering-standards/all-manuals-and-standards/manuals/highway-runoff-manual>.
- WSDOT (Washington State Department of Transportation). 2024. *Endangered Species Act & Essential Fish Habitat, Biological Assessment Preparation Manual & Template*. Available: <https://wsdot.wa.gov/engineering-standards/environmental-guidance/endangered-species-act-essential-fish-habitat>.

Appendix A

**Southwest Development Post-
Construction Stormwater
Management Plan**



SOUTHWEST DEVELOPMENT AREA POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN

PORT OF FRIDAY HARBOR
AIRPORT IMPROVEMENT PROGRAM
FEDERAL AVIATION ADMINISTRATION AIP NO. 3-53-0152-043-2023



FRIDAY HARBOR REGIONAL AIRPORT

Friday Harbor, Washington

February 2025



12/13/2025

Prepared by
PRECISION APPROACH ENGINEERING, INC.
Corley McFarland, PE
Email: CMcFarland@preappinc.com
Phone: (541) 754-0043

TABLE OF CONTENTS

POST CONSTRUCTION STORMWATER MANAGEMENT PLAN

Page

Table of Contents

Introduction	1
Stormwater Design Summary	1
Basin Description	1
Proposed Site Development	2
National Marine Fisheries Service (NMFS) – Applicable Post-Construction Stormwater Management Project Design Criteria	3
Proposed Water Quality Treatment and Flow Control Approach	4
Operation and Maintenance.....	7
Stormwater Design Summary	8

Figures

- Figure 1 – Site Plan
- Figure 2 – Drainage Basin Map
- Figure 3 – Stormwater Quality Treatment Facilities
- Figure 4 – Stormwater Quality Treatment Details

Appendices

- Appendix A – Water Quality (Treatment) Facilities Modeling
- Appendix B – Water Quantity (Flow Control) Facilities Modeling
- Appendix C – 2024 SWMMWW Appendix V-A: Best Management Practices (BMP) Maintenance
Tables Sections V-A.1 – V-A.23

INTRODUCTION

The Port of Friday Harbor (Port), owner and operator of the Friday Harbor Regional Airport (FHR), is in the planning stages for the development of new aircraft taxilanes, aircraft parking apron, aircraft hangars, airfield support facilities, and utilities to support airport operations and address the immediate need for aircraft storage and parking as identified in the recent Airport Master Plan (AMP2020). Identified as the Southwest Development Area (SWDA), the planned development is located within the mostly undeveloped southwest portion of the airport property. The development includes approximately 4.5 acres of new aircraft pavement, 3.3 acres of new and replaced airport access road pavement and vehicle parking, and 1.3 acres of new hangar and airport support facilities as shown on **Figure 1**.

The total development is expected to occur in multiple stages as needed to support airport operations, aircraft storage, and aircraft parking needs compatible with available funding for the improvements. These improvements, including hangar buildings, aircraft access pavements, airport operations support facilities, site development, and access roads, are included within this report as the proposed improvements. Major work elements associated with the proposed development will include demolition, pavement section construction, site grading, stormwater conveyance and management, hangar construction, airport operations support facility construction, utility development, airfield and hangar lighting installation, and signage improvements. The new impervious surfaces will require stormwater infrastructure improvements for both quality (treatment) and quantity (flow control). There are limited existing stormwater facilities present within and adjacent to this project, and there are areas with stormwater ponding and conveyance problems. Stormwater from the airport eventually discharges to nearshore areas of North Bay, part of the Salish Sea, which is designated as a critical habitat for Chinook salmon. Therefore, stormwater best management practices (BMPs) will be designed to meet National Marine Fisheries Service (NMFS) water quality treatment criteria.

The project is being partially funded by an Airport Improvement Program (AIP) grant issued by the Federal Aviation Administration (FAA). As a condition of the AIP funding, the improvements will be designed to meet the FAA Advisory Circular (AC) standards, including stormwater conveyance design according to AC 150/5320-5D Airport Drainage Design and AC 150/5200-33C Hazardous Wildlife Attractants on or near Airports. These guidelines outline requirements for airports that are intended to increase airport safety by controlling stormwater and hazardous wildlife attractants on or near airports. Typical hazardous wildlife at airports and within the region includes waterfowl, predatory/migratory birds, and larger mammals such as coyotes, foxes, and deer.

The National Resources Conservation Service (NRCS) Soil Survey map indicates that most of the site is underlain by Roche-Killebrew-Rock Outcrop, which is classified by the NRCS as hydrologic group C/D. The presence of this soil type was confirmed by geotechnical investigation. Group C/D soils are considered unsuitable for stormwater infiltration, and according to NRCS and limited onsite infiltration testing, the majority of the site is expected to have infiltration rates of approximately 0.06 to 0.13 inches/hour. This low infiltration rate will not support wholesale infiltration of the stormwater runoff associated with the proposed new impervious surfaces; therefore, post-construction stormwater quality and quantity measures are required, as documented within this report.

Stormwater Design Summary

Basin Description

The airport sits on the east slope of San Juan Island, and the terrain generally slopes toward the southeast area of the airport. The runway is aligned North to South and sits approximately 1,000 feet from Puget

Sound. A previous drainage study of the airport was completed in 2012, and it identified three primary basins on the airport property. Basin 1 includes the northern portion of the airport infrastructure and drains to the existing Mullis Detention Pond located adjacent to Mullis Street; Basin 2 includes the majority of the existing southern airport impervious area; and Basin 3 includes the remaining airport property generally south of the runway, which consists of airport support infrastructure, minor access roads, and small developments. Subbasins have been identified within the three primary basins. The proposed improvements occur within Subbasins 2B, 3A, 3B, and 3D as shown on **Figure 2**. Therefore, all other basin and subbasin infrastructure, including the existing Mullis Street detention pond, is not included in the modeling for this report.

The existing impervious surfaces within Subbasins 2B, 3A, 3B, and 3D consist primarily of asphalt-paved runway, taxiways, aprons, miscellaneous concrete surfaces, paved and gravel vehicle access roads, gravel or asphaltic pavement shoulders, and drains. At present, these surfaces typically sheet flow into parallel swale and ditch systems and are conveyed offsite at the southeast area of the airport property. Construction of portions of the existing pavements dates back to the 1960s, and the airport runway and other infrastructure has been improved, maintained, and expanded to the current configuration since that time period. With the exception of recent developments, existing impervious runoff from Basin 2 and Basin 3 leaves the airport property without passing through a stormwater system specifically designed for quantity or quality treatment; however, sediment and pollutants are filtered and settled to a degree as the stormwater is conveyed primarily through the existing vegetated shoulders and open channel swales and ditches.

The pollutants of concern that may be discharged from aircraft operating surfaces are various. They primarily include particulates such as trace metals (e.g., copper or zinc) and petroleum-related products (polycyclic aromatic hydrocarbons – PAHs) or general sediment consisting of dirt, dust, and grit. There is also the potential for 6PPD-quinone (6PPD-q) from tire wear. The extent of 6PPD-q discharge from airports continues to be evaluated. However, according to the Washington State Department of Ecology's (DOE) 2024 Stormwater Management Manual for Western Washington (SWMMWW), flow control and runoff treatment best management practices (BMPs) that utilize infiltration, sorption, filtration, and sedimentation may have potential to reduce some 6PPD-q from stormwater.

The Proposed Project will utilize funding from the FAA, creating a federal nexus. The Endangered Species Act (ESA) requires federal agencies to ensure that their actions do not jeopardize the continued existence of threatened or endangered species or their critical habitats. Therefore, the National Marine Fisheries (NMFS) must assess the effect of the proposed Airport improvements on species under their jurisdiction that are listed or proposed for listing as endangered or threatened under the federal ESA. As such, stormwater treatment for quality and quantity is proposed in accordance with the NMFS design criteria section of this document.

Proposed Site Development

The proposed project action improvements include approximately 4.5 acres of new asphalt and concrete pavement and 3.3 acres of new and replaced access roads and vehicle parking for a total of 7.8 acres of new and replaced pollution generating impervious surfaces as shown on **Figure 1**. Hangar and airport operations support building impervious area developments total approximately 1.3 acres. When combined with the existing contributing impervious area to remain, the total new, replaced, and existing impervious surfaces within subbasins 2B, 3A, 3B and 3D (the contributing project basin area) is approximately 15.7 acres. The remaining 83.2 acres of the contributing project basin area will remain pervious, vegetated, open space as a result of the proposed action.

The proposed hangar and airport operations support building developments are considered non-pollution generating impervious surfaces, as they will be surfaced with an inert, non-leachable material per the DOE 2024 SWMMWW allowances. Accordingly, the non-pollution generating impervious surface area is included in the flow control design model; however, it is not included in the stormwater quality design models. In practice, roof drains will be constructed to bypass the adjacent water quality treatment facilities and connect directly to the primary water conveyance system.

Table 1: Mitigated Condition Area Input for Western Washington Hydrology Model (WWHM)				
(Acres)				
<u>Category</u>	<u>Basin 2B</u>	<u>Basin 3A</u>	<u>Basin 3B</u>	<u>Basin 3D</u>
C,Forest,Flat	2.29	1.87	0.00	0.00
C,Forest,Mod	14.33	2.52	0.00	0.00
C,Pasture,Flat	14.37	17.99	0.00	0.00
C,Pasture, Mod	1.88	8.58	0.00	0.10
C,Lawn, Mod	8.96	0.00	0.00	0.00
C,Lawn,Flat	9.60	0.00	0.70	0.00
Roads,Flat	6.94	1.15	0.50	0.20
Parking, Flat	3.74	0.00	0.00	0.00
Roof Tops, Flat	1.38	0.14	0.00	0.00
Pond	0.00	1.30	0.20	0.10
Basin Subtotal:	63.49	33.55	1.40	0.40

Table 2: Pre-Development Area Summary (Acres)				
<u>Category</u>	<u>Basin 2B</u>	<u>Basin 3A</u>	<u>Basin 3B</u>	<u>Basin 3D</u>
Pervious	63.49	33.55	1.40	0.40
Impervious ¹	0.00	0.00	0.00	0.00
Basin Subtotal:	63.49	33.55	1.40	0.40

Table 2 Notes:

¹ Per the SSNP, the predevelopment site conditions assume natural, undeveloped conditions for the site. Accordingly, the predeveloped models do not include existing impervious surfaces.

Table 3: Post-Development Area Summary (Acres)				
<u>Category</u>	<u>Basin 2B</u>	<u>Basin 3A</u>	<u>Basin 3B</u>	<u>Basin 3D</u>
Pervious	51.43	30.96	0.70	0.10
Impervious	12.06	2.59	0.70	0.30
Basin Subtotal:	63.49	33.55	1.40	0.40

National Marine Fisheries Service (NMFS) – Applicable Post-Construction Stormwater Management Project Design Criteria

NMFS has developed stormwater management criteria for projects involving new or redeveloped impervious surfaces to avoid and minimize impacts on species and habitats protected under the federal ESA.

The NMFS design criteria have been documented in various programmatic agreements; however, because the FAA is the lead federal agency for this consultation, none of the available programmatic agreements apply directly. With the goal of expediting the NMFS review process, existing programmatic agreements were reviewed for relevance. Although the proposed action does not directly apply to the covered categories of activities, the Salish Sea Nearshore Programmatic Consultation (SSNP; NMFS No. WCRO-2019-04086), which is employed on routine construction projects regulated by the US Army Corps of Engineers within the Salish Sea nearshore area, has activity categories that align in scope and design criteria that correspond to the proposed actions for this project. Accordingly, the post-construction stormwater treatment and flow control for this project is designed to meet NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management of the SSNP, which requires stormwater management for proposed actions triggering Project Design Criteria (PDC) #3 – Stormwater Facilities and Outfalls, or any project under the SSNP which creates new contributing impervious surface associated with any of the other PDCs. Additionally, the project utilizes Low Impact Development (LID) approaches to stormwater treatment and management facilities listed in Section 1.3.1.C.13, including vegetated filter strips and LID swales. The Stormwater Management section provides design storms for both water quality (treatment) and water quantity (flow control) as follows:

- a. **Water Quality Design.** Per SSNP Section 1.3.1.C.13.e, all stormwater quality treatment practices and facilities are designed to accept 50% of the cumulative rainfall from the 2-year, 24-hour storm (the water quality design storm) utilizing Low Impact Development (LID) treatments. A continuous simulation model was used to establish the design storm for the site.
- b. **Water Quantity Design.** Per SSNP Section 1.3.1.C.13.f, flow control is required for proposed actions subject to PDC #3 – Stormwater Facilities and Outfalls. Per the SSNP, the predevelopment site conditions assume the natural, undeveloped conditions of the project site. Accordingly, the proposed project provides flow control for the new proposed action impervious areas and flows from existing impervious areas that are comingled with the proposed project upstream of the flow control facilities within the contributing project basin area (Drainage subbasins 2B, 3A, 3B, and 3D).

The discharge design storm endpoints are set out in SSNP Section 1.3.1.C.13.f, which requires flow control for all storms between a lower and upper discharge endpoint. The upper flow control discharge endpoint is either the 10-year storm or may be reduced to the bank overtopping event for the receiving drainage as determined by the Entrenchment Ratio. The proposed project will default to the 10-year storm, which is associated with a low Entrenchment Ratio because the site terrain is composed of relatively steep grades and is not within the floodplain, whereas a high Entrenchment Ratio is stated as depicting more floodplain development per the SSNP. As required by the SSNP, on-site flow control facilities were designed using a continuous model simulation and maintain the natural, pre-development condition frequency and duration of flows generated by the following rainfall events:

- 1. 50% of the 2-year, 24-hour storm (lower discharge endpoint);
- 2. 2-year, 24-hour storm;
- 3. 5-year, 24-hour storm; and
- 4. 10-year, 24-hour storm (upper discharge endpoint)

Proposed Water Quality Treatment and Flow Control Approach

The general stormwater facility design is to treat pollution generating impervious areas for water quality flows at or close to the source, then convey flows through various open-channel swales or pipes to the southeast detention area and detain stormwater volume to release at controlled rates. The controlled

release will cross Cattle Point Road through an existing 36-inch culvert crossing, which then flows via overland and piped conveyance into North Bay approximately 1,000 feet east of the airport property.

The DOE Western Washington Hydrology Model (WWHM) software was utilized for the stormwater modeling which meets the requirements of Section 1.3.1.C.13 of the SSNP. The stormwater basins were input into the modeling software for each stormwater facility design, and the WWHM design report files are included in the appendices of this report.

Water Quality Treatment Design

The water quality treatment facilities utilize two primary approaches depending on the impervious area shapes; linear type pavements are treated utilizing adjacent Compost-Amended Vegetated Filter Strips (CAVFS), and the remaining intersection areas and parking areas are treated utilizing bioretention swales as shown on **Figure 3**. Both methods of treatment are listed as Low Impact Development (LID) techniques in the SSNP, with the primary treatment happening as the runoff is filtered through the soil medium. Storms smaller than or equal to the water quality storm for the contributing basins flow through the treatment facilities, and the pollutants are filtered out before the stormwater is discharged downstream and ultimately into the detention (flow control) facilities. The design of both types of water quality treatment facilities utilizes criteria outlined in the 2024 DOE SWMMWW and are shown on **Figure 4**. The bioretention swales are composed of an 18-inch layer of amended water quality soil blend placed on top of a gravel layer and an underdrain collection system. Higher volumes of runoff (flows greater than the water quality design storm) will be allowed to bypass through a riser structure, which is then conveyed with the treated runoff to the detention ponds. Although the detention facilities' primary purpose is for flow control, the ponds will also provide additional opportunities for particulates to settle out before discharging offsite.

All water quality treatment facilities will be vegetated with a minimum of a low-mow grass mixture and modified as recommended in the 2008 WSDOT Aviation Stormwater Design Manual (ASDM) for airport specific considerations. The ASDM is recognized as an accepted design standard to reduce the wildlife attractant nature of surface stormwater infrastructure, a critical element of the project, and an FAA requirement for stormwater facility design for airport safety. A summary of water quality treatment facility design geometry and achieved treatment is included in Table 4.

Table 4: Design Summary of Water Quality Treatment Facilities				
Facility (See Figure 3 for Location)	Length (ft)	Width (ft)	Slope (%)	Percent Treatment (>91% Required)
Bioretention Swale 1	14	14	0%	91.3%
Bioretention Swale 2	12	14	0%	92.1%
Bioretention Swale 3	12	14	0%	92.1%
Bioretention Swale 4	8.5	8	0%	91.5%
Bioretention Swale 5	7	5	0%	91.3%
Bioretention Swale 6	9	8	0%	91.1%
CAVFS 1	350	10	25%	92.9%
CAVFS 2	325	5	25%	98.5%
CAVFS 3	1420	5	25%	94.80%
CAVFS 4	3420	2	25%	99.20%

Stormwater quality facilities are designed utilizing WWHM software and in accordance with the 2024 SWMMWW, and a detailed report for each facility is included in **Appendix A**. These facilities are non-proprietary and comply with the SSNP Section 1.3.1.C.13.e design standards for stormwater quality treatment. Per the SSNP, proprietary (or manufactured) stormwater facilities will only be considered if site constraints preclude the implementation of LID methods, or the alternative can demonstrate improvement in ecosystem health and function commensurate with identified LID practices. Additionally, selecting BMPs that utilize infiltration, sorption, filtration, and sedimentation may have the potential to reduce some 6PPD-q from stormwater, per the 2024 SWMMWW.

Flow Control Design

Three stormwater detention (flow control) facilities are proposed as shown on **Figure 2**, which use a combination of orifice and weir control structures to provide the NMFS design flow control, each of which are open storage detention ponds. The Basin 2B and 3A detention pond is designed at a 10-foot depth (Including 1-foot of freeboard) due to the relatively steep existing slopes at this location, has a bottom area of approximately 24,000 square feet, and has a maximum storage of approximately 320,000 cubic feet. The smaller Basin 3B detention pond is designed at a 4-foot depth (Including 1-foot of freeboard), has a bottom area of approximately 2,000 square feet, and has a maximum storage of 9,000 cubic feet. Similarly, the Basin 3D detention pond is designed at a 4-foot depth (Including 1-foot of freeboard), has a bottom area of approximately 950 square feet, and has a maximum storage of 3,800 cubic feet.

Table 5 presents stormwater discharge peak flow rates and volumes for pre-development and post-development conditions for each basin. The ponds are both designed utilizing WWHM software, and the software outputs are given in **Appendix B**.

Table 5: Stormwater Pre-Developed vs. Mitigated Discharges						
24-hr Storm	Basin 2B & 3A		Basin 3B		Basin 3D	
	Pre-Dev Flow (CFS)	Mitigated Flow (CFS)	Pre-Dev Flow (CFS)	Mitigated Flow (CFS)	Pre-Dev Flow (CFS)	Mitigated Flow (CFS)
2-yr	1.573	1.077	0.022	0.016	0.006	0.004
5-yr	2.412	1.753	0.034	0.027	0.009	0.007
10-yr	2.864	2.310	0.040	0.037	0.011	0.010
25-yr ¹	3.321	3.153	0.047	0.052	0.013	0.015
50-yr ¹	3.592	3.890	0.050	0.065	0.014	0.020
100-yr ¹	3.814	4.728	0.053	0.081	0.015	0.026

Table 5 Notes:

¹ Not a design storm for flow control. Provided for informational purposes only.

Similar to the water quality treatment facilities, the open storage detention pond bottoms will be vegetated with a minimum of a low-mow grass mixture and plantings as recommended in the WSDOT ASDM. Additional wildlife hazard mitigation measures, as set out in FAA AC 150/5200-33C and the ASDM, are to be incorporated into the final detention pond configuration, primarily including the layout of the open storage areas generally in a linear form, steepened side slopes, non-vegetated side slopes, and perimeter fencing, to reduce waterfowl and other animal attractancy. Further mitigation measures may be implemented in the future if needed to obscure the water features and reduce the attractiveness to waterfowl and may include the installation of additional plantings, netting, or bird balls.

After discharge from the proposed detention facilities, the treated and controlled stormwater from the proposed development is routed through the existing 36-inch culvert and ultimately into the North Bay which is part of the Salish Sea.

Operation and Maintenance

Maintenance will be performed by the Port of Friday Harbor airport operations staff. Maintenance activities will be performed on a seasonal basis according to the following general schedule:

- Summer: Make structural repairs. Improve filter medium as needed. Clear drains.
- Fall: Replant exposed soil and replace dead plants. Remove sediment and plant debris.
- Winter: Clear inlets and outlets/overflows to maintain conveyance.
- Spring: Remove sediment and plant debris. Replant exposed soil and replace dead plants. Mulch as needed, but do not block the inlets, outlets, or flow path with mulch.
- All seasons: Weed, as necessary. Maintain or add wildlife mitigation measures, as necessary.

Table 6 includes general maintenance indicators and prescribed corrective actions to be taken by each element. A copy of the 2024 SWMMWW Appendix V-A: BMP Maintenance Tables Sections V-A.1 – V-A.23 is provided in **Appendix C**. The appropriate maintenance activities will be incorporated into an operations and maintenance plan and kept on file at the airport office.

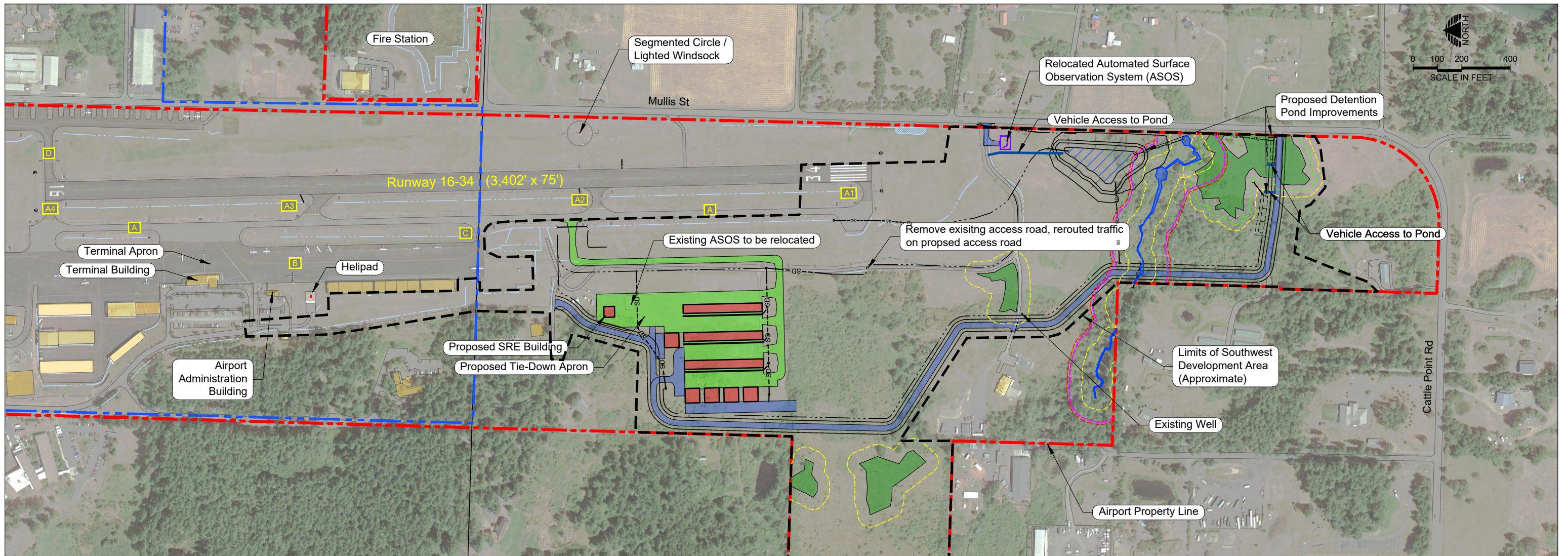
Table 6: Maintenance Indicators and Corrective Actions	
Maintenance Indicator	Corrective Action
Element - Structural Components, including inlets and outlets/overflows, shall freely convey stormwater	
• Clogged inlets or outlets • Broken inlets or outlets • Cracked or exposed drain pipes • Visible debris and/or petroleum deposits	• Remove sediment and debris from catch basins, trench drains, curb inlets, and pipes to maintain at least 50% conveyance capacity at all times. • Repair or replace broken downspouts, curb cuts, standpipes, and screens as needed. • Repair/seal cracks. Replace when a repair is insufficient. Cover with 6 inches of growing medium to prevent freeze/thaw and UV damage.
Element - Vegetation shall cover 75% of the facility	
• Dead or strained vegetation • Tall grass and vegetation • Weeds	• Replant per original planting plan. • Mulch banks as needed. DO NOT apply fertilizers, herbicides, or pesticides. • Prune to allow sightlines and foot traffic. Prune to ensure inlets and outlets freely convey stormwater into and/or out of the facility. Prune as needed to mitigate attracting wildlife. • Manually remove weeds. Remove all plant debris.
Element - Water quality media, including soil and gravel, shall sustain healthy plant cover.	
• Erosion and/or exposed soils • Scouring at the inlet(s) • Slope slippage	• Fill-in and lightly compact areas of erosion with originally specified soil mix. Stabilize soils with plants from the original planting plan.

Stormwater Design Summary

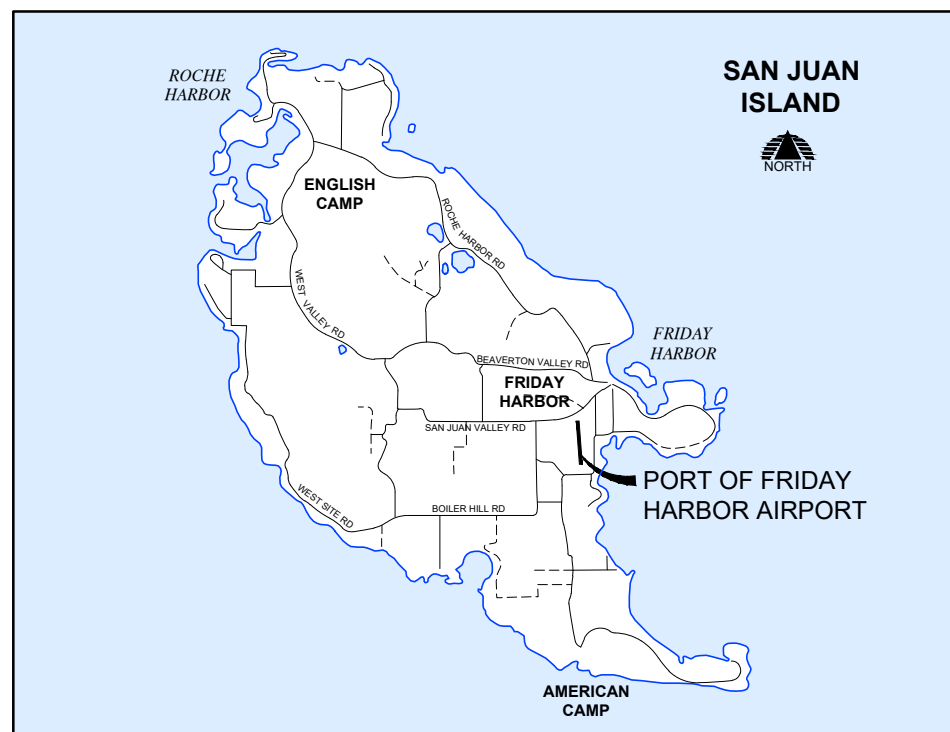
The stormwater management improvements planned in conjunction with the proposed development are designed to control discharge rates and filter pollutants for impervious surfaces while mitigating the wildlife hazard attractant nature of open stormwater facilities at airports. The work includes the required stormwater management improvements to address proposed, existing, and adjacent impervious areas within the affected drainage basins. The stormwater runoff from the proposed and existing surfaces will be managed utilizing non-proprietary bioretention swales, compost amended vegetated filter strips (CAVFS), and detention facilities that provide stormwater quality (treatment) and stormwater quantity (flow control), meeting the NMFS requirements set out in Section 1.3.1.C.13 of the Salish Sea Nearshore Programmatic Consultation (SSNP). Although the SSNP is not directly applicable to the categories of activities associated with the proposed actions of this project and since the FAA is the lead agency, it was chosen due to the alignment in scope with the proposed actions for this project and with the goal of expediting the NMFS review process.

FIGURES

02/13/25 - 1:42pm - jwade - P:\E\esa012-ph sa-swda\0400CAD\Graphics\EXH-Site-Basins.dwg



VICINITY MAP



Legend

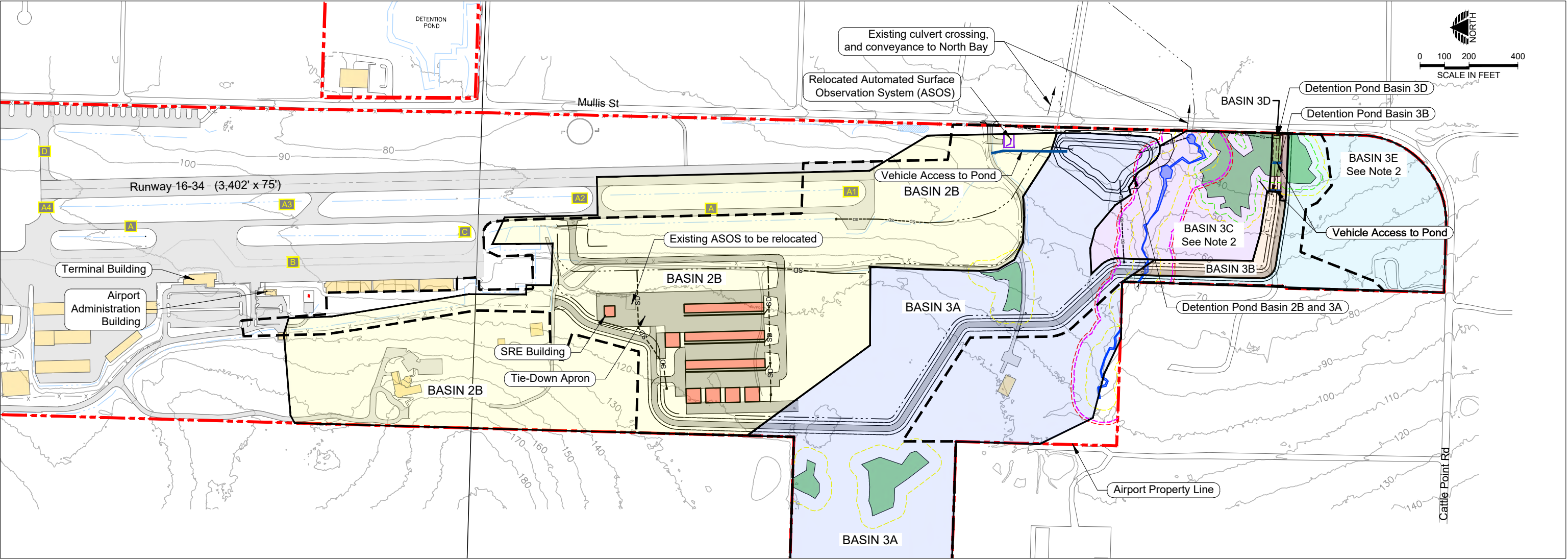
- Existing Impervious Pavement Areas
- Proposed Impervious Pavement Area
- Proposed Hangar Development
- Area of Potential Effect (APE) / Limits of Southwest Development Area (Approximate)

Wetland Legend

- Wetland Area
- Existing Stream
- 25 Foot Buffer
- 50 Foot Buffer
- 100 Foot Buffer
- 110 Foot Buffer

NOT FOR CONSTRUCTION

02/13/25 - 1:43pm - jwade - P:\E\esa012-ph ea-swda\0400CAD\Graphics\EXH-Basins.dwg



Legend

- Existing Impervious Pavement Areas
- Proposed Impervious Pavement Area
- Proposed Hangar Development
- Area of Potential Effect (APE) / Limits of Southwest Development Area (Approximate)

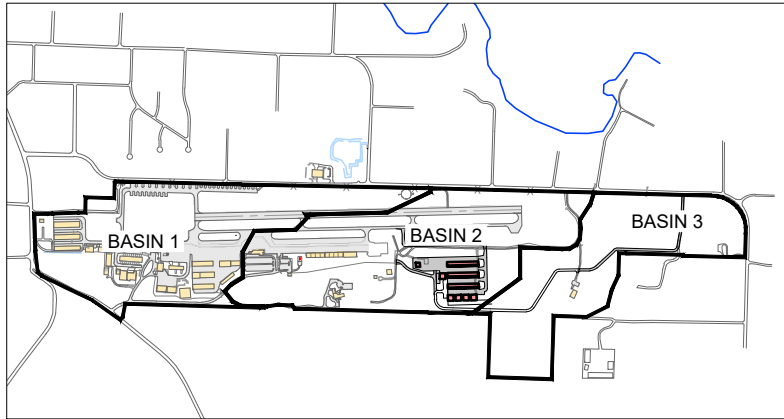
Wetland Legend

- Wetland Area
- Existing Stream
- 25 Foot Buffer
- 50 Foot Buffer
- 100 Foot Buffer
- 110 Foot Buffer

Notes

- Layout and Grading shown are based on existing LiDAR terrain model surface and historical storm drain reporting. Design survey will be performed prior to Project Design, and minor modifications to Layout and Grading are anticipated with more detailed terrain modeling.
- Basin 3C and Basin 3E shown for informational purposes. No change in surface type and no change to existing usage occur.

AIRPORT DRAINAGE BASINS



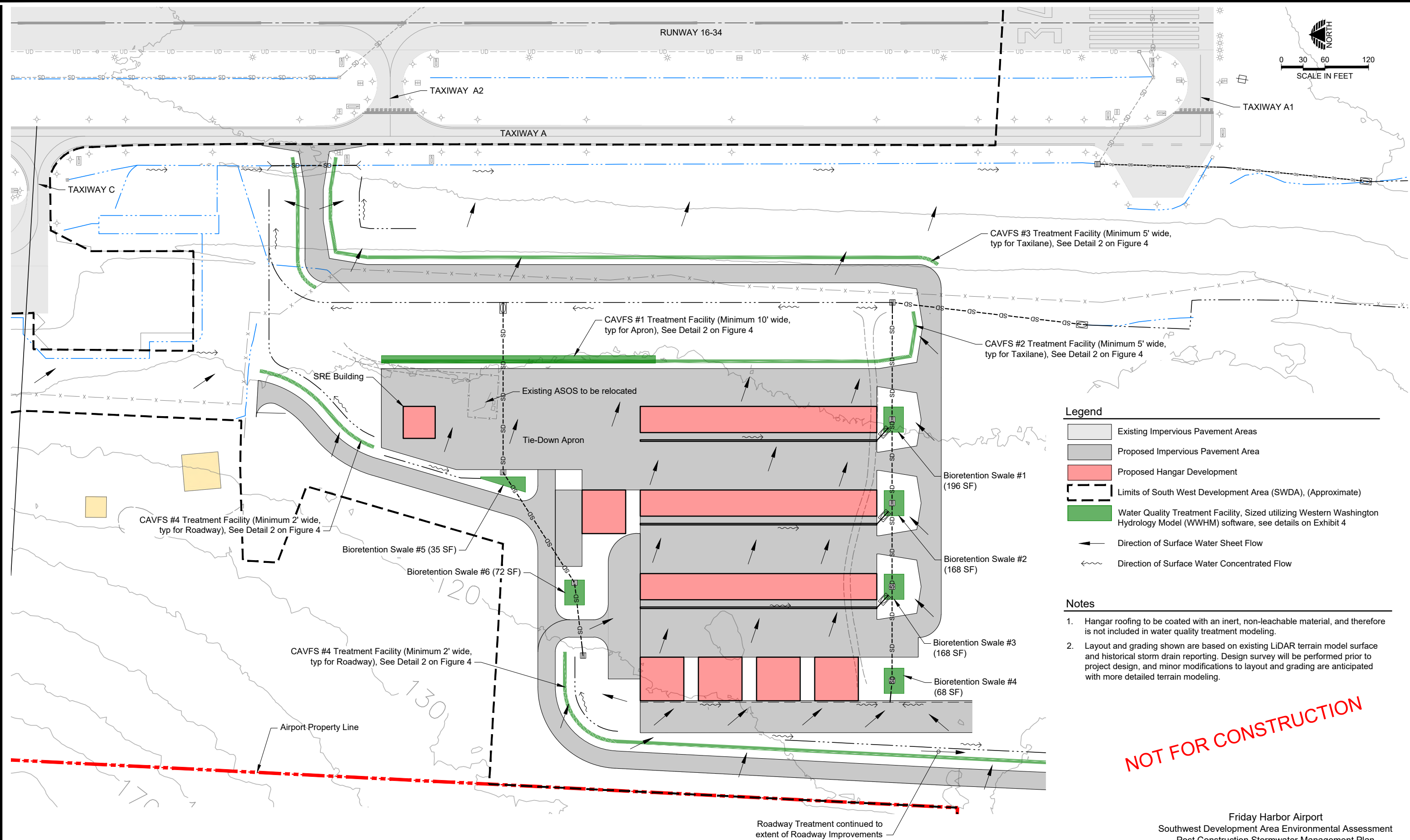
MITIGATED CONDITION

Category	Basin 2B	Basin 3A	Basin 3B	Basin 3D
C,Forest,Flat	2.29	1.87	0.00	0.00
C,Forest,Mod	14.33	2.52	0.00	0.00
C,Pasture,Flat	14.37	17.99	0.00	0.00
C,Pasture, Mod	1.88	8.58	0.00	0.10
C,Lawn, Mod	8.96	0.00	0.00	0.00
C,Lawn,Flat	9.60	0.00	0.70	0.00
Roads,Flat	6.94	1.15	0.50	0.20
Parking, Flat	3.74	0.00	0.00	0.00
Roof Tops, Flat	1.38	0.14	0.00	0.00
Pond	0.00	1.30	0.20	0.10
Basin Subtotal:	63.49	33.55	1.40	0.40

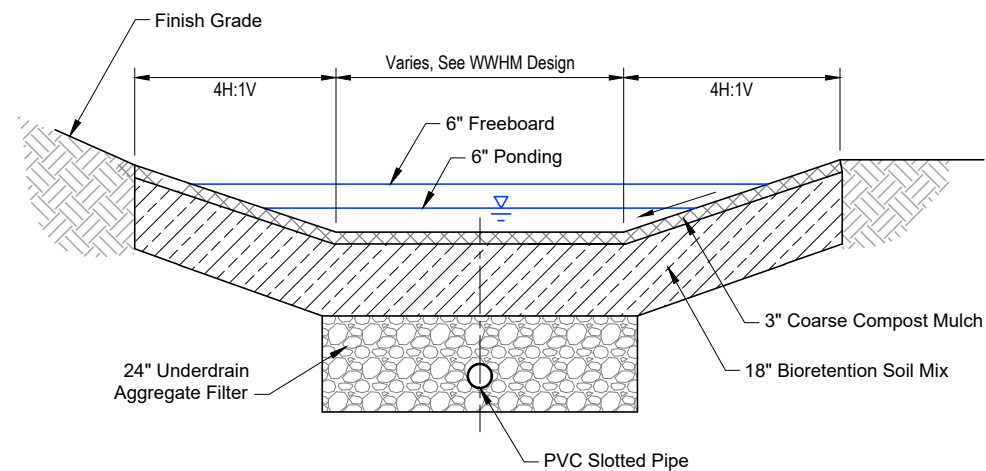
For Basins 3C and 3E, see Note 2.

NOT FOR CONSTRUCTION

02/13/25 - 1:43pm - jwade - P:\E\es012-ph ea-swda\0400CAD\Graphics\EXH-SD-Treatment.dwg

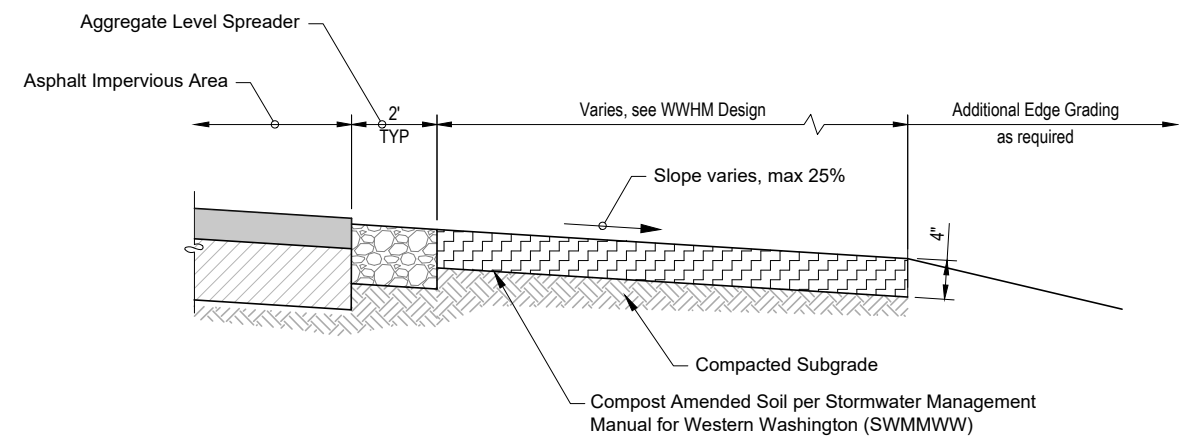


NOT FOR CONSTRUCTION



Bioretention Swale Detail
NTS

1
4



Compost-Amended
Vegetated Filter Strip Detail
NTS

2
4

NOT FOR CONSTRUCTION

Friday Harbor Airport
Southwest Development Area Environmental Assessment
Post Construction Stormwater Management Plan

Stormwater Quality Treatment Details

APPENDIX A

WATER QUALITY (TREATMENT) FACILITIES MODELING

(Modeling files are available upon request)

APPENDIX B

WATER QUANTITY (FLOW CONTROL) FACILITIES MODELING

(Modeling files are available upon request)

APPENDIX C

2024 SWMMWW APPENDIX V-A: BEST MANAGEMENT PRACTICES (BMP) MAINTENANCE TABLES SECTIONS V-A.1 – V-A.23

Appendix V-A: BMP Maintenance Tables

V-A.1 How To Use The BMP Maintenance Tables

The Best Management Practice (BMP) specific maintenance criteria contained in this appendix are intended to be conditions for determining if maintenance actions are required as identified through inspection. They are not intended to be measures of the required condition of the BMP at all times between inspections. In other words, exceeding these conditions at any time between inspections and/or maintenance does not automatically constitute a violation of these criteria. However, based on inspection observations, the inspection and maintenance schedules shall be adjusted to minimize the length of time that a BMP is in a condition that requires a maintenance action.

V-A.2 Maintenance Standards - Detention Ponds

Table V-A.1: Maintenance Standards - Detention Ponds

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
General	Trash and Debris	Any trash and debris which exceed 5 cubic feet (cf) per 1,000 square feet (sf), which is about equal to the amount of trash it would take to fill up one standard size garbage can. In general, there should be no visual evidence of dumping. If less than the threshold above, all trash and debris will be removed as part of next scheduled maintenance.	Trash and debris cleared from site
	Poisonous Vegetation and Noxious Weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined by State or local regulations. (Apply requirements of adopted integrated pest management (IPM) policies for the use of herbicides).	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with local health department). Complete eradication of noxious weeds may not be possible. Compliance with State or local eradication policies required
	Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants. (Coordinate removal/cleanup with local water quality response agency).	No contaminants or pollutants present.
	Rodent Holes	Any evidence of rodent holes if the pond is acting as a dam or berm, or any evidence of water piping through dam or berm via rodent holes.	Rodents destroyed and dam or berm repaired. (Coordinate with local health department and Ecology Dam Safety Office if pond exceeds 10 acre-feet).
	Beaver Dams	Dam results in change or function of the BMP.	BMP is returned to design function. (Coordinate trapping of beavers and removal of dams with appropriate permitting agencies).
	Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted IPM policies
	Tree Growth and Hazard Trees	Tree growth does not allow maintenance and inspection access, or interferes with maintenance activity (i.e. slope mowing, silt removal, vactoring, or equipment movements). If trees are not interfering with access or maintenance, do not remove. If dead, diseased, or dying trees are identified. (Use a certified arborist to determine health of tree or removal requirements)	Trees do not hinder maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses (e.g. alders for firewood). Remove hazard trees.
Side Slopes of Pond	Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized using appropriate erosion control measure(s); e.g. rock reinforcement, planting of grass, compaction.

Table V-A.1: Maintenance Standards - Detention Ponds (continued)

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
		Any erosion observed on a compacted berm embankment.	If erosion is occurring on compacted berms a licensed engineer in the state of Washington should be consulted to resolve source of erosion.
Storage Area	Sediment	Accumulated sediment that exceeds 10% of the designed pond depth unless otherwise specified or affects inletting or outletting condition of the BMP.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion.
	Liner (if applicable)	Liner is visible and has more than three 0.25-inch holes in it.	Liner repaired or replaced. Liner is fully covered.
Pond Berms (Dikes)	Settlements	Any part of berm which has settled 4 inches lower than the design elevation. If settlement is apparent, measure berm to determine amount of settlement. Settling can be an indication of more severe problems with the berm or outlet works. A licensed engineer in the state of Washington should be consulted to determine the source of the settlement.	Dike is built back to the design elevation.
	Piping	Discernible water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a geotechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.	Piping eliminated. Erosion potential resolved.
Emergency Over-flow/Spillway	Tree Growth	Tree growth on emergency spillways creates blockage problems and may cause failure of the berm due to uncontrolled overtopping. Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed engineer in the state of Washington should be consulted for proper berm/spillway restoration.
	Piping	Discernible water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a geotechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.	Piping eliminated. Erosion potential resolved.
	Emergency Over-flow/Spillway	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil at the top of outflow path of spillway. (Riprap on inside slopes need not be replaced.)	Rocks and pad depth are restored to design standards.
	Erosion	See Side Slopes of Pond	

V-A.3 Maintenance Standards - Infiltration

Table V-A.2: Maintenance Standards - Infiltration

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
General	Trash & Debris	See V-A.2 Maintenance Standards - Detention Ponds	
	Poisonous/Noxious Vegetation	See V-A.2 Maintenance Standards - Detention Ponds	
	Contaminants and Pollution	See V-A.2 Maintenance Standards - Detention Ponds	

Table V-A.2: Maintenance Standards - Infiltration (continued)

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
	Rodent Holes	See V-A.2 Maintenance Standards - Detention Ponds	
Storage Area	Sediment	Water ponding in infiltration pond after rainfall ceases and appropriate time allowed for infiltration. (A percolation test pit or test of the pond indicates that the pond is only working at 90% of its designed capabilities. Test every 2 to 5 years. If two inches or more sediment is present, remove).	Sediment is removed and/or pond is cleaned so that infiltration system works according to design.
Filter Bags (if applicable)	Filled With Sediment and Debris	Sediment and debris fill bag more than 1/2 full.	Filter bag is replaced or system is redesigned.
Rock Filters	Sediment and Debris	By visual inspection, little or no water flows through filter during heavy rain storms.	Gravel in rock filter is replaced.
Side Slopes of Pond	Erosion	See V-A.2 Maintenance Standards - Detention Ponds	
Emergency Overflow Spillway and Berms over 4 feet in height	Tree Growth	See V-A.2 Maintenance Standards - Detention Ponds	
	Piping	See V-A.2 Maintenance Standards - Detention Ponds	
Emergency Overflow Spillway	Rock Missing	See V-A.2 Maintenance Standards - Detention Ponds	
	Erosion	See V-A.2 Maintenance Standards - Detention Ponds	
Pre-settling Ponds and Vaults	Facility of Sump Filled with Sediment and/or Debris	6" or designed sediment trap depth of sediment.	Sediment is removed.

V-A.4 Maintenance Standards - Evaporation Ponds

Table V-A.3: Maintenance Standards - Evaporation Ponds

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris	See V-A.2 Maintenance Standards - Detention Ponds	
	Poisonous/ Noxious Vegetation	See V-A.2 Maintenance Standards - Detention Ponds	
	Contaminants and Pollution	See V-A.2 Maintenance Standards - Detention Ponds	
	Rodent Holes	See V-A.2 Maintenance Standards - Detention Ponds	
Side Slopes of Pond	Erosion	See V-A.2 Maintenance Standards - Detention Ponds	
Storage Area	Sediment	Accumulated sediment that exceeds 10% of the designed pond depth unless otherwise specified or affects inletting or outletting condition of the pond.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion.
	Liner (if applicable)	Liner is visible and has > three 0.25-inch holes in it.	Liner repaired or replaced. Liner is fully covered.

Table V-A.3: Maintenance Standards - Evaporation Ponds (continued)

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Pond Berms (Dikes)	Settlements	Any part of berm which has settled 4 inches lower than the design elevation. If settlement is apparent, measure berm to determine amount of settlement. Settling can be an indication of more severe problems with the berm or outlet works. A licensed engineer in the state of Washington should be consulted to determine the source of the settlement.	Dike is built back to the design elevation.
	Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a licensed engineer in the state of Washington with geotechnical expertise be called in to inspect and evaluate condition and recommend repair of condition.	Piping eliminated. Erosion potential resolved.
General	Inlet Pipe	Inlet pipe clogged with sediment and/or debris material.	No clogging or blockage in the inlet and outlet piping.
	Oil Sheen on Water	Prevalent and visible oil sheen.	Oil removed from water using oil-absorbent pads or Vactor truck. Source of oil located and corrected. If chronic low levels of oil persist, plant wetland plants such as <i>Juncus effusus</i> (soft rush) which can uptake small concentrations of oil.
	Erosion	Erosion of the pond's side slopes and/or scouring of the pond bottom that exceeds 6 inches, or where continued erosion is prevalent.	Slopes stabilized using proper erosion control measures and repair methods.
	Overflow Spill-way	Rock is missing and soil is exposed at top of spillway or outside slope.	Rocks replaced to specifications.
	Snow	Snow removal operations deposit snow into evaporation pond.	This added factor must be considered in the water budget, especially if snow from another basin is put into the system. Temporary sediment ponds should be included in the design, to prevent sediment-laden runoff from entering the pond and storm disposal system during construction.

V-A.5 Maintenance Standards - Tanks and Vaults

Table V-A.4: Maintenance Standards - Tanks and Vaults

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
Storage Area	Plugged Air Vents	One-half of the cross section of a vent is blocked at any point, or the vent is damaged.	Vents open and functioning.
	Debris and Sediment	Accumulated sediment depth exceeds 10% of the diameter of the storage area for one-half the length of the storage vault, or any point depth exceeds 15% of the diameter. (Example: 72-inch diameter storage tank would require cleaning when sediment reaches depth of 7 inches for more than 1/2 the length of the tank.)	All sediment and debris removed from storage area.
	Joints Between Tank/Pipe Section	Any openings or voids allowing material to be transported into the tank/vault. (Will require engineering analysis to determine structural stability).	All joint between tank/pipe sections are sealed.
	Tank Pipe Bent Out of Shape	Any part of tank/pipe is bent out of shape more than 10% of its design shape. (Review required by engineer to determine structural stability).	Tank/pipe repaired or replaced to design.
	Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than 0.5-inch and any evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determines that the vault is not structurally sound. Cracks wider than 0.5-inch at the joint of any inlet/outlet pipe or any evidence of soil particles entering the vault through the walls.	Vault replaced or repaired to design specifications and is structurally sound. No cracks more than 0.25-inch wide at the joint of the inlet/outlet pipe.
Access Opening(s)	Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole is closed.
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 0.5-inch of thread (may not apply to self-locking lids).	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, not securely attached to structure wall, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.
Catch Basins	See V-A.7 Maintenance Standards - Catch Basins		

V-A.6 Maintenance Standards - Control Structures

Table V-A.5: Maintenance Standards - Control Structures

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris (includes sediment)	Material exceeds 25% of sump depth or 1 foot below orifice plate.	Control structure orifice is not blocked. All trash and debris removed.
	Structural Damage	Structure is not securely attached to manhole wall. Structure is not in upright position (allow up to 10% from plumb). Connections to outlet pipe are not watertight and show signs of rust. Any holes - other than designed holes - in the structure.	Structure securely attached to wall and outlet pipe. Structure in correct position. Connections to outlet pipe are water tight; structure repaired or replaced and works as designed. Structure has no holes other than designed holes.

Table V-A.5: Maintenance Standards - Control Structures (continued)

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Clean-out Gate	Damaged or Missing	Clean-out gate is not watertight or is missing. Gate cannot be moved up and down by one maintenance person. Chain/rod leading to gate is missing or damaged. Gate is rusted over 50% of its surface area.	Gate is watertight and works as designed. Gate moves up and down easily and is watertight. Chain is in place and works as designed. Gate is repaired or replaced to meet design standards.
Orifice Plate	Damaged or Missing	Control device is not working properly due to missing, out of place, or bent orifice plate.	Plate is in place and works as designed.
	Obstructions	Any trash, debris, sediment, or vegetation blocking the plate.	Plate is free of all obstructions and works as designed.
Overflow Pipe	Obstructions	Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	Pipe is free of all obstructions and works as designed.
Access Opening	See V-A.5 Maintenance Standards - Tanks and Vaults		
Catch Basin	See V-A.7 Maintenance Standards - Catch Basins		

V-A.7 Maintenance Standards - Catch Basins

Table V-A.6: Maintenance Standards - Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
General	Trash & Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%. Trash or debris (in the basin) that exceeds 60% of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the debris surface to the invert of the lowest pipe. Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height. Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g. methane).	No Trash or debris located immediately in front of catch basin or on grate opening. No trash or debris in the catch basin. Inlet and outlet pipes free of trash or debris. No dead animals or vegetation present within the catch basin.
	Sediment	Sediment (in the basin) that exceeds 60% of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin
	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch. (Intent is to make sure no material is running into basin). Frame not sitting flush on top slab, i.e. separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached.	Top slab is free of holes and cracks. Frame is sitting flush on the riser rings or top slab and firmly attached.
	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound. Grout fillet has separated or cracked wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Basin replaced or repaired to design standards. Pipe is regouted and secure at basin wall.
	Settlement/ Mis-alignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening. Vegetation growing in inlet/outlet pipe joints that is more than 6 inches tall and less than 6 inches apart.	No vegetation blocking opening to basin. No vegetation or root growth present.
	Contamination and Pol-	See V-A.2 Maintenance Standards - Detention Ponds	No pollution present.

Table V-A.6: Maintenance Standards - Catch Basins (continued)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
	lution		
Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Cover/grate is in place, meets design standards, and is secured.
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread.	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Metal Grates (if applicable)	Grate opening Unsafe	Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
	Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.	Grate free of trash and debris.
	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place, meets the design standards, and is installed and aligned with the flow path.

V-A.8 Maintenance Standards - Debris Barriers (e.g. Trash Racks)

Table V-A.7: Maintenance Standards - Debris Barriers (e.g. Trash Racks)

Maintenance Components	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris	Trash or debris that is plugging more than 20% of the openings in the barrier.	Barrier cleared to design flow capacity.
Metal	Damaged/ Missing Bars	Bars are bent out of shape more than 3 inches.	Bars in place with no bends more than 3/4 inch.
		Bars are missing or entire barrier missing.	Bars in place according to design.
		Bars are loose and rust is causing 50% deterioration to any part of barrier.	Barrier replaced or repaired to design standards.
	Inlet/Outlet Pipe	Debris barrier missing or not attached to pipe	Barrier firmly attached to pipe

V-A.9 Maintenance Standards - Energy Dissipators

Table V-A.8: Maintenance Standards - Energy Dissipators

Maintenance Components	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
External			
Rock Pad	Missing or Moved Rock	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil.	Rock pad replaced to design standards.
	Erosion	Soil erosion in or adjacent to rock pad.	Rock pad replaced to design standards.
Dispersion Trench	Pipe Plugged with Sediment	Accumulated sediment that exceeds 20% of the design depth.	Pipe cleaned/flushed so that it matches design.

V-A.21 Maintenance Standards - Media Filter Drains

Table V-A.20: Maintenance Standards - Media Filter Drains

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Sediment accumulation on grass filter strip	Sediment depth exceeds 2 inches or creates uneven grading that interferes with sheet flow.	Remove sediment deposits on grass treatment area of the embankment. When finished, embankment should be level from side to side and drain freely toward the toe of the embankment slope. There should be no areas of standing water once inflow has ceased.
	No-vegetation zone/flow spreader	Flow spreader is uneven or clogged so that flows are not uniformly distributed over entire embankment width.	Level the spreader and clean to spread flows evenly over entire embankment width.
	Poor vegetation coverage	Grass is sparse or bare, or eroded patches are observed in more than 10% of the grass strip surface area.	Determine why grass growth is poor and correct the offending condition. Reseed into loosened, fertile soil or compost; or, replant with plugs of grass from the upper slope.
	Vegetation	Grass becomes excessively tall (greater than 10 inches); nuisance weeds and other vegetation start to take over.	Mow vegetation or remove nuisance vegetation to not impede flow. Mow grass to a height of 6 inches.
	Media filter drain mix replacement	Water is seen on the surface of the media filter drain mix long after the storms have ceased. Typically, the 6-month, 24-hour precipitation event should drain within 48 hours. More common storms should drain within 24 hours. Maintenance also needed on a 10-year cycle and during a preservation project.	Excavate and replace all of the media filter drain mix contained within the media filter drain.
	Excessive shading	Grass growth is poor because sunlight does not reach embankment.	If possible, trim back overhanging limbs and remove brushy vegetation on adjacent slopes.
	Trash and debris	Trash and debris have accumulated on embankment.	Remove trash and debris from embankment.
	Flooding of Media filter drain	When media filter drain is inundated by flood water	Evaluate media filter drain material for acceptable infiltration rate and replace if media filter drain does not meet long-term infiltration rate standards.

V-A.22 Maintenance Standards - Compost-Amended Vegetated Filter Strips (CAVFS)

Table V-A.21: Maintenance Standards - Compost-Amended Vegetated Filter Strips (CAVFS)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Sediment Accumulation on Grass	Sediment depth exceeds 2 inches.	Remove sediment deposits. Relevel so slope is even and flows pass evenly through strip.
	Vegetation	Grass becomes excessively tall (greater than 10 inches); nuisance weeds and other vegetation start to take over.	Mow grass and control nuisance vegetation so that flow is not impeded. Grass should be mowed to a height of 6 inches.
	Trash and debris	Trash and debris have accumulated on the vegetated filter strip.	Remove trash and debris from filter.
	Erosion/Scouring	Areas have eroded or scoured due to flow channelization or high flows.	For ruts or bare areas less than 12 inches wide, repair the damaged area by filling with a 50/50 mixture of crushed gravel and compost. The grass will creep in over the rock in time. If bare areas are large, generally greater than 12 inches wide, the vegetated filter strip should be regraded and reseeded. For smaller bare areas, overseed when bare spots are evident.

Table V-A.21: Maintenance Standards - Compost-Amended Vegetated Filter Strips (CAVFS) (continued)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
	Flow Spreader	Flow spreader is uneven or clogged so that flows are not uniformly distributed over entire filter width.	Level the spreader and clean so that flows are spread evenly over entire filter width.

V-A.23 Maintenance Standards - Bioretention

Table V-A.22: Maintenance Standards - Bioretention

Maintenance Component	Recommended Frequency ^a		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
Facility Footprint				
Earthen side slopes and berms	B, S		Erosion (gullies/ rills) greater than 2 inches deep around inlets, outlet, and alongside slopes	- Eliminate cause of erosion and stabilize damaged area (regrade, rock, vegetation, erosion control matting) - For deep channels or cuts (over 3 inches in ponding depth), temporary erosion control measures should be put in place until permanent repairs can be made. - Properly designed, constructed and established facilities with appropriate flow velocities should not have erosion problems except perhaps in extreme events. If erosion problems persist, the following should be reassessed: (1) flow volumes from contributing areas and bioretention facility sizing; (2) flow velocities and gradients within the facility; and (3) flow dissipation and erosion protection strategies at the facility inlet.
	A		Erosion of sides causes slope to become a hazard	Take actions to eliminate the hazard and stabilize slopes
	A, S		Settlement greater than 3 inches (relative to undisturbed sections of berm)	Restore to design height
	A, S		Downstream face of berm wet, seeps or leaks evident	Plug any holes and compact berm (may require consultation with engineer, particularly for larger berms)
	A		Any evidence of rodent holes or water piping in berm	- Eradicate rodents (see "Pest control") - Fill holes and compact (may require consultation with engineer, particularly for larger berms)
Concrete sidewalls	A		Cracks or failure of concrete sidewalls	- Repair/ seal cracks - Replace if repair is insufficient
Rockery sidewalls	A		Rockery side walls are insecure	Stabilize rockery sidewalls (may require consultation with engineer, particularly for walls 4 feet or greater in height)
Facility area		All maintenance visits (at least biannually)	Trash and debris present	Clean out trash and debris
Facility bottom area	A, S		Accumulated sediment to extent that infiltration rate is reduced (see "Ponded water") or surface storage capacity significantly impacted	- Remove excess sediment - Replace any vegetation damaged or destroyed by sediment accumulation and removal - Mulch newly planted vegetation - Identify and control the sediment source (if feasible)

Table V-A.22: Maintenance Standards - Bioretention (continued)

Maintenance Component	Recommended Frequency ^a		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
				If accumulated sediment is recurrent, consider adding presettlement or installing berms to create a forebay at the inlet
		During/after fall leaf drop	Accumulated leaves in facility	Remove leaves if there is a risk to clogging outlet structure or water flow is impeded
Low permeability check dams and weirs	A, S		Sediment, vegetation, or debris accumulated at or blocking (or having the potential to block) check dam, flow control weir or orifice	Clear the blockage
	A, S		Erosion and/or undercutting present	Repair and take preventative measures to prevent future erosion and/or undercutting
	A		Grade board or top of weir damaged or not level	Restore to level position
Ponded water	B, S		Excessive ponding water: Water overflows during storms smaller than the design event or ponded water remains in the basin 48 hours or longer after the end of a storm.	Determine cause and resolve in the following order: - Confirm leaf or debris buildup in the bottom of the facility is not impeding infiltration. If necessary, remove leaf litter/debris. - Ensure that underdrain (if present) is not clogged. If necessary, clear underdrain. - Check for other water inputs (e.g., groundwater, illicit connections). - Verify that the facility is sized appropriately for the contributing area. Confirm that the contributing area has not increased. If steps #1-4 do not solve the problem, the bioretention soil is likely clogged by sediment accumulation at the surface or has become overly compacted. Dig a small hole to observe soil profile and identify compaction depth or clogging front to help determine the soil depth to be removed or otherwise rehabilitated (e.g., tilled). Consultation with an engineer is recommended.
Bioretention soil mix	As needed		Bioretention soil mix protection is needed when performing maintenance requiring entrance into the facility footprint	- Minimize all loading in the facility footprint (foot traffic and other loads) to the degree feasible in order to prevent compaction of bioretention soils. - Never drive equipment or apply heavy loads in facility footprint. - Because the risk of compaction is higher during saturated soil conditions, any type of loading in the cell (including foot traffic) should be minimized during wet conditions. - Consider measures to distribute loading if heavy foot traffic is required or equipment must be placed in facility. As an example, boards may be placed across soil to distribute loads and minimize compaction. - If compaction occurs, soil must be loosened or otherwise rehabilitated to original design state.
Inlets/Outlets/Pipes				
Splash block inlet	A		Water is not being directed properly to the facility and away from the inlet structure	Reconfigure/ repair blocks to direct water to facility and away from structure
Curb cut inlet/outlet	M during the wet season and before severe storm is forecasted	Weekly during fall leaf drop	Accumulated leaves at curb cuts	Clear leaves (particularly important for key inlets and low points along long, linear facilities)

Table V-A.22: Maintenance Standards - Bioretention (continued)

Maintenance Component	Recommended Frequency ^a		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
Pipe inlet/outlet	A		Pipe is damaged	Repair/ replace
	W		Pipe is clogged	Remove roots or debris
	A, S		Sediment, debris, trash, or mulch reducing capacity of inlet/outlet	• Clear the blockage • Identify the source of the blockage and take actions to prevent future blockages
		Weekly during fall leaf drop	Accumulated leaves at inlets/outlets	Clear leaves (particularly important for key inlets and low points along long, linear facilities)
		A	Maintain access for inspections	• Clear vegetation (transplant vegetation when possible) within 1 foot of inlets and outlets, maintain access pathways • Consultation with a landscape architect is recommended for removal, transplant, or substitution of plants
Erosion control at inlet	A		Concentrated flows are causing erosion	Maintain a cover of rock or cobbles or other erosion protection measure (e.g., matting) to protect the ground where concentrated water enters the facility (e.g., a pipe, curb cut or swale)
Trash rack	S		Trash or other debris present on trash rack	Remove/dispose
	A		Bar screen damaged or missing	Repair/replace
Overflow	A, S		Capacity reduced by sediment or debris	Remove sediment or debris/dispose
Underdrain pipe	Clean pipe as needed	Clean orifice at least biannually (may need more frequent cleaning during wet season)	• Plant roots, sediment or debris reducing capacity of underdrain • Prolonged surface ponding (see "Ponded water"	• Jet clean or rotary cut debris/roots from underdrain(s) • If underdrains are equipped with a flow restrictor (e.g., orifice) to attenuate flows, the orifice must be cleaned regularly.
Vegetation				
Facility bottom area and upland slope vegetation	Fall and Spring		Vegetation survival rate falls below 75% within first two years of establishment (unless project O&M manual or record drawing stipulates more or less than 75% survival rate).	• Determine cause of poor vegetation growth and correct condition • Replant as necessary to obtain 75% survival rate or greater. Refer to original planting plan, or approved jurisdictional species list for appropriate plant replacements (See Appendix 3 - Bioretention Plant List, in the <i>LID Technical Guidance Manual for Puget Sound</i>, (Hinman and Wulkan, 2012)). • Confirm that plant selection is appropriate for site growing conditions • Consultation with a landscape architect is recommended for removal, transplant, or substitution of plants
Vegetation (general)	As needed		Presence of diseased plants and plant material	• Remove any diseased plants or plant parts and dispose of in an approved location (e.g., commercial landfill) to avoid risk of spreading the disease to other plants • Disinfect gardening tools after pruning to prevent the spread of disease • See the <i>Pacific Northwest Plant Disease Management Handbook</i> (Pscheidt and Ocamb, 2016) for information on disease recognition and for additional resources • Replant as necessary according to recommendations provided for "facility bottom area and upland slope vegetation".
Trees and shrubs		All pruning seasons (timing varies by	Pruning as needed	• Prune trees and shrubs in a manner appropriate for each species. Pruning should be performed by landscape professionals familiar with proper pruning techniques

Table V-A.22: Maintenance Standards - Bioretention (continued)

Maintenance Component	Recommended Frequency ^a		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
		species)		All pruning of mature trees should be performed by or under the direct guidance of an ISA certified arborist
	A		Large trees and shrubs interfere with operation of the facility or access for maintenance	- Prune trees and shrubs using most current ANSI A300 standards and ISA BMPs. - Remove trees and shrubs, if necessary.
	Fall and Spring		Standing dead vegetation is present	- Remove standing dead vegetation - Replace dead vegetation within 30 days of reported dead and dying plants (as practical depending on weather-/planting season) - If vegetation replacement is not feasible within 30 days, and absence of vegetation may result in erosion problems, temporary erosion control measures should be put in place immediately. - Determine cause of dead vegetation and address issue, if possible - If specific plants have a high mortality rate, assess the cause and replace with appropriate species. Consultation with a landscape architect is recommended.
	Fall and Spring		Planting beneath mature trees	- When working around and below mature trees, follow the most current ANSI A300 standards and ISA BMPs to the extent practicable (e.g., take care to minimize any damage to tree roots and avoid compaction of soil). - Planting of small shrubs or groundcovers beneath mature trees may be desirable in some cases; such plantings should use mainly plants that come as bulbs, bare root or in 4-inch pots; plants should be in no larger than 1-gallon containers.
	Fall and Spring		Presence of or need for stakes and guys (tree growth, maturation, and support needs)	- Verify location of facility liners and underdrain (if any) prior to stake installation in order to prevent liner puncture or pipe damage - Monitor tree support systems: Repair and adjust as needed to provide support and prevent damage to tree. - Remove tree supports (stakes, guys, etc.) after one growing season or maximum of 1 year. - Backfill stake holes after removal.
Trees and shrubs adjacent to vehicle travel areas (or areas where visibility needs to be maintained)	A		Vegetation causes some visibility (line of sight) or driver safety issues	- Maintain appropriate height for sight clearance - When continued, regular pruning (more than one time/ growing season) is required to maintain visual sight lines for safety or clearance along a walk or drive, consider relocating the plant to a more appropriate location. - Remove or transplant if continual safety hazard - Consultation with a landscape architect is recommended for removal, transplant, or substitution of plants
Flowering plants		A	Dead or spent flowers present	Remove spent flowers (deadhead)
Perennials		Fall	Spent plants	Cut back dying or dead and fallen foliage and stems
Emergent vegetation		Spring	Vegetation compromises conveyance	Hand rake sedges and rushes with a small rake or fingers to remove dead foliage before new growth emerges in spring or earlier only if the foliage is blocking water flow (sedges and rushes do not respond well to pruning)
Ornamental grasses (perennial)		Winter and Spring	Dead material from previous year's growing cycle or dead collapsed foliage	- Leave dry foliage for winter interest - Hand rake with a small rake or fingers to remove dead foliage back to within several inches from the soil before new growth emerges in spring or earlier if the foliage collapses and is blocking water flow

Table V-A.22: Maintenance Standards - Bioretention (continued)

Maintenance Component	Recommended Frequency ^a		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
Ornamental grasses (evergreen)		Fall and Spring	Dead growth present in spring	• Hand rake with a small rake or fingers to remove dead growth before new growth emerges in spring • Clean, rake, and comb grasses when they become too tall • Cut back to ground or thin every 2-3 years as needed
Noxious weeds		M (March - October, preceding seed dispersal)	Listed noxious vegetation is present (refer to current county noxious weed list)	• By law, class A & B noxious weeds must be removed, bagged and disposed as garbage immediately • Reasonable attempts must be made to remove and dispose of class C noxious weeds • It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality; use of herbicides and pesticides may be prohibited in some jurisdictions • Apply mulch after weed removal (see "Mulch")
Weeds		M (March - October, preceding seed dispersal)	Weeds are present	• Remove weeds with their roots manually with pincer-type weeding tools, flame weeders, or hot water weeders as appropriate • Follow IPM protocols for weed management (see "Additional Maintenance Resources" section for more information on IPM protocols)
Excessive vegetation		Once in early to mid- May and once in early- to mid- September	Low-lying vegetation growing beyond facility edge onto sidewalks, paths, or street edge poses pedestrian safety hazard or may clog adjacent permeable pavement surfaces due to associated leaf litter, mulch, and soil	• Edge or trim groundcovers and shrubs at facility edge • Avoid mechanical blade-type edger and do not use edger or trimmer within 2 feet of tree trunks • While some clippings can be left in the facility to replenish organic material in the soil, excessive leaf litter can cause surface soil clogging
	As needed		Excessive vegetation density inhibits stormwater flow beyond design ponding or becomes a hazard for pedestrian and vehicular circulation and safety	• Determine whether pruning or other routine maintenance is adequate to maintain proper plant density and aesthetics • Determine if planting type should be replaced to avoid ongoing maintenance issues (an aggressive grower under perfect growing conditions should be transplanted to a location where it will not impact flow) • Remove plants that are weak, broken or not true to form; replace in-kind • Thin grass or plants impacting facility function without leaving visual holes or bare soil areas • Consultation with a landscape architect is recommended for removal, transplant, or substitution of plants
	As needed		Vegetation blocking curb cuts, causing excessive sediment buildup and flow bypass	Remove vegetation and sediment buildup
Mulch				
Mulch		Following weeding	Bare spots (without mulch cover) are present or mulch depth less than 2 inches	• Supplement mulch with hand tools to a depth of 2 to 3 inches • Replenish mulch per O&M manual. Often coarse compost is used in the bottom of the facility and arborist wood chips are used on side slopes and rim (above typical water levels) • Keep all mulch away from woody stems
Watering				
Irrigation system (if any)		Based on manufacturer's instructions	Irrigation system present	Follow manufacturer's instructions for O&M

Table V-A.22: Maintenance Standards - Bioretention (continued)

Maintenance Component	Recommended Frequency ^a		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
		tions		
	A		Sprinklers or drip irrigation not directed/located to properly water plants	Redirect sprinklers or move drip irrigation to desired areas
Summer watering (first year)		Once every 1-2 weeks or as needed during prolonged dry periods	Trees, shrubs and groundcovers in first year of establishment period	• 10 to 15 gallons per tree • 3 to 5 gallons per shrub • 2 gallons water per square foot for groundcover areas • Water deeply, but infrequently, so that the top 6 to 12 inches of the root zone is moist • Use soaker hoses or spot water with a shower type wand when irrigation system is not present ◦ Pulse water to enhance soil absorption, when feasible ◦ Pre-moisten soil to break surface tension of dry or hydrophobic soils/mulch, followed by several more passes. With this method , each pass increases soil absorption and allows more water to infiltrate prior to run-off • Add a tree bag or slow-release watering device (e.g., bucket with a perforated bottom) for watering newly installed trees when irrigation system is not present
Summer watering (second and third years)		Once every 2-4 weeks or as needed during prolonged dry periods	Trees, shrubs and groundcovers in second or third year of establishment period	• 10 to 15 gallons per tree • 3 to 5 gallons per shrub • 2 gallons water per square foot for groundcover areas • Water deeply, but infrequently, so that the top 6 to 12 inches of the root zone is moist • Use soaker hoses or spot water with a shower type wand when irrigation system is not present ◦ Pulse water to enhance soil absorption, when feasible ◦ Pre-moisten soil to break surface tension of dry or hydrophobic soils/mulch, followed by several more passes. With this method , each pass increases soil absorption and allows more water to infiltrate prior to run-off
Summer watering (after establishment)		As needed	Established vegetation (after 3 years)	• Plants are typically selected to be drought tolerant and not require regular watering after establishment; however, trees may take up to 5 years of watering to become fully established • Identify trigger mechanisms for drought-stress (e.g., leaf wilt, leaf senescence, etc.) of different species and water immediately after initial signs of stress appear • Water during drought conditions or more often if necessary to maintain plant cover
Pest Control				
Mosquitoes	B, S		Standing water remains for more than 3 days after the end of a storm	• Identify the cause of the standing water and take appropriate actions to address the problem (see "Ponded water") • To facilitate maintenance, manually remove standing water and direct to the storm drainage system (if runoff is from non pollution-generating surfaces) or sanitary sewer system (if runoff is from pollution-generating surfaces) after getting approval from sanitary sewer authority. • Use of pesticides or <i>Bacillus thuringiensis israelensis</i> (Bti) may be considered only as a temporary measure while

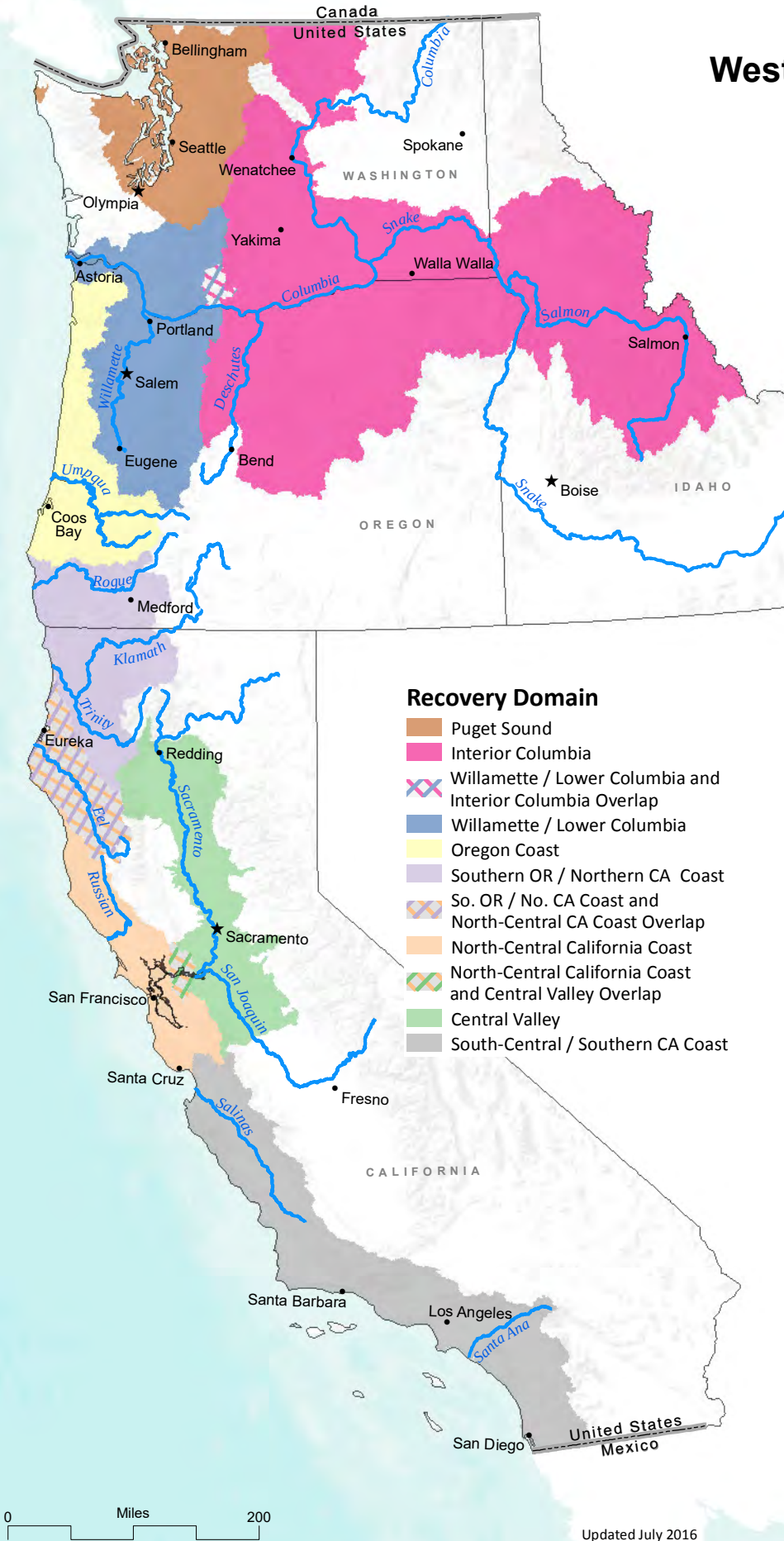
Table V-A.22: Maintenance Standards - Bioretention (continued)

Maintenance Component	Recommended Frequency ^a		Condition when Maintenance is Needed (Standards)	Action Needed (Procedures)
	Inspection	Routine Maintenance		
				addressing the standing water cause. If overflow to a surface water will occur within 2 weeks after pesticide use, apply for coverage under the Aquatic Mosquito Control NPDES General Permit.
Nuisance animals	As needed		Nuisance animals causing erosion, damaging plants, or depositing large volumes of feces	• Reduce site conditions that attract nuisance species where possible (e.g., plant shrubs and tall grasses to reduce open areas for geese, etc.) • Place predator decoys • Follow IPM protocols for specific nuisance animal issues (see "Additional Maintenance Resources" section for more information on IPM protocols) • Remove pet waste regularly • For public and right-of-way sites consider adding garbage cans with dog bags for picking up pet waste.
Insect pests	Every site visit associated with vegetation management		Signs of pests, such as wilting leaves, chewed leaves and bark, spotting or other indicators	• Reduce hiding places for pests by removing diseased and dead plants • For infestations, follow IPM protocols (see "Additional Maintenance Resources" section for more information on IPM protocols)
Note that the inspection and routine maintenance frequencies listed above are recommended by Ecology. They do not supersede or replace the municipal stormwater permit requirements for inspection frequency required of municipal stormwater permittees for "stormwater treatment and flow control BMPs/facilities". ^a Frequency: A = Annually; B = Biannually (twice per year); M = Monthly; W = At least one visit should occur during the wet season (for debris/clog related maintenance, this inspection/maintenance visit should occur in the early fall, after deciduous trees have lost their leaves); S = Perform inspections after major storm events (24-hour storm event with a 10-year or greater recurrence interval). IPM - Integrated Pest Management ISA - International Society of Arboriculture				

Appendix B

NMFS Species List

Status of ESA Listings & Critical Habitat Designations for West Coast Salmon & Steelhead



Evolutionarily Significant Unit / Distinct Population Segment	ESA Status	Date of ESA Listing	Date of CH Designation
Puget Sound Recovery Domain			
Hood Canal Summer-run Chum Salmon	T	3/25/1999	9/2/2005
Ozette Lake Sockeye Salmon	T	3/25/1999	9/2/2005
Puget Sound Chinook Salmon	T	3/24/1999	9/2/2005
Puget Sound Steelhead	T	5/11/2007	2/24/2016

Interior Columbia Recovery Domain			
Middle Columbia River Steelhead	T	3/25/1999 1/5/2006	9/2/2005
Snake River Fall-run Chinook Salmon	T	4/22/1992	12/28/1993
Snake River Spring / Summer-run Chinook Salmon	T	4/22/1992	10/25/1999
Sockeye Salmon	E	11/20/1991	12/28/1993
Snake River Steelhead	T	8/18/1997 1/5/2006	9/2/2005
Upper Columbia River Spring-run Chinook Salmon	E	3/24/1999	9/2/2005
Upper Columbia River Steelhead	T	8/18/1997 1/5/2006	9/2/2005

Willamette / Lower Columbia Recovery Domain			
Columbia River Chum Salmon	T	3/25/1999	9/2/2005
Lower Columbia River Chinook Salmon	T	3/24/1999	9/2/2005
Lower Columbia River Coho Salmon	T	6/28/2005	2/24/2016
Lower Columbia River Steelhead	T	3/19/1998 1/5/2006	9/2/2005
Upper Willamette River Chinook Salmon	T	3/24/1999	9/2/2005
Upper Willamette River Steelhead	T	3/25/1999 1/5/2006	9/2/2005

Oregon Coast Recovery Domain			
Oregon Coast Coho Salmon	T	2/11/2008	2/11/2008

Southern Oregon / Northern California Coast Recovery Domain			
Southern OR / Northern CA Coasts Coho Salmon	T	5/6/1997	5/5/1999

North-Central California Coast Recovery Domain			
California Coastal Chinook Salmon	T	9/16/1999	9/2/2005
Central California Coast Coho Salmon	E	10/31/1996 (T) 6/28/2005 (E) 4/2/2012 (RE)	5/5/1999
Central California Coast Steelhead	T	8/18/1997 1/5/2006	9/2/2005
Northern California Steelhead	T	6/7/2000 1/5/2006	9/2/2005

Central Valley Recovery Domain			
California Central Valley Steelhead	T	3/19/1998 1/5/2006	9/2/2005
Central Valley Spring-run Chinook Salmon	T	9/16/1999	9/2/2005
Sacramento River Winter-run Chinook Salmon	E	11/5/1990 (T) 1/4/1994 (E)	6/16/1993

South-Central / Southern California Coast Recovery Domain			
South-Central California Coast Steelhead	T	8/18/1997 1/5/2006	9/2/2005
Southern California Steelhead	E	8/18/1997 5/1/2002 (RE) 1/5/2006	9/2/2005

Critical Habitat Rules Cited

- 2/24/2016 (81 FR 9252) Final Critical Habitat Designation for Puget Sound Steelhead and Lower Columbia River Coho Salmon
- 2/11/2008 (73 FR 7816) Final Critical Habitat Designation for Oregon Coast Coho Salmon
- 9/2/2005 (70 FR 52630) Final Critical Habitat Designation for 12 ESU's of Salmon and Steelhead in WA, OR, and ID
- 9/2/2005 (70 FR 52488) Final Critical Habitat Designation for 7 ESU's of Salmon and Steelhead in CA
- 10/25/1999 (64 FR 57399) Revised Critical Habitat Designation for Snake River Spring/Summer-run Chinook Salmon
- 5/5/1999 (64 FR 24049) Final Critical Habitat Designation for Central CA Coast and Southern OR/Northern CA Coast Coho Salmon
- 12/28/1993 (58 FR 68543) Final Critical Habitat Designation for Snake River Chinook and Sockeye Salmon
- 6/16/1993 (58 FR 33212) Final Critical Habitat Designation for Sacramento River Winter-run Chinook Salmon

ESA Listing Rules Cited

- 4/2/2012 (77 FR 19552) Final Range Extension for Endangered Central California Coast Coho Salmon
- 2/11/2008 (73 FR 7816) Final ESA Listing for Oregon Coast Coho Salmon
- 5/11/2007 (72 FR 26722) Final ESA Listing for Puget Sound Steelhead
- 1/5/2006 (71 FR 5248) Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead
- 6/28/2005 (70 FR 37160) Final ESA Listing for 16 ESU's of West Coast Salmon
- 5/1/2002 (67 FR 21586) Range Extension for Endangered Steelhead in Southern California
- 6/7/2000 (65 FR 36074) Final ESA Listing for Northern California Steelhead
- 9/16/1999 (64 FR 50394) Final ESA Listing for Two Chinook Salmon ESUs in California
- 3/25/1999 (64 FR 14508) Final ESA Listing for Hood River Canal Summer-run and Columbia River Chum Salmon
- 3/25/1999 (64 FR 14517) Final ESA Listing for Middle Columbia River and Upper Willamette River Steelhead
- 3/25/1999 (64 FR 14528) Final ESA Listing for Ozette Lake Sockeye Salmon
- 3/24/1999 (64 FR 14308) Final ESA Listing for 4 ESU's of Chinook Salmon
- 3/19/1998 (63 FR 13347) Final ESA Listing for Lower Columbia River and Central Valley Steelhead
- 8/18/1997 (62 FR 43937) Final ESA Listing for 5 ESU's of Steelhead
- 5/6/1997 (62 FR 24588) Final ESA Listing for Southern Oregon / Northern California Coast Coho Salmon
- 10/31/1996 (61 FR 56138) Final ESA Listing for Central California Coast Coho Salmon
- 1/4/1994 (59 FR 222) Final ESA Listing for Sacramento River Winter-run Chinook Salmon
- 4/22/1992 (57 FR 14653) Final ESA Listing for Snake River Spring/summer-run and Snake River Fall Chinook Salmon
- 11/20/1991 (56 FR 58619) Final ESA Listing for Snake River Sockeye Salmon
- 11/5/1990 (55 FR 46515) Final ESA Listing for Sacramento River Winter-run Chinook Salmon

Appendix C

Species Life History

Puget Sound ESU of Chinook Salmon

The National Marine Fisheries Service (NMFS) completed an Endangered Species Act (ESA) status review of Chinook salmon populations from Washington, Oregon, Idaho, and California and defined 15 evolutionarily significant units (ESUs) within the region. Naturally spawned spring, summer/fall, and fall Chinook salmon runs from the Puget Sound ESU were considered likely to become endangered in the foreseeable future (Myers et al. 1998). NMFS issued a ruling in May 1999 listing the Puget Sound ESU as threatened (NMFS 1999).

Chinook salmon have a historic range from the Ventura River in California to Point Hope, Alaska in North America; and from Hokkaido, Japan to Anadyr River in Russia (63 Federal Register [FR] 45; Myers et al. 1998). The abundance of Chinook salmon in the Puget Sound ESU has declined substantially from historic levels, and there is concern over the effects of hatchery supplementation on genetic fitness of stocks, as well as severely degraded spawning and rearing habitats throughout the area (Myers et al. 1998). In addition, harvest exploitation rates in excess of 90 percent were estimated to occur on some Puget Sound Chinook salmon stocks. Subsequent to this status review, primary factors contributing to declines in Chinook salmon in the Puget Sound ESU were identified as habitat blockages, hatchery introgression, urbanization, logging, hydropower development, harvests, and flood control (NMFS 1998).

Chinook salmon require varied habitats during different phases of their life. Spawning habitat typically consists of riffles and the tailouts of pools with clean substrates dominated by cobbles. These habitats are located in the mainstem of rivers and larger tributaries. Adult Chinook salmon spawn in freshwater streams in the late summer and fall. Fry emerge in the late winter and early spring. Juvenile Chinook salmon rear in the lower mainstem of rivers and tributaries before entering the estuary and salt marshes (Myers et al. 1998). Typically, fall Chinook fry (also termed “ocean type” Chinook) feed for a short period after emergence (a few days to several months) and then migrate to the ocean or remain in the lower river for a year (Wydoski and Whitney 1979; Healey 1991). Spring Chinook salmon fry (“stream type” Chinook) may rear in freshwater over the summer and migrate to the ocean in the fall, or may overwinter in freshwater and outmigrate the following spring. Most juvenile Chinook salmon in the Puget Sound basin are expected to smolt within the first year after emergence. In winter, juvenile Chinook frequently use boulder pockets along stream margins for cover (Myers et al. 1998). Juvenile Chinook may rear in freshwater from 3 months to 2 years (63 FR 45; Weitkamp et al. 1995); however, Chinook generally migrate to saltwater in the spring and summer. After outmigration to estuarine and saltwater habitats, Chinook utilize estuaries and coastal areas for rearing, where they feed on small crustaceans and insects (Wydoski and Whitney 1979; Healey 1991). As juveniles grow, they eat more larval and juvenile fishes, including herring, anchovies, pilchard, and rockfish. Most Chinook spend from 2 to 4 years feeding in the North Pacific before returning to spawn. Adult Chinook salmon return to spawn in their natal streams from mid-May through October (Myers et al. 1998). Chinook salmon die after spawning.

Puget Sound DPS of Steelhead

On May 7, 2007, NMFS announced the listing of the Puget Sound distinct population segment (DPS) of steelhead as a threatened species under the ESA (72 FR 91).

The DPS distribution extends from the United States/Canada border and includes all naturally spawned anadromous winter-run and summer-run populations in streams and river basins of the Strait of Juan de Fuca (east of and including the Elwha River), Puget Sound (north to include the Nooksack River), and Hood Canal. Possible factors influencing the depletion of Puget Sound steelhead populations include habitat destruction and fragmentation, inadequate regulatory mechanisms of hatchery practices and land use activities, and potential genetic introgression between hatchery- and natural-origin steelhead.

Steelhead exhibit one of the most complex suites of life history traits of any salmonid species. Steelhead may be anadromous or freshwater residents (rainbow trout). Biologically, steelhead can be divided into two reproductive ecotypes: “stream maturing” and “ocean maturing.” Stream-maturing, or summer-run steelhead enter freshwater in a sexually immature condition and require several months to mature and spawn. Ocean maturing, or winter-run steelhead enter freshwater with well-developed gonads and spawn shortly after river entry. Steelhead adults typically spawn between December and June. Depending on water temperature, steelhead eggs may incubate in redds for 1.5 to 4 months before hatching. Puget Sound DPS of steelhead typically smolt after 2 years, although they may spend 1 to 4 years in freshwater. They then reside in marine waters for typically 2 or 3 years prior to returning to their natal stream to spawn. Unlike salmon, not all steelhead die after spawning. Some steelhead successfully return to the ocean and can spawn again in later years.

Yelloweye Rockfish

Rockfish comprise a diverse group of marine fishes including 102 species worldwide and 72 species in the northeastern Pacific Ocean (NMFS 2017). Rockfish are among the most common mid-water and bottom-dwelling fish species on the Pacific coast of North America (Love et al. 2002). Adult rockfish can be one of the most abundant fish species associated with coastal benthic habitats such as kelp forests, rocky reefs, and rocky outcroppings in submarine canyons at depths greater than 980 feet (NMFS 2017). The life history of rockfish is different than most other bony fishes in that rockfish fertilization and embryo development is internal as opposed to external egg fertilization in other species. Females give birth to live larval young, which disperse to open waters extending several hundred miles offshore (Love et al. 2002).

Yelloweye rockfish primarily inhabit waters between 25 and 474 meters (m) (80 and 1,560 feet) in depth but are most common between 91 and 180 m (300 and 590 feet) (Love et al. 2002). Yelloweye rockfish are one of the largest (up to 25 pounds) and longest lived (up to 118 years) species of rockfish (Love et al. 2002).

Yelloweye rockfish sexually mature at about the age of six (NMFS 2017). Female yelloweye rockfish can produce between 1.2 and 2.7 million eggs, which is considerably more than most rockfish species (Love et al. 2002). Although thought to only spawn once per year, there is evidence from studies in Puget Sound that spawning may occur up to twice per year (NMFS 2017). Estimates of pelagic larval dispersion duration are not available for yelloweye rockfish; however, the pelagic larval duration is thought to be similar to that of canary rockfish and bocaccio (116–155 days) (NMFS 2017). Following the pelagic larval stage, juvenile yelloweye rockfish settle primarily in shallow, high-relief zones, crevices, and sponge gardens (NMFS 2017). As juveniles grow and mature, they move to deeper water, but maintain an association with rocky, high-relief areas (NMFS 2017). Therefore, yelloweye rockfish are less frequently

observed in South Puget Sound and are more commonly found in North Puget Sound (Miller and Borton 1980) such as the Strait of Georgia and Canadian Gulf Islands, which exhibit more complex, high-relief, rocky habitats (Yamanaka et al. 2006).

Yelloweye rockfish are opportunistic feeders, and due to their larger size, adults can feed on larger prey including smaller yelloweye rockfish and are preyed upon less frequently (Rosenthal et al. 1982). Typical adult forage includes sand lance, gadids, flatfish, shrimp, crabs and gastropods (Love et al. 2002). Juveniles and larval life history forms of yelloweye rockfish feed on species similar to that of canary rockfish and bocaccio. Predators of yelloweye rockfish include salmon and orcas (Love et al. 2002).

Bocaccio Rockfish

Bocaccio rockfish primarily inhabits waters between 50 and 250 m (164 and 820 feet) in depth but may be found in waters as deep as 475 m (1,560 feet) (NMFS 2017) and are suspected to live as long as 54 years. Bocaccio rockfish were at one time considered fairly common in the greater Puget Sound area (NMFS 2017). In the Georgia Basin and based on available information, bocaccio rockfish are generally not associated with areas containing hard substrates. This may be due to their pelagic behavior or availability of prey items.

Reproduction (copulation and fertilization) generally occurs in the fall between August and November. Female bocaccio rockfish can produce 20,000 to more than 2 million eggs, which is more than many other rockfish species (Love et al. 2002). Bocaccio rockfish larvae are readily dispersed, with a pelagic larval duration of approximately 155 days (Shanks and Eckert 2005). Larvae and pelagic juveniles tend to be associated with floating kelp mats and are therefore generally near the surface. Most bocaccio rockfish remain pelagic between 3.5 and 5.5 months before settling to shallower areas. Several weeks after settlement, juveniles move to deeper water 18–30 m (60–100 feet) where they are found on rock reefs (NMFS 2017). As bocaccio rockfish mature into adults, generally between 4 and 6 years (MBC 1987), they move into deeper water habitats (typically found at least 98 feet off the bottom) and associated hard substrata (Love et al. 2002). In the Georgia Basin, and based on available information, bocaccio rockfish are generally not associated with areas containing hard substrates. This may be due to their pelagic behavior or availability of prey items (74 FR 77). Bocaccio are also known to stray into mudflats (Love et al. 2002).

Bocaccio rockfish larvae feed primarily on plankton, larval krill, diatoms, and dinoflagellates. Pelagic juveniles are opportunistic, feeding on fish larvae, copepods, krill, and other prey. Larger juveniles and adults are generally piscivorous, eating other rockfish, sablefish, hake, anchovies, lanternfish, and squid. Predators of juvenile bocaccio rockfish include Chinook salmon, terns, and harbor seals (Love et al. 2002).

Eulachon Southern DPS

Eulachon, also known as smelt or candlefish, are anadromous fish found from British Columbia to central California (Gustafson et al. 2010). Eulachon utilize a saltwater environment for 3 to 5 years after birth before returning to their freshwater natal streams to spawn (Gustafson et al. 2010). They spawn on the lower portions of major rivers draining into the Pacific Ocean. Eulachon broadcast spawn their eggs in

large congregations, which are then fertilized and attach themselves to the stream substrate. Larvae hatch within 30–40 days and then spend weeks or months rearing in nearshore estuaries.

Larval and juvenile eulachon feed on plankton, while adults primarily eat euphasids or copepods (Gustafson et al. 2010). Predators include various marine mammals including seals, sea lions, dolphins and porpoises, and whales. Piscivorous birds and fish species are also common predators of eulachon (Gustafson et al. 2010).

Southern Resident Population Killer Whale Life History

Southern Resident killer whales, which are present in the Salish Sea, prey on fish of many species but predominantly feed on salmon (Wiles 2004). Transient killer whales, which occasionally enter the Salish Sea, prey primarily on marine mammals, mostly harbor seals in Washington (Wiles 2004). There are no known predators of killer whales.

Male killer whales average about 26 feet (8 m) in length; females are about 23 feet (7 m) in length (Heyning and Dahlheim 1988). Males live about 50 to 60 years and females 80 to 90 years (Reeves et al. 2002). Females reach sexual maturity when they are about 16 feet (5 m) in length and give birth every 3 to 8 years after that (Heyning and Dahlheim 1988). Calves are about 6.5 feet (2 m) long when born and, although weaned at about 12 months, they remain closely tied to their mother until they are about 2 years old (Heyning and Dahlheim 1988). There is no specific breeding season for killer whales, although most breeding behavior in the Salish Sea is observed in summer and fall (Osborne et al. 1988).

Resident whales live in small groups called matriline in which all the whales are linked by maternal descent (Wiles 2004). Several matriline make up a pod. For instance, the Southern Resident L pod is made up of 11 matriline consisting of 33 individual whales. (Center for Whale Research 2024)). Transient whales live in smaller groups than residents, usually up to about 10 animals.

Habitat use by resident and transient killer whales differs, and much of the information known about habitat use is preliminary. Killer whales use a variety of habitats throughout the year. Distribution of resident whales while in the inland waters of Washington and British Columbia is strongly correlated with areas of greater salmon abundance. Resident killer whales rarely enter water less than about 15 feet (5 m) deep. Transient whales often enter small inlets and shallow areas while hunting for harbor seals (Wiles 2004).

References

- Center for Whale Research. 2024. *About killer whales*. Accessed February 8, 2024. Available: <http://www.whaleresearch.com/#!/about-orcas/c1qa8>.
- Gustafson, R.G., M.J. Ford, D. Teel, and J.S. Drake. 2010. *Status review of eulachon (Thaleichthys pacificus) in Washington, Oregon, and California*. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-105, 360 p.
- Healey, M.C. 1991. *The Life History of Chinook Salmon (Oncorhynchus tshawytscha)*. Pages 311-393 in Groot and Marcolis (eds.), *Pacific Salmon Life Histories*. UBC Press, Vancouver, Canada.

- Heyning, J.E., and M.E. Dahlheim. 1988. *Orcinus orca*. Mammalian Species 304:1-9.
- Love, M. S., M. Yoklavich, and L. K. Thorsteinson. 2002. *The rockfishes of the northeast Pacific*. University of California Press, Berkeley.
- Miller, B.S., and S.F. Borton. 1980. *Geographical distribution of Puget Sound fishes: Maps and data source sheets*. University of Washington Fisheries Research Institute, 3 vols.
- MBC Applied Environmental Sciences. 1987. *Ecology of Important Fisheries Species Offshore California*. Minerals Management Service, Pacific Outer Continental Shelf Region. Washington, D.C. MMS 86-0093, 252 p.
- Myers, J., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lieberman, T.C. Wainwright, W.S. Grand, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. *Status Review of Chinook Salmon from Washington, Idaho, Oregon, and California*. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-NWFSC-35.
- NMFS (National Marine Fisheries Service). 1998. *Factors contributing to the decline of Chinook salmon: an addendum to the 1996 west coast steelhead factors for decline report*. Protected Resources Division, Portland, OR.
- NMFS (National Marine Fisheries Service). 1999. *Endangered and threatened species; threatened status for three Chinook salmon evolutionarily significant units (ESUs) in Washington and Oregon, and endangered status for one Chinook salmon ESU in Washington. Final Rule*. March 24, 1999. Federal Register 64(56):14308-14328.
- NMFS (National Marine Fisheries Service). 2017. *Rockfish recovery plan Puget Sound/Georgia Basin: yelloweye rockfish (Sebastes ruberrimus) and bocaccio (S. paucispinis)*. Accessed February 2024. Available: <https://repository.library.noaa.gov/view/noaa/16866>.
- Osborne, R., J. Calambokidis, and E.M. Dorsey. 1988. *A guide to marine mammals of Greater Puget Sound*. Island Publishers, Anacortes, Wash. 191pp.
- Reeves, R.R., B.S. Stewart, P.J. Clapham, and J.A. Powell. 2002. *Guide to the marine mammals of the world*. Alfred A. Knopf, New York, New York.
- Shanks, A.L., and J.L. Ekert. 2005. *Population persistence of California Current fishes and benthic crustaceans: a marine drift paradox*. Ecological Monographs 75(4): 505-524.
- Wiles, G.J. 2004. *Washington State status report for the killer whale*. Washington Department Fish and Wildlife, Olympia. 106 pp.
- Weitkamp, L.A., T.C. Wainwright, G.J. Bryant, G.B. Milner, D.J. Teel, R.G. Kope, and R.S. Waples. 1995. *NOAA Technical Memorandum NMFS-NWFSC-24; Status Review of Coho Salmon from Washington, Oregon, and California*. National Marine Fisheries Service, Northwest Fisheries Science Center, Coastal Zone and Estuarine Studies Division. Seattle WA.
- Wydoski, R.S., and R.R. Whitney. 1979. *Inland Fishes of Washington*. University of Washington Press, Seattle, WA.

Yamanaka, K.L., L.C. Lacko, R.E. Withler, C.J. Grandin, J.K. Lohead, J.C. Martin, N. Olsen, and S. S. Wallace. 2006. *A review of yelloweye rockfish* *Sebastes ruberrimus* *along the Pacific coast of Canada: biology, distribution and abundance trends*. Canadian Science Advisory Secretariat Research Document 2006/076.

Appendix D

Representative Photographs



Photo 1. Site of proposed ASOS relocation



Photo 2. Project site and site of proposed large stormwater detention pond



Photo 3. Store More Way (new vehicle access road to be improved) and site of two smaller stormwater detention ponds



Photo 4. Typical vegetation in vicinity of new access road and realigned trail



Photo 5. Excavated material and typical vegetation in location of proposed hangars



Photo 6. Typical vegetation in proposed soil disposal area



Photo 7. Typical vegetation in area of proposed trail realignment at south end of site



Photo 8. On-site stream near existing trail crossing



Photo 9. Excavated pond feature in eastern portion of on-site stream



Photo 10. Outlet of on-site stream at culvert under Mullis Street

B2 NMFS Biological Opinion



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OR 97232-1274

Refer to NMFS No:
WCRO-2025-02452

March 19, 2026

Laura Sample
2200 South 216th Street
Des Moines, WA
98198

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and
Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat
Response for the Port of Friday Harbor Southwest Development Area Project (HUC
171100030500).

Dear Ms. Sample:

This letter responds to your August 21, 2025 request for consultation with the National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act (ESA) for the Port of Friday Harbor Southwest Development Area Project (WCRO-2025-02452). Your request, after being updated as described in the consultation history below, qualified for our expedited review and analysis because it met our screening criteria and contained sufficient information on, and analysis of, your proposed action and its potential effects to listed species and designated critical habitat (CH).

We reviewed the Federal Aviation Administration (FAA) consultation request and related initiation package. Where relevant, we have adopted the information and analyses you provided and/or referenced, but only after our independent, science-based evaluation confirmed they meet our regulatory and scientific standards. In our biological opinion (Opinion) below, we indicate what parts of your documents we incorporated by reference and where that information is incorporated.

We adopt by reference sections of the project's Biological Assessment (BA) to the Opinion as follows:

- Sections 2.1, 2.5, and Figures for the proposed action;
- Section 3.2 for the action area;
- Chapter 4 for the Status of Species and Critical Habitat;
- Section 6.2 for the effects section.



Consultation History

On August 21, 2025, the FAA requested formal consultation with NMFS under the ESA. The FAA provided with its request a BA, prepared in June 2025. They also requested an Essential Fish Habitat (EFH) consultation under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Emails were exchanged between November 18, 2025 and February 4, 2026, and the consultation was initiated on February 10, 2026.

Updates to the regulations governing interagency consultation (50 CFR part 402) were effective on May 6, 2024 (89 FR 24268). We are applying the updated regulations to this consultation. The 2024 regulatory changes, like those from 2019, were intended to improve and clarify the consultation process, and, with one exception from 2024 (offsetting reasonable and prudent measures), were not intended to result in changes to the Services' existing practice in implementing section 7(a)(2) of the ESA (89 FR 24268; 84 FR 45015). We have considered the prior rules and affirm that the substantive analysis and conclusions articulated in this biological opinion and incidental take statement would not have been any different under the 2019 regulations or pre-2019 regulations.

Proposed Federal Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies (see 50 CFR 402.02).

We adopt by reference a more detailed project description from section 2.1 and Figures from the BA. In summary, the FAA proposes a multifaceted development of approximately 115 acres of currently undeveloped land at the southern end of the Friday Harbor Regional Airport (airport), bordered by Mullis St. and Cattle Point Rd.

To accomplish this multifaceted action, 34.6 acres of land would be cleared (email correspondence), graded, and retaining walls constructed where necessary. In total, the development would create 7.8 acres of pollution generating surfaces (PGIS).

Impact Avoidance and Minimization Measures (IAMMs) are adopted by reference from BA section 2.5.

BIOLOGICAL OPINION

We examined the status of each species that would be adversely affected by the proposed action to inform the description of the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. Status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery, and informs our jeopardy analysis.

We also examined the condition of CH throughout the designated area and discuss the function of the physical or biological features (PBFs) essential to the conservation of the species that create the conservation value of the various watersheds and coastal and marine environments that make up the designated CH.

One factor affecting the status of ESA-listed species considered in this opinion, and aquatic animals and their habitats at large, is exposure to increasing environmental variation due to shifts in average weather conditions. Increasing environmental variation is likely to play a role in determining the abundance and distribution of ESA-listed species, and the conservation value of their designated CHs in the Pacific Northwest. These shifts will not be spatially homogeneous across the Pacific Northwest.

There is a large and growing body of literature on past, present, and future impacts of increasing environmental variation on sea level rise, frequency of severe weather events, and changes in air and water temperatures. Major ecological realignments are already occurring in response to these shifts (IPCC 2022). Long-term trends in warming have continued at global, national, and regional scales. The 10 warmest years in the historical record (1890-2023) have all occurred in the past decade, with NOAA (2025), Bardan (2025), and the WMO (2025) stating 2024 was the world's warmest year on record.

Increasing temperatures and the potential loss of biodiversity represent profound threats to ecosystem functionality (IPCC WGII 2022). These two factors are often examined in isolation but likely have interacting effects on ecosystem function. Updated projections of increasing temperature are similar to or greater than previous projections (WGI 2021). Retaining and restoring habitat complexity, access to flow and cold-water refuges, and improving growth opportunities in both freshwater and marine environments are strongly advocated in the recent literature (Siegel and Crozier 2019; Siegel et al. 2020).

Status of the Species and Critical Habitat

Listing and recovery plan information, status summaries, and limiting factors for the species as well as PBFs and descriptions of the critical habitats addressed in this opinion are adopted by reference from Chapter 4 of the BA.

Species Determinations

NMFS concurs with the action agency's determinations that the project will result in a 'may affect' and 'likely to adversely affect' (LAA) determination for:

- PS Chinook salmon;
- PS steelhead;
- PS/Georgia Basin yelloweye rockfish;
- PS/Georgia Basin bocaccio;
- PS eulachon, and;
- SRKW.

NMFS also concurs with the determination that the proposed action is LAA CH for:

- PS Chinook salmon;
- PS/Georgia Basin yelloweye rockfish;
- PS/Georgia Basin bocaccio, and;
- SRKW.

Action Area

“Action area” means all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02).

We adopt by reference the action area determined by aquatic noise, described in section 3.2 of the BA. To this area, NMFS extends the area of impact associated with stormwater discharge, adding the entirety of North Bay and the nearshore north to Turn Island Marine State Park and south to Dinner Island.

Stormwater effects caused by harmful runoff from pollution generating impervious surfaces (PGIS) would likely be the farthest-reaching effect of the proposed action. NMFS takes a fate and transport approach to understanding downstream movement of stormwater contaminants such as PAHs¹ and 6ppd/q². NMFS expects the stormwater effects to extend into the estuaries in North Bay and into the nearshore areas, described above, most likely influenced by currents between San Juan Island and Lopez Island (Greer et al. 2023; Law et al. 1997; Overdahl et al. 2021; Peter et al. 2024; Zhang et al. 2016).

Environmental Baseline

The “environmental baseline” refers to the condition of the listed species or their designated CH in the action area, without consequences to the listed species or designated CH caused by the proposed action. The environmental baseline includes the past and present impacts of all federal, state, and/or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of State and/or private actions which are contemporaneous with the consultation in process. The impacts to listed species or designated CH from federal agency activities or existing federal agency facilities that are not within the agency’s discretion to modify are part of the environmental baseline (50 CFR 402.02).

¹ Polycyclic aromatic hydrocarbons (PAHs) represent a group of aromatic hydrocarbons with two or more fused benzene rings, which are among the most important classes of hydrophobic organic contaminants. The compounds have low solubility and low volatility; therefore, they bioaccumulate in aquatic organisms and collect in estuary and coastal sediments.

² N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylenediamine-quinone (6PPD/q or 6PPD-quinone) is an ozonated transformation product of 6PPD, the most abundant substituted p-phenylenediamine (PPD) antioxidant added to rubber tires to prevent oxidation and extend service life and a ubiquitous pollutant in urbanized watersheds and the nearshore.

The information below was not provided in the BA.

Geologically, the San Juan Islands are remnants of the Cascades, caved into separate land mass through glaciation. The 400+ islands left behind were blanketed by glacial clay, silt, sand, gravel and boulders (Herrera Environmental Consultants et al. 2013).

San Juan Island, the second largest island in the San Juan Islands, has varied topography, with steep sea cliffs changing to gentle gravel beaches. The southern side of the island is quite dry, averaging less than 20 inches of rain per year. Floods are a regular part of the hydrological cycle, raising the water on the shoreline and increasing flow in the island's channels. The highest flood on record occurred in 1982 when the water rose 11 feet above mean lower-low water (Friends of the San Juans 2016; Herrera Environmental Consultants et al. 2013).

Friday Harbor, the largest city on San Juan Island and the largest commercial center in the archipelago, was incorporated in 1909 after the port grew rapidly through the late 1800s and early 1900s. Canneries, ship business, forestry, and sawmills were the predominant industries. Tourism began to flourish over the same time period and continues to be prevalent today (Friends of the San Juans 2016; National Parks Service 2020).

Due to urbanization, natural flora and fauna has shifted over the years. Beavers, while once present and still present on other Islands within the archipelago, are not present on San Juan Island. Large rocks, boulders, or spawning gravel are not prevalent in the channels on San Juan Island which, as of 2007, favor grass and mud pasture land (Wild Fish Conservancy). Eel grass communities around the island decreased with urbanization but have rebounded recently (Friends of the San Juans 2016; National Parks Service 2020).

The shoreline surrounding North Bay, the bay south of Friday Harbor where the streams crossing the airport property flow into the ocean, is relatively developed compared to other locations on San Juan Island (Herrera Environmental Consultants et al. 2013). Friends of the San Juans (2016) identify this shoreline as very high priority habitat, with high proximity to rearing juvenile salmon, and high concentrations of wetlands, forage fish spawning, eel grass and bull kelp. Urbanization, as discussed above, favors second growth forests. Habitat surveys on the Friday Harbor Airport property documented salmonberry, willows, and Himalayan blackberry along the channels, small woody debris in the channel, and large woody debris on both banks. Root structures from the described vegetation are not enough to stabilize the banks. Surveys on the airport property describe incised and sloughing channel walls (Corps 2025).

Despite the urbanization on the island, Washington Department of Ecology (WDOE) and Washington Department of Fish and Wildlife (WDFW) do not identify any water quality violations in the action area (WDOE 2025).

Effects to Critical Habitat and Species

Under the ESA, "effects of the action" are all consequences to listed species or CH that are caused by the proposed action, including the consequences of other activities that are caused by

the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

In the following analysis, information from the provided material is adopted by reference and supplemented, or, where no material is adopted, original analysis is provided.

Effects to Critical Habitat

The proposed action, including full application of the planned IAMMs, is likely to adversely affect designated CH for PS Chinook salmon, PS/Georgia Basin yelloweye rockfish, PS/Georgia Basin bocaccio rockfish, and SRKW as described below.

The 7.8 acres of new and replaced PGIS resulting from proposed action, and the consequent increase in vehicle and airplane traffic, have the potential to increase stormwater flows into the system resulting in degraded water quality to CHs of the aforementioned subset of the species listed in **Table 1**. The effects of stormwater pollutants on these CHs is adopted by reference from section 6.2 of the BA.

Effects to Species

Effects to species range from short-term (those that last days to weeks), to long-term (those that last for months, years, or decades).

The short-term effects from the proposed action are:

Suspended Sediment

Deposition of airborne sediment, from the grating of 34.6 acres, into the channel within the action area would attenuate to background levels within approximately 200 ft downstream of the construction zone. As there is no spawning or rearing for PS Chinook salmon or PS steelhead in the channel, and effects are expected to attenuate before reaching the nearshore, effects to individuals of all species listed in Table 1 are unlikely to occur.

Noise

As no work is likely to occur in-water, effects to all species (listed in Table 1) due to noise are unlikely to occur.

The long-term effects from the proposed action are:

Stormwater Runoff

The 7.8 acres of new and replaced PGIS resulting from proposed action, and the consequent increase in vehicle and airplane traffic, have the potential to increase stormwater flows into the system resulting in numerous physical, behavioral, and chemical effects to all species listed in

Table 1. The effects of stormwater pollutants on these individuals are adopted by reference from section 6.2 of the BA.

Cumulative Effects

“Cumulative effects” are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR 402.02). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Some continuing non-federal activities are reasonably certain to contribute to environmental variation within the action area. However, it is difficult, if not impossible, to distinguish between the action area’s future environmental conditions caused by global anthropogenically driven weather variations that are part of the environmental baseline vs. cumulative effects. Therefore, all relevant future environmental variation in the action area is described earlier in the Opinion.

The current conditions of ESA-listed species and designated CH within the action area are described in the Status of the Species, Status of Critical Habitat, and Environmental Baseline sections above. The non-federal activities in and upstream of the action area that have contributed to those conditions include past and on-going bankside development, vessel activities, and urbanization, as well as upstream forest management, agriculture, road construction, water development, subsistence and recreational fishing, and restoration activities. Those actions were, and continue to be, driven by a combination of economic conditions characterized by traditional natural resource-based industries, general resource demands associated with settlement of local and regional population centers, and the efforts of conservation groups dedicated to restoration and use of natural amenities, such as cultural inspiration and recreational experiences.

We are unaware of any specific future, non-federal activities that are reasonably certain to affect the action area. However, we are reasonably certain that future non-federal actions similar to the previously mentioned activities are all likely to continue, and increase, in the future as the human population continues to grow across the region. Continued habitat loss and degradation of water quality from development and chronic input from point- and non-point pollutant sources will likely continue, and increase, into the future. Recreational and commercial use of the waters within the action area are also likely to increase as the human population grows.

The intensity of these influences depends on many social and economic factors and, therefore, is difficult to predict. Further, the adoption of more environmentally acceptable practices and standards may gradually reduce some negative environmental impacts over time. Interest in restoration activities has increased as environmental awareness rises among the public. State, tribal, and local governments have developed plans and initiatives to benefit ESA-listed PS Chinook salmon, PS steelhead, Pacific Eulachon, PS/Gorgia Basin bocaccio rockfish, PS/Gorgia Basin yelloweye rockfish, or SRKW. However, the implementation of plans, initiatives, and

specific restoration projects are often subject to political, legislative, and fiscal challenges that increase the uncertainty of their success.

Integration and Synthesis

The “integration and synthesis” section is the final step in assessing the risk that the proposed action poses to species and CH. In this section, we add the effects of the action to the environmental baseline and the cumulative effects, taking into account the status of the species and CH, to formulate the agency’s biological opinion as to whether the proposed action is likely to: (1) reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of designated CH as a whole for the conservation of the species.

Species in the action area include PS Chinook salmon, PS steelhead, PS/Georgia Basin DPS yelloweye rockfish, and Pacific Eulachon, all listed as threatened under the ESA, and PS/Georgia Basin DPS bocaccio rockfish and SRKW, listed as endangered. Salmonids in the action area would be mixed stock blends of PS populations. The salmonids are listed for a number of reasons, including all-encompassing degradation of habitat conditions across all life stages, pressure on genetic viability from harvest and hatchery production, and urbanization. Listing factors for both of the rockfish species are identical: over harvest, water pollution, environmental variation changes to rockfish habitat, and population dynamics caused by reduced population size. Eulachon listing factors include environmental variation, bycatch and direct catch in commercial fisheries, urbanization, and predation. Lastly, SRKW listing factors include quantity and quality of prey, exposure to toxic chemicals, disturbance from sound and vessels, and risk from oil spills (Table 1).

Aside from SRKW, none of the populations in Table 1 are identified as critical for recovery of the species by their respective recovery plans, but no population or subpopulation’s extirpation is supported by either recovery plan. The status of these species is due in part to the systematic degradation of habitat conditions, such as those as a result of the proposed action, throughout the species range.

Increased area of PGIS would increase the concentration of stormwater runoff in North Bay, reducing water quality required by all of the above listed species. No aspects of the proposed action would benefit recovery goals.

CH, as described in Table 1, would be equally affected by the reduction in water quality caused by increased stormwater runoff.

When considering cumulative effects, future development, together with anthropogenically driven weather variations, would continue to lower water quality, applying continued pressure to already reduced CH features required for salmonids, rockfishes, eulachon, and whale survival.

No future development plans are explicitly planned out in the proposed action, however, even if stormwater runoff is maintained at the levels proposed by the action, increased water temperature

due to inevitable environmental variation would amplify the effects from said contaminants on species of concern.

Overall, any annual reduction in the number of PS Chinook salmon, PS steelhead, PS/Georgia Basin yelloweye rockfish, PS/Georgia Basin bocaccio rockfish, PS eulachon, and SRKW caused by the proposed action is likely to be very small. No species' component population would be so affected in terms of abundance that the distribution, diversity, or productivity of the ESA-listed species would be impaired, even when cumulative effects are considered.

After reviewing and analyzing the current status of the listed species and CH, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of PS Chinook salmon, PS steelhead, PS/Georgia Basin yelloweye rockfish, PS/Georgia Basin bocaccio rockfish, PS eulachon, or SRKW, or destroy or adversely modify their designated CH.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "Harass" is further defined by guidance as to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

Amount or Extent of Take

In the biological opinion, NMFS determined that take is reasonably certain to occur as harm of species listed in Table 1 from exposure to: stormwater pollutants generated from 7.8 acres of PGIS.

We cannot predict with meaningful accuracy the number of individuals from said species that are reasonably certain to be injured or killed annually by exposure to any of these stressors.

The distribution and abundance of the listed fish and whales that occur within the action area are affected by numerous biotic and environmental processes, such as timing in relation to the life stage and typical behaviors of the species under consideration, intra- and inter-specific

interactions such as competition and predation, habitat quality, and the interaction of processes that influence genetic, population, and environmental characteristics. These processes interact in ways that may be random or directional, and may operate across far broader temporal and spatial scales than are affected by the proposed action. Therefore, the distribution and abundance of listed fish in any given area are likely to vary greatly, and somewhat randomly, over time. Further, we know of no device or practicable technique that would yield reliable counts of individuals that may be injured or killed annually by exposure to the proposed action's impacts. In such circumstances, we use the causal link established between an activity and the likely extent and duration of changes in habitat conditions as surrogates to describe the extent of take as a numerical level of habitat disturbance. The most appropriate surrogates for take are action-related parameters that are directly related to the magnitude of the expected take. For this action,

- The acreage of PGIS (7.8 acres) is an appropriate surrogate for take as a result of exposure to a suite of stormwater pollutants because concentration of these pollutants is directly correlated to the surface area of pollutant generating material.

Exceedance of the exposure limits described above, would constitute an exceedance of authorized take that would trigger the need to reinitiate consultation.

Although this surrogate could be construed as partially coextensive with the proposed action, they nevertheless function as effective reinitiation triggers. If the size and configuration of the structure exceeds the proposed characteristics, it could still meaningfully trigger reinitiation because the Corps has authority to conduct compliance inspections and to take actions to address non-compliance, including post-construction (33 CFR 326.4).

Effect of the Take

In the biological opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of CH.

Reasonable and Prudent Measures

“Reasonable and prudent measures” refer to those actions the Director considers necessary or appropriate to minimize the impact of incidental take on the species (50 CFR 402.02).

The FAA shall require the applicant to:

1. Implement monitoring and reporting to confirm that the take exemption for the proposed action is not exceeded.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the federal action agency must comply (or must ensure that any applicant complies) with the following terms and conditions. The FAA or any applicant has a continuing duty to monitor the impacts of incidental

take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. To implement RPM Number 1, the FAA shall require the applicants to develop and implement plans to collect and report details about construction and structures, to then share that information with NMFS. Those plans shall:
 - a. Require the contractors to maintain and submit records to verify that all take indicators are monitored and reported. Minimally, the records shall include documentation of the final acreage of the PGIS and confirmation they do not exceed the surface area described in this Opinion.
 - b. Require the applicant to establish procedures for the submission of the construction records and other materials to the appropriate FAA office; and
 - c. Require the FAA to submit an electronic post-construction report to NMFS within six months of project completion. Send the reports to: projectreports.wcr@noaa.gov. Be sure to include Attn: WCRO-2024-02452.

Conservation Recommendations

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or CH or regarding the development of information (50 CFR 402.02).

The FAA should minimize impacts to individual PS Chinook salmon and PS steelhead and their CH by:

- Implement "dry" runway sweeping to capture rubber particles before they wash away, thereby reducing the expected 6PPD-q and metals debris from takeoff/landing events that may reach the environment through stormwater events.
- Explore permeable pavements alternatives to the traditional (non-permeable) pavement proposed.

Reinitiation of Consultation

Under 50 CFR 402.16(a): "Reinitiation of consultation is required and shall be requested by the federal agency where discretionary federal involvement or control over the action has been retained or is authorized by law and: (1) If the amount or extent of take specified in the incidental take statement is exceeded; (2) If new information reveals effects of the agency action that may affect listed species or CH in a manner or to an extent not previously considered; (3) If

the identified action is subsequently modified in a manner that causes an effect to the listed species or CH that was not considered in the biological opinion or written concurrence; or (4) If a new species is listed or CH designated that may be affected by the identified action.”

ESSENTIAL FISH HABITAT RESPONSE

Thank you also for your request for essential fish habitat (EFH) consultation. NMFS reviewed the proposed action for potential effects on EFH pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation. We have concluded that the action would adversely affect EFH designated under the Pacific Coast Salmon Fishery Management Plan (FMP), Pacific Coast Groundfish FMP, and the Coastal Pelagic Species FMP. We propose EFH conservation recommendations for this project below.

Magnuson-Stevens Fishery Conservation and Management Act

Section 305(b) of the MSA directs federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species’ contribution to a healthy ecosystem. For the purposes of the MSA, EFH means “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity”, and includes the associated physical, chemical, and biological properties that are used by fish (50 CFR 600.10). Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects may result from actions occurring within EFH or outside of it and may include direct, indirect, site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH (50 CFR 600.905(b)).

EFH Affected by the Proposed Action

Pacific coast salmon EFH includes those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem. The FMP designated five habitat areas of particular concern (HAPCs): 1) complex channels and floodplain habitats; 2) thermal refugia; 3) spawning habitat; 4) estuaries; and 5) marine and estuarine submerged aquatic vegetation. HAPCs are described in the regulations as subsets of EFH which are rare, particularly susceptible to anthropogenic-induced degradation, especially ecologically important, or located in an environmentally stressed area. Designated HAPCs are not afforded any additional regulatory protection under the MSA; however, federal

projects with potential adverse impacts on HAPCs would be more carefully scrutinized during the consultation process.

Groundfish EFH includes those water that are necessary to fish for spawning, breeding, feeding, or growth to maturity. The FMP designated 5 HAPCs: 1) estuaries, 2) canopy kelp, 3) seagrass, 4) rocky reefs, and 5) seamounts and canyons.

Coastal Pelagic Species FMP includes aquatic areas and their associated physical, chemical, and biological properties, that are currently or historically used by fish, and substrate, including sediment, hard bottom, structures underlying the waters, and associated biological communities, necessary to fish for spawning, breeding, feeding, or growth to maturity.

Adverse Effects on EFH

NMFS determined the proposed action would adversely affect EFH through stormwater pollution affecting water quality in the North Bay.

These impacts would affect the following FMPS:

- Pacific Coast Salmon FMP;
- Groundfish FMP, and;
- Coastal Pelagic Species FMP.

EFH Conservation Recommendations

NMFS determined that the following conservation recommendations are necessary to avoid, minimize, mitigate, or otherwise offset the adverse effects of the proposed action on EFH.

- Implement "dry" runway sweeping to capture rubber particles before they wash away, thereby reducing the expected 6PPD-q and metals debris from takeoff/landing events that may reach the environment through stormwater events.
- Explore permeable pavements alternatives to the traditional (non-permeable) pavement proposed.

As required by section 305(b)(4)(B) of the MSA, FAA must provide a detailed response in writing to NMFS within 30 days after receiving an EFH conservation recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH conservation recommendations unless NMFS and the federal agency have agreed to use alternative time frames for the federal agency response. The response must include a description of the measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations, the federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)).

Supplemental Consultation

The FAA must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR 600. 920(l)).

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The biological opinion will be available through NOAA Institutional Repository <https://repository.library.noaa.gov/welcome>. A complete record of this consultation is on file at Oregon Washington Coastal Office.

Please direct questions regarding this letter to Colleen McGee in our West Coast Regional Office at Colleen.McGee@noaa.gov or (206) 526 – 4103.

Sincerely,

A handwritten signature in blue ink that reads "Kathleen Wells". The signature is fluid and cursive, with the first name and last name clearly distinguishable.

Kathleen Wells
Assistant Regional Administrator
National Marine Fisheries West Coast Region
Oregon and Washington Coastal Area Office

References

- Bardan, R. 2025. Temperatures Rising: NASA Confirms 2024 Warmest Year on Record, <https://www.nasa.gov/news-release/temperatures-rising-nasa-confirms-2024-warmest-year-on-record/>
- Corps. 2025. RE: WCRO-2025-02452 Friday Harbor Regional Airport Development. Redman, Jessica.
- Ford, M. J. 2022. Biological Viability Assessment Update for Pacific Salmon and Steelhead Listed Under the Endangered Species Act: Pacific Northwest. U.S. Department of Commerce, Pages 191-224.
- Friends of the San Juans. 2016. Salmon Habitat Protection Blueprint for San Juan County, Washington.4-51.
- Greer, J. B.et al. 2023. Tire-Derived Transformation Product 6PPD-Quinone Induces Mortality and Transcriptionally Disrupts Vascular Permeability Pathways in Developing Coho Salmon. *Environmental Science and Technology* 57(30):10940-10950.
- Herrera Environmental Consultantset al. 2013. Shoreline Inventory and Characterization Report, Pages 21-397.
- IPCC. 2022. Climate Change 2022: Impacts, adaptation and vulnerability: contribution of working group II to the sixth assessment report of the Intergovernmental Panel on Climate Change, Pages 3-84.
- Law, R. J.et al. 1997. Polycyclic Aromatic Hydrocarbons (PAH) in Seawater around England and Wales. *Marine Pollution Bulletin* 34(5):306-322.
- Lowry, D.et al. 2024. Yelloweye Rockfish (*Sebastes ruberrimus*) and Bocaccio (*Sebastes paucispinis*) of the Puget Sound/Georgia Basin 5-Year Review: Summary and Evaluation. N. O. a. A. A. N. M. F. S. W. C. Region, editor, Seattle.
- National Parks Service. 2020. Natural Resource Condition Assessment San Juan Island National Historical Park, Pages 17-238.
- NMFS. 2005. Assessment of NOAA Fisheries' critical habitat analytical review teams for 12 evolutionarily significant units of West Coast salmon and steelhead. National Marine Fisheries Service, Protected Resources Division, Portland, Oregon, Pages 583.
- NMFS. 2006. Final Supplement to the Shared Strategy's Puget Sound Salmon Recovery Plan, Pages 5-47.
- NMFS. 2008. Recovery Plan for Southern Resident Killer Whales (*Orcinus orca*), Pages 6-251.
- NMFS. 2017a. 2016 5-Year Review Puget Sound Chinook Salmon Hood Canal Summer-run Chum Salmon Puget Sound Steelhead. Pages 5-583 in D. o. Commerce, editor. National Marine Fisheries Service West Coast Region Portland, OR.
- NMFS. 2017b. Recovery Plan for the Southern Distinct Population Segment of Eulachon (*Thaleichthys pacificus*). National Marine Fisheries Service, West Coast Region, Protected Resources Division, Portland, Oregon, Pages 132.
- NMFS. 2017c. Rockfish Recovery Plan Puget Sound / Georgia Basin Yelloweye Rockfish (*Sebastes ruberrimus*) and Bocaccio (*Sebastes paucispinis*), Pages
- NMFS. 2019. ESA Recovery Plan for the Puget Sound Steelhead Distinct Population Segment (*Oncorhynchus Mykiss*), Seattle, WA, Pages 174.

- NMFS. 2022a. 5-Year Review: Summary and Evaluation of Eulachon, Southern DPS. Pages 7-74 in N. O. a. A. A. National Marine Fisheries Service, Commerce, editor.
- NMFS. 2022b. 2021 Southern Resident Killer Whales (*Orcinus Orca*) 5-Year Review: Summary and Evaluation January 04, 2022, Pages 5-103.
- NOAA. 2025. 2024 was the World's Warmest Year on Record, <https://www.noaa.gov/news/2024-was-worlds-warmest-year-on-record>
- Overdahl, K. E. et al. 2021. Assessment of emerging polar organic pollutants linked to contaminant pathways within an urban estuary using non-targeted analysis. *Environ Sci Process Impacts* 23(3):429-445.
- Peter, K. T. et al. 2024. Storms mobilize organophosphate esters, bisphenols, PFASs, and vehicle-derived contaminants to San Francisco Bay watersheds. *Environ Sci Process Impacts* 26(10):1760-1779.
- Shared Strategy for Puget Sound et al. 2007. Puget Sound Salmon Recovery Plan. *Puget Sound Salmon Recovery Plan* 1:4-550.
- Siegel, J., and L. Crozier. 2019. Impacts of Climate Change on Salmon of the Pacific Northwest. A Review of the Scientific Literature Published in 2018. Pages 2-73 in. Fish Ecology Division, NWFSC,.
- Siegel, J. et al. 2020. Impacts of Climate Change on Salmon of the Pacific Northwest: A Review of the Scientific Literature Published in 2019. Fish Ecology Division, Northwest Fisheries Science Center, National Marine Fisheries Service, NOAA, Pages 2-46.
- WDOE. 2025. Water Quality Atlas Map, <https://apps.ecology.wa.gov/waterqualityatlas/wqa/map>
- WGI, I. 2021. Climate Change 2021: The Physical Science Basis Contribution of Working Group to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Pages 18-2409.
- Wild Fish Conservancy. Wild Fish Conservancy Watertyping Surveys, <https://experience.arcgis.com/experience/ed1aa7c063ee4d1e8ee212fd3bd8b499/page/Page?views=phase-2>
- WMO. 2025. WMO confirms 2024 as Warmest Year on Record at about 1.55°C above Pre-industrial Level. Pages 1-7 in.
- Zhang, A. et al. 2016. Polycyclic aromatic hydrocarbons (PAHs) in seawater and sediments from the northern Liaodong Bay, China. *Mar Pollut Bull* 113(1-2):592-599.

bcc: Colleen McGee
Jeromy Jording
Kate Wells

PDFs sent to:

Laura Sample,
Laura.A.Sample@uscg.mil

B3 USFWS Biological Assessment

Final

FRIDAY HARBOR AIRPORT SOUTHWEST DEVELOPMENT AREA PROJECT

Biological Assessment (USFWS)

Prepared for
Port of Friday Harbor

June 2025



Final

FRIDAY HARBOR AIRPORT SOUTHWEST DEVELOPMENT AREA PROJECT

Biological Assessment (USFWS)

Prepared for
Port of Friday Harbor

June 2025

204 Front Street,
Friday Harbor, WA 98250

2801 Alaskan Way
Suite 200
Seattle, WA 98121
206.789.9658
esassoc.com



Bend	Pasadena	San Francisco
Irvine	Pensacola	San Jose
Los Angeles	Petaluma	Santa Barbara
Mobile	Portland	Sarasota
Oakland	Rancho Cucamonga	Seattle
Orlando	Sacramento	Tampa
Palm Beach County	San Diego	Thousand Oaks

EXECUTIVE SUMMARY

The Port of Friday Harbor (Port), owner and operator of the Friday Harbor Regional Airport (FHR), proposes to develop approximately 65 acres on the southwest portion of the airport called the Southwest Development Area (SWDA) (Proposed Project) to meet design standards and safety requirements established by the Federal Aviation Administration (FAA). Key elements of the Proposed Project include the following: constructing taxiways, building new hangars, constructing a snow removal equipment (SRE) building, building a new vehicle access road and parking lot, upgrading the existing stormwater treatment and detention facilities, and a partial realignment of the Clark McAlpine Trail to continue public access.

The Proposed Project will require funding from the FAA, creating a federal nexus. Section 7 of the Endangered Species Act (ESA) requires that, through consultation (or conferencing for proposed species) with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS), federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species or result in the destruction or adverse modification of Critical Habitat. Environmental Science Associates prepared this Biological Assessment (BA) on behalf of the Port to assess the effect of the proposed airport improvements on species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) that are listed or proposed for listing as endangered or threatened under the federal ESA. Species under the jurisdiction of USFWS are being addressed in a separate BA. Analyses of potential effects were made based on a review of Project plans, on-site evaluation of existing habitat conditions, and a data review on the current and historic distributions of each species.

The Proposed Project will include approximately 4.5 acres of new asphalt and concrete pavement and 3.3 acres of new and replaced access roads and vehicle parking, for a total increase of 7.8 acres of new and replaced pollution-generating impervious surfaces (PGIS). However, new stormwater treatment facilities will be constructed in the SWDA that are designed to meet NMFS stormwater management criteria for projects involving new or redeveloped impervious surfaces. The NMFS design criteria have been documented in various programmatic agreements; however, because the FAA is the lead federal agency for this consultation, none of the available programmatic agreements apply directly. Although the Proposed Project does not directly apply to the covered categories of activities, the Salish Sea Nearshore Programmatic Consultation (SSNP; NMFS 2022), which is employed on routine construction projects regulated by the U.S. Army Corps of Engineers within the Salish Sea nearshore area, has activity categories that align in scope and design criteria that correspond to this Proposed Project. Therefore, the new stormwater treatment facilities will be constructed using these criteria, to avoid and minimize impacts on species and habitats protected by USFWS under the federal ESA, primarily bull trout. The pollutants of concern that may be discharged from aircraft operating surfaces are particulates such as trace metals (e.g., copper or zinc) and petroleum-related products (polycyclic aromatic hydrocarbons – PAHs) or general sediment consisting of dirt, dust, and grit. There is also the potential for 6PPD-quinone (6PPD-q) from tire wear. The extent of 6PPD-q discharge from airports continues to be evaluated. There are

currently multiple stormwater treatment facilities at the FHR but no treatment facilities in the SWDA. The general stormwater facility design is to treat pollution-generating impervious areas for water quality flows at or close to the source, then convey flows through various open-channel swales or pipes to the southeast detention area and detain stormwater volume to release at controlled rates. The bioinfiltration techniques used for this Project will include infiltration, sorption, filtration, and sedimentation, which follows current best management practices (BMPs) for the removal of 6PPD-q from stormwater runoff prior to discharge to surface waters, per the 2024 Stormwater Management Manual for Western Washington (SWMMWW). Linear type pavements will be treated using Compost-Amended Vegetated Filter Strips (CAVFS), and runoff from other paved areas will be routed to bioretention swales. The water quality treatment facilities are expected to treat between 91 and 99 percent of stormwater before it is discharged into North Bay and have been designed to meet NMFS standards for water quality. The proposed stormwater flow control will include constructing two open storage stormwater detention facilities, which will use a combination of orifice and weir control structures to provide the NMFS design flow control.

Stormwater from the airport ultimately discharges to North Bay through two stormwater outfalls approximately 1,000 feet from FHR. Federally listed bull trout (*Salvelinus confluentus*) may occur in North Bay. The stormwater treatment technologies feasible at the site are not 100 percent effective at removing a number of stormwater pollutants that are persistent and mobile in the aquatic environment. Given that recognized stormwater treatment will occur, stormwater effects to listed aquatic species will be reduced but not eliminated. Therefore, the Proposed Project's effects determination is “**may affect, likely to adversely affect**” for bull trout that may be present in North Bay (**Table ES-1**).

Additionally, for terrestrial species under the jurisdiction of USFWS, this BA has determined that the Proposed Project will have **no effect** on island marble butterfly (*Euchloe ausonides insulanus*), yellow-billed cuckoo (*Coccyzus americanus*), monarch butterfly (*Danaus plexippus*), and Suckley's cuckoo bumble bee (*Bombus suckleyi*). However, the Proposed Project's effect determination for marbled murrelet (*Brachyramphus marmoratus*) is “**may affect, not likely to adversely affect**,” due to the potential decrease in marbled murrelet prey species in the Action Area caused by a decline in water quality from stormwater runoff.

Table ES-1 summarizes the ESA effect determinations for listed species made for the Friday Harbor Airport Southwest Development Area.

TABLE ES-1
SUMMARY OF LISTED SPECIES AND EFFECT DETERMINATIONS IN THE ACTION AREA

Common Name	ESA Status	Critical Habitat in the Action Area	Impacts Analysis Determination
Bull Trout Coterminous U.S. Population	Threatened	No	May Affect, Likely to Adversely Affect. No Critical Habitat present
Island Marble Butterfly	Endangered	No	No Effect
Marbled Murrelet	Threatened	No	May Affect, Not Likely to Adversely Affect No Critical Habitat present
Monarch Butterfly	Proposed Threatened	No	No Effect
Suckley's Cuckoo Bumble Bee	Proposed Endangered	No	No Effect
Yellow-billed Cuckoo	Threatened	No	No Effect

This page intentionally left blank

CONTENTS

Friday Harbor Airport Southwest Development Area Project – Biological Assessment (USFWS)

	<u>Page</u>
Executive Summary	ES-1
Acronyms and Abbreviations	iii
Chapter 1 Introduction.....	1-1
1.1 Project Location and Setting	1-1
1.2 Existing Stormwater Facilities	1-2
Chapter 2 Project Description.....	2-1
2.1 Proposed Project	2-1
2.2 Proposed Stormwater Management	2-2
2.3 Wetland Impacts	2-6
2.4 Construction Activities and Schedule.....	2-6
2.5 Impact Avoidance and Minimization Measures	2-8
Chapter 3 Action Area.....	3-1
3.1 Terrestrial Action Area	3-1
3.2 Aquatic Portion of the Action Area	3-3
Chapter 4 Status/Presence of Listed Species and Designated Critical Habitat.....	4-1
4.1 Listed Species with the Potential to Occur in the Action Area.....	4-1
4.2 Listed Species Not Present in the Action Area	4-5
Chapter 5 Environmental Setting.....	5-1
5.1 Terrestrial Habitat Conditions in the Action Area	5-1
5.2 Aquatic Habitat Conditions in the Action Area	5-1
Chapter 6 Consequences of the Action	6-1
6.1 Direct Effects	6-1
6.2 Indirect Effects	6-2
6.3 Effects from Interrelated and Interdependent Actions	6-3
6.4 Cumulative Effects	6-3
Chapter 7 Effect Determinations.....	7-1
7.1 Effects on Listed Species.....	7-1
Chapter 8 References	8-1

Figures

Figure 1	Project Location	1-3
Figure 2.	Project Elements.....	2-3
Figure 3	Wetland Impacts	2-7
Figure 4	Action Area	3-2

Tables

Table ES-1	Summary of Listed Species and Effect Determinations in the Action Area.....	ES-3
Table 1	Design Summary of Proposed Water Quality Treatment Facilities	2-5
Table 2	Stormwater Pre-Developed vs. Mitigated Discharges.....	2-5
Table 3	Construction Schedule.....	2-8
Table 4	ESA-Listed Species with Potential for Occurrence in the Action Area	4-2

Appendices

- A. Southwest Development Post-Construction Stormwater Management Plan
- B. USFWS Species List
- C. Species Life History
- D. Representative Photographs

Acronyms and Abbreviations

Abbreviation	Definition
µg/L	micrograms per liter
6PPD-Q	6PPD-quinone
ASOS	Automated Surface Observing System
BA	Biological Assessment
BMPs	best management practices
CAVFS	Compost-Amended Vegetated Filter Strips
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIP	Capital Improvement Plan
dB	decibel
dBA	A-weighted decibel
Ecology	Washington State Department of Ecology
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FHR	Friday Harbor Regional Airport
FMO	foraging, migration, and overwintering
FR	Federal Register
GIS	geographic information system
IPaC	Information for Planning and Consultation
LID	Low-Impact Development
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NWIFC	Northwest Indian Fisheries Commission
PAE	Precision Approach Engineering
PAHs	polycyclic aromatic hydrocarbons
PBF	physical or biological feature
PGIS	pollution-generating impervious surface
PHS	Priority Habitats and Species
Port	Port of Friday Harbor
SPCC Plan	Spill Prevention, Control, and Countermeasure Plan
SRE	snow removal equipment
SSNP	Salish Sea Nearshore Programmatic Consultation

Abbreviation	Definition
SWDA	Southwest Development Area
SWMMWW	Stormwater Management Manual for Western Washington
SWPCP	Stormwater Pollution Control Plan
TESC Plan	Temporary Erosion and Sediment Control Plan
USFWS	United States Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WSDOT	Washington State Department of Transportation
WWHM	Western Washington Hydrology Model

CHAPTER 1

Introduction

The Port of Friday Harbor (Port), owner and operator of the Friday Harbor Regional Airport (FHR), proposes to develop approximately 65 acres of an approximately 115-acre portion of the airport, identified as the Southwest Development Area (SWDA), for airport maintenance and improvements to accommodate future airport operations (Proposed Project). The planned development is located within the mostly undeveloped southwest portion of the airport property.

This Biological Assessment (BA) evaluates the potential effects of the Proposed Project on species listed as threatened or endangered under the federal Endangered Species Act (ESA) of 1973, as amended. The Proposed Project requires approval from the Federal Aviation Administration (FAA), which is the lead federal agency for ESA Section 7 consultation. Section 7 of the ESA requires that, through consultation (or conferencing for proposed species) with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species or result in the destruction or adverse modification of Critical Habitat. This BA addresses ESA-listed species under the jurisdiction of the USFWS, and a BA addressing NMFS species is being prepared separately. This BA was developed using existing data from species lists and information from the USFWS website, literature reviews, stormwater management design methods, and recent field studies conducted for the Proposed Project.

This evaluation has the following objectives:

- To review and compile information on species that may be found within and near the Proposed Project.
- To describe impacts of the Proposed Project and effects to species and habitats.
- To identify expected permit conditions and additional impact avoidance and minimization measures.
- To provide a recommendation with regard to effect determinations.

1.1 Project Location and Setting

FHR is located on the southeast side of San Juan Island in San Juan County, Washington in Sections 14 and 23 of Township 35 North, Range 3 West, of the Willamette Meridian (**Figure 1**). The southern approximately 115-acre portion of the airport property where the Proposed Project is located, known as the SWDA, is in unincorporated San Juan County. The airport is bordered by Mullis Street and Cattle Point Road on the east, Cattle Point Road on the south, and private and publicly owned properties on the west and north. The majority of the land west of the airport property is forested. The Clark McAlpine Trail runs through the airport property, south and west of the runway.

1.2 Existing Stormwater Facilities

FHR is situated within three primary drainage basins: Basin 1, which drains the northern portion of the airport and drains to the existing Mullis Detention Pond; Basin 2, which drains the southern portion; and Basin 3, which drains the remaining airport property, including airport support infrastructure, minor access roads, and small developments (PAE 2025; **Appendix A, Figure 2**). Subbasins have been identified within the three primary basins. The proposed improvements occur within Subbasins 2B, 3A, 3B, and 3D. Stormwater runoff from Basin 1 drains across the northern portion of the airport in a southerly and easterly direction, discharging to a constructed stormwater detention pond on the east side of Mullis Street (Mullis Pond). In addition to airport runoff, Mullis Pond receives runoff from the adjacent fire station and areas upstream. Discharges from Mullis Pond are conveyed approximately 0.25 mile to North Bay, part of the Salish Sea, and east of the airport through a series of pipes, ditches, and three constructed ponds on private property.

Existing impervious runoff from Basin 2 and Basin 3 leaves the airport property without passing through a stormwater system specifically designed for quantity or quality treatment; however, sediment and pollutants are filtered and settled to a degree as the stormwater is conveyed primarily through the existing vegetated shoulders and open channel swales and ditches. Stormwater from the basins ultimately discharges into North Bay (Reid Middleton 2012).

Various pollutants of concern may be discharged from aircraft operating surfaces. They primarily include particulates such as trace metals (e.g., copper or zinc) and petroleum-related products (polycyclic aromatic hydrocarbons – PAHs) or general sediment consisting of dirt, dust, and grit. There is also the potential for 6PPD-quinone (6PPD-q) from tire wear. However, the extent of 6PPD-q discharge from airports continues to be evaluated.

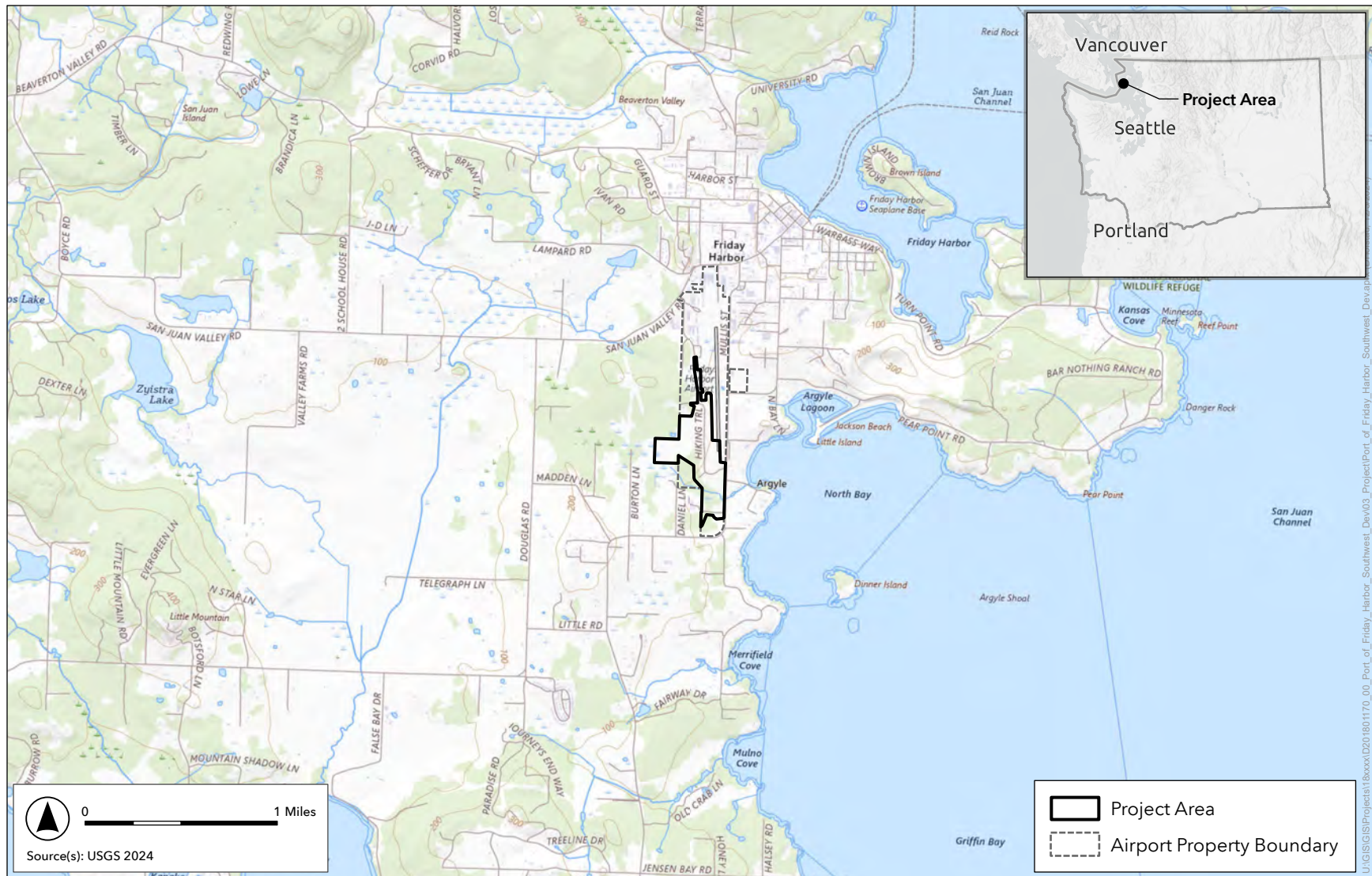


Figure 1
Project Location

CHAPTER 2

Project Description

2.1 Proposed Project

The Proposed Project involves the development of various Aircraft Operations Areas, aircraft storage and parking facilities, and supporting infrastructure on an approximately 115-acre site, the SWDA, on the southwest portion of the airport property (**Figure 2**) Additional details are shown in **Appendix A, Figure 1**. The Proposed Project includes:

- Construction of three approximately 12,000-square-foot T-hangars, and five box hangars with a maximum size of approximately 10,000 square feet each.
- Construction of taxilanes and aircraft parking apron to support approximately 10 aircrafts per FAA Airplane Design Group I (up to 49-foot wingspan) standards.
- Construction of approximately 9 acres of Aircraft Operations Area pavement, aircraft operational support areas, and vehicle pavement. Includes approximately 4,200 linear feet of vehicle roadway and approximately 35 vehicle parking stalls for aircraft hangars and airport operations support. Roadway would connect to Cattle Point Road at the existing Store More Way intersection, resulting in improvements to the existing Store More Way roadway, and includes crossing an existing stream. Vehicle parking would be located on the northwestern portion of the Proposed Project site.
- Construction of one 2,000-square foot snow removal equipment (SRE) building.
- Relocation of the existing FAA-owned Automated Surface Observing Systems (ASOS) aircraft weather station, including associated utilities.
- Removal of the existing Shelter Road access to airport property, which eliminates an incompatible use in the existing Runway 34 Runway Protection Zone.
- Installation of new security fencing, vehicle gates, and pedestrian gates around the perimeter of the proposed Aircraft Operations Area.
- Installation of pole-mounted and/or building-mounted exterior lights for vehicle parking lots, and aircraft parking apron.
- Installation of appropriate airfield lights, retroreflective markers, and signage for the aircraft parking apron and taxilanes.
- Land clearing, demolition of existing facilities, excavation, embankment, grading, and retaining wall construction.
- Extension of utilities to the Proposed Project site, including electrical power. A utility corridor will be provided to allow for the future installation of utilities not installed during this Proposed Project, which may include water, sanitary sewer, communications, fiber, and other related utility infrastructure.

- Installation of stormwater collection, conveyance, treatment, flow control systems, and associated infrastructure.
- Realignment of a portion of the existing Clark McAlpine Trail that crosses the Proposed Project site, resulting in approximately 3,500 linear feet of realigned trail.
- Landscaping and permanent soil stabilization measures.

The Proposed Project improvements include approximately 4.5 acres of new asphalt and concrete pavement and 3.3 acres of new and replaced access roads and vehicle parking, for a total of 7.8 acres of new and replaced pollution-generating impervious surfaces. Hangar and airport operations support building impervious area developments total approximately 1.3 acres. When combined with the existing contributing impervious area to remain, the total new, replaced, and existing impervious surfaces within subbasins 2B, 3A, 3B, and 3D (the contributing Project basin area) is approximately 15.7 acres. The remaining 83.2 acres of the contributing Project basin area will remain pervious, vegetated, open space.

2.2 Proposed Stormwater Management

As discussed with NMFS prior to design, the *Southwest Development Area Post-Construction Stormwater Management Plan (Appendix A)* for the Proposed Project has been designed to meet NMFS stormwater management criteria for projects involving new or redeveloped impervious surfaces to avoid and minimize impacts on species and habitats protected under the federal ESA. Stormwater criteria applicable to species under the jurisdiction of NMFS are assumed to be applicable to aquatic species under the jurisdiction of USFWS (i.e., bull trout). The NMFS design criteria have been documented in various programmatic agreements; however, because the FAA is the lead federal agency for this consultation, none of the available programmatic agreements apply directly. Although the Proposed Project does not directly apply to the covered categories of activities, the Salish Sea Nearshore Programmatic Consultation (SSNP; NMFS 2022), which is employed on routine construction projects regulated by the U.S. Army Corps of Engineers within the Salish Sea nearshore area, has activity categories that align in scope and design criteria that correspond to this Proposed Project. Accordingly, the post-construction stormwater treatment and flow control for this Proposed Project is designed to meet NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management of the SSNP (NMFS 2022; PAE 2025). These facilities are non-proprietary (manufactured). Per the SSNP, proprietary stormwater facilities will only be considered if site constraints preclude the implementation of low-impact development (LID) methods or the alternative can demonstrate improvement in ecosystem health and function commensurate with identified LID practices.

The general stormwater facility design is to treat pollution-generating impervious surface (PGIS) for water quality flows at or close to the source, then convey flows through various open-channel swales or pipes to a detention area in the southeast portion of the Project site and detain stormwater volume to release at controlled rates. The controlled release will cross Cattle Point Road through an existing 36-inch culvert crossing, which then flows via overland and piped conveyance into the bay approximately 1,000 feet east of the airport property.

The Washington Department of Ecology (Ecology) Western Washington Hydrology Model (WWHM) software was utilized for stormwater modeling (Ecology 2024a). The stormwater basins were input into the modeling software for each stormwater facility design. Results are included in **Appendix A**.

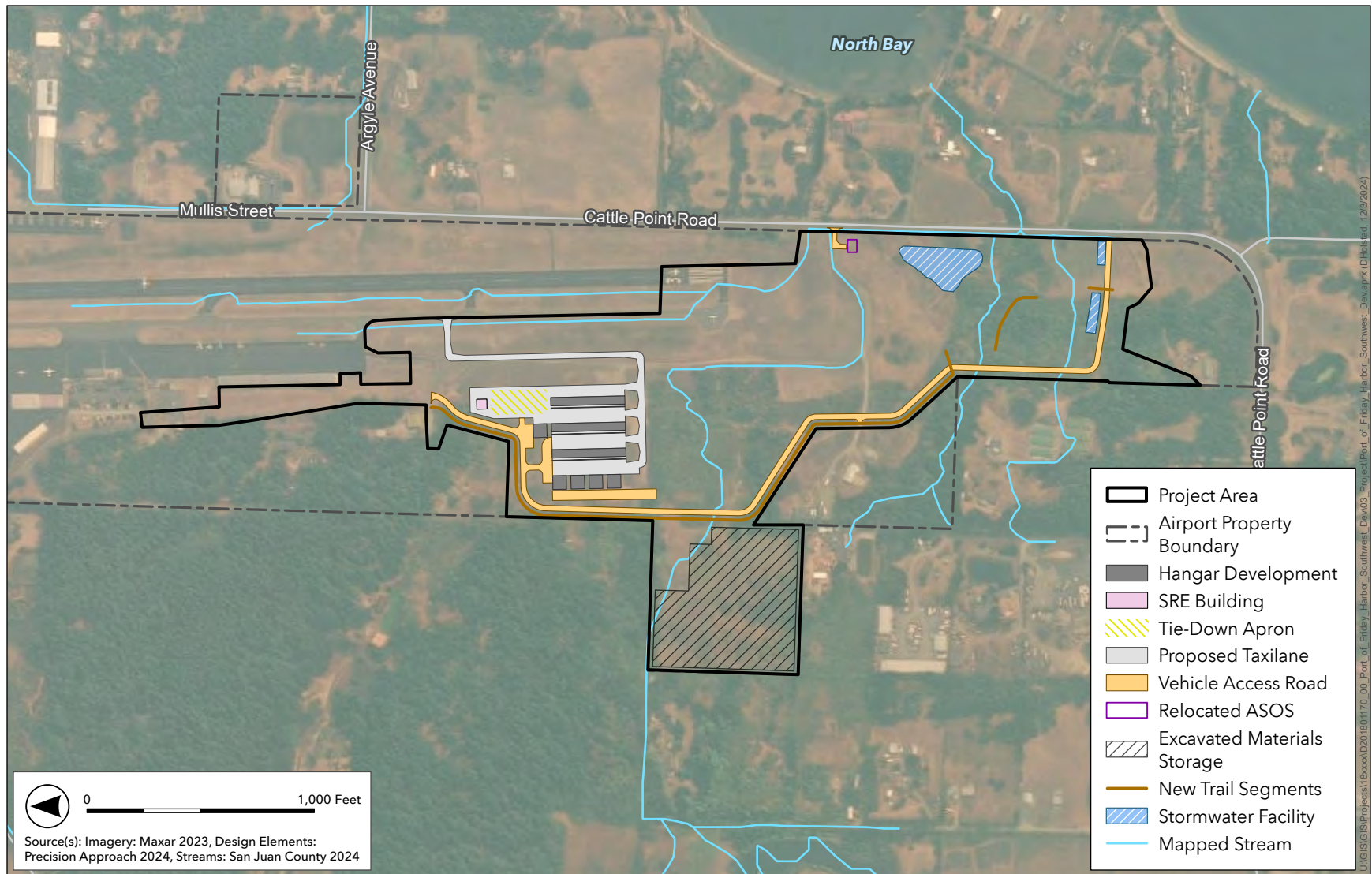


Figure 2
Project Elements

2.2.1 Water Quality Treatment Design

Water quality treatment facilities will be designed following two primary guidelines depending on the impervious area shapes. Linear type pavements will be treated utilizing four Compost-Amended Vegetated Filter Strips (CAVFS). The other intersection and parking areas will be conveyed to a series of six bioretention swales (**Appendix A, Figure 3**). Both types of facilities are considered LID treatment techniques, with the primary treatment happening as the runoff is filtered through the soil medium. Stormwater from storms smaller than or equal to the water quality storm for the contributing basins will flow through the treatment facilities, and the pollutants are filtered out before discharging downstream and ultimately into the detention (flow control) facilities. The design of both types of water quality treatment facilities utilizes criteria outlined in the 2024 Ecology Stormwater Management Manual for Western Washington (SWMMWW; Ecology 2024b).

Additionally, per SSNP Section 1.3.1.C.13.e, all stormwater quality treatment practices and facilities are designed to accept 50 percent of the cumulative rainfall from the 2-year, 24-hour storm (the water quality design storm) utilizing LID treatments. The bioretention swales are composed of an 18-inch layer of the amended water quality soil blend placed on top of a gravel layer and an underdrain collection system (**Appendix A, Figure 4**). Higher volumes of runoff (flows greater than the water quality design storm) will be allowed to bypass through a riser structure, and then conveyed with the treated runoff to the detention ponds. Although the detention facility's primary purpose is for flow control, the ponds will also provide opportunity for sediment to settle out before discharging off-site. According to the 2024 SWMMWW, flow control and runoff treatment best management practices (BMPs) that utilize infiltration, sorption, filtration, and sedimentation may have potential to reduce some 6PPD-q from stormwater (Ecology 2024b).

All water quality treatment facilities will be vegetated with a minimum of a low-mow grass mixture and modified as recommended in the 2008 Washington State Department of Transportation (WSDOT) *Aviation Stormwater Design Manual*. This is recognized as an accepted design standard to reduce the wildlife attractant nature of surface stormwater infrastructure, a critical element of the Proposed Project, and an FAA requirement for stormwater facility design for airport safety per FAA Advisory Circular 150/5320-5D. A summary of water quality treatment facility design geometry is included in **Table 1**. See **Appendix A** for more detail.

The on-site stormwater quality treatment facilities, designed using the SWMMWW BMPs, meet the design standards for water quality treatment identified in the section above.

2.2.2 Flow Control Design

Flow control facilities are manmade stormwater detention and treatment ponds used to capture and hold stormwater runoff for a specific period of time before it is ultimately discharged. Flow control facilities will be designed using a combination of orifice and weir control structures to provide the NMFS design flow control, per SSNP Section 1.3.1.C.13.f. The Proposed Project will create two flow control facilities in the form of open storage detention ponds. The site terrain is relatively steep, which lends itself to deeper ponds. Including a 1-foot freeboard above the design storage volume, the ponds are designed at a 10-foot depth. The proposed Basin 2B and 3A detention pond will be approximately 24,000 square feet, which stores a maximum of 320,000 cubic feet. The smaller Basin 3B detention pond is designed at a 4-

foot depth, requires approximately 2,000 square feet, and detains a maximum of 9,000 cubic feet of storage. Per SSNP Section 1.3.1.C.13.f, post-construction stormwater flow control methods shall demonstrate that the post-construction stormwater runoff is equal to, or less than, the predevelopment stormwater runoff for all storm events between the 50 percent of the 2-year, 24-hour and the 10-year storm events. **Table 2** presents stormwater discharge peak flow rates and volumes for pre-development and post-development conditions for each basin, which meet these requirements.

TABLE 1
DESIGN SUMMARY OF PROPOSED WATER QUALITY TREATMENT FACILITIES

Facility	Length (ft)	Width (ft)	Slope (%)	Percent Treatment (>91%)
Bioretention Swale 1	14	14	0%	91.3%
Bioretention Swale 2	12	14	0%	92.1%
Bioretention Swale 3	12	14	0%	92.1%
Bioretention Swale 4	8.5	8	0%	91.5%
Bioretention Swale 5	7	5	0%	91.3%
Bioretention Swale 6	9	8	0%	91.1%
CAVFS 1 (Taxilane)	350	10	25%	92.9%
CAVFS 2 (Apron/Taxilane)	1,600	5	25%	98.5%
CAVFS 3 (Roadway)	3,200	2	25%	94.8%
CAVFS 4 (Roadway)	3,420	2	25%	99.2

TABLE 2
STORMWATER PRE-DEVELOPED VS. MITIGATED DISCHARGES

24-hour Storm	Basin 2B & 3A		Basin 3B		Basin 3D	
	Pre-Dev Flow (cfs)	Mitigated Flow (cfs)	Pre-Dev Flow (cfs)	Mitigated Flow (cfs)	Pre-Dev Flow (cfs)	Mitigated Flow (cfs)
2-year ¹	1.573	1.077	0.022	0.016	0.006	0.004
5-year ¹	2.412	1.753	0.034	0.027	0.009	0.007
10-year ¹	2.864	2.310	0.040	0.037	0.011	0.010
25-year ¹	3.321	3.153	0.047	0.052	0.013	0.015
50-year ¹	3.592	3.890	0.050	0.065	0.014	0.020
100-year ¹	3.814	4.728	0.053	0.081	0.015	0.026

NOTES:

1. year flood.
cfs – cubic feet per second

Similar to the water quality treatment facilities, the open storage detention pond bottoms will be vegetated with a minimum of a low-mow grass mixture and plantings as recommended in WSDOT (2008) and will also implement BMPs that utilize infiltration, sorption, filtration, and sedimentation, which may have potential to reduce some 6PPD-q from stormwater (Ecology 2024b). Additionally, wildlife hazard mitigation measures are incorporated into the detention pond design, and primarily include the layout of

the open storage areas generally being in a linear form, steepened side slopes, non-vegetated side slopes, and perimeter fencing, to reduce attracting waterfowl and other animals.

2.3 Wetland Impacts

A wetland delineation of the SWDA identified five wetland features (Wetlands A through E) totaling 3.1 acres. The wetlands are generally seasonally saturated grass fields that are maintained by mowing. All five wetlands are dominated by palustrine emergent cover, with two of them also containing a scrub-shrub class. Four of the five wetlands have a hydrogeomorphic class of Slope, with the fifth wetland being Depressional. All of the identified wetland features are considered to have a low ecological function and were classified as Category IV wetlands using the Wetland Rating System for Western Washington (Hruby and Yahnke 2023). Three of the five wetland features will be permanently impacted by the Proposed Project. Permanent wetland impacts total approximately 36,629 square feet (0.84 acre), and another 2,334 square feet within their buffers, and will result from the construction of the stormwater ponds, widening of the access roads, and the storage of excavated material (**Figure 3**).

2.4 Construction Activities and Schedule

Staging will occur within the limits of Port property, primarily on existing unpaved surfaces consisting mostly of pasture grasses and weedy herbaceous species. Construction equipment will include but is not limited to excavators, dump trucks, rollers/compactors, pavers, pavement marking trucks, hydroseeder, and slurry seal truck/crack sealers. No highly disturbing construction activities such as impact pile-driving or blasting will occur.

Construction of the Proposed Project would be phased according to the following schedule, based on the following eligible and justified SWDA projects for Airport Improvement Program and Bipartisan Infrastructure Law funding, per the January 11, 2024, FAA 2024-2028 Capital Improvement Plan (CIP) memorandum:

- 2025 – SWDA (New Hangar Taxilanes, Relocate Access Road) – Phase 1 Design. (This project was shifted to 2026 in conjunction with the 2024 FAA CIP update.)
- 2027 – SWDA (New Hangar Taxilanes, Relocate Access Road) – Phase 2 Final Design and Construction. (This project was shifted to 2028 in conjunction with the 2024 FAA CIP update.)
- 2027 – Snow Removal Equipment Building – Phase 2 Design and Construction. (This project was shifted to 2028/9 in conjunction with the 2024 FAA CIP update.)
- 2028 – SWDA - New Hangar Taxilanes, Relocate Access Road) – Phase 3 Design and Construction. (This project was moved beyond 2030 in conjunction with the 2024 FAA CIP update.)

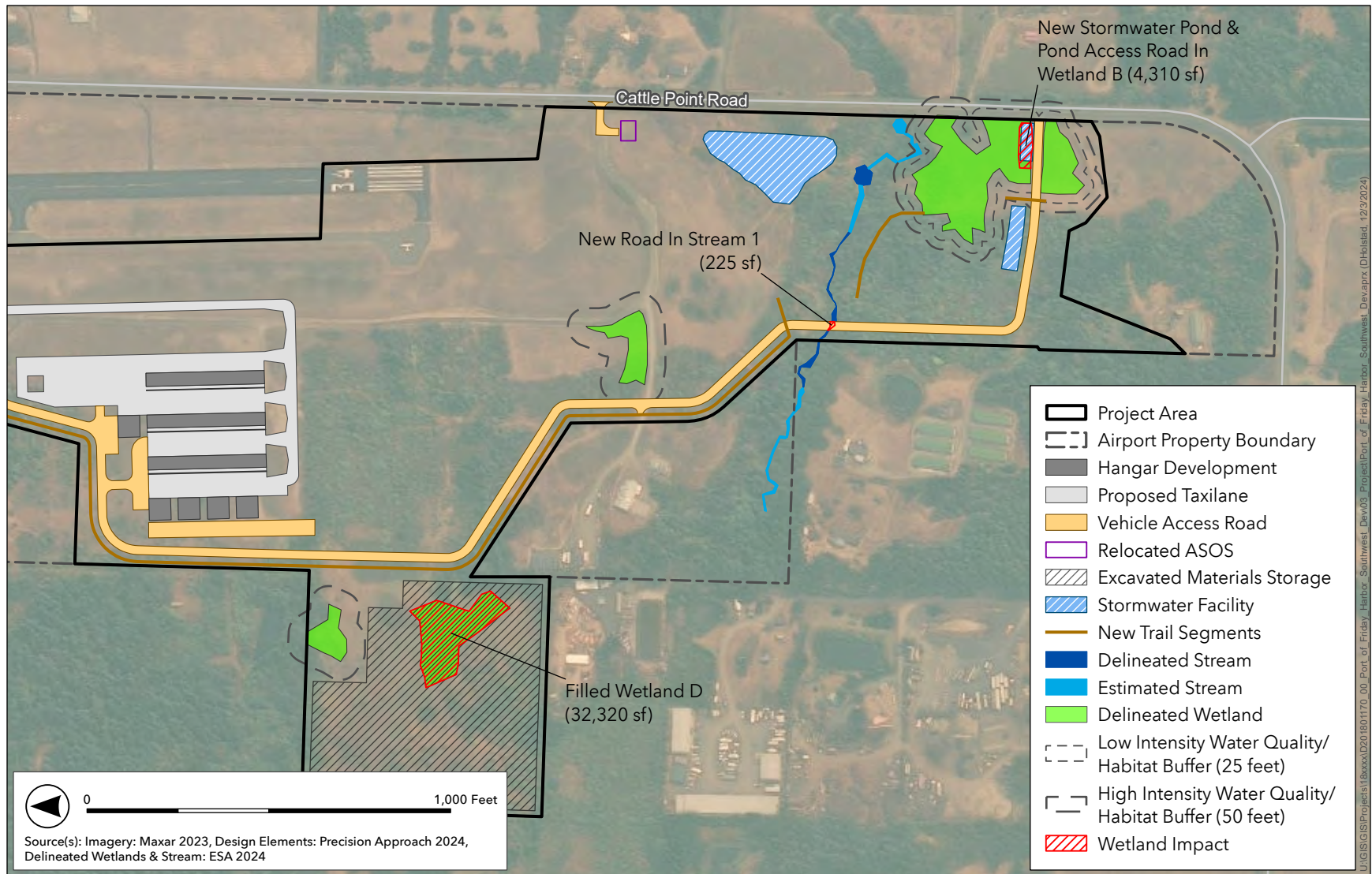


Figure 3
Wetland Impacts

Construction of the Proposed Project would occur over the course of approximately 20 months between 2028 and 2031. Construction would begin in May 2028 and operation of the Proposed Project would begin in late 2031. As shown in **Table 3**, Phase 2 construction would start with site preparation activities (i.e., vegetation clearance, including removal/realignment of the Clark McAlpine Trail) and grading (i.e., cut/fill of land) occurring first, followed by paving (i.e., placement of concrete and/or asphalt) and infrastructure improvements (i.e., installation of water, wastewater, storm drain, electrical, telecommunications facilities, hangars, etc.), followed by the construction of the SRE building. The construction of Phase 3 taxilanes and roadways would be the final phase of construction.

TABLE 3
CONSTRUCTION SCHEDULE

Phase	Estimated Start Date (Month/Year)	Estimated End Date (Month/Year)
Site Preparation	5/2028	6/2028
Grading	6/2028	7/2028
Realignment of Clark McAlpine Trail	6/2028	8/2028
Installation of Stormwater System and Associated Infrastructure	6/2028	8/2028
Paving (Construction of Taxilanes and Aircraft Parking Apron)	7/2028	10/2028
Paving (Vehicle Roadways, Parking)	8/2028	10/2028
Infrastructure Improvements	8/2028	1/2029
Construction of SRE Building	5/2029	9/2029
Construction of Taxilanes – Phase 3	7/2031	10/2031
Paving (Vehicle Roadways) – Phase 3	8/2031	10/2031
Infrastructure Improvements – Phase 3	8/2031	10/2031

SOURCE: Information provided by Port of Friday Harbor

NOTES: If construction phases can reasonably be combined, they will be consolidated.

2.5 Impact Avoidance and Minimization Measures

Measures to avoid and minimize impacts on the environment and ESA-listed species and habitats during construction and post-construction include the following:

- Work areas will be confined to the minimum area needed to complete the work.
- Haul routes will use the existing road system to the extent feasible.
- Stormwater runoff from the completed Project impervious surfaces during airport operation will be collected and treated in accordance with NMFS criteria as defined in the SSNP.
- Vegetated filter strips will be amended with medium compost to accentuate removal of 6PPD-q, as per the 2024 SWMMWW.
- A Temporary Erosion and Sediment Control (TESC) Plan will be developed and implemented in accordance with the National Pollutant Discharge Elimination System (NPDES) 1200-C Permit requirements for construction stormwater discharges. TESC measures may include sediment fencing, inlet protection, use of designated construction entrances, and/or other measures to minimize erosion of site soils and sediment transport to downstream receiving waters.

- Industrial stormwater discharges on airport property will continue to be managed under the airport's Stormwater Pollution Control Plan (SWPCP) and NPDES 1200-Z Permit.
- A Spill Prevention, Control, and Countermeasure (SPCC) Plan will be developed and implemented to ensure the appropriate storage, handling, and use of petroleum products and other potential pollutants on-site during construction. The SPCC Plan will include measures for preventing and responding to spills or other releases of potential pollutants, such as fuel, motor oil, and hydraulic fluid.
- Construction vehicles and equipment will be stored, fueled, and maintained on designated areas on-site or on nearby paved areas adjacent to the site.

CHAPTER 3

Action Area

The ESA requires that potential effects on listed and proposed endangered and threatened species be evaluated in relation to the complete extent of the area influenced by a proposed project (the Action Area) (50 Code of Federal Regulations [CFR] Part 402.02). The Action Area (**Figure 4**) encompasses the area where measurable direct and indirect effects resulting from the Proposed Project are foreseeable and are reasonably certain to occur. Work activities will include ground disturbance, generate airborne noise, and increase PGIS; therefore, the Action Area includes both terrestrial and aquatic elements.

3.1 Terrestrial Action Area

The terrestrial portion of the Action Area includes all areas directly affected by physical ground disturbance from construction activities. This includes all areas of the Proposed Project that will be temporarily or permanently impacted by vegetation removal, grading, and pavement rehabilitation, as well as construction access and staging areas.

The Action Area includes the area surrounding the Proposed Project that will be subject to increased noise from construction equipment and activities during Project work. This area of noise impact was determined using a noise analysis methodology and model developed by WSDOT and outlined in its *Biological Assessment Preparation Manual for Transportation Projects* (WSDOT 2025).

The three loudest pieces of construction equipment expected for the Proposed Project (and their associated average maximum sound levels at 50 feet from the equipment) are an excavator [87 A-weighted decibels (dBA)], concrete paver (84 dBA), and an asphalt paver (82 dBA). Based on the rules of decibel (dB) addition outlined in the WSDOT BA Manual (2025), the estimated equipment noise level for the Proposed Project is 89 dBA. This estimate assumes these three pieces of equipment are operating at the same time. For the purposes of this assessment, an average daytime background noise level for the airport of 50 dBA is estimated, based on Friday Harbor's population density of 1,000 – 3,000 people per square mile. Land cover in the surrounding area consists largely of natural cover and is representative of "soft site" conditions with regard to sound attenuation.

WSDOT's *Noise Attenuation Table* (WSDOT 2025) was used to estimate the distance that construction noise from the Proposed Project will travel before it attenuates to the background sound levels. Based on the noise values identified above, construction noise will travel approximately 1,690 feet before attenuating to background sound levels. Therefore, the area of terrestrial noise impact for the Proposed Project may extend, on average, approximately 1,690 feet from the Proposed Project in all directions.

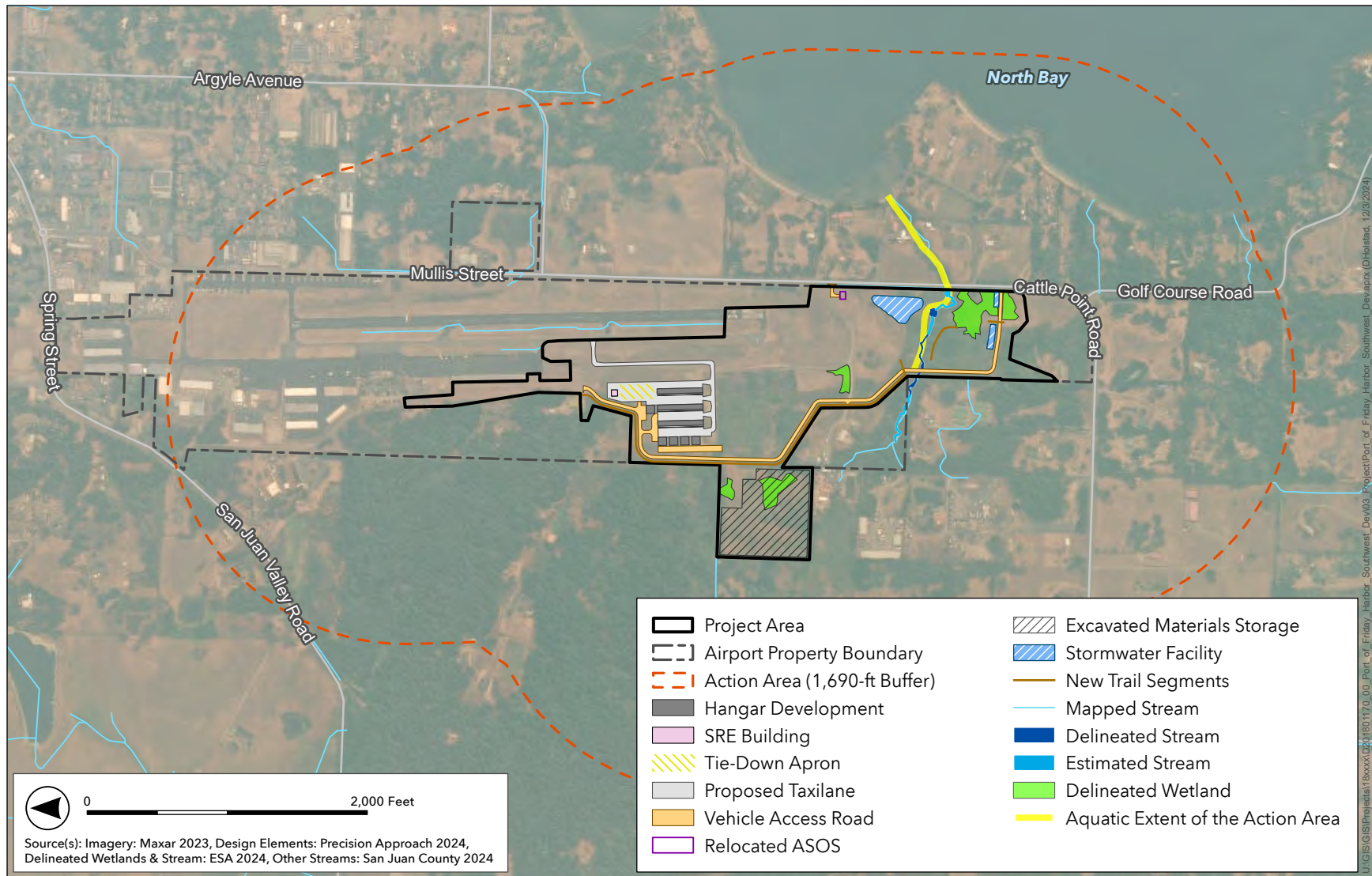


Figure 4
Action Area

3.2 Aquatic Portion of the Action Area

The aquatic portion of the Action Area encompasses all downstream waterbodies that receive stormwater runoff from stormwater discharge, and airport stormwater during daily operations. Stormwater discharge from the airport ultimately discharges into North Bay; therefore, the aquatic portion of the Action Area includes the area where runoff meets with North Bay.

CHAPTER 4

Status/Presence of Listed Species and Designated Critical Habitat

4.1 Listed Species with the Potential to Occur in the Action Area

A list of ESA-protected species under USFWS jurisdiction was obtained using the Information for Planning and Consultation (IPaC) website (**Appendix B**). The IPaC species list indicates that the federally listed species and designated Critical Habitats listed in **Table 4** may occur in the Action Area. The Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) database mapping tool was also used to identify the known or presumed distribution of listed species within the immediate vicinity (WDFW 2024).

4.1.1 Coterminous U.S. Population of Bull Trout

In 1998, the USFWS completed a status review of bull trout (*Salvelinus confluentus*), identifying five DPSs in the continental U.S. (USFWS 2015). The Coterminous U.S. Population of bull trout was listed as threatened under the ESA on November 1, 1999 (USFWS 1999). Dolly Varden (*S. malma*) was proposed as threatened in 2001, under the “Similarity of Appearance” provisions of the ESA (USFWS 2015). Although these two species of ‘native char’ were previously considered a single species, they are now formally recognized as two separate species, which occur together only within the areas in Puget Sound occupied by the Coterminous U.S. Population of bull trout. Therefore, the information below generally applies to both species.

Life History

The life history of the Coastal-Puget Sound DPS of bull trout is described in the *Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for Bull Trout in the Coterminous U.S.; Final Rule* (USFWS 1999) and is included herein by reference. The life history of Dolly Varden is described in USFWS (2015) and is also included herein by reference. This information has been summarized to assist in the analysis of effects related to the Proposed Project, and is included in **Appendix C**.

TABLE 4
ESA-LISTED SPECIES WITH POTENTIAL FOR OCCURRENCE IN THE ACTION AREA

Species Common Name (Scientific Name)	Federal ESA Listing and Critical Habitat Status
Bull Trout (<i>Salvelinus confluentus</i>)	Listed as Threatened on June 10, 1998 (63 FR 31693). Critical Habitat was Designated October 18, 2010 (75 FR 63898-64070). Critical Habitat is not present within the Action Area.
Marbled Murrelet (<i>Brachyramphus marmoratus</i>)	Listed as Threatened on October 1, 1992 (57 FR 45328), with Threatened status species re-affirmed in January 2010. Critical Habitat was Designated August 4, 2016 (81 FR 51348). Critical Habitat is not present within the Action Area.
Island Marble Butterfly (<i>Euchloe ausonides insulanus</i>)	Listed as Endangered on June 4, 2020 (85 FR 26786) wherever found. Critical Habitat was Designated May 5, 2020 (85 FR 26786-26820). Critical Habitat is not present within the Action Area.
Monarch Butterfly (<i>Danaus Plexippus</i>)	Proposed as Threatened on December 12, 2024 (89 FR 100662) wherever found. Critical Habitat was Proposed December 12, 2024 (89 FR 100662). Critical Habitat is not present in the Action Area.
Suckley's Cuckoo Bumble Bee (<i>Bombus suckleyi</i>)	Proposed as Endangered on December 17, 2024 (89 FR 102074). Critical Habitat has not been proposed.
Yellow-billed Cuckoo (<i>Coccyzus americanus</i>) Western DPS	Listed as Threatened on October 3, 2014 (78 FR 61621). Critical Habitat was Designated April 21 2021 (86 FR 20798). Critical Habitat is not present within the Action Area.
NOTES: DPS – Distinct Population Segment; ESU – Evolutionarily Significant Unit; FR – Federal Register	

Environmental Baseline

The USFWS completed the Bull Trout Recovery Plan, and the Action Area is within the Coastal Recovery Unit (USFWS 2015). The Action Area is outside of the eight Puget Sound core areas but is within the Puget Sound foraging, migrating, and overwintering (FMO) area (USFWS 2015). FMO areas allow for the continued natural population dynamics that core areas have evolved under. These FMO areas are particularly important to the anadromous and fluvial life history forms due to their complex migratory patterns associated with foraging and overwintering. FMO areas are also critical to maintaining or reestablishing the expression of the anadromous life history behavior within the recovery unit. Unique to the Puget Sound and Olympic Peninsula regions of the Coastal Recovery Unit are the use of nearshore marine and estuarine habitats and the frequent use of a number of independent (i.e., separated by marine waters so not directly connected to a core area), non-natal river or creek basins for foraging and overwintering by anadromous bull trout (USFWS 2015).

Degradation of nearshore ecosystems and impacts on bull trout prey species (e.g., juvenile salmon, surf smelt, sand lance, herring) are identified as contributing factors to the decline of bull trout in the Puget Sound FMO (USFWS 2015). Actions identified to address habitat threats in the Puget Sound FMO include:

- (1) Implement protection activities in nearshore marine and estuarine habitats.
- (2) Implement restoration activities in nearshore marine and estuarine habitats (USFWS 2015).

Distribution in the Action Area

North Bay contains bull trout (FMO) habitat, and both adult and sub-adult bull trout may be present in North Bay while foraging in the Salish Sea before they return to their natal rivers to spawn. Prey species that are exposed to stormwater contaminants can accumulate toxins, which can be passed onto feeding bull trout (NMFS 2022).

Critical Habitat

Critical Habitat for the Coterminous U.S. Population of bull trout DPS was designated in September 2005 (70 Federal Register [FR] 185) and was revised on October 18, 2010 (75 FR 200). The ruling designated 19,729 miles of streams and included 754 miles of marine shoreline on the Olympic Peninsula and Puget Sound (USFWS 2015). The Puget Sound Critical Habitat Unit for bull trout includes approximately 1,144 miles of streams; 40,182 acres of lake surface area; and 443 miles of marine shoreline designated as Critical Habitat. Neither Friday Harbor nor the San Juan Islands are included in the Puget Sound Critical Habitat Unit (USFWS 2015).

4.1.2 Marbled Murrelet

The USFWS listed the marbled murrelet (*Brachyramphus marmoratus*) on May 24, 1996 (61 FR 26256) as a federally threatened species in Washington, Oregon, and California. Marbled murrelet Critical Habitat was designated in May 1996 in 50 CFR Part 17.11.

Life History

The life history and habitat requirements of marbled murrelets are described in the USFWS *Marbled Murrelet (Brachyramphus marmoratus) 5-Year Status Review* (USFWS 2019), and that information is included herein by reference. This information has been summarized to assist in the analysis of effects related to the Proposed Project, and is included in **Appendix C**.

Environmental Baseline

Marbled murrelets nest in mature and old-growth coniferous forests, which are found in Olympic National Park and Olympic National Forest, as well as in pockets of Washington Department of Natural Resources (WDNR) lands. In Washington, murrelet breeding season occurs between April 1 and September 23. Suitable nesting habitat for marbled murrelet consists of large coniferous older forest stands, defined by USFWS (2012) as conifer-dominated stands (more than 60 percent conifer) greater than 5 acres with trees greater than 15 inches diameter at breast height. To be suitable nesting habitat, murrelets require nesting platforms (meeting criteria of minimum of 4 inches wide and a minimum of 33 feet above the ground [USFWS 2012]). Marbled murrelets may be found foraging in the marine areas of Puget Sound and the Strait of Juan de Fuca. Foraging is more common near areas with old-growth, but murrelets may still be found in areas with higher disturbances (USFWS 2012).

Distribution in the Action Area

San Juan County created a Marbled Murrelet Habitat Map that they produced using input from the U.S. Forest Service in 2009 (San Juan County 2009). The map delineated four types of potential nesting habitat on San Juan Island (unsuitable, unknown, low, or high) using aerial imagery to estimate tree canopy density (San Juan County 2009). The map indicates that low potential marbled murrelet nesting habitat is mapped within 1,000 feet west of the airport. Field surveys previously conducted in 2016 identified some conifer trees west of the airport; however, these stands did not meet the requirements for nesting habitat (5-acre stands with greater than or equal to 60 percent conifer cover, and nesting platforms) (Environmental Science Associates 2016).

North Bay contains suitable habitat for marine forage fish species that comprise a portion of the marbled murrelet's diet and may provide year-round foraging opportunities for marbled murrelets. However, there is no nesting habitat near North Bay, and there is a high level of human activity from the airport. These indicate that marble murrelet occurrence is expected to be relatively low.

Critical Habitat

The Critical Habitat designation for marbled murrelet includes 11 units in Washington State, including 1.2 million acres of federal land, 421,500 acres of state forest land, and 2,500 acres of private land (50 CFR Part 17.11). Not all suitable habitats are included in this designation, as only areas designated as most essential to murrelet survival in terms of quality, distribution, and ownership are included. Physical or biological features (PBFs) for marbled murrelet include individual conifer trees with potential nesting platforms, and forested areas within 0.5 mile of suitable conifer trees for nesting. The San Juan Islands do not contain designated Critical Habitat for marbled murrelet. There are no PBFs found in the Action Area, there is no designated Critical Habitat within the Action Area, and the nearest Critical Habitat is more than 24 miles west of the Action Area on Vancouver Island.

4.2 Listed Species Not Present in the Action Area

The IPaC report includes the following species that do not occur in the Action Area because of their limited range or specific habitat requirements: island marble butterfly (*Euchloe ausonides insulanus*), monarch butterfly (*Danaus plexippus*), Suckley's cuckoo bumble bee (*Bombus suckleyi*), and western yellow-billed cuckoo (*Coccyzus americanus*). However, these species are not expected to occur in the Action Area due to their limited range or specific habitat requirements.

4.2.1 Island Marble Butterfly

The island marble butterfly is a subspecies of the large marble butterfly and is found in the San Juan Islands. It is a medium-sized butterfly with an expanded marbling pattern of yellow and green on the underside of its wings. The island marble butterfly distinguishes itself by leaving its host plant to find a suitable pupation site, up to 13 feet away, whereas other large marble butterflies pupate on their larval host plants. There are three known hosts plants, all members of the mustard family (*Brassicaceae*) for the island marble butterfly; the Menzies' pepperwood (*Lepidium virginicum* var. *menziesii*), the field mustard (*Brassica rapa*), and the tumble mustard (*Sisymbrium altissimum*). Currently, the only location on San Juan Island where island marbled butterflies have been observed is at the American Camp at San Juan Island National Historic Park (Potter et al. 2011) approximately 3.0 miles south. In 2015, another extensive survey was conducted on sites around San Juan Island outside of American Camp, and it yielded no detections of the island marble butterfly (outside of American Camp). Based on the results of years of extensive surveys, it is highly unlikely that there is suitable habitat for the island marble butterfly found at the Friday Harbor Airport property. Additionally, there is no designated Critical Habitat found in the Action Area.

4.2.2 Monarch Butterfly

On December 12, 2024, the USFWS proposed the monarch butterfly be listed as a threatened species under the ESA under the 4(d) rule and designation of Critical Habitat (89 FR 100662). Monarch butterflies are a migratory species that occur throughout most of the United States, southern Canada, and northern Mexico. During migration, monarch populations overwinter in tree groves along the Pacific coast in California. In the spring, monarchs expand their range north into Eastern Washington, returning to California groves in the fall (WDFW 2025). Monarchs are dependent on plants from milkweed species (*Asclepias* spp.) for foraging and reproduction. Monarch eggs hatch about 4 days after they are laid, but the rate of development in this stage, like all other stages, is temperature dependent. The duration of complete development (from egg to adult) is dependent on weather conditions and can vary from 25 days to 7 weeks (WDFW 2025). Lifespans for adult monarchs vary by season and can be as short as a few weeks, or as long as 9 months if the adults are migrating. Milkweed plants are found east of the Cascades and require dry climates and large open habitats including fields and meadows (Xerces Society 2012). These habitats are not found in the Action Area, which is a mixture of forested upland, and riparian forested vegetation near Puget Sound. Therefore, the monarch butterfly is unlikely to occur in the Action Area.

4.2.3 Suckley's Cuckoo Bumble Bee

On December 17, 2024, the USFWS proposed the Suckley's cuckoo bumble bee as an endangered species under the ESA under the 4(d) rule (89 FR 102074). No Critical Habitat has been proposed since the time of this ruling. Suckley's cuckoo bumble bees are parasitic and do not collect pollen like other bumble bee species. Instead, female cuckoo bees enter a host bee's hive and pose as the queen, killing the host queen and larvae, and replacing the host larvae with their own (USFWS 2024). Suckley's cuckoo bumble bees occupy a wide range of habitats and can be found in meadow, woodland, agricultural, and urban habitat types from sea level to 10,000 feet mean sea level (USFWS 2024). There have been no records of this species in the continental U.S. since 2018, and Washington's most recent record is from 1982. The Action Area falls within the Marine West Coast Forest Habitat Unit, one of 15 analytical units designated for Suckley's cuckoo bumble bee habitat. Suckley's cuckoo bumble bee is considered to be "quasi-extirpated" from this unit, which only makes up 3.5 percent of the habitats used by this bee species historically, and the most recent record is from 1982 (USFWS 2024). Therefore, the Suckley's cuckoo bumble bee is not likely to be present in the Action Area.

4.2.4 Western Yellow-Billed Cuckoo

Western yellow-billed cuckoos are extremely rare in Washington State, and if breeding still occurs in the state, it is likely limited to an extremely small number of breeding pairs (single digits). All or nearly all birds recorded since the 1950s were very likely non-breeding vagrants or migrants, indicating that cuckoos are now functionally extirpated in the state. There is no designated or proposed Critical Habitat within the State of Washington. Furthermore, the yellow-billed cuckoo breeds in large blocks (>300 acres) of riparian habitats (particularly in woodlands containing cottonwoods and willows) (Wiles and Kalasz 2017). Patch size is a key feature of breeding habitat for western yellow-billed cuckoo populations, with larger, wider areas of habitat strongly preferred. There are no documented historic sightings of yellow-billed cuckoos within the vicinity of the Action Area (Wiles and Kalasz 2017); there are no large blocks of suitable cottonwood/willow forest (greater than 20 acres) in the Action Area, and there is no Critical Habitat for this species in the Action Area.

In summary, the Proposed Project will have no effect on island marble butterfly, monarch butterfly, Suckley's cuckoo bumble bee, or western yellow-billed cuckoo, due to the lack of suitable habitat in the Action Area. There are no known records of these species occurring in the Action Area, and no designated Critical Habitat is present within, or adjacent to, the Action Area. Therefore, these species and their Critical Habitats are not addressed further in this BA evaluation.

CHAPTER 5

Environmental Setting

5.1 Terrestrial Habitat Conditions in the Action Area

Vegetation at the airport is managed to discourage wildlife use and consists predominantly of non-native grasses and herbs that are frequently mowed. General vegetation cover types surrounding the airport include upland forest, open woodlands, riparian forest, grassland and shrub habitat, and emergent and forested wetlands. Habitat on airport property consists of grassy fields, scrub-shrub, and forested areas. In addition to the five wetlands that were delineated in the southern half of the SWDA, San Juan County geographic information system (GIS) data identify several isolated wetlands within the Action Area, south and west of the airport (San Juan County 2024).

Habitat adjacent to the managed airfield is a mix of forested woodlots, grassland, and shrubland with low-density residences nearby. The vegetation in the north and central portions of the airport consists of mixed Douglas-fir – madrone forest over oceanspray, salal, and swordfern. Subdominant trees include western red-cedar and red alder. At the south end of the Action Area (south of the end of the runway), wooded areas consist primarily of Douglas-fir over snowberry, oceanspray, salal, and swordfern (WDNR 2024). A narrow riparian forest encompasses a small, intermittent unnamed stream that flows across the southern portion of the Action Area between the end of the runway and Cattle Point Road (San Juan County 2024). The site is primarily upland or developed for airport use.

5.2 Aquatic Habitat Conditions in the Action Area

San Juan County identifies one fish-bearing (Type F) stream that discharges into North Bay within the Action Area. The stream originates near Daniel Lane south of the airport and flows west to east. Some riparian vegetation will likely be cleared during the construction of the access road; however, this stream does not contain ESA-listed fish species presented in this BA (NWIFC 2024).

The shoreline along North Bay is relatively undeveloped, with scattered rural residential properties. North Bay includes the Argyle Lagoon tidelands, 12.3 acres classified as “oysterlands” including part of a tidal creek. The University of Washington manages Argyle Lagoon as one of the five WDFW fisheries preserves established in 1990, known collectively as the “San Juan Islands Biological Preserves” (University of Washington 2016). The adjacent beaches (North Bay Beach and Jackson Beach) are owned by the Port and see extensive recreational use.

Depths in North Bay near the airport stormwater discharge locations vary from 5 feet to 20 feet along the nearshore, to a maximum of 64 feet in the bay. Depths increase up to 250 feet in the main channel between San Juan Island and Lopez Island. Floating kelp, other submerged aquatic vegetation, and rocky

shorelines within the San Juan/Strait of Juan de Fuca Basin are of beneficial use as settlement sites for prey species for juvenile bull trout.

Forage fish spawning has historically occurred in North Bay along Jackson Beach County Park for smelt, approximately 2,800 feet northeast of the airport's stormwater discharge location in the Argyle Lagoon (WDNR 2024). Eelgrass is also found along the Jackson Beach County Park. Decreasing water quality by increasing stormwater discharge at the airport could cause a decline in kelp and other aquatic vegetation along nearshore areas essential for bull trout and forage fish species (NMFS 2022).

CHAPTER 6

Consequences of the Action

Under the ESA, when a discretionary federal action may adversely affect listed species or Critical Habitat, federal agencies must analyze consequences caused by a proposed project, including those effects that used to be referred to as “direct” and “indirect” effects and “interrelated” or “interdependent” activities (50 CFR 402). These effects are now rolled up into “consequences of the action” and are described in the following subsections.

Bull trout may be present near the airport stormwater discharge location in North Bay at various times of the year. The Proposed Project has the potential to decrease the overall water quality in North Bay by increasing the total impervious surfaces at the airport. Decreasing the water quality in North Bay has the potential to reduce foraging opportunities for bull trout. Marbled murrelet dispersal habitat may be present in the undeveloped forest to the west of the airport; however, there is no suitable nesting habitat in the Action Area. The Proposed Project will generate noise up to 1,690 feet in all directions, which may disturb marbled murrelets’ ability to disperse in the Action Area.

6.1 Direct Effects

6.1.1 Construction Noise

The Proposed Project will generate terrestrial noise from the operation of heavy equipment and trucks, which is expected to attenuate to background levels in the terrestrial environment within 1,690 feet of the construction areas. No highly intensive noise activities, such as blasting or pile driving, will occur in the terrestrial environment, and there will be no underwater noise. There is no marbled murrelet nesting habitat or Critical Habitat in the Action Area, and the Proposed Project will not impact murrelets in North Bay because there are no highly intensive noise activities (blasting, pile-driving). Since there is no underwater noise component, there will be no impacts on listed fish species from construction noise. Therefore, there are no expected direct effects to listed terrestrial or aquatic species from construction-related noise activities (WSDOT 2025).

6.1.2 Construction-Related Turbidity and Water Quality

There is no suitable habitat for the species described in this BA on airport property that would be directly affected through ground-disturbing activities. Habitat on airport property consists of grassy fields, scrub-shrub, and forested areas. Additionally, one stream and five wetlands were delineated on-site.

Excavation activities within or near streams and wetlands can cause temporary negative impacts on water quality. However, implementing construction BMPs, a SWPCP, and an SPCC Plan is expected to eliminate the potential effects to these species. Ground-disturbing activities associated with construction will increase the short-term potential for erosion from the site. The potential for sediment inputs to leave

the site will be minimized through the implementation of site-specific erosion and sediment control measures, such as the use of sediment fencing and limiting soil-disturbing activities to the minimum area necessary to complete the Proposed Project. It is highly unlikely that erosion-generated sediment from construction activities will reach North Bay. Vegetated areas that are temporarily disturbed will be stabilized, and groundcover will be reestablished upon completion of construction.

6.2 Indirect Effects

The Proposed Project will result in a net addition of approximately 7.8 acres of new and replaced PGIS for paving the new Aircraft Operations Area, aircraft operational support areas, and new access roads. The new PGIS will be accompanied by an increase in use from planes and airport vehicles, which may increase the amount of contaminants discharged into the surrounding stormwater treatment facilities. Stormwater at the airport ultimately discharges through a network of ponds, pipes, and ditches from the airport east to North Bay. The nearshore areas of North Bay may be used by ESA-listed bull trout, and stormwater pollutants can discharge year-round and are a source of potentially adverse effects to fish, even at ambient levels (NMFS 2011). As part of the Proposed Project, the airport is adding stormwater facilities that treat PGIS for water quality flows at or close to the source, and convey flows through various open-channel swales or pipes to a detention area. The detention area will provide additional treatment, as well as detain stormwater volume to be released at a controlled rate. These water quality and water detention facilities have been designed per NMFS requirements in the SSNP (NMFS 2022). Water quality facilities will include bioretention swales and CAVFS and are capable of treating between 91 percent (bioretention swales) and 99 percent (CAVFS) of stormwater before reaching North Bay.

With respect to salmonids, the primary constituents of concern in stormwater generated by roadways include all contaminants, including dissolved metals and 6PPD-q. Dissolved copper and zinc discharge can adversely affect olfactory sensory responsiveness and cause behavioral changes, including decreased predator avoidance at relatively low concentrations (2.0 micrograms per liter [$\mu\text{g/L}$] above background concentrations of 3.0 $\mu\text{g/L}$ or less) (WSDOT 2019). Emerging research indicates that urban runoff mortality syndrome can be caused by the organic compound 6PPD-q, with adult and juvenile coho salmon (*Oncorhynchus kisutch*) being particularly vulnerable to lethal effects of exposure to 6PPD-q. The parent compound (6PPD), which becomes 6PPD-q through oxidation, is a tire additive that enhances tire longevity and is found in almost all automobile and plane tires (Ecology 2022). The assumed primary method of 6PPD-q transport is via runoff from roads and parking areas with tire wear to surface waters. Concentrations of 6PPD-q may be higher in streams in urbanized areas, and potentially lower in more rural areas. BMPs identified with the highest potential to reduce 6PPD and 6PPD-q are infiltration, dispersion, and some biofiltration combined with sorption (particularly BMPs that contain bioretention soil media or compost) (Ecology 2022).

Some contaminants accumulate in both the prey of and tissues of juvenile salmonids where, depending on the level of exposure, they cause a variety of lethal and sublethal effects, including disrupted behavior, reduced olfactory function, immune suppression, reduced growth, disrupted smoltification, hormone disruption, disrupted reproduction, cellular damage, and physical and developmental abnormalities (NMFS 2011). Heavy metals, such as copper, zinc, cadmium, and mercury, can have a range of acute and chronic physiological and behavior effects on fish. Recent literature demonstrates that exposure to stormwater pollutants such as petroleum-based hydrocarbons and metals can affect salmonids, with

effects ranging from avoidance to mortality depending on pollutant concentrations and synergistic effects (NMFS 2022).

Sub-adult and adult bull trout utilize the nearshore habitats of Puget Sound and may be present year-round in North Bay. Bull trout could be exposed to stormwater contamination through direct exposure in the Action Area, through bioaccumulation in their prey, and may have decreased foraging opportunities in North Bay caused by a decline in water quality supporting forage fish and nearshore vegetation.

Marbled murrelet may use North Bay to feed on forage fish species, and may have decreased foraging opportunities in North Bay caused by a decline in water quality supporting forage fish and nearshore vegetation.

Measures to reduce the concentration of metals, 6PPD-q, and other pollutants in stormwater include filtration, adsorption, and bioaccumulation in plants. The Proposed Project would provide water quality treatment and flow control for 15.7 acres of new, replaced, and existing impervious surfaces. The proposed water quality treatment facilities include CAVFS and vegetated swales, sized to treat the water quality design storm for the contributing impervious surfaces.

Because the Proposed Project includes water quality treatment for impervious surfaces that currently do not receive treatment, it may reduce the amount of pollutants delivered to North Bay through stormwater. However, no treatment is 100 percent effective, and there is some inherent uncertainty in how post-Project pollutant levels (with increased impervious surface) will compare with pre-Project pollutant levels. Infiltration through a bioretention system designed with a soil mixture has been shown to reduce or eliminate toxicity to juvenile coho salmon caused by pollutants in stormwater (McIntyre et al. 2015). Effective treatment of 6PPD-q, other organic compounds, and heavy metals occurs from applying infiltration, sorption, or filtration techniques (Ecology 2024b). The Proposed Project would install six bioretention swales and four CAVFS, both of which are designed for infiltration and/or filtration of stormwater, in addition to constructing detention ponds that would provide additional opportunity for pollutant settling/removal for higher flows (PAE 2025). The existing vegetated stormwater drainage ditches would also continue to provide some level of treatment.

6.3 Effects from Interrelated and Interdependent Actions

An interdependent activity is an activity that has no independent utility apart from a proposed project (50 CFR 402.02). An interrelated activity is an activity that is part of a larger action and depends on the larger action for its justification (50 CFR 402.02). There are no interrelated or interdependent actions that are not considered in this BA. No other airport projects depend on this Proposed Project or will become necessary because of it.

6.4 Cumulative Effects

Cumulative effects are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the Action Area of the federal action subject to consultation (50 CFR 402.02). According to the Friday Harbor Regional Airport Master Plan, additional development will likely be proposed in the future and includes additional roads, parking, commercial space, and a new terminal building (Coffman & PAE 2020). Additionally, according to the County's Comprehensive Plan

(2022), San Juan Island's population is projected to increase by 5 percent between 2025 and 2036. Development activities in the Action Area and watershed will likely increase with population growth. However, the majority of the Action Area has a land use designation of either Agricultural Resource, Rural Farm Forest, or Rural Residential, and therefore development will be limited. Regulations governing land development—including development near wetlands and streams—have become more protective over time, but development activities still present potential for adverse environmental effects through land clearing and increases in impervious surfaces, which can adversely affect listed species and their habitat, particularly through water quality degradation. When considered together, the cumulative effects are likely to have a negligible negative effect on ESA-listed species due largely to degraded water quality conditions. Effects on Critical Habitat are expected to be similar.

CHAPTER 7

Effect Determinations

7.1 Effects on Listed Species

7.1.1 Bull Trout

The Proposed Project warrants a **“may affect, likely to adversely affect”** determination for bull trout because:

- Anadromous life history forms of bull trout, primarily sub-adults and adults, are likely to occur along the nearshore areas of San Juan Island.
- The Proposed Project will increase the total PGIS in the SWDA by 7.8 acres, and airport stormwater is ultimately discharged into North Bay.
- BMPs cannot treat 100 percent of all stormwater pollutants, and treated runoff will ultimately drain into North Bay.
- Stormwater pollutants have the potential to bioaccumulate in forage fish species, common prey of bull trout, which are present in North Bay.
- Stormwater pollutants have the potential to decrease water quality in North Bay and reduce the amount of forage fish found in the Action Area, reducing feeding opportunities for bull trout.

However, impacts on bull trout will be mitigated and limited by the following minimization measures:

- Flow control and runoff treatment BMPs that utilize infiltration, sorption, filtration, and sedimentation will be added to treat between 91 and 99 percent of SWDA stormwater before it reaches North Bay.
- All stormwater generated from construction will be treated in accordance with the NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management, of the SSNP.

7.1.2 Marbled Murrelet

The Proposed Project warrants a **“may affect, but not likely to adversely affect”** determination for the marbled murrelet based on the following rationale:

- Marbled murrelet foraging opportunities in North Bay may be reduced by a decline in water quality supporting forage fish and nearshore vegetation.

However, the Proposed Project is not likely to adversely affect marbled murrelet for the following reasons:

- There is no marbled murrelet nesting habitat within the Action Area.

- The Proposed Project includes no highly auditory disturbing activities such as blasting or impact pile-driving.
- Flow control and runoff treatment BMPs that utilize infiltration, sorption, filtration, and sedimentation will be added to treat between 91 and 99 percent of SWDA stormwater before it reaches North Bay.
- All stormwater generated from construction will be treated in accordance with the NMFS General Construction Measure criteria stated in Section 1.3.1.C.13, Stormwater Management, of the SSNP.

CHAPTER 8

References

- Coffman Associates, Inc. & Precision Approach Engineering. 2020. *Airport Master Plan for Friday Harbor Airport*. Prepared for the Port of Friday Harbor. April 2020. Accessed February 2025. Available: <https://www.portfridayharbor.org/master-plan/FHRFinalMPApril2020-123mb.pdf>.
- Ecology (Washington State Department of Ecology). 2022. *Stormwater Treatment of Tire Contaminants Best Management Practices (BMP) Effectiveness*.
- Ecology (Washington State Department of Ecology). 2024a. *Western Washington Hydrology Model (WWHM)*. Available: <https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/stormwater-permittee-guidance-resources/stormwater-manuals/western-washington-hydrology-model>.
- Ecology (Washington State Department of Ecology). 2024b. *Ecology Stormwater Management Manual for Western Washington (SWMMWW)*. Available: https://fortress.wa.gov/ecy/ezshare/wq/SWMMs/2024SWMMWW/2024_SWMMWW.htm.
- Environmental Science Associates. 2016. *Biological Assessment for the Friday Harbor Airport Anticipated Airport Improvement Program Funded Projects From 5-Year Capital Improvement Plan (2017-2021)*. Prepared for Precision Approach Engineering 119 Grand Ave., Suite D Bellingham, WA 98225. July 2016.
- FAA (Federal Aviation Administration). 2013. *FAA Advisory Circular 150/5320-5D – Airport Drainage Design*. Accessed February 2024. Available: https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5320-5.
- Hruby, Thomas, PhD, and Amy Yahnke. 2023. *Washington State Wetland Rating System for Western Washington. 2014 Update, Version 2.0*. Publication 23-06-009. Shorelands and Environmental Assistance Program, Washington State Department of Ecology, Olympia, Washington October 2014 (updated July 2023).
- McIntyre, J.K., J.W. Davis, C. Hinman, K.H. Macneale, B.F. Anulacion, N.L. Scholz, J.D. Stark. 2015. *Soil bioretention protects juvenile salmon and their prey from the toxic impacts of urban stormwater runoff*. Chemosphere, Volume 132, 2015, Pages 213-219. Available: <https://www.sciencedirect.com/science/article/pii/S0045653514014805>.
- NMFS (National Marine Fisheries Service). 2011. *Endangered Species Act Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Roseburg Regional Airport Taxiway Separation Project, Newton Creek (HUC 6: 171003021305), Douglas County, Oregon*. May 25, 2011.

- NMFS (National Marine Fisheries Service). 2022. *Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Salish Sea Nearshore Programmatic Consultation (SSNP)*. Seattle, Washington. Available: <https://www.fisheries.noaa.gov/feature-story/salish-sea-biological-opinion-provides-path-nearshore-projects-while-safeguarding>.
- NWIFC (Northwest Indian Fisheries Commission). 2024. *Statewide Integrated Fish Distribution Database (SWIFD) and Map Viewer*. Includes data from the Northwest Indian Fisheries Commission and Washington Department of Fish and Wildlife. Accessed February 2024. Available: <https://geo.nwifc.org/swifd/>.
- Potter, A., T. Hanson, and S. Vernon. 2011. *Surveys for the island marble butterfly (Euchloe ausonides insulanus) in San Juan County, Washington, 2010*. Washington Department of Fish and Wildlife, Olympia, Washington.
- PAE (Precision Approach Engineering). 2025. *Southwest Development Area Post-Construction Stormwater Management Plan*. Prepared for Port of Friday Harbor.
- Reid Middleton. 2012. *Friday Harbor Airport Drainage Study*. Prepared for the Port of Friday Harbor.
- San Juan County. 2009. *Marbled Murrelet Habitat of the San Juan Islands*. Map provided by U.S. Forest Service.
- San Juan County. 2024. *Friday Harbor Marina Artificial Habitats – ArcGIS Map*. San Juan County Assessor's Office. Accessed March 14, 2024. Available: <http://www.arcgis.com/apps/OnePane/basicviewer/index.html?appid=5def95e3511d42e68a702095e1040f50>.
- University of Washington. 2016. *The Friday Harbor Laboratories*. Accessed February 2024. Available: <https://depts.washington.edu/fhl/about.html>.
- USFWS (United States Fish and Wildlife Service). 1999. *Endangered and threatened wildlife and plants; determination of threatened status for bull trout in the coterminous United States*. Final rule November 1, 1999. Federal Register 64(210):58910-58933.
- USFWS (United States Fish and Wildlife Service). 2012. *Guidance for Identifying Marbled Murrelet Nests*. Washington Fish and Wildlife Office. Lacey, Washington. April 26, 2012.
- USFWS (United States Fish and Wildlife Service). 2015. *Recovery plan for the coterminous United States population of bull trout (Salvelinus confluentus)*. Portland, Oregon. xii + 179 pages.
- USFWS (United States Fish and Wildlife Service). 2019. *Marbled Murrelet (Brachyramphus marmoratus) 5-Year Status Review*. U.S. Fish and Wildlife Service Washington Fish and Wildlife Office. Lacey, Washington.
- USFWS (United States Fish and Wildlife Service). 2024. *Species status assessment report for the Suckley's Cuckoo Bumble Bee (Bombus suckleyi)*, Version 1.0. August 2024. Alaska Region. 131 pp.
- WDFW (Washington Department of Fish and Wildlife). 2024. *Priority Habitats and Species (PHS) on the Web*. Accessed March 1, 2024. Available: <http://apps.wdfw.wa.gov/phsontheweb/>.

- WDFW (Washington Department of Fish and Wildlife). 2025. *Monarch butterfly* (*Danaus plexippus*). Accessed January 30, 2025. Available at: <https://wdfw.wa.gov/species-habitats/species/danaus-plexippus#desc-range>.
- WDNR (Washington Department of Natural Resources). 2024. *Natural Heritage Rare Plants and High Quality Ecosystems GIS Data*, revised August 2024. <https://test-fortress.wa.gov/dnr/adminsaqa/dataweb/dmmatrix.html>.
- Wiles, G.J., and K.S. Kalasz. 2017. *Status Report for the Yellow-Billed Cuckoo in Washington*. Washington Department of Fish and Wildlife, Olympia, Washington. 32+ iv pp.
- WSDOT (Washington State Department of Transportation). 2008. *Aviation Stormwater Design Manual*. Managing Wildlife Hazards near Airports.
- WSDOT (Washington State Department of Transportation). 2019. *Highway Runoff Manual*. April 2019. Available: <https://wsdot.wa.gov/engineering-standards/all-manuals-and-standards/manuals/highway-runoff-manual>.
- WSDOT (Washington State Department of Transportation). 2025. *Endangered Species Act & Essential Fish Habitat, Biological Assessment Preparation Manual & Template*. Available: <https://wsdot.wa.gov/engineering-standards/environmental-guidance/endangered-species-act-essential-fish-habitat>.
- Xerces Society. 2012. *A Guide to the Native Milkweeds of Washington*. The Xerces Society of Invertebrate Conservation. 628 NE Broadway, Suite 200, Portland, OR 97232.

Appendix A

**Please see Appendix A in NMFS
BA for Southwest Development
Post-Construction Stormwater
Management Plan**

Appendix B

USFWS Species List



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish And Wildlife Office

510 Desmond Drive Se, Suite 102

Lacey, WA 98503-1263

Phone: (360) 753-9440 Fax: (360) 753-9405



In Reply Refer To:

02/18/2025 16:49:28 UTC

Project Code: 2025-0057745

Project Name: Friday Harbor Airport SWDA Environmental Assessment

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf>

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see <https://www.fws.gov/program/migratory-bird-permit/what-we-do>.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see <https://www.fws.gov/library/collections/threats-birds>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/partner/council-conservation-migratory-birds>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Washington Fish And Wildlife Office
510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263
(360) 753-9440

PROJECT SUMMARY

Project Code: 2025-0057745

Project Name: Friday Harbor Airport SWDA Environmental Assessment

Project Type: Airport - Maintenance/Modification

Project Description: NEPA EA for future airport improvements at the Friday Harbor Regional Airport

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@48.522445649999995,-123.02559517151825,14z>



Counties: San Juan County, Washington

ENDANGERED SPECIES ACT SPECIES

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

BIRDS

NAME	STATUS
Marbled Murrelet <i>Brachyramphus marmoratus</i> Population: U.S.A. (CA, OR, WA) There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4467	Threatened
Yellow-billed Cuckoo <i>Coccyzus americanus</i> Population: Western U.S. DPS There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

FISHES

NAME	STATUS
Bull Trout <i>Salvelinus confluentus</i> Population: U.S.A., coterminous, lower 48 states There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8212	Threatened

INSECTS

NAME	STATUS
Island Marble Butterfly <i>Euchloe ausonides insulanus</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3285	Endangered
Monarch Butterfly <i>Danaus plexippus</i> There is proposed critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened
Suckley's Cuckoo Bumble Bee <i>Bombus suckleyi</i> Population: No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10885	Proposed Endangered

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: ESA

Name: Jessica Redman

Address: 2801 Alaskan Way, Suite 200

City: Seattle

State: WA

Zip: 98121

Email: jredman@esassoc.com

Phone: 2067899658

Appendix C

Species Life History

Coterminous U.S. Population of Bull Trout

On November 1, 1999 (64 FR 58910), all bull trout in the coterminous U.S. were listed as threatened under the ESA. Critical Habitat was later designated on September 26, 2005 (70 FR 56212) and revised on October 18, 2010 (75 FR 63898). Bull trout are found in the Klamath River basin of south-central Oregon, the Puget Sound and Olympic Peninsula watersheds of Western Washington, and the Columbia River and Snake River basins, extending east to headwater streams in Idaho and Montana (including the Saint Mary headwaters east of the continental divide), and as far north as Canada and Southeast Alaska (USFWS 2015).

Bull trout have one of the strictest life history requirements of all salmonids and require streams with clean gravel substrates; cold-water temperatures (less than 48° Fahrenheit); complex habitats with large woody debris, overhanging riparian vegetation, areas of pooling, etc.; and connectivity from cold-water refugia to spawning habitats (Wydoski and Whitney 1979; USFWS 2015). Low stream temperatures and clean substrates are key features of bull trout spawning habitat, and spawning is associated with pristine or only slightly disturbed basins (USFWS 1999). Spawning occurs in the fall and spans from late October through early November. Redds are dug by females in water 8 to 24 inches deep, in substrate gravels 0.2 to 2 inches in diameter (Wydoski and Whitney 1979). Juvenile bull trout prey on terrestrial and aquatic insects, macro-zooplankton, and small fish before switching to a primary piscivorous diet as adults. Bull trout may utilize several life histories depending on the watershed they occupy. Resident bull trout occupy a watershed year-round and do not make large spawning migrations. Fluvial and adfluvial bull trout are migratory and migrate across large river systems (fluvial) or from a lake into its tributaries to spawn (adfluvial).

Marbled Murrelet

The marbled murrelet is a Pacific seabird that occurs along the Pacific coastline from the Bering Sea, Alaska, southward to central California. Unlike the relatively continuous occurrence of the species exhibited across the northern extent of its range in Alaska, there are distinct gaps separating the breeding populations throughout Washington, Oregon, and California.

Observations made along the coastlines of the three states document that the largest concentrations of marbled murrelets at sea during the breeding season were adjacent to areas with available inland nesting habitat (old-growth forest) (USFWS 2019). This fact supports the theory identifying habitat loss as the major causative agent for gaps in breeding range.

An essential structural component of suitable marbled murrelet habitat is the presence of potential nesting platforms (USFWS 2012). In general, old-growth, mature, or younger coniferous forests with appropriate structures can provide these platforms. The USFWS defines a suitable nesting platform as a relatively flat surface at least 10 centimeters (4 inches) in diameter and located a minimum of 10 meters (33 feet) high in the live crown of a coniferous tree. Another important attribute of nesting habitat is vertical and horizontal cover around potential nest platforms to protect chicks and adults from predation, while allowing adults access to nest platforms (USFWS 2012).

References

- USFWS (United States Fish and Wildlife Service). 1999. *Endangered and threatened wildlife and plants; determination of threatened status for bull trout in the coterminous United States*. Final rule November 1, 1999. Federal Register 64(210):58910-58933.
- USFWS (United States Fish and Wildlife Service). 2012. *Guidance for Identifying Marbled Murrelet Nests*. Washington Fish and Wildlife Office. Lacey, Washington. April 26, 2012.
- USFWS (United States Fish and Wildlife Service). 2015. *Recovery plan for the coterminous United States population of bull trout (Salvelinus confluentus)*. Portland, Oregon. xii + 179 pages.
- USFWS (United States Fish and Wildlife Service). 2019. *Marbled Murrelet (Brachyramphus marmoratus) 5-Year Status Review*. U.S. Fish and Wildlife Service Washington Fish and Wildlife Office. Lacey, Washington.
- Wydoski, R.S., and R.R. Whitney. 1979. *Inland Fishes of Washington*. University of Washington Press, Seattle, WA.

Appendix D

Representative Photographs



Photo 1. Site of proposed ASOS relocation



Photo 2. Project site and site of proposed large stormwater detention pond



Photo 3. Store More Way (new vehicle access road to be improved) and site of two smaller stormwater detention ponds



Photo 4. Typical vegetation in vicinity of new access road and realigned trail



Photo 5. Excavated material and typical vegetation in location of proposed hangars



Photo 6. Typical vegetation in proposed soil disposal area



Photo 7. Typical vegetation in area of proposed trail realignment at south end of site



Photo 8. On-site stream near existing trail crossing



Photo 9. Excavated pond feature in eastern portion of on-site stream



Photo 10. Outlet of on-site stream at culvert under Mullis Street

**B4 USFWS Letter of
Concurrence**



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Ecological Services
1009 College St. SE, Suite 215
Lacey, Washington 98503



In Reply Refer to:
FWS/R1/2025-0057745

February 20, 2026

Laura Sample, Environmental Protection Specialist
Federal Aviation Administration
2200 S. 216th Street
Des Moines, Washington 98198

Dear Ms. Sample:

This letter is in response to your August 21, 2025, request for our concurrence with your determination that the proposed airport improvements in Friday Harbor, San Juan County, Washington, “may affect, but is not likely to adversely affect” federally listed species. We received your letter and Biological Assessment (BA) providing information in support of “may affect, not likely to adversely affect” determinations, on August 21, 2025.

Specifically, you requested informal consultation pursuant to section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (ESA) for the following federally listed species bull trout (*Salvelinus confluentus*) and marbled murrelet (*Brachyramphus marmoratus*).

The Federal Aviation Administration (Action Agency) has determined that the action will have “no effect” on additional listed species. The determination of “no effect” to listed resources rests with the action agency. The U.S. Fish and Wildlife Service (USFWS) has no regulatory or statutory authority for concurring with “no effect” determinations, and no consultation with the USFWS is required. We recommend that the action agency document their analysis on effects to listed species and maintain that documentation as part of the project file.

Based on the information you provided, best available science, and complete and successful implementation of the conservation measures included in the BA, we concur with your determination that the effects of the proposed action “may affect, not likely to adversely affect” bull trout and marbled murrelet.

PACIFIC REGION 1

IDAHO, OREGON*, WASHINGTON,
AMERICAN SAMOA, GUAM, HAWAII, NORTHERN MARIANA ISLANDS

*PARTIAL

DESCRIPTION OF THE PROPOSED ACTION AND EFFECTS OF THE ACTION

In summary, the proposed action (Project) includes the development of 65 acres of an approximately 115-acre portion of the airport identified as the southwest portion of the airport Southwest Development Area of the Friday Harbor Regional Airport. The proposed project will include constructing taxilanes, building new hangars, constructing a snow removal equipment (SRE) building, constructing a new access vehicle road and parking lot, upgrading the existing stormwater treatment and detention facilities, and a partial realignment of the Clark McAlpine Trail.

Project Phases

The project activities will occur in phases. The first phase (Design) will be completed prior to construction, estimated in 2026. Construction is expected to begin in May 2028 and be completed by 2031.

Staging will occur within the property, mostly on unpaved surfaces consisting of pasture grasses and weedy herbaceous species. Construction equipment will include excavators, dump trucks, rollers/compactors, pavers, pavement marking trucks, hydroseeder, and slurry seal truck/crack sealers. The three loudest pieces of equipment are the excavator, concrete paver, and asphalt paver. No impact pile-driving or blasting will occur.

There will be a net increase of 7.8 acres of impervious surfaces which includes 4.5 acres of new asphalt and concrete pavement, and 3.3 acres of access roads and vehicle parking. After completion, the property will have 15.7 acres of impervious surfaces. The remaining 83.2 acres of the area will remain pervious, vegetated, open space.

Phase Two: May 2028 – September 2029

Phase two begins with site preparation. Site preparation will include clearing vegetation, demolishing existing facilities, excavation, embankment and a retaining wall. Additionally, 3,500 linear feet of the Clark McAlpine Trail, which crosses the project area, will be realigned. This will be followed by grading the land (i.e., cutting and filling the land) to create a level surface.

Once grading is completed, taxilanes, aircraft parking apron, nine-acre Aircraft Operations Area, support areas, and vehicle parking will be constructed.

While paving occurs, the stormwater system will be installed (see below, p. 3). Phase two will be completed with the construction of three approximately 12,000 square-foot hangars, and five box hangars with a maximum size of 10,000 square feet each, and the 2,000-square foot SRE building.

Stormwater System

The stormwater system will include collection, conveyance, treatment, flow control systems. The project proponent has developed a post-construction stormwater management plan; design of the stormwater system aligns with the Salish Sea Nearshore Programmatic project design criteria (PDC) 3 (USFWS 2022, pp. 28 – 34). The project will use Low Impact Development (LID) approaches, including composted-amended vegetated filter strips (CAVFS) and LID swales. The water quality treatment facilities are expected to treat between 91 and 99 percent of stormwater before it is discharged into North Bay and have been designed to meet NMFS standards for water quality. The proposed stormwater flow control will include constructing two open storage stormwater detention facilities, which will use a combination of orifice and weir control structures to provide flow control.

Phase Three: July 2031 – October 2031

Phase three includes final construction of taxilanes and paving roadways and finalizing infrastructure improvements. A utility corridor will be installed for the future installation of utilities not installed during this project. These utilities may include water, sanitary sewer, communications, fiber or other related utility infrastructure.

Final infrastructure improvements include installing security fencing, vehicle and pedestrian gates, exterior lights for parking lots airfields, retroreflective markers, and signage for aircraft parking apron and taxilanes.

Conservation Measures

The project will implement the following avoidance and minimization measures:

- Work areas will be confined to minimum area needed to complete work.
- Construction vehicles and equipment will be stored, fueled, and maintained on designated areas onsite or on nearby paved areas adjacent to the site.
- Haul routes will use existing road system to extent feasible.
- A Spill Prevention, Control, and Countermeasure (SPCC) Plan will be developed and implemented to ensure the appropriate storage, handling, and use of petroleum products and other potential pollutants on-site during construction. The SPCC Plan will include measures for preventing and responding to spills or other releases of potential pollutants, such as fuel, motor oil, and hydraulic fluid.
- A Temporary Erosion and Sediment Control (TESC) plan will be developed and implemented for construction stormwater discharges. The TESC measures may include sediment fencing, inlet protection, using designated construction entrances or other measures to minimize erosion of soils and sediment to downstream waters.
- Stormwater runoff from the projects' created impervious surfaces during operation will be collected and treated in accordance with the Salish Sea Nearshore Programmatic criteria.

- Vegetated filter strips will be amended with medium compost to accentuate the removal of 6PPD-Q, per the 2024 Stormwater Management Manual for Western Washington (SWMMWW; Ecology 2024, p. 69-70, 975-979).
- Industrial stormwater discharges on airport property will continue to be managed under the airport's Stormwater Pollution Control Plan and NPDES 1200-Z Permit.

EFFECTS TO SPECIES

Bull Trout

The Action Area is in the San Juan Islands, where, at present, bull trout occurrence is extremely rare. Exposures of bull trout to stressors are extremely unlikely; therefore, the effects of this action to bull trout are discountable.

Marbled Murrelet

The action area is developed and has a high level of human activity from the airport. Suitable marbled murrelet nesting habitat is not present at the project site or surrounding areas of North Bay. However, North Bay contains suitable habitat for marine forage fish species that comprise a portion of the marbled murrelet's diet and may provide year-round foraging opportunities for marbled murrelet nesting inland.

Effects to marbled murrelet will not be measurable and will not significantly disrupt normal behaviors (i.e., the ability to successfully feed, move, and/or shelter) and are therefore considered insignificant because of the following:

- There will be no blasting, pile-driving, or other intense noise-producing disturbances.
- Vegetation disturbance during construction will not impact current or future murrelet habitat.
- Impacts to food resources (i.e., marine forage fish species) will be minimized through the implementation of erosion, sedimentation, and pollution control and management plans.
 - During construction, a Spill Prevention, Control, and Counter measure (SPCC) Plan will be developed and implemented. Temporary Erosion and Sedimentation Control (TESC) measures will be fully implemented, and may include sediment fencing, and other measures to minimize erosion and sediment transport to areas occupied by forage fish species.
 - The airport will continue to implement a stormwater pollution control plan. After construction, a Post-Construction Stormwater Management Plan (PCSMP) will be fully implemented. Compost-amended vegetated filter strips will be used further reduce the transport of pollutants, including 6PPD-Q.

With successful implementation of the conservation measures included by the action agency as part of the proposed action, we expect that the effects of the action will not measurably degrade

the water quality or quantity such that the normal reproduction, growth, and survival of marbled murrelet are not inhibited in the action area.

CONCLUSION

This concludes consultation pursuant to the regulations implementing the ESA. This action should be re-analyzed and re-initiation may be necessary if 1) new information reveals effects of the action that may affect listed species or critical habitat in a manner, or to an extent, not considered in this consultation, 2) if the action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this consultation, and/or 3) a new species is listed or critical habitat is designated that may be affected by this action.

This letter constitutes a complete response by the USFWS to your request for informal consultation and concurrence. A complete record of this consultation is on file at the Washington Fish and Wildlife Office, in Lacey, Washington.

If you have any questions about this letter or our shared responsibilities under the ESA, then please contact Gabriela Wolf-Gonzalez (Gabriela_Wolf-Gonzalez@fws.gov) and copy the Washington Ecological Services Inbox (washingtonfwo@fws.gov).

Sincerely,

for Brad Thompson, State Supervisor
Washington Ecological Services

LITERATURE CITED

Ecology. (Washington Department of Ecology), 2024. Stormwater Management Manual for Western Washington. Publication Number 24-10-013. Washington State Department of Ecology, Water Quality Program. Revised July 2024.

USFWS. (United States Fish and Wildlife Service), 2022. Biological Opinion for the Salish Sea Nearshore Programmatic for Actions Authorized by the U.S. Army Corps of Engineers. Reference Number: 2022-0048454. Lacey, Washington. July 29, 2022.

B5 IPaC Species List

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

San Juan County, Washington



Local office

Washington Fish And Wildlife Office

☎ (360) 753-9440

📠 (360) 753-9405

1009 College St Se

Ste 215

Lacey, WA 98503-1249

<https://www.fws.gov/office/washington-fish-and-wildlife>

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act requires Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS
Marbled Murrelet <i>Brachyramphus marmoratus</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/4467	Threatened
Yellow-billed Cuckoo <i>Coccyzus americanus</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/3911	Threatened

Fishes

NAME	STATUS
Bull Trout <i>Salvelinus confluentus</i> There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/8212	Threatened

Insects

NAME	STATUS
Island Marble Butterfly <i>Euchloe ausonides insulanus</i> Wherever found There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/3285	Endangered

Monarch Butterfly *Danaus plexippus*

Proposed Threatened

Wherever found

There is proposed critical habitat for this species. Your location does not overlap the critical habitat.

<https://ecos.fws.gov/ecp/species/9743>

Suckley's Cuckoo Bumble Bee *Bombus suckleyi*

Proposed Endangered

No critical habitat has been designated for this species.

<https://ecos.fws.gov/ecp/species/10885>

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act ² and the Migratory Bird Treaty Act (MBTA) ¹. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

There are Bald Eagles and/or Golden Eagles in your [project](#) area.

Measures for Proactively Minimizing Eagle Impacts

For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the [National Bald Eagle Management Guidelines](#). You may employ the timing and activity-specific distance recommendations in this document when designing your project/activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to [Bald Eagle Nesting and Sensitivity to Human Activity](#).

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional [Migratory Bird Office](#) or [Ecological Services Field Office](#).

If disturbance or take of eagles cannot be avoided, an [incidental take permit](#) may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the [Do I Need A Permit Tool](#). For assistance making this determination for golden eagles, please consult with the appropriate Regional [Migratory Bird Office](#) or [Ecological Services Field Office](#).

Ensure Your Eagle List is Accurate and Complete

If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the [Supplemental Information on Migratory Birds and Eagles](#), to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

Review the FAQs

The FAQs below provide important additional information and resources.

Bald Eagle *Haliaeetus leucocephalus*

Breeds Mar 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read ["Supplemental Information on Migratory Birds and Eagles"](#), specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

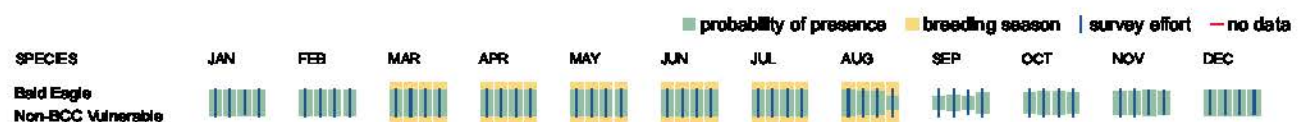
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle ([Bald and Golden Eagle Protection Act](#) requirements may apply).

Proper Interpretation and use of your eagle report

On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there,

and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the [RAIL Tool](#) and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:

The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Migratory birds

The Migratory Bird Treaty Act (MBTA) ¹ prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

Measures for Proactively Minimizing Migratory Bird Impacts

Your IPaC Migratory Bird list showcases [birds of concern](#), including [Birds of Conservation Concern \(BCC\)](#), in your project location. This is not a comprehensive list of all birds found in your project area. However, you can help proactively minimize significant impacts to all birds at your project location by implementing the measures in the [Nationwide avoidance and minimization measures for birds](#) document, and any other project-specific avoidance and minimization measures suggested at the link [Measures for avoiding and minimizing impacts to birds](#) for the birds of concern on your list below.

Ensure Your Migratory Bird List is Accurate and Complete

If your project area is in a poorly surveyed area, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the [Supplemental Information on Migratory Birds and Eagles document](#), to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

Review the FAQs

The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
Ancient Murrelet <i>Synthliboramphus antiquus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 10 to Sep 10
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Mar 1 to Aug 31
Black Oystercatcher <i>Haematopus bachmani</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9591	Breeds Apr 15 to Oct 31
Black Swift <i>Cypseloides niger</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8878	Breeds Jun 15 to Sep 10
Black Turnstone <i>Arenaria melanocephala</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Brandt's Cormorant <i>Urile penicillatus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 15 to Sep 15
California Gull <i>Larus californicus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 1 to Jul 31
Cassin's Auklet <i>Ptychoramphus aleuticus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/6967	Breeds Mar 21 to Sep 21
Chestnut-backed Chickadee <i>Poecile rufescens rufescens</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 1 to Jul 31
Evening Grosbeak <i>Coccothraustes vespertinus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Marbled Godwit <i>Limosa fedoa</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Olive-sided Flycatcher <i>Contopus cooperi</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31

Oregon Vesper Sparrow *Poocetes gramineus affinis*

Breeds Apr 21 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

<https://ecos.fws.gov/ecp/species/5141>

Rufous Hummingbird *Selasphorus rufus*

Breeds Apr 15 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/8002>

Short-billed Dowitcher *Limnodromus griseus*

Breeds Jun 1 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9480>

Tufted Puffin *Fratercula cirrhata*

Breeds May 5 to Oct 5

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

<https://ecos.fws.gov/ecp/species/430>

Western Grebe *Aechmophorus occidentalis*

Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/6743>

Western Gull *Larus occidentalis*

Breeds Apr 21 to Aug 25

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Western Screech-owl *Megascops kennicottii cardonensis*

Breeds Mar 1 to Jun 30

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "[Supplemental Information on Migratory Birds and Eagles](#)", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

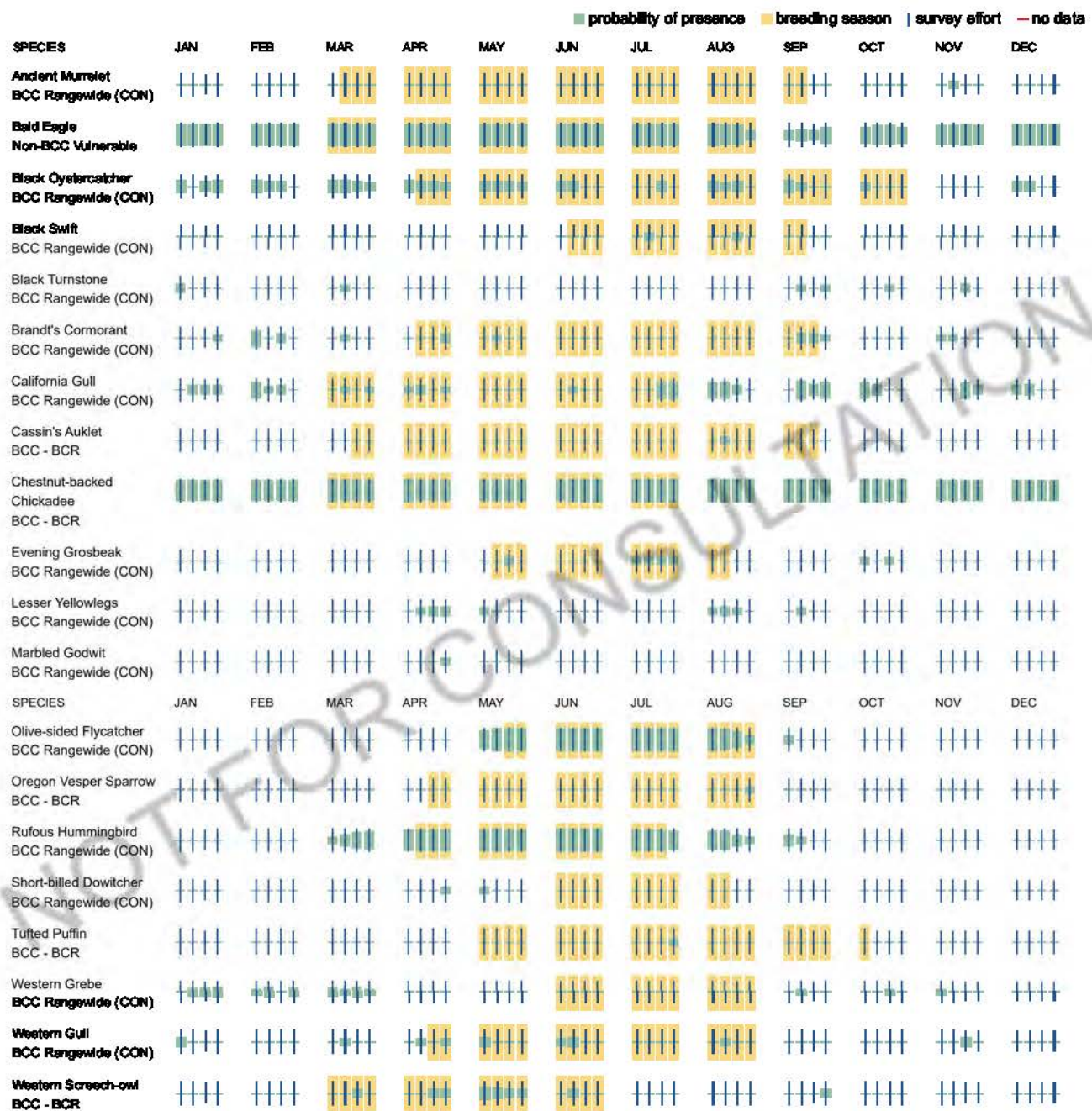
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Avoidance & Minimization Measures for Birds](#) describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the [Bald and Golden Eagle Protection Act](#) and those species marked as "Vulnerable". See the FAQ "What are the levels of concern for migratory birds?" for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle ([Bald and Golden Eagle Protection Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for the species are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the [RAIL Tool](#) and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Bald and Golden Eagle Protection Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ "Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternatively, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:

The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

This location did not intersect any wetlands mapped by NWI.

NOTE: This initial screening does not replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data Limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and

nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this Inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

Appendix C

Farmlands



2801 Alaskan Way
Suite 200
Seattle, WA 98121
206.789.9658 [phone](#)
206.789.9684 [fax](#)

esassoc.com

memorandum

date April 13, 2026

to Laura Sample, Environmental Protection Specialist, Federal Aviation Administration

from Todd Nicholson, Executive Director, Port of Friday Harbor
Kyle Gropp, Deputy Director, Port of Friday Harbor
Jessica Redman, Ecologist, Environmental Science Associates

subject Friday Harbor Regional Airport – Southwest Development Area – AD-1006 Farmland Conversion Rating Form and

As requested by the Federal Aviation Administration (FAA) as part of its consideration of the Friday Harbor Regional Airport (FHR or the Airport) Southwest Development Area project (Proposed Action) under the National Environmental Policy Act (NEPA), ESA (on behalf of FHR) has compiled this information to assist FAA with its consultation with the Natural Resources Conservation Service (NRCS) concerning the Proposed Action's impacts to Farmlands. The information will also be used to assess the Proposed Action's effects on Farmlands under NEPA. This information has been provided to accompany our respectful request that the Washington State Office of the NRCS complete the attached Form AD-1006 in accordance with the Farmland Protection Policy Act for the Proposed Action at FHR.

Overview of Proposed Action

The Port of Friday Harbor (Port), owner and operator of the Airport, proposes to develop portion of airport property, known as the Southwest Development Area (SWDA), to accommodate current and forecasted demand for aircraft operations at the Airport and to meet design standards established by the FAA. FHR is located on the southeast side of San Juan Island in San Juan County, Washington (Attachment A; Figure 1). The area upon which the Proposed Action would be constructed totals 115 acres in size. Of that amount, 65 acres of the site would be developed for the proposed use, with the rest of the site remaining in its current condition. Principal components of the Proposed Action are shown in Attachment A; Figure 2, and include the following:

- Construction of approximately three approximately 12,000 square-foot (SF) T-Hangars, and approximately five box hangars with a maximum size of approximately 10,000 SF each. The T-hangars are Design Group I (Up to 49' wingspan) and the box hangars may be Group I or Group II (Up to 79' wingspan).
- Construction of taxiways and aircraft parking apron to support approximately 10 aircraft FAA Airplane Design Group I (Up to 49' wingspan) standards.

- Construction of approximately seven acres of Aircraft Operations Area pavements, aircraft operational support areas, and vehicle pavements. Includes including approximately 4,200 linear feet of vehicle roadway and approximately 35 vehicle parking stalls for aircraft hangars and airport operations support. Roadway would connect to Cattle Point Road at the existing Store More Way intersection, which results in improvements to the existing Store More Way roadway and includes crossing an existing stream. Vehicle parking would be located on the northwestern portion of the site.
- Construction of one approximately 2,000-SF snow removal equipment (SRE) building.
- Land clearing, demolition of existing facilities, excavation, embankment, grading, and retaining wall construction. This includes relocating the existing soil stockpile to a new onsite disposal area.
- Installation of stormwater collection, conveyance, treatment, flow control systems, and associated infrastructure.
- Realignment of a portion of the existing Clark McAlpine trail that crosses the site, resulting in approximately 3,500 linear feet of realigned trail.

Relevant Regulatory Guidance

FAA Order 5050.4B, National Environmental Policy Act (NEPA Implementing Instructions for Airport Actions, provides information to FAA’s Office of Airports (ARP) personnel and others interested in fulfilling NEPA requirements for airport actions under FAA’s authority. The Order is part of FAA's effort to ensure its personnel have clear instructions to address potential environmental effects resulting from major airport actions.

Detailed procedures concerning environmental impact analysis are specified in FAA’s 1050.1 Desk Reference, which provides explanatory guidance for environmental impact analysis performed to comply with the *National Environmental Policy Act*, U.S. Department of Transportation (DOT) Order 5610.1C, *Procedures for Considering Environmental Impacts*, and FAA Order 1050.1G, *Environmental Impacts: Policies and Procedures*.¹

Within FAA Order 1050.1G, “Farmlands” are defined as those agricultural areas considered important and protected by federal, state, and/or local regulations. Important farmlands include all pasturelands, croplands, and forests (even if zoned for development) considered to be prime, unique, or of statewide or local importance. The *Farmland Protection Policy Act* (7 U.S.C. 4201-4209), administered by NRCS, regulates federal actions with the potential to convert important farmland to non-agricultural uses.

Existing Conditions

According to the NRCS Web Soil Survey, the area of the Proposed Action includes lands that have been designated as Prime Farmland, Prime Farmland if Drained, and Prime Farmland if Irrigated and Drained

¹ The Desk Reference is designed to complement FAA Order 1050.1, and FAA has specified when citing requirements from laws, regulations (including the CEQ Regulations), DOT Order 5610.1C, FAA Order 1050.1, or other authorities, FAA Order 1050.1 is to be cited as the original source authority and not the Desk Reference. Accordingly, this memorandum follows that direction.

(Attachment A; Figure 3). As such, the site of the Proposed Action meets the definition of “Farmlands” as defined in FAA Order 1050.1F.

According to the San Juan Comprehensive Plan, the entirety of the SWDA, is on County land. The area of the Proposed Action is zoned as Rural General Use (RGU). San Juan County defines RGU as the land use designation of the Comprehensive Plan designed to provide flexibility for a variety of small-scale, low-impact uses to locate on rural lands. These areas are further defined as having soils that are marginal or unsuitable for intensive commercial agriculture or forestry uses (San Juan County 2022).

No portion of the area of the Proposed Action is currently used for farming.

Proposed Farmland Conversion

Implementation of the Proposed Action would convert a total of 16.7 acres of farmland to non-agricultural use. Approximately 10.4 acres of prime farmland would be converted through the construction of the hangars, the SRE building, the taxilane, the access road, the trail, and the soil disposal area. An additional 5.6 acres of prime farmland if drained would be converted as a result of the construction of the access road, trail, and the soil disposal area; and an additional 0.7-acre of prime farmland if irrigated and drained would be converted through the construction of the access road and trail (Attachment A; Figure 4).

Additionally, use of the site for any use that could attract wildlife (particularly birds) that could present a hazard to aviation is a concern for all airports. In 2020, the FAA issued Advisory Circular (AC) 150/5200-33C, *Hazardous Wildlife Attractants on or Near Airports*, which listed land use practices that potentially attract hazardous wildlife. The AC noted that many agricultural crops can attract hazardous wildlife, and should not be planted in proximity to airports.

Process for Determining Impacts to Farmlands & NRCS Form AD-1006

FAA Order 1050.1G provides that FAA may make its own determination as to whether a project site meets the criteria for classification as Farmland. The Order also provides that the FAA may defer to the expertise of the NRCS to make the determination. The latter process begins with submittal of NRCS Form AD-1006, the *Farmland Conversion Impact Rating Form*. Using the information from the form, NRCS will measure the relative value of the site as Farmland on a scale of 0 to 100.

After NRCS notifies the FAA of the score of a site’s relative value, the FAA (or its designee) will apply the site assessment criteria contained within 7 CFR 658.5 and assign a site assessment score for the site. By combining the relative value score provided by NRCS with the site assessment score, the FAA will determine the combined score for the site. This combined score is composed of up to 100 points for relative value and up to 160 points for the site assessment, resulting in a maximum possible score of 260 points. An action would be considered to create a significant impact if the total combined score on Form AD-1006, *Farmland Conversion Impact Rating*, ranges between 200 and 260 points.

An NRCS Form AD-1006 has been prepared, except for those portions of the form that are required to be completed by the NRCS. A conversion rating of 10 was calculated in Part VI for the Proposed Action. The partially completed form is attached to this memorandum as Attachment B.

Attachment A

Figures

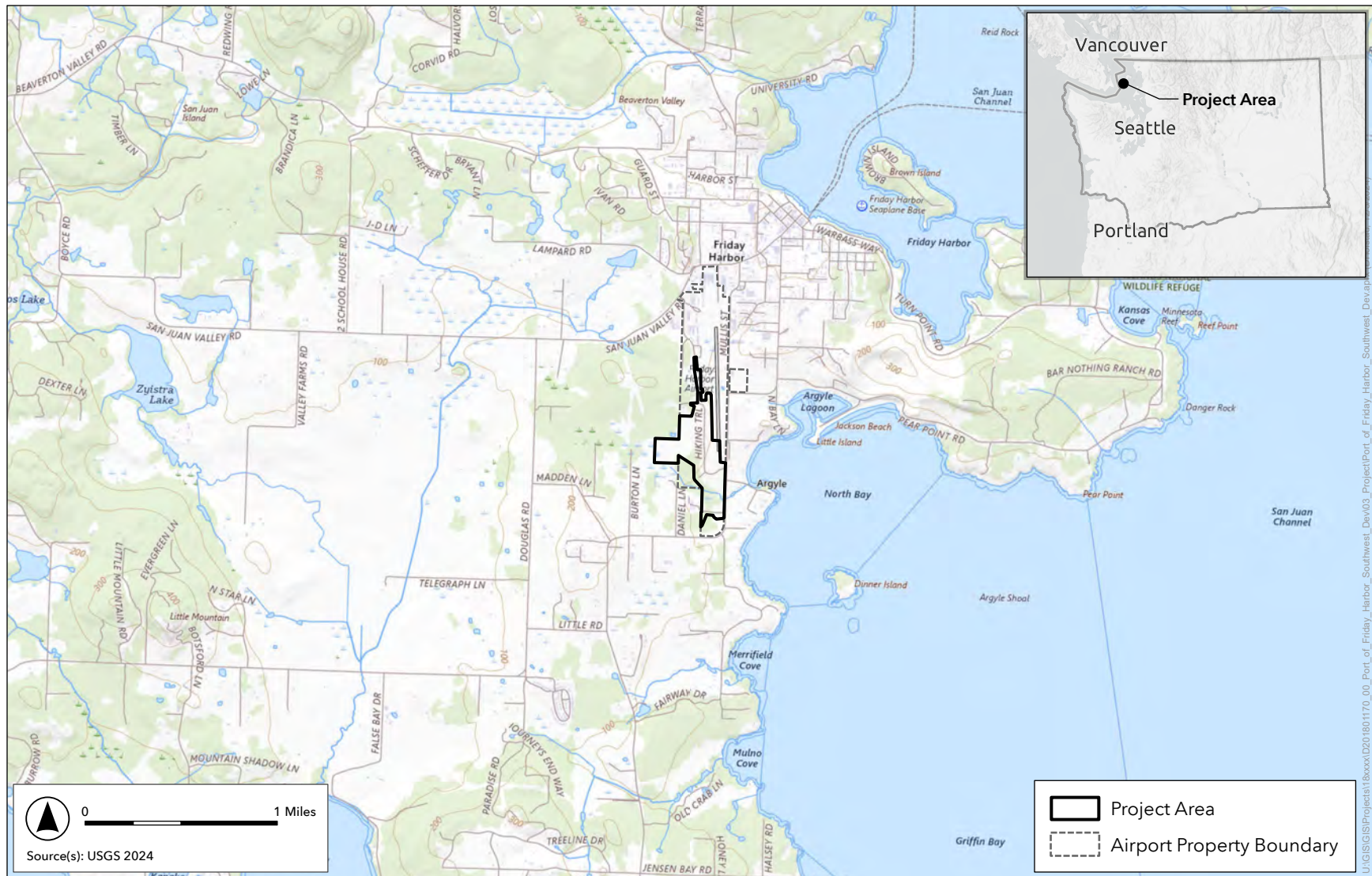


Figure 1
Project Location

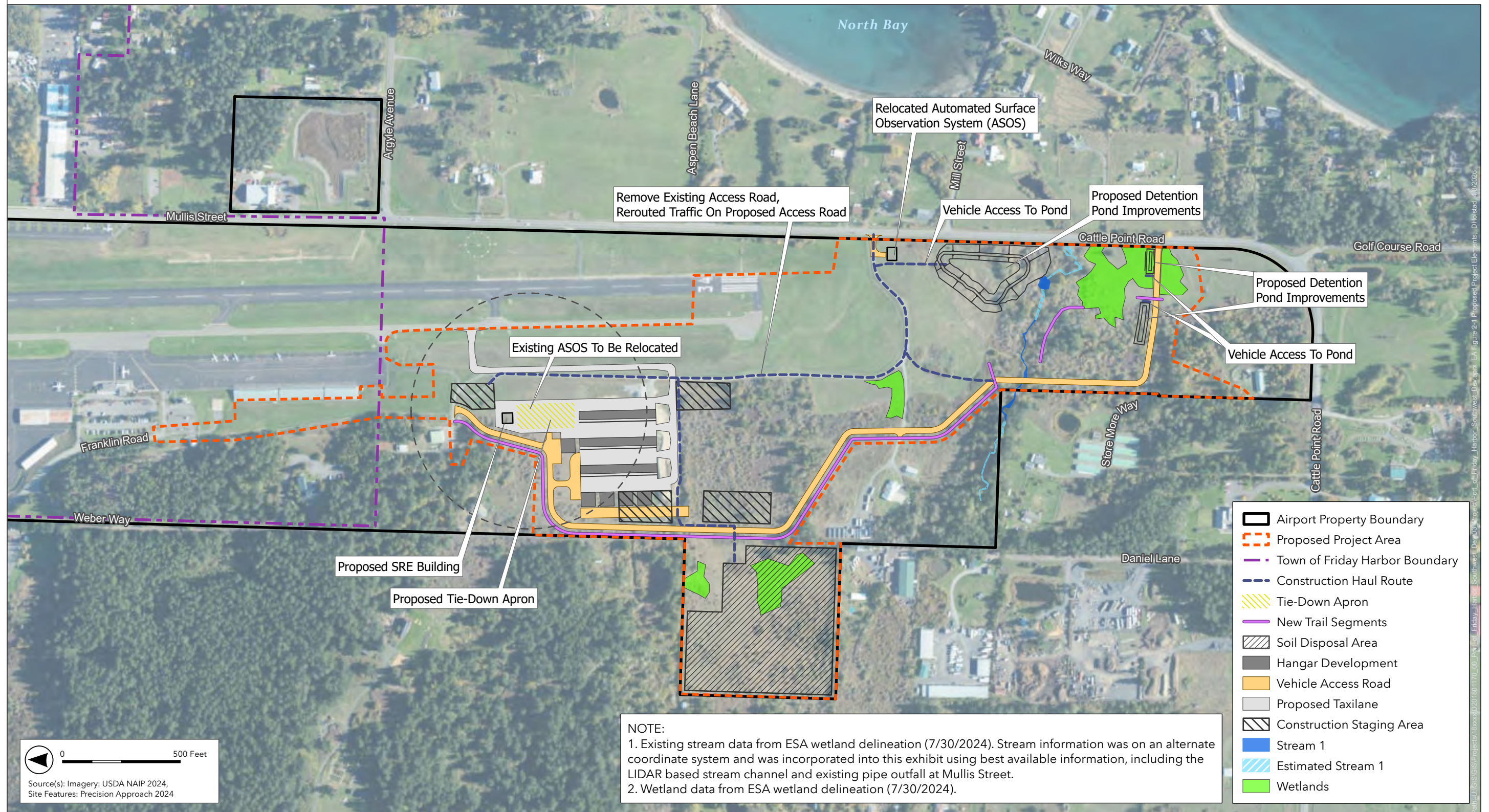
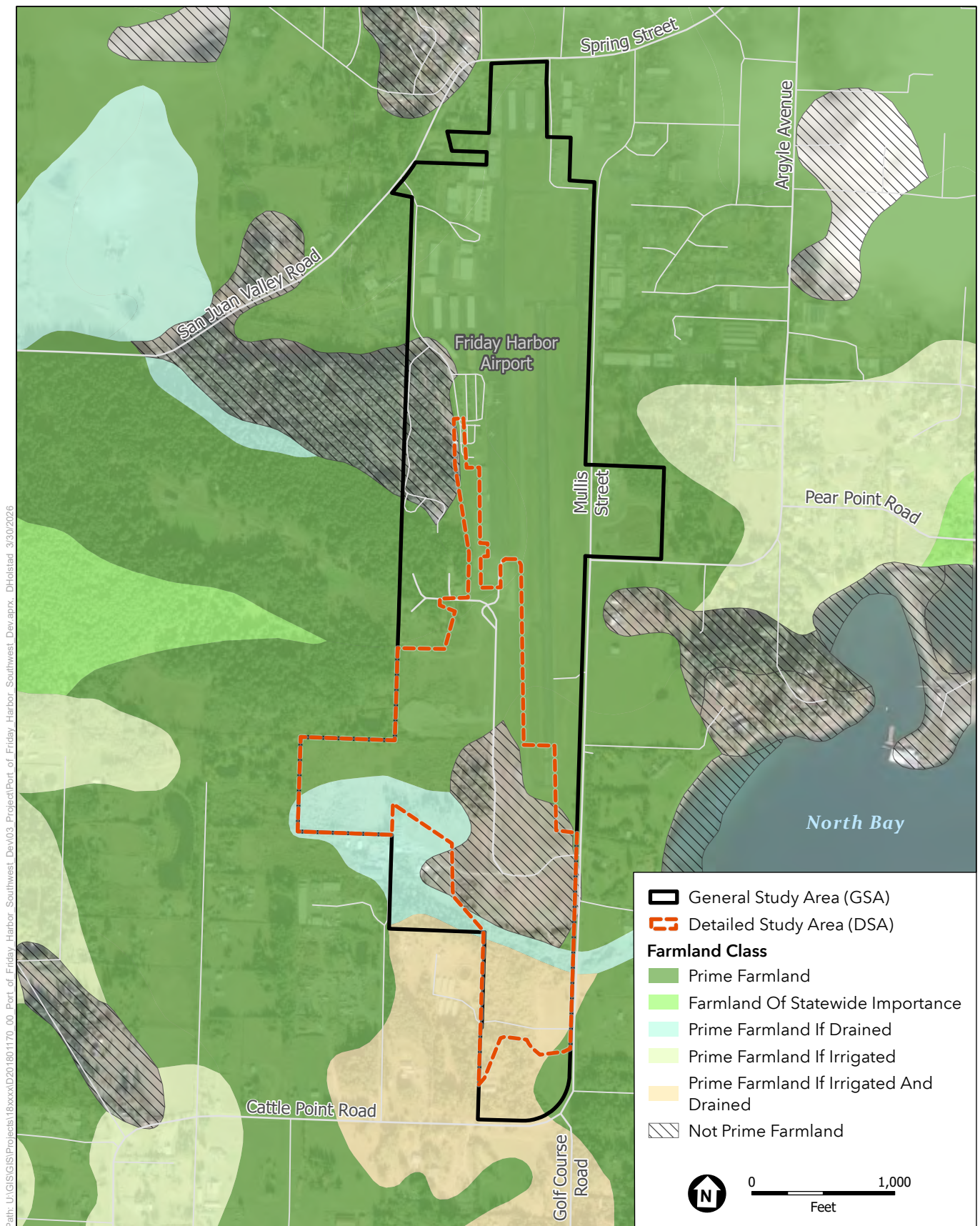


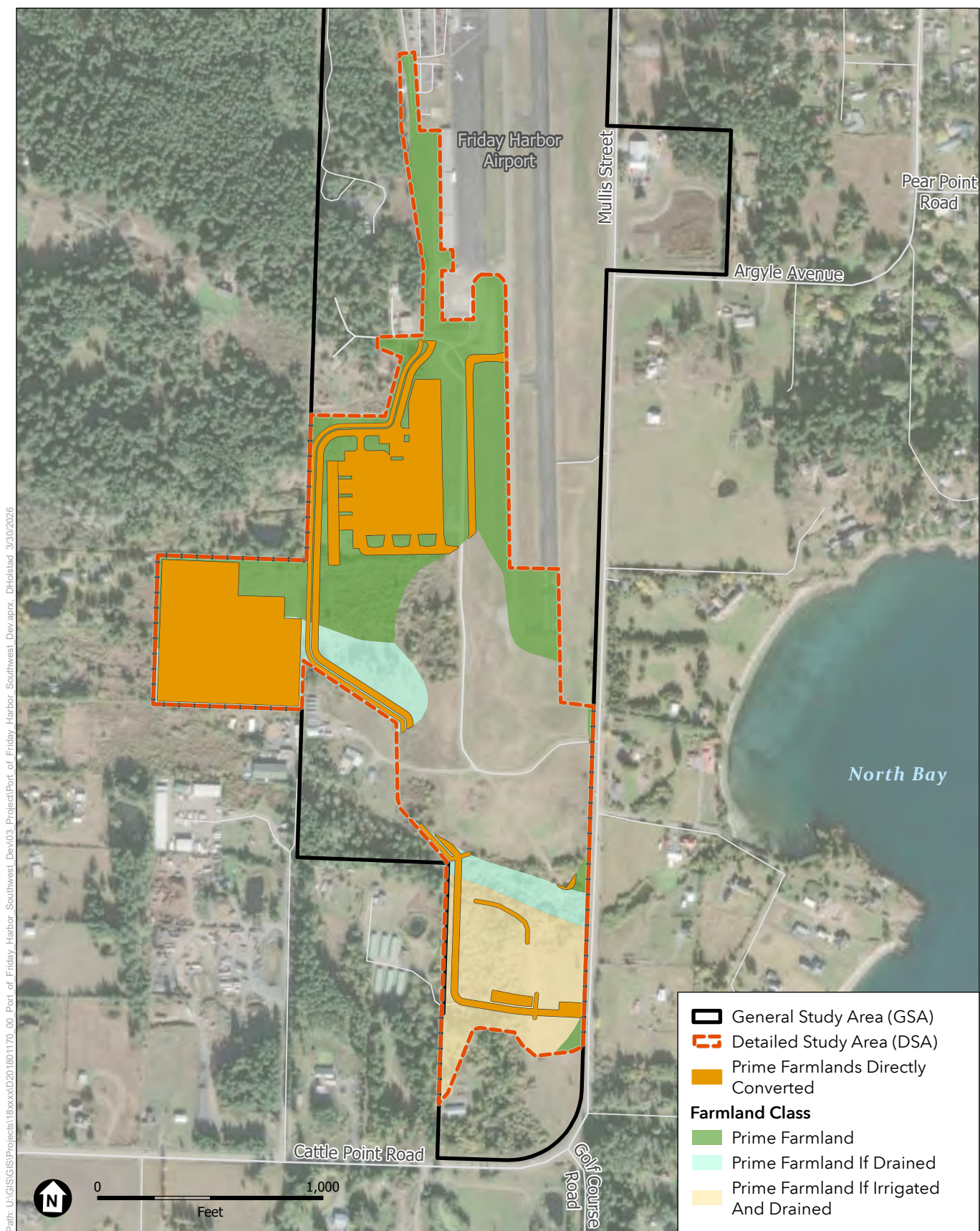
Figure 2
 Proposed Project – Location and Project Elements



SOURCE: Imagery: Maxar 2022; Soils: SSURGO 2025

Port of Friday Harbor Southwest Development

Figure 3
Prime Farmland in Study Area



SOURCE: Imagery: Maxar 2022; ESA 2023

Port of Friday Harbor Southwest Development

Figure 4
Prime Farmland Directly Converted to Non-Agricultural Use

Attachment B

NRCS Form AD-1006

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)					Date Of Land Evaluation Request					
Name of Project Friday Harbor Regional Airport Southwest Development Area					Federal Agency Federal Aviation Administration					
Proposed Land Use Airport operations and support					County and State San Juan County, Washington					
PART II (To be completed by NRCS)					Date Request Received By NRCS			Person Completing Form:		
Does the site contain Prime, Unique, Statewide or Local Important Farmland? (If no, the FPPA does not apply - do not complete additional parts of this form)					YES ☐ NO ☐		Acres Irrigated		Average Farm Size	
Major Crop(s)			Farmable Land In Govt. Jurisdiction Acres: %			Amount of Farmland As Defined in FPPA Acres: %				
Name of Land Evaluation System Used			Name of State or Local Site Assessment System			Date Land Evaluation Returned by NRCS				
PART III (To be completed by Federal Agency)					Alternative Site Rating					
					Site A	Site B	Site C	Site D		
A. Total Acres To Be Converted Directly					16.74					
B. Total Acres To Be Converted Indirectly					0					
C. Total Acres In Site					115					
PART IV (To be completed by NRCS) Land Evaluation Information										
A. Total Acres Prime And Unique Farmland										
B. Total Acres Statewide Important or Local Important Farmland										
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted										
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value										
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)										
PART VI (To be completed by Federal Agency) Site Assessment Criteria (Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)					Maximum Points	Site A	Site B	Site C	Site D	
1. Area In Non-urban Use					(15)	2				
2. Perimeter In Non-urban Use					(10)	0				
3. Percent Of Site Being Farmed					(20)	0				
4. Protection Provided By State and Local Government					(20)	0				
5. Distance From Urban Built-up Area					(15)	5				
6. Distance To Urban Support Services					(15)	0				
7. Size Of Present Farm Unit Compared To Average					(10)	0				
8. Creation Of Non-farmable Farmland					(10)	0				
9. Availability Of Farm Support Services					(5)	1				
10. On-Farm Investments					(20)	0				
11. Effects Of Conversion On Farm Support Services					(10)	0				
12. Compatibility With Existing Agricultural Use					(10)	2				
TOTAL SITE ASSESSMENT POINTS					160	10				
PART VII (To be completed by Federal Agency)										
Relative Value Of Farmland (From Part V)					100					
Total Site Assessment (From Part VI above or local site assessment)					160	10				
TOTAL POINTS (Total of above 2 lines)					260					
Site Selected:			Date Of Selection			Was A Local Site Assessment Used? YES ☐ NO ☒				
Reason For Selection: Project will improve undeveloped portions of the existing airport property for hanger, roadway, and trail uses. Though Prime Farmland areas are present on the property, no portion of the airport is used for agricultural purposes. There are no alternative sites.										
Name of Federal agency representative completing this form: Laura Sample - Federal Aviation Administration Date: 4/8/2026										

(See Instructions on reverse side)

Form AD-1006 (03-02)

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

- Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, <http://fppa.nrcs.usda.gov/lesa/>.
- Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s) of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map, or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)
- Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.
- Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.
- Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.
- Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.
- Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM (For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.
2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.

Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \times 160 = 144 \text{ points for Site A}$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.



Natural Resources Conservation Service

U.S. DEPARTMENT OF AGRICULTURE

Washington State Office

11707 E. Sprague Avenue, Suite 301
Spokane Valley, WA 99206

SUBJECT: Farmland Protection Policy Act

4/27/2026

Jessica Redman
ESA; Environmental Science Associates,

RE: Friday Harbor Regional Airport

Dear Ms. Redman,

The Farmland Protection Policy Act (FPPA) is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to non-agricultural use. It assures that to the extent possible federal programs are administered to be compatible with state, local units of government, and private programs and policies to protect farmland.

For the purpose of the FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to the FPPA requirements does not have to be currently used for cropland. Projects are subject to the FPPA requirements if they may irreversibly convert farmland to non-agriculture use and are completed by a federal agency or with assistance from a federal agency.

The Friday Harbor Regional Airport project area contains prime or important farmland that will be irreversibly converted as a result of project activities; see the attached FPPA Conversion Impact Rating Form and map. Project elements outside of the area shown on the attached map are not subject to FPPA because they are either not considered an irreversible farmland conversion or they occur within a US Census Bureau designated urban area.

NRCS encourages the use of accepted erosion control practices during the construction of this project.

If you have any further questions, please call at 360.480.6578.

Thank you,

Max Ross
State Resource Soil Scientist
Max.Ross@usda.gov

cc:

Robert Evans - State Resource Conservationist, NRCS, Spokane Valley WA
Roylene Comes at Night – State Conservationist, NRCS, Spokane Valley WA

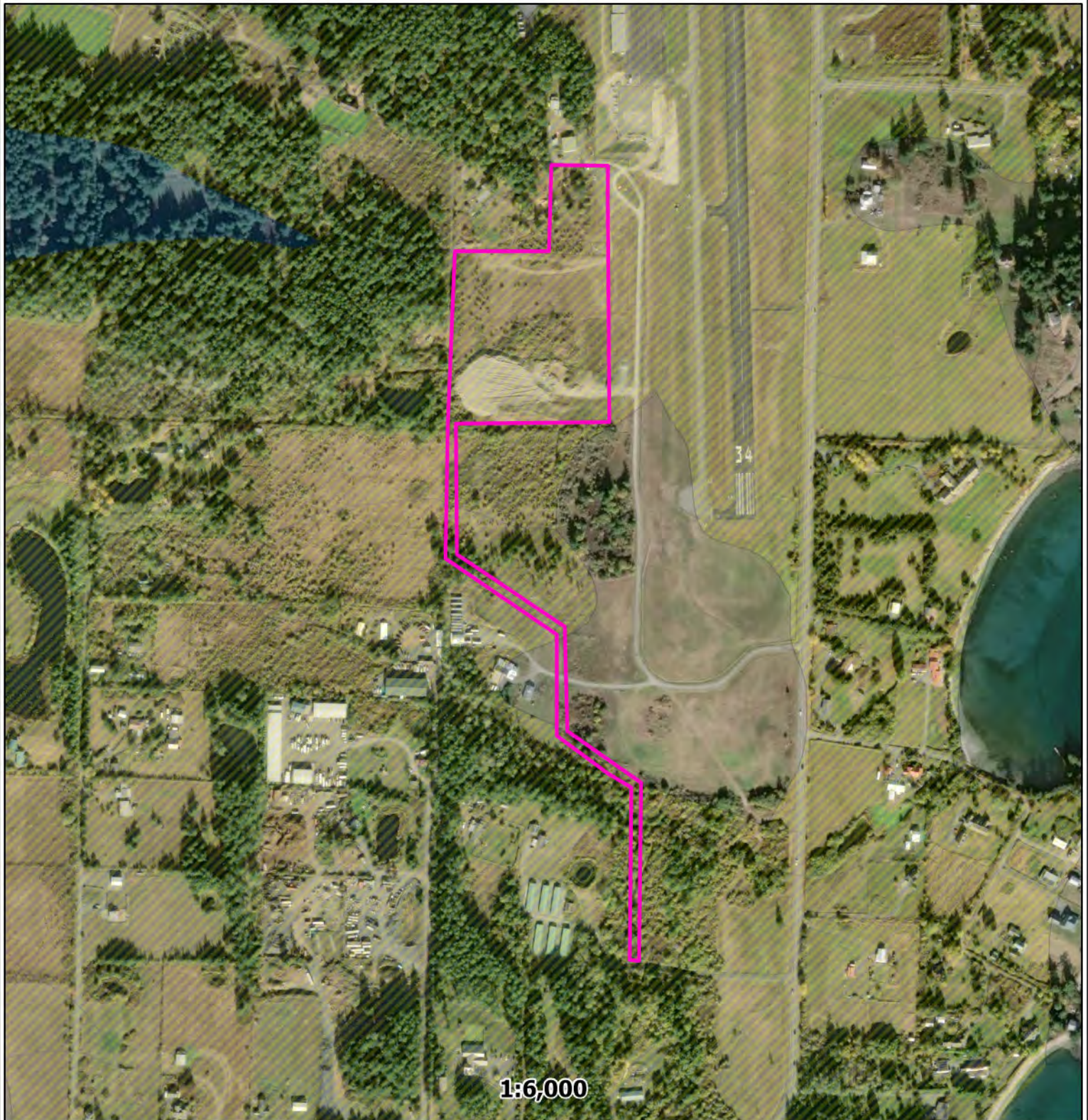
Helping People Help the Land

An Equal Opportunity Provider and Employer





Farmland Protection Policy Act Farmland Conversion Map



Legend

Farmland
Classification
farmland_class

-  Unique and Important Farmland
-  Not Prime Farmland
-  FH_Airport_Conversion_
-  Prime Farmland

Friday Harbor Regional Airport Expansion

4/27/2026

0 375 750 1,500 Feet

U.S. Department of Agriculture						
FARMLAND CONVERSION IMPACT RATING						
PART I (To be completed by Federal Agency)			Date Of Land Evaluation Request: 4/27/2026			
Name of Project: Friday Harbor Regional Airport			Federal Agency Involved: Federal Aviation Administration			
Proposed Land Use: Airport Expansion			County: San Juan		State: Washington	
PART II (To be completed by NRCS)			Date Received By NRCS: 4/27/2026		Person Completing Form: Max Ross	
Does the site contain Prime, Unique, Statewide or Local Important Farmland? (If no, the FPPA does not apply - do not complete additional parts of this form)			Yes		Acres Irrigated: 473	
					Average Farm Size: 74 Acres	
Major Crop(s):		Farmable Land in Govt. Jurisdiction Acres: 19571 % 17.02		Amount of Farmland as Defined in FPPA Acres: 52920.0 % 46.03		
Name of Land Evaluation System Used Crop Productivity Index		Name of State or Local Site Assessment System Washington		Date Land Evaluation Returned by NRCS: 4/27/2026		
PART III (To be completed by Federal Agency)			Alternative Site Rating			
			Site A	Site B	Site C	Site D
A. Total Acres to Be Converted Directly			16.74			
B. Total Acres to Be Converted Indirectly			0			
C. Total Acres in Site			115			
PART IV (To be completed by NRCS) Land Evaluation Information						
A. Total Acres Prime and Unique Farmland			11.46			
B. Total Acres Statewide Important or Local Important Farmland			0			
C. Percentage of Farmland in County or Local Govt. Unit to Be Converted			0.02			
D. Percentage of Farmland in Govt. Jurisdiction with Same or Higher Relative Value			24.91			
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland to Be Converted (Scale of 0 to 100 Points)			82			
PART VI (To be completed by Federal Agency) Site Assessment Criteria (Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)			Maximum Points	Site A	Site B	Site C
1. Area In Non-Urban Use			(15)	2		
2. Perimeter In Non-Urban Use			(10)	0		
3. Percent Of Site Being Farmed			(20)	0		
4. Protection Provided by State and Local Government			(20)	0		
5. Distance From Urban Built-up Area			(15)	5		
6. Distance To Urban Support Services			(15)	0		
7. Size Of Present Farm Unit Compared to Average			(10)	0		
8. Creation Of Non-Farmable Farmland			(10)	0		
9. Availability Of Farm Support Services			(5)	1		
10. On-Farm Investments			(20)	0		
11. Effects Of Conversion on Farm Support Services			(10)	0		
12. Compatibility With Existing Agricultural Use			(10)	2		
TOTAL SITE ASSESSMENT POINTS			160	10		
PART VII (To be completed by Federal Agency)						
Relative Value of Farmland (From Part V)			100	82		
Total Site Assessment (From Part VI above or local site assessment)			160	10		
TOTAL POINTS (Total of above 2 lines)			260	92		
Site Selected:		Date Of Selection		Was A Local Site Assessment Used?		
				YES ☐ NO ☒		
Reason For Selection: Project will improve undeveloped portions of the existing airport property for hanger, roadway, and trail uses. Though Prime Farmland areas are present on the property, no portion of the airport is used for agricultural purposes. There are no alternative sites.						
Name of Federal agency representative completing this form: Laura Sample – Federal Aviation Administration					Date: 4/27/2026	

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

- Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, <http://fppa.nrcs.usda.gov/lesa/>.
- Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s) of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map, or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)
- Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.
- Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.
- Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.
- Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.
- Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.
2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.

Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \times 160 = 144 \text{ points for Site A}$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.

Appendix D

Historic & Cultural Resources

D1 Cultural Resources Inventory and Evaluation Report

Confidential

Not included in public distribution.

D2 FAA and DAHP Section 106 Consultation



U.S. Department
of Transportation
**Federal Aviation
Administration**

Seattle Airports District Office
2200 S. 216th Street
Des Moines, WA. 98198

November 15, 2024

Friday Harbor Airport (FHR)
DAHP Project: 2024-11-08343
Friday Harbor, San Juan County, WA
APE and Survey Methodology Memo

To Whom this Concerns,

The Federal Aviation Administration (FAA) would like to initiate consultation with you in accordance with Section 106 of the National Historic Preservation Act of 1966, and implementing regulations 36 CFR Part 800 for the aforementioned project.

Project Description

The Project involves development of various Aircraft Operations Areas, aircraft storage and parking facilities, and supporting infrastructure on an approximately 115-acre site on the southwest portion of the Airport property, known as the Southwest Development Area (SWDA).

- Construction of three approximately 12,000-square-foot (SF) T-Hangars, and five box hangars with a maximum size of approximately 10,000 SF each.
- Construction of taxilanes and aircraft parking apron to support approximately 10 aircraft FAA Airplane Design Group I (Up to 49' wingspan) standards.
- Construction of approximately 7 acres of Aircraft Operations Area pavements, aircraft operational support areas, and vehicle pavements. Includes approximately 4,200 linear feet of vehicle roadway and approximately 35 vehicle parking stalls for aircraft hangars and Airport operations support. Roadway would connect to Cattle Point Road at the existing Store More Way intersection, result in improvements to the existing Store More Way roadway and includes crossing an existing stream. Vehicle parking would be located on the northwestern portion of the Project site.
- Construction of one 2,000-SF snow removal equipment (SRE) building.

- Construction of approximately 35 vehicle parking stalls. Hangar parking would be located on the northwestern portion of the Project site.
- Relocation of the existing FAA-owned Automated Surface Observing Systems (ASOS) aircraft weather station including associated utilities.
- Removal of the existing Shelter Road access to Airport property which eliminates an incompatible use in the existing Runway 34 Runway Protection Zone.
- Installation of new security fencing, vehicle gates, and pedestrian gates around the perimeter of the proposed Aircraft Operations Area.
- Installation of pole-mounted and/or building-mounted exterior lights for vehicle parking lots, and aircraft parking apron.
- Installation of appropriate airfield lights, retroreflective markers, and signage for the aircraft parking apron and taxilanes.
- Land clearing, demolition of existing facilities, excavation, embankment, grading, and retaining wall construction.
- Extension of utilities to the Project site, including electrical power. A utility corridor will be provided to allow for the future installation of utilities not installed during this project which may include water, sanitary sewer, communications, fiber, and other related utility infrastructure.
- Installation of stormwater collection, conveyance, treatment, flow control systems, and associated infrastructure.
- Realignment of a portion of the existing Clark McAlpine trail that crosses the Project site, resulting in approximately 3,500 linear feet of realigned Trail.
- Landscaping and permanent soil stabilization measures.
- Geotechnical studies to support development of stormwater retention ponds.

Area of Potential Effect

The APE encompasses the full extent of the proposed Project components listed above, and includes all demolition, construction, supporting improvements for drainage and utilities, staging, and stockpiling (see Figures 1-3). The horizontal APE is approximately 73 acres in total and the vertical APE is 15 feet below ground surface (bgs), which is the maximum depth of proposed ground disturbance.

Preliminary Historical and Archaeological Review

The Washington State Department of Archaeology and Historic Preservation (DAHP) statewide predictive model classifies the APE as High Risk for containing precontact-era cultural resources. This model does not predict the potential for historic-era archaeological resources or aboveground historic properties, which may be present within the APE.

The APE does not contain any recorded cemeteries, traditional cultural properties, or historic properties listed or determined eligible for listing in the National Register of Historic Places. There are no recorded historic aged buildings within or adjacent to the APE, and no archaeological sites

have been recorded within or adjacent to the Airport. Multiple precontact period sites are found to the east of the Airport along the coastline, as close as a third of a mile.

Two previous cultural resources studies have been conducted within and immediately adjacent to the APE (**Figure 4**), neither of which resulted in identification of archaeological resources. In 2009, Paragon Research Associates examined 30 geotechnical test pits, two of which were within the APE, in advance of hangar development, but none of the test pits contained cultural materials (Hoyt et al. 2009; DAHP No. 1353066). Paragon determined that the majority of the study area had been heavily disturbed by clearing and leveling activities associated first with logging, and later from Airport construction and maintenance. In most places topsoil has been completely removed leaving only consolidated glacial deposits; where topsoil/A-horizon was intact it extended 30-40 cm bgs. Paragon recommended no additional cultural resource investigations within the examined areas.

In 2022, Drayton Archaeology conducted pedestrian survey and shovel probe testing within and adjacent to the northwest portion of the APE (Gareth and Hill 2022; DAHP No. 1696518). No archaeological resources were identified as part of the study and subsurface conditions encountered during shovel probe testing consisted of shallow soils with an A horizon extending 15-40 cm bgs.

Additionally, as a part of due diligence during data collection in support of potential new development projects at the Airport, ESA conducted archaeological monitoring of geotechnical trenching and archaeological surface survey across the Airport in 2023, including the APE. This work was done in support of an earlier version of this Project. The results of this work have not yet been formally reported, but will be included the cultural resources assessment report for the Project. This work did not identify any resources and found that many areas within the APE have been heavily altered by past earthwork for Airport construction. Figure 4 provides the locations of monitored geotechnical trenches and the surface survey findings, which identified areas of minimal, moderate, and major previous ground disturbance; these areas are clearly seen in light detection and ranging (LiDAR) imagery provided on Figure 4. The 2023 surface survey and archaeological monitoring of geotechnical explorations confirmed that the upper portion (A horizon) of the pre-development land surface had been disturbed (areas of “moderate disturbance” on Figure 4) or entirely removed with archaeologically-sterile glacial deposits exposed at the surface (areas of “major disturbance” on Figure 4) across much of the APE.

Proposed Survey Methods

Following FAA approval of the APE, ESA proposes to prepare a cultural resources assessment that will use a 1-mile study area for a literature review. No built environment features will be recorded or evaluated as part of this effort. ESA will conduct an archaeological surface survey across the entire APE. Transect intervals will vary depending on the existing conditions present within the APE. Paved areas will be at a wide 30 meter (100 foot) interval, as will major disturbance areas. This portion of the APE includes the proposed hangar and taxiway developments, exiting taxiways and runway, soils disposal areas and the majority of the construction staging. Moderate and minimal disturbance areas will be surveyed at a tighter 20 meter (66 foot) transect interval. This portion of the APE includes the majority of the proposed road and trail alignment along the west side of the APE, as well as the proposed detention ponds and ASOS in the southeast portion of the APE. Those areas of the APE characterized

by moderate disturbance will be subject to shovel test probe excavations at 30-meter intervals. Project elements subject to this moderate level of survey include the tie-down apron, soil disposal area, and two staging areas. Portions of the APE characterized by minimal disturbance will be subject to a tighter 20 meter shovel probe interval. This portion of the APE includes the majority of the proposed trail alignment, the detention ponds, and the new ASOS station. No subsurface survey is proposed in portions of the APE containing existing impervious surfaces or those areas shown to have been subject to major past ground disturbance.

Shovel probes will consist of hand excavated round holes, approximately 40 cm (1.3 feet) in diameter. Probes will be excavated from the ground surface until they encounter intact glacial soils. If excavation is required further than 1 meter (3.3 feet) bgs, then probe excavation will be continued with a hand advanced 10 cm (4 in.) bucket auger. Excavated soil matrix will be screened through ¼ inch hardware mesh. Digital notes on probe location, soil description, and presence of artifacts or features will be recorded. If artifacts or features are encountered ESA will conduct analysis and description of the finds in the field. Artifacts will be reburied at the location of the find. Finds will be delineated within the bounds of the APE.

If additional geotechnical work is required for the Project, and that work consists of mechanically excavated pits or trenches within the minimally or moderately disturbed portions of the APE, then that work will be subject to archaeological monitoring. If geotechnical work is required in heavily disturbed areas, or the work consists of smaller data collection units, such as direct push borings, augers, or hand excavated test pits, then the results of the geotechnical investigation will be reviewed and included in the cultural resources assessment, but not subject to direct monitoring.

TRIBAL CONSULTATION

The Federal Aviation Administration (FAA) will initiate government-to-government consultation during the consultation for APE/survey methodology and final project concurrence with the following tribes:

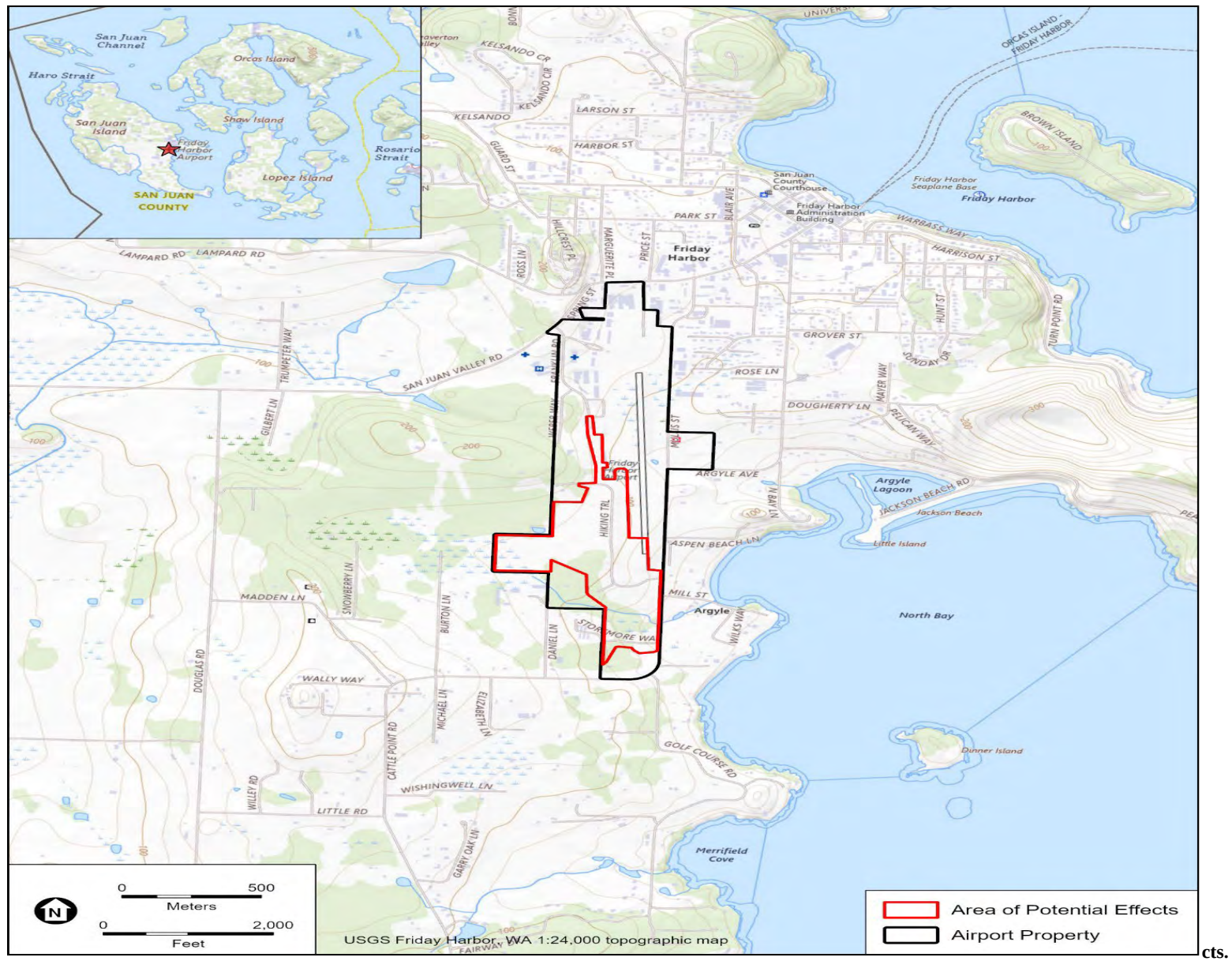
Confederated Tribes of the Warm Springs Reservation of Oregon
Lummi Tribe of the Lummi Reservation
Samish Indian Nation
Swinomish Indian Tribal Community

The FAA will notify DAHP of any concerns raised as part of the government-to-government consultation process.

If you have questions, please call me at (206)-231-4136.

Sincerely,

Matthew Prevo
Environmental Protection Specialist
FAA – SEATTLE ADO



cts.

Figure 1. Area of Potential Effects.



Figure 2. Area of Potential Effects, aerial view.

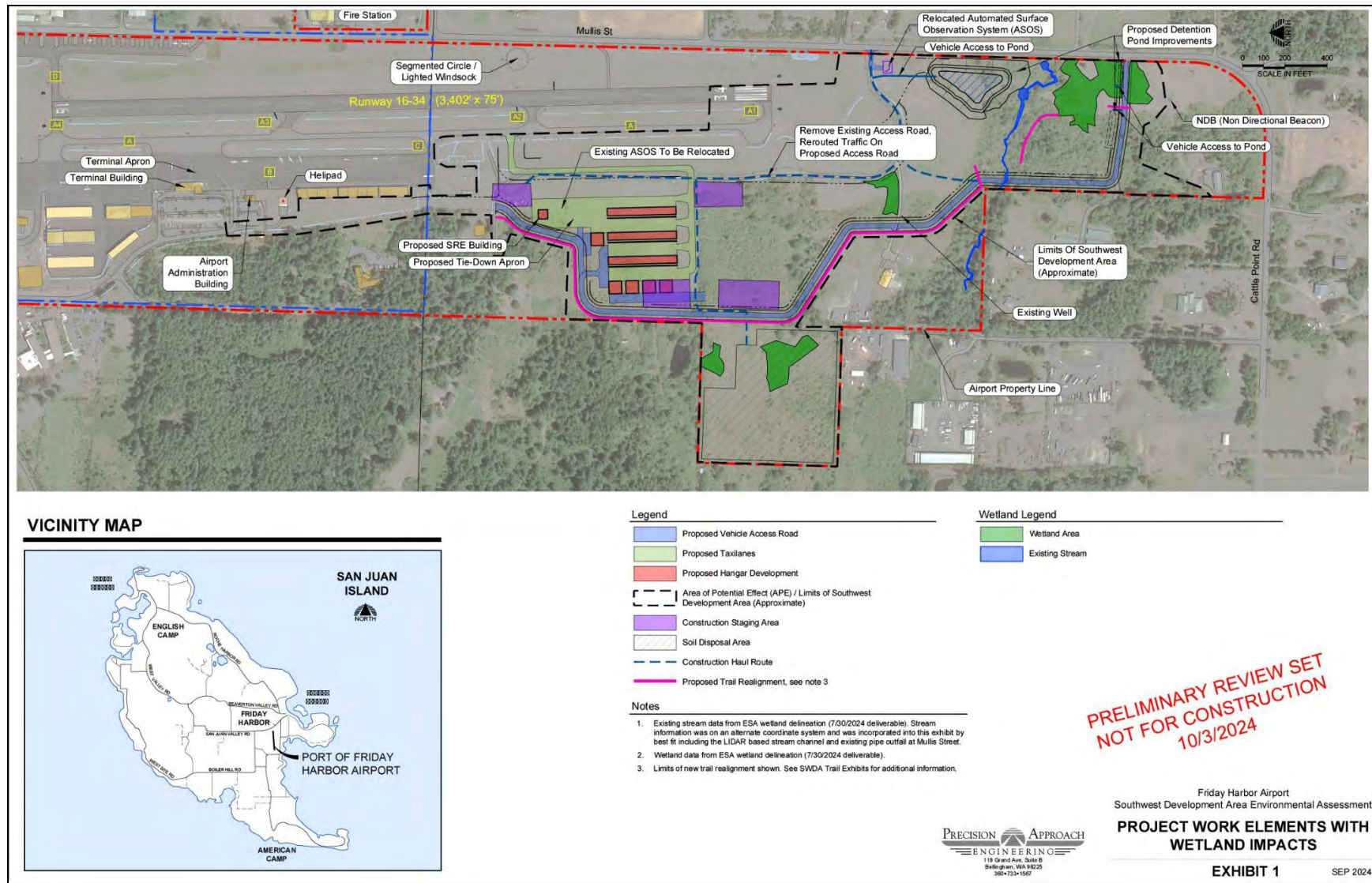


Figure 3. Proposed project components.



U.S. Department
of Transportation
**Federal Aviation
Administration**

Northwest Mountain Region
Colorado · Idaho · Montana · Oregon · Utah
Washington · Wyoming

Seattle Airports District Office
2200 S. 216th Street, Room 1W-420
Des Moines, WA 98198

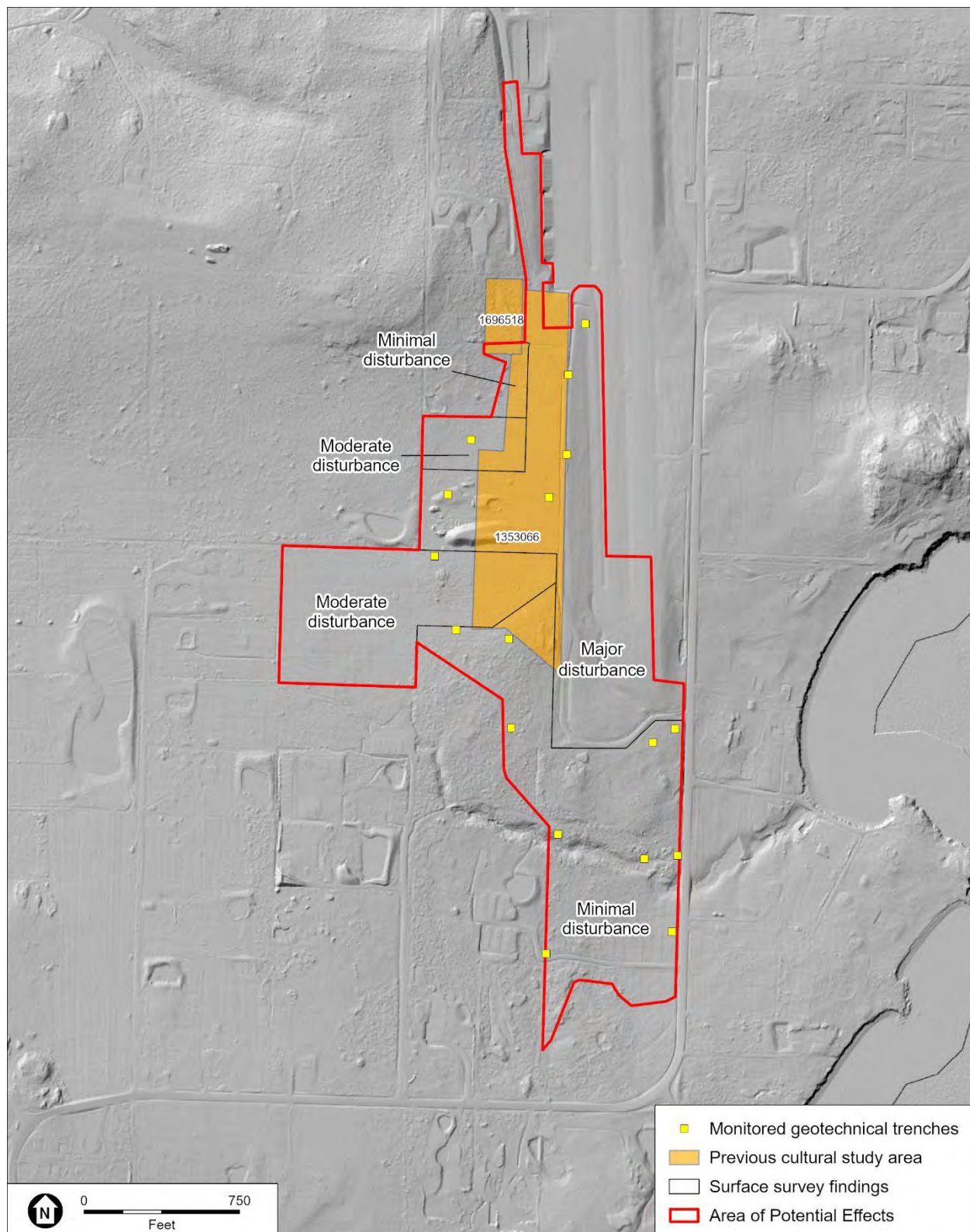


Figure 4. Previous cultural resources studies and 2023 field reconnaissance findings on LiDAR imagery.



U.S. Department
of Transportation
**Federal Aviation
Administration**

Northwest Mountain Region
Colorado · Idaho · Montana · Oregon · Utah
Washington · Wyoming

Seattle Airports District Office
2200 S. 216th Street, Room 1W-420
Des Moines, WA 98198

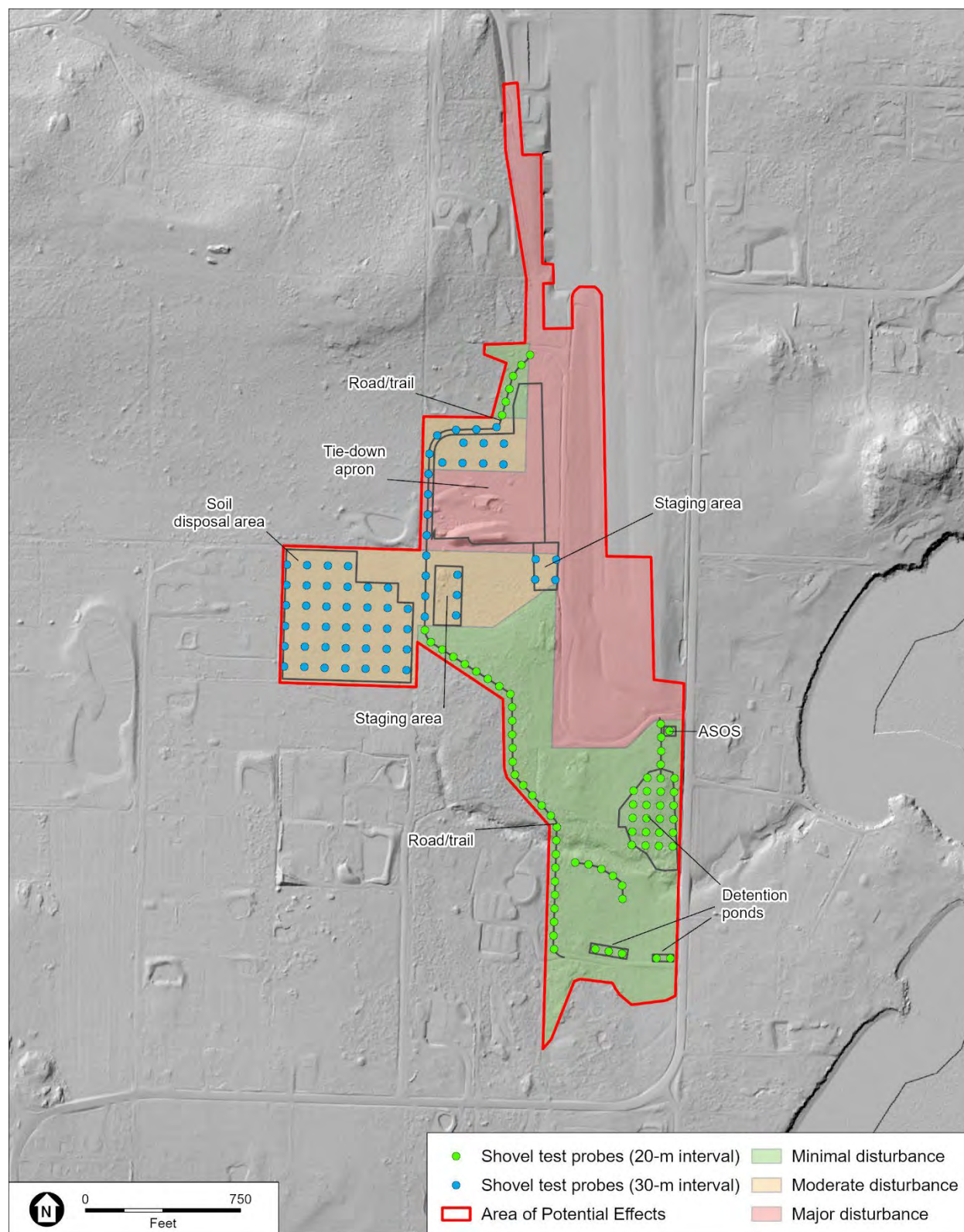


Figure 5. Proposed subsurface testing locations on LiDAR imagery.



Allyson Brooks Ph.D., Director
State Historic Preservation Officer

November 18, 2024

Mr. Matthew Prevo
Environmental Protection Specialist
Federal Aviation Administration

In future correspondence please refer to:
Project Tracking Code: 2024-11-08343
Property: Friday Harbor Airport Southwest Development Area - EA
Re: APE Concur

Dear Mr. Prevo:

Thank you for contacting the State Historic Preservation Officer (SHPO) and Department of Archaeology and Historic Preservation (DAHP) regarding the above referenced project. In response, we have reviewed your description and map of the area of potential effect (APE).

We concur with your definition of the APE. Along with the results of the inventory we will need to review your consultation with the concerned tribes, and other interested/affected parties. Please provide any correspondence or comments from concerned tribes and/or other parties that you receive as you consult under the requirements of 36 CFR 800.4(a)(4).

These comments are based on the information available at the time of this review and on behalf of the SHPO in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36 CFR 800. Should additional information about the project become available, our assessment may be revised.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,

Dennis Wardlaw
Transportation Archaeologist
(360) 485-5014
dennis.wardlaw@dahp.wa.gov





Allyson Brooks Ph.D., Director
State Historic Preservation Officer

March 24, 2026

Mr. Clayton Knudson
Environmental Protection Specialist
Federal Aviation Administration

In future correspondence please refer to:
Project Tracking Code: 2024-11-08343
Property: Friday Harbor Airport Southwest Development Area - EA
Re: No Historic Properties Affected

Dear Mr. Knudson:

Thank you for contacting the Department of Archaeology and Historic Preservation (DAHP) and providing a copy of the cultural resources survey report for the above-referenced project. As a result of our review, we concur with the recommendations made in the report and your finding of No Historic Properties Affected. As a result of our concurrence, further contact with DAHP on this matter is not necessary.

However, if information becomes available and/or the scope of work changes, please resume consultation with DAHP and all consulting parties. In the event that archaeological or historic materials are discovered during project activities, work in the immediate vicinity must stop, the area secured, and contact made with concerned tribes and DAHP for further consultation.

We appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36 CFR 800.4(a)(4).

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36 CFR 800.

Thank you for the opportunity to review and comment. If you have any questions, please feel free to contact me.

Sincerely,

A handwritten signature in blue ink, appearing to read 'D. Wardlaw', is positioned above the typed name.

Dennis Wardlaw
Transportation Archaeologist
(360) 485-5014
dennis.wardlaw@dahp.wa.gov



D3 Cultural Resources Inadvertent Discovery Plan

FRIDAY HARBOR REGIONAL AIRPORT SOUTHWEST DEVELOPMENT AREA

Cultural Resources Inadvertent Discovery Plan

Prepared for
Port of Friday Harbor

April 2026



FRIDAY HARBOR REGIONAL AIRPORT SOUTHWEST DEVELOPMENT AREA

Cultural Resources Inadvertent Discovery Plan

Prepared for
Port of Friday Harbor

April 2026

Prepared by
Tom Ostrander M. Sc., and Rowan Leinart, M.A.,

Services provided pursuant to this Agreement are intended solely for the use and benefit of the Port of Friday Harbor.

No other person or entity shall be entitled to rely on the services, opinions, recommendations, plans or specifications provided pursuant to this agreement without the express written consent of ESA, 575 Market Street, San Francisco CA 94105.

2801 Alaskan Way
Suite 200
Seattle, WA 98121
206.789.9658
esassoc.com



Bend	Pasadena	San Francisco
Irvine	Pensacola	San Jose
Los Angeles	Petaluma	Santa Barbara
Mobile	Portland	Sarasota
Oakland	Rancho Cucamonga	Seattle
Orlando	Sacramento	Tampa
Palm Beach County	San Diego	Thousand Oaks

CONTENTS

	<u>Page</u>
Acronyms and Other Abbreviations	ii
1. Introduction	1
2. Regulatory Environment	1
3. Area of Potential Effects	1
4. Project Description	4
5. Cultural Resources Identification	5
5.1 Human Remains	6
5.2 Resources Not Requiring DAHP Documentation	6
5.3 Resources Requiring DAHP Documentation	6
6. Procedures for Notification	7
7. Inadvertent Discovery of Human Remains	8
8. References	9
9. Contact Information	9

Figures

Figure 1. Friday Harbor Regional Airport Southwest Development Area APE	2
Figure 2. Detail of the Friday Harbor Regional Airport Southwest Development Area APE	3
Figure 3. Schematic of Proposed Work	5

ACRONYMS AND OTHER ABBREVIATIONS

Abbreviation	Definition
AOAs	Aircraft Operations Areas
APE	Area of Potential Effects
ASOS	Automated Surface Observing Systems
CRA	cultural resources assessment
DAHP	Department of Archaeology and Historic Preservation
ESA	Environmental Science Associates
FAA	Federal Aviation Administration
FHR	Friday Harbor Regional Airport
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
RCW	Revised Code of Washington
SF	square-foot
SRE	snow removal equipment

1. INTRODUCTION

This Inadvertent Discovery Plan (IDP) has been prepared at the request of the Federal Aviation Administration (FAA). It was developed for use during ground disturbing construction for the Port of Friday Harbor's Project (project) in San Juan County, Washington. The project is located at the Friday Harbor Regional Airport (FHR) in Sections 14 and 23 of Township 35 North, Range 3 West, on the Friday Harbor, Washington 7.5' series topographic map (Figure 1). This IDP establishes procedures to be implemented in the event that cultural resources are inadvertently discovered during project activities.

This plan provides a generalized approach to identifying, protecting, and resolving inadvertent discoveries of cultural resources that may be eligible for inclusion in the National Register of Historic Places (NRHP).

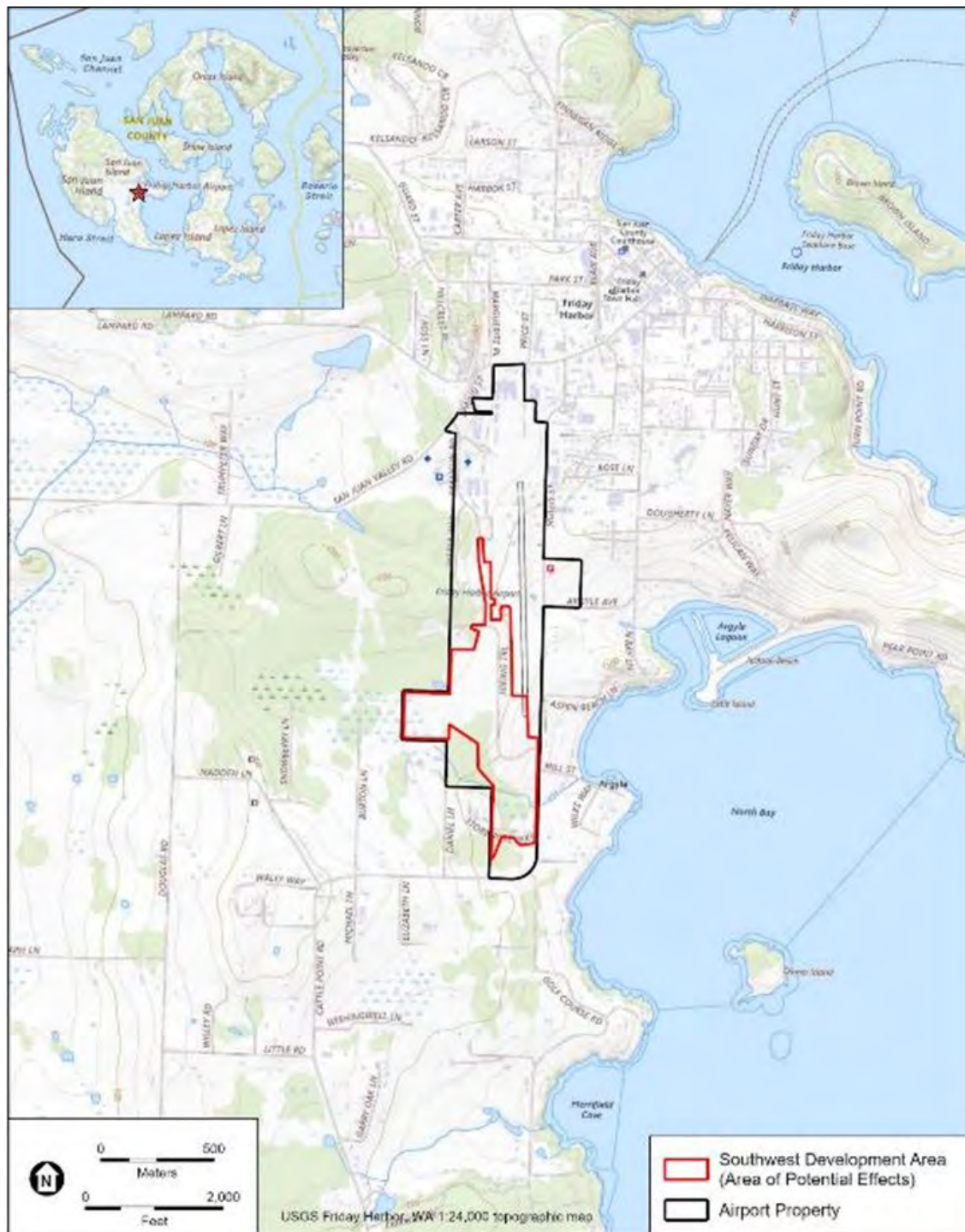
2. REGULATORY ENVIRONMENT

The Project is receiving funding from the FAA. Federal funding of the Project constitutes a Federal "undertaking" and requires that the Project comply with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 CFR 800. Section 106 requires that FAA consider the effects of this undertaking upon Historic Properties within the Project's Area of Potential Effects (APE) (Figure 2). In coordination with the Washington State Department of Archaeology and Historic Preservation (DAHP), the Confederated Tribes of the Warm Springs Reservation of Oregon, Lummi Tribe of the Lummi Reservation, Samish Indian Nation, and the Swinomish Indian Tribal Community, the Port of Friday Harbor and FAA defined the APE for the Project.

The project will also comply with all State laws pertaining to cultural resources including Archaeological Sites and Resources (Revised Code of Washington [RCW] 27.53), Indian Graves and Records (RCW 27.44), Human Remains (RCW 68.50), and Abandoned and Historic Cemeteries and Historic Graves (RCW 68.60).

3. AREA OF POTENTIAL EFFECTS

The APE consists of the maximum extent of horizontal and vertical proposed areas of ground disturbance. The anticipated maximum depth of ground disturbance is 15 feet (4.6 meters) below surface. The entire APE is 73 acres in size.



Prepared by ESA 2025

Figure 1.
Friday Harbor Regional Airport Southwest Development Area APE



Prepared by ESA 2025

Figure 2.

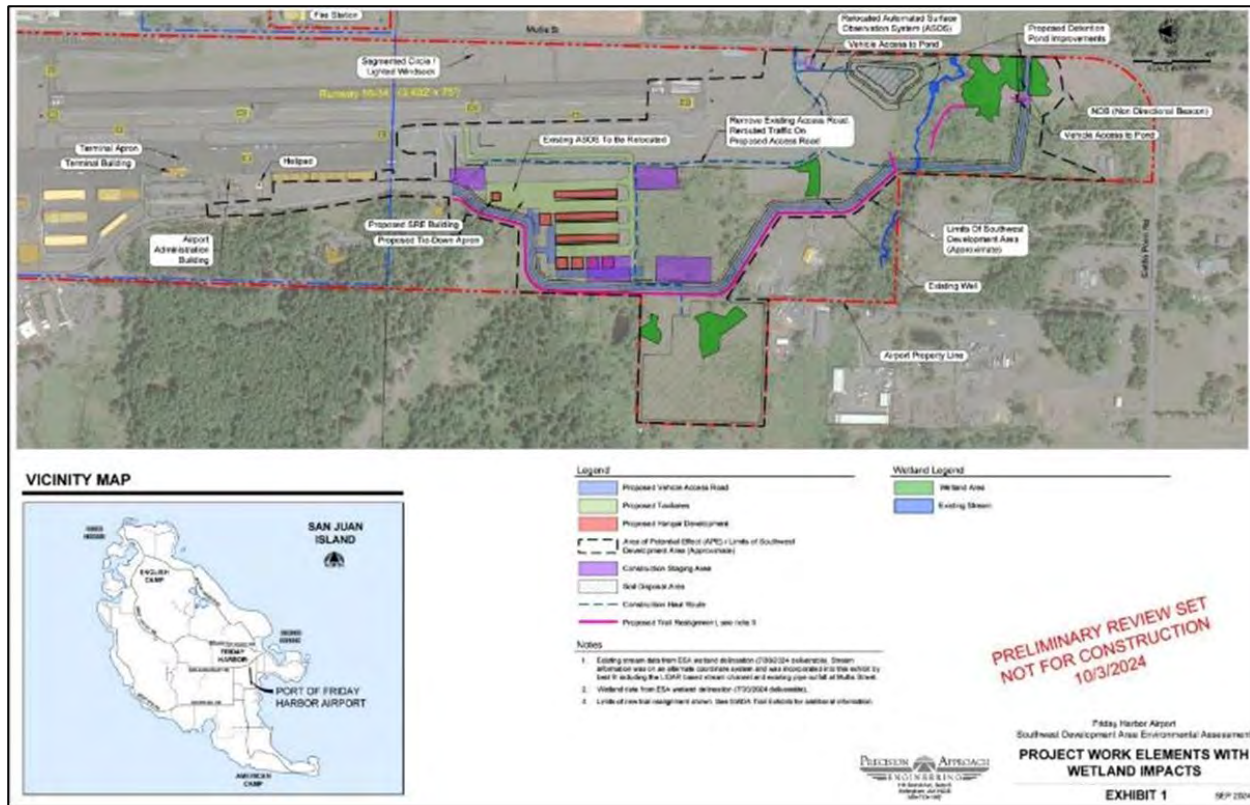
Detail of the Friday Harbor Regional Airport Southwest Development Area APE

4. PROJECT DESCRIPTION

The Project involves development of various Aircraft Operations Areas (AOAs), aircraft storage and parking facilities, and supporting infrastructure on an approximately 73-acre site on the southwest portion of the Airport property, known as the SWDA. Figure 3 provides a site schematic of the Project components, which include the following:

- Construction of three approximately 12,000-square-foot (SF) T-hangars, and five box hangars with a maximum size of approximately 10,000 SF each.
- Construction of taxilanes and an aircraft parking tie-down apron to support approximately 10 aircraft Federal Aviation Administration (FAA) Airplane Design Group I (Up to 49-foot wingspan) standards.
- Construction of approximately 7 acres of AOA pavement, aircraft operational support and staging areas, and vehicle pavement. Includes approximately 4,200 linear feet of vehicle roadway and approximately 35 vehicle parking stalls for aircraft hangars and Airport operations support. The roadway would connect to Cattle Point Road at the existing Store More Way intersection, require improvements to the existing Store More Way roadway and include crossing an existing stream. Vehicle parking would be located on the northwestern portion of the Project site.
- Construction of one 2,000-SF snow removal equipment (SRE) building.
- Construction of approximately 35 vehicle parking stalls. Hangar parking would be located on the northwestern portion of the Project site.
- Relocation of the existing FAA-owned Automated Surface Observing Systems (ASOS) aircraft weather station, including associated utilities.
- Removal of the existing Shelter Road access to Airport property, which would eliminate an incompatible use in the existing Runway 34 Runway Protection Zone.
- Installation of new security fencing, vehicle gates, and pedestrian gates around the perimeter of the proposed AOA.
- Installation of pole-mounted and/or building-mounted exterior lights for vehicle parking lots, and aircraft parking apron.
- Installation of appropriate airfield lights, retroreflective markers, and signage for the aircraft parking apron and taxilanes.
- Land clearing, demolition of existing facilities, excavation, embankment, grading, and retaining wall construction.
- Extension of utilities to the Project site, including electrical power. A utility corridor will be constructed to allow for the future installation of utilities not installed during this Project, which may include water, sanitary sewer, communications, fiber, and other related utility infrastructure.
- Installation of stormwater collection, conveyance, treatment, flow control systems, and associated infrastructure, including detention basins.

- Realignment of a portion of the existing Clark McAlpine Trail that crosses the Project site, resulting in approximately 3,500 linear feet of realigned trail.
- Landscaping and permanent soil stabilization measures.
- Geotechnical studies to support development of stormwater retention ponds.



SOURCE: Provided by Precision Approach Engineering

Figure 3.
Schematic of Proposed Work

5. CULTURAL RESOURCES IDENTIFICATION

There are no recorded archaeological sites within the Project APE. The nearest recorded archaeological site is 45-SJ-616, a multi-component site consisting of a historic debris scatter and a precontact-era shell midden located 0.18 mile east of the APE.

During the project planning phase a cultural resources identification effort was conducted as part of the Section 106 Process. This effort resulted in the authorship of a cultural resources assessment (CRA) report for the Project. The CRA consisted of a background research effort into the natural and cultural history of the APE and the surrounding area, and an archaeological survey. The archaeological survey consisted of an archaeological surface survey across the entire APE, monitoring of a total of 25 geotechnical investigations, and a subsurface survey that included excavation of 135 shovel test probes.

No archaeological or historic resources (buildings, districts, structures, objects, and sites) were identified within the APE. The surface and subsurface surveys did not identify any archaeological sites, isolates, or other potential indicators of past cultural activity, or landforms with a high potential for containing such resources (Zimmer et al 2026).

5.1 Human Remains

If any human remains are discovered, all work will immediately cease. See Section 7.0.

5.2 Resources Not Requiring DAHP Documentation

The following materials are presumed not significant and would not require recording:

- Isolated (single) cans or bottles
- Materials less than 50 years old
- Abandoned utilities

5.3 Resources Requiring DAHP Documentation

The following materials that are older than 50 years, if encountered, are presumed to require recording. These are broadly divided into two categories. The first category are cultural resources associated with the precontact-era, and the second category are cultural resources associated with the historic-era.

- Precontact-era cultural resources may include, but are not limited to:
 - Stone tools and flaking debris
 - River mussel shell or non-sawed bone fragments
 - Charcoal concentrations and darkened earth
 - Fire-modified rock or unaltered cached rock piles
 - Wooden posts (house posts, food drying racks)
 - Basketry or fiber objects (cedar twine ropes, woven mats, cedar twine fishing nets)
- Historic-era cultural resources may include, but are not limited to:
 - Low-fired and bisque ceramics with subdued colors, or blue/pink willow-like design; thick-bodied pieces, indicating crockery
 - Non-tempered glass, violet-colored glass, stopper-topped glass jars or bottles, press-capped (cork gasket liner) heavy-walled soda bottles (not twist-top, thin-walled), zinc and vitreous glass-lidded glass canning jars with colored body
 - Miscellaneous fragments of metal (or plated) clothing closures (buttons, hooks, eyes, and suspender fittings)
 - Sawed animal bone

- Bakelite, celluloid, glass, and shell buttons (but no nylon or polystyrene)
- Enameled ironware dishes
- Punch-opened and solder-sealed beverage cans, solder-sealed food tins, general lack of thin-walled aluminum and welded steel cans
- Rock-picker piles collected by farmers and agricultural equipment or implements
- Older automotive parts
- Knob-and-tube electrical insulators
- Residential structural remains, such as historic building foundations or privies

6. PROCEDURES FOR NOTIFICATION

Prior to beginning construction the contractor shall review this IDP.

If human remains are observed, the contractor will follow the procedures detailed in Section 7.0. If potentially significant cultural resources are observed (see Section 5.3), the contractor will temporarily suspend further ground disturbance and immediately contact the project archaeologist (see Section 9.0). The contractor will provide the project archaeologist with photographs and descriptions. Based on the provided information, the project archaeologist will recommend the following notification procedure to be followed:

1. The discovery is less than 50 years old, and, therefore, is non-archaeological. In this case, the contractor shall be allowed to continue work without restriction.
2. The discovery is older than 50 years, but no additional documentation is feasible at the time (for example, in a deep excavation or boring). In this case, the project manager shall ensure that clear photos are taken of any artifacts or features, and that cultural materials are reburied. The project manager shall provide copies of notes and photos to the project archaeologist. The FAA shall confirm that the project archaeologist's determination and approach are acceptable before the contractor resumes ground disturbance.
3. The discovery is older than 50 years and additional documentation is needed (for example, in an open test pit). In this case, the project manager shall protect the discovery location until the project archaeologist is able to conduct on-site investigation. The purpose of the on-site investigation shall be to collect information needed communicate and coordinate with regulatory agencies.

7. INADVERTENT DISCOVERY OF HUMAN REMAINS

If any human remains are inadvertently discovered, all work adjacent to the discovery shall cease immediately. A 50-foot work stoppage area shall be established around the discovery. Vehicles, equipment, and unauthorized personnel shall not be permitted to traverse or enter the discovery site.

The Project Manager will be notified by the contractor or subcontractor responsible for the discovery without delay. If the Project Manager is unsure if the material is human remains, they will contact the Project Archaeologist. Once the discovery is confirmed as human remains, or is suspected as such by the Project Archaeologist, the Project Manager will then notify the San Juan County Medical Examiner and local law enforcement via the non-emergency telephone number without delay. Personnel making the discovery shall not leave the discovery unattended prior to the arrival of local law enforcement or county medical examiner/coroner.

The following text is the DAHP's preferred language regarding the inadvertent discovery of human skeletal remains to be used in the development of inadvertent discovery protocols (DAHP 2026):

If ground disturbing activities encounter human skeletal remains during the course of construction, then all activity **will** cease that may cause further disturbance to those remains. The area of the find will be secured and protected from further disturbance until the State provides notice to proceed. The finding of human skeletal remains **will** be reported to the county medical examiner/coroner **and** local law enforcement in the most expeditious manner possible. The remains will not be touched, moved, or further disturbed. The county medical examiner/coroner will assume jurisdiction over the human skeletal remains and make a determination of whether those remains are forensic or non-forensic. If the county medical examiner/coroner determines the remains are non-forensic, then they will report that finding to the Department of Archaeology and Historic Preservation (DAHP) who will then take jurisdiction over the remains. The DAHP will notify any appropriate cemeteries and all affected tribes of the find. The State Physical Anthropologist will make a determination of whether the remains are Indian or Non-Indian and report that finding to any appropriate cemeteries and the affected tribes. The DAHP will then handle all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains.

8. REFERENCES

- Department of Archaeology and Historic Preservation. 2026. Recommended Inadvertent Human Remains Discovery Language. Electronic document, <https://dahp.wa.gov/archaeology/human-remains/recommended-inadvertent-human-remains-discovery-language>, accessed April 2, 2026.
- Zimmer, Paul, Kate Hannah, and Meagan Scott. 2026. Cultural Resources Assessment Report for the Friday Harbor Regional Airport Southwest Development Area Project, San Juan County, WA. Prepared for The Port of Friday Harbor by Environmental Science Associates, Seattle. On file, Washington State Department of Archaeology and Historic Preservation, Olympia.

9. CONTACT INFORMATION

Project Archaeologist

Tom Ostrander, Archaeologist
Environmental Science Associates (ESA)
Office: 206-789-9658
Cell: 206-909-6631
Email: tostrander@esassoc.com

Project Manager

Tod Nicholson
Port of Friday Harbor Executive Director
Office: 360-378-2688 ext. 226
Email: toddn@portfridayharbor.org

FAA Project Contact

Laura Sample
FAA Seattle Airport District Office
Office: 907-457-9249
Email: Laura.A.Sample@faa.gov

San Juan County Medical Examiner

Gary Goldfogel, M.D.
Office: 360-738-4557

San Juan County Sherriff (non-emergency number)

Office: 360-778-6600

Contractor (TBD)

Name, Title

Company

Office: xxx-xxx-xxxx

Cell: xxx-xxx-xxxx

Appendix E

Wetland Delineation

FRIDAY HARBOR REGIONAL AIRPORT SOUTHWEST DEVELOPMENT AREA

Wetland and Stream Delineation Report

Prepared for
Port of Friday Harbor

April 2026



FRIDAY HARBOR REGIONAL AIRPORT SOUTHWEST DEVELOPMENT AREA

Wetland and Stream Delineation Report

Prepared for
Port of Friday Harbor

April 2026

2801 Alaskan Way
Suite 200
Seattle, WA 98121
206.789.9658
esassoc.com



Bend	Pasadena	San Francisco
Irvine	Pensacola	San Jose
Los Angeles	Petaluma	Santa Barbara
Mobile	Portland	Sarasota
Oakland	Rancho Cucamonga	Seattle
Orlando	Sacramento	Tampa
Palm Beach County	San Diego	Thousand Oaks

CONTENTS

Wetland and Stream Delineation Report

	<u>Page</u>
1.0 Project Authorization and Scope of Work	1
2.0 Proposed Project	1
2.1 Project Location	1
2.2 Project Description.....	2
3.0 Methods	3
3.1 Review of Existing Documentation	3
3.2 Wetland Identification, Delineation, and Classification.....	3
3.3 Wetland Function Assessment and Rating	4
3.4 Aquatic Area Identification and Classification	4
4.0 Results	5
4.1 Watershed Description.....	6
4.2 Climate and Precipitation Data	6
4.3 Vegetation.....	7
4.4 Soils	7
4.5 Wetlands.....	8
4.6 Streams	12
5.0 Regulatory Considerations	12
5.1 Federal Regulatory Requirements	13
5.2 State Regulatory Requirements.....	14
5.3 San Juan County Regulatory Requirements.....	14
6.0 Limitations.....	15
7.0 References	16

Tables

Table 1	Average vs. Measured Precipitation (in inches) for the 3 Months Prior to the Field Investigation.....	6
Table 2	Wetland Summary	8
Table 3	Stream Summary Table	12

Appendices

- A. Figures
- B. Existing Resource Information
- C. Representative Photographs

FRIDAY HARBOR REGIONAL AIRPORT SOUTHWEST DEVELOPMENT AREA

Wetland and Stream Delineation Report

1.0 Project Authorization and Scope of Work

The Port of Friday Harbor (Port), owner and operator of the Friday Harbor Regional Airport (Airport), is proposing to develop approximately 65 acres on the southwest portion of the Airport property, known as the Southwest Development Area (SWDA) to meet design standards and safety requirements established by the Federal Aviation Administration (FAA). The proposed development (proposed project) includes the construction of taxilanes, hangars, and a snow removal equipment (SRE) building; a new vehicle access road and parking; regional stormwater facilities; and partial realignment of the Clark McAlpine Trail. At the request of the Port, Environmental Science Associates (ESA) biologists identified and delineated wetlands and streams within the SWDA, and prepared this report in support of this effort.

This Wetland and Stream Delineation Report adheres to the U.S. Army Corps of Engineers' (USACE) *Components of a Complete Wetland Delineation Report* (USACE 2011) and San Juan County Code (SJCC) 18.35.105 *Wetlands – Determination of wetland boundary and requirements for wetland reports*. The report provides a brief overview of the proposed project, describes mapped critical areas, presents the results of the field investigation, and documents potential regulatory implications associated with identified critical areas. This report focuses on wetlands and streams; other critical areas (such as frequently flooded areas, geologically hazardous areas, and critical aquifer recharge areas) are not addressed in this report.

2.0 Proposed Project

2.1 Project Location

The proposed project is southwest of Friday Harbor, Washington on an approximately 115-acre site on the southwest portion of Airport property. The SWDA is in the northeast corner of Section 23, Township 25 North, Range 3 West in unincorporated San Juan County. The SWDA is bound by Cattle Point Road to the east and south, Airport operations to the north, and rural residences to the west. The SWDA includes the following San Juan County tax parcels owned by the Port: 352342005, 352324007, 352312015, 352312014, 352312010, 352312011, 352312003, 352312004, 352312016, and 351491902.

The SWDA and adjacent land are designated Rural General Use and Rural Farm Forest (San Juan County 2024). The SWDA has a mosaic of vegetative communities including pasture, shrub, and forested communities. The SWDA is a highly disturbed area. Human disturbances within the SWDA include Store

More Way, Shelter Road, storage facilities, and large areas cleared of vegetation. Frequent mowing occurs in the prairie immediately west and north of Cattle Point Road, near Store More Way.

The western portion of the SWDA is generally flat, then gently slopes toward the east before leveling out west of Cattle Point Road. An unnamed tributary to North Bay flows in a ravine that runs west to east through the southern portion of the SWDA. The unnamed tributary discharges into North Bay approximately 755 feet east and downslope of the SWDA.

2.2 Project Description

The Port updated the Friday Harbor Regional Airport Master Plan in April 2020 (Coffman and Precision 2020). The Master Plan identified specific types and quantities of facilities required or desired to adequately serve the Airport over the next 20 years. The project will also enhance safety by moving roads and trails out of the runway protection zone (RPZ) to meet FAA safety and design guidelines. The proposed project includes the following components:

- Construction of approximately three approximately 12,000-square-foot (SF) T-hangars, and approximately five box hangars with a maximum size of approximately 10,000 SF each. The T-hangars are Design Group I (up to 49-foot wingspan), and the box hangars may be Group 1 or Group II (up to 79-foot wingspan).
- Construction of taxilanes and aircraft parking apron to support approximately 10 aircraft FAA Airplane Design Group I (up to 49-foot wingspan) standards.
- Construction of approximately 7 acres of Aircraft Operations Area pavements, aircraft operational support areas, and vehicle pavements. Includes approximately 4,200 linear feet of vehicle roadway and approximately 35 vehicle parking stalls for aircraft hangars and Airport operations support. Roadway would connect to Cattle Point Road at the existing Store More Way intersection, which results in improvements to the existing Store More Way roadway and includes crossing an existing stream. Vehicle parking would be located on the northwestern portion of the SWDA site.
- Construction of one approximately 2,000-SF SRE building.
- Relocation of the existing FAA-owned Automated Surface Observing Systems (ASOS) aircraft weather station, including associated utilities.
- Closure of the existing Shelter Road.
- Installation of new security fencing, vehicle gates, and pedestrian gates around the perimeter of the proposed Aircraft Operations Area.
- Installation of pole-mounted and/or building-mounted exterior lights for vehicle parking lots, and aircraft parking apron.
- Installation of appropriate airfield lights, retroreflective markers, and signage for the aircraft parking apron and taxilanes.
- Land clearing, demolition of existing facilities, excavation, embankment, grading, and retaining wall construction.
- Extension of utilities to the SWDA site, including electrical power. A utility corridor will be provided to allow for the future installation of utilities not installed during this project, which may include water, sanitary sewer, communications, fiber, and other related utility infrastructure.

- Installation of stormwater collection, conveyance, treatment, flow control systems, and associated infrastructure.
- Realignment of a portion of the existing Clark McAlpine Trail that crosses the SWDA site, resulting in approximately 3,500 linear feet of realigned trail.
- Landscaping and permanent soil stabilization measures.

3.0 Methods

3.1 Review of Existing Documentation

Prior to conducting the field assessment, ESA biologists reviewed the following data sources for specific information about the ecological and geographic conditions within the vicinity of the SWDA site:

- Natural Resources Conservation Service (NRCS) Climate Analysis for Wetlands Tables (WETS) (NRCS 2024a).
- NRCS Web Soil Survey (NRCS 2024c).
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Wetland Mapper (USFWS 2020).
- San Juan County Polaris Property Search map (San Juan County 2024).
- Washington Department of Natural Resources (DNR) Forest Practices Application Mapping Tool (FPAMT) (DNR n.d.-a).
- DNR Natural Heritage Program (NHP) Data Explorer: Rare Plant and Ecosystem Locations
- Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) (WDFW 2025).

The collected information was used as a baseline for the in-field assessment and delineation.

3.2 Wetland Identification, Delineation, and Classification

During the field investigation, ESA biologists delineated wetlands according to local, state, and federal guidelines within the project area boundary. Wetlands were delineated using the Routine Determination Method documented in the USACE *Wetland Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region – Version 2.0* (USACE 2010).

The wetland delineation consisted of the following: (1) assessing vegetation, soil, and hydrologic characteristics to identify areas meeting the wetland criteria; and (2) marking wetland boundaries. In places that appeared to have wetland characteristics, the dominant plant species, soil conditions in test pits, and evidence of hydrologic conditions were recorded on routine data forms. Upland areas adjacent to potential wetland areas were also evaluated. Based on the field data, a wetland/non-wetland determination was made for each examined area. Following confirmation of all three wetland parameters in an area, the wetland boundary was marked by placing sequentially numbered, fluorescent pink flagging labeled “wetland delineation” along the wetland perimeter. Sample plots were marked with plain orange flagging.

The flag and sample plot locations were recorded using the ArcGIS Field Maps application on an Apple iPad paired with an EOS Arrow surveyor device with sub-meter accuracy. Where wetlands extended beyond the study area, only those portions of the wetland within the study area were flagged and surveyed.

Several tools were used to identify and classify plants and soils examined within the study area. The wetland indicator status and scientific names of plants were identified using the 2022 *National Wetland Plant List – Western Mountains, Valleys, and Coast Region* (USACE 2022). Hydric soil conditions were assessed using *Field Indicators of Hydric Soils in the United States*, Version 9.0 (NRCS 2024b).

The wetlands delineated within the study area were classified according to federal, state, and local systems. The USFWS system (Cowardin et al. 1979) is a descriptive classification, based on physical attributes (i.e., vegetation, soils, and water regime). The hydrogeomorphic (HGM) classification (Brinson 1993) is based on three fundamental factors that influence how wetlands function: position in the landscape (geomorphic setting), water source (hydrology), and the flow and fluctuation of the water once in the wetland (hydrodynamics).

3.3 Wetland Function Assessment and Rating

Wetlands perform a variety of biological, physical (hydrologic), and chemical (water quality) functions. How and to what level these functions are provided depend primarily on the wetland's HGM classification. Functions for the wetlands delineated within the study area were classified using the *Washington State Wetland Rating System for Western Washington* (Hruby and Yahnke 2023). The rating system first classifies a wetland's HGM class and then assigns multiple aspects relating to each function type (water quality, hydrology, and habitat) a high, medium, or low level of function based on the wetland's attributes. The system classifies wetlands into four hierarchical categories based on rarity, sensitivity to disturbance, and water quality, hydrologic, and habitat functions. Classifications range from Category I wetlands, which exhibit outstanding features (rare wetland type, relatively undisturbed or high sensitivity to disturbance, and high level of functions) to Category IV wetlands, which have the lowest levels of function and are often heavily disturbed.

San Juan County has codified use of the 2014 wetland rating system (SJCC 18.35.090) and assigns wetland buffer widths based on wetland category, adjacent land use intensity, and habitat score. San Juan County wetland buffers range from 25 feet to 250 feet (SJCC Table 18.35.100-1). ESA biologists used the *Washington Tool for Online Rating* (Ecology n.d.-a) to complete the rating forms and associated figures.

3.4 Aquatic Area Identification and Classification

ESA identified the ordinary high water mark (OHWM) of streams in the study area using global positioning system (GPS) on-site relative to the topography mapped on-site. The assessment of streams in the study area followed methods defined by the USACE and Washington State Department of Ecology (Ecology) for the identification of streams and the OHWM (USACE 2014; Anderson et al. 2016). For purposes of determining its lateral jurisdiction under the Clean Water Act (33 Code of Federal Regulations [CFR] 328.3(c)(4)), the USACE defines the OHWM as:

"That line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." (USACE 2014)

Similarly, Ecology defines the OHWM as:

"The mark that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland." (Anderson et al. 2016)

Other physical characteristics that were used to determine the OHWM include debris wracking; matted down, bent, or absent vegetation; sediment sorting; disturbed or washed away leaf litter; evidence of scour or deposition; multiple observed flow events; bed and bank; water staining; and a change in plant community (USACE 2014).

ESA biologists also made general observations of in-stream habitat, such as depth of surface water, streambed substrate, streambank erosion, and in-stream habitat features such as large wood, boulders, riffles, and pools. The condition of riparian vegetation was also recorded, including plant species, canopy cover, and evidence of human disturbance.

In areas where streams were inaccessible, ESA relied on existing mapping and publicly available light detection and ranging (LiDAR) data.

San Juan County regulates aquatic fish and wildlife habitat conservation areas under SJCC 18.35.130. The state water typing system (Washington Administrative Code [WAC] 222-16-030) classifies streams as S, F, Np, or Ns, depending on their "shoreline of the state" status, presence of fish habitat, annual flow rate (seasonal or perennial), and connections to other waters. San Juan County designates buffers widths to stream in SJCC 18.35.130; stream buffers widths range from 50 to 110 feet based on water quality functions and condition of the riparian corridor.

4.0 Results

ESA biologists Jessica Redman, PWS, Matt Maynard, Madeline Remmen, and Maxwell Krieg conducted a field investigation on June 18 and 19, and July 9, 2024, to identify wetlands and streams within the SWDA. This report was subsequently written to align with the National Environmental Policy Act (NEPA) review schedule. The following sections summarize the results of the desktop review, as well as the field investigation. Existing critical areas maps are located in **Appendix B**. Representative photos of the site are located in **Appendix C**.

4.1 Watershed Description

The proposed project is in Water Resource Inventory Area (WRIA) 2 – San Juan Islands Watershed (Hydrologic Unit Code [HUC] 17110003). WRIA 2 is comprised of four major islands with over 100 smaller islands within the Salish Sea between Skagit County and Vancouver Island, British Columbia, Canada. There are no major rivers in WRIA 2 (Ecology 2023). Within WRIA 2, the San Juan Island subbasin (HUC 171100030700) has four major waterbodies (Trout Lake, Sportsman Lake, Roche Harbor Lake, and Zylstra Lake) and several tributaries to the surrounding Salish Sea. The San Juan Island subbasin is dominated by forested land cover with large land areas used for agriculture (San Juan County 2024).

The varied topography of San Juan Island results in several smaller drainages that discharge into the marine waterbodies. The SWDA lies within a topographically confined drainage basin approximately 469 acres in size (San Juan County 2024). The western portion of this smaller drainage is forested and gradually shifts toward prairie and agricultural lands as the land slopes east toward North Bay.

4.2 Climate and Precipitation Data

WRIA 2 is partially situated in the rain shadow of the Olympic Mountains and therefore receives a broad range of annual rainfall. Most of this precipitation arrives during the winter months when water demands are the lowest, and only a fraction becomes available for human and economic uses. Little of WRIA 2 benefits from snowpack; during the summer when there is little rain, streamflows are dependent on groundwater inflow. This means that groundwater and surface water are least available when water demands are the highest (Ecology 2023). Over a 28-year period, the average annual rainfall at the Airport was 17.41 inches, and the estimated growing season is between April 4 and November 8 (NRCS 2024a).

The NRCS WETS identify the normal ranges for monthly precipitation as well as the probability of normal precipitation during a defined period. According to the NRCS, precipitation amounts for the months preceding the June and July 2024 field investigation were above normal (NRCS 2024a; **Table 1**).

TABLE 1
AVERAGE VS. MEASURED PRECIPITATION (IN INCHES) FOR THE 3 MONTHS PRIOR TO THE FIELD INVESTIGATION

Time Interval	Recorded Precipitation	WETS			Dry, Normal, Or Wet? ¹	Condition Value ²	Month Weight Value ³	Product of Condition and Month Weight Value
		30% Chance Less	Average	30% Chance More				
March 2024	0.79	0.64	1.24	1.51	Normal	1	1	1
April 2024	1.54	0.52	0.93	1.12	Wet	3	2	6
May 2024	2.36	0.36	0.98	1.14	Wet	3	3	9
Total⁴								16

Notes:

1. Conditions are considered normal if they fall within the low and high range around the average and wet or dry if they lie above or below the average, respectively.
2. Condition Values: Dry = 1; Normal = 2; and Wet = 3.
3. Month Weight Values: 1st Month Prior = 3, 2nd Month Prior = 2; and 3rd Month Prior = 1.
4. If the sum of the equals 6 to 9, precipitation was below normal (dry) range; 10 to 14 precipitation was within normal (normal) range; and 15 to 18 precipitation was above normal (wet) range.

Source: NRCS 2024a

4.3 Vegetation

Situated in the rain shadow of the Olympic Mountains, the San Juan Islands have some of the driest conditions in Western Washington, resulting in unique conditions different from the rest of the Puget Sound area. Varying topography and aspect lead to a diverse assemblage of plant communities.

Within WRIA 2, dry, south-facing slopes that receive prevailing dry summer winds are occupied by grassland vegetation accompanied by outcroppings of tree species. The open grasslands in the project area are dominated by species of the genus *Festuca* and smaller amounts of *Agropyron* and *Poa* species. Forested communities are characterized by Douglas-fir (*Pseudotsuga menziesii*) and Pacific madrone (*Arbutus menziesii*). Other tree species observed include shore pine (*Pinus contorta*) and Garry oak (*Quercus garryana*). The understory is variable, with salal (*Gaultheria shallon*) being the most common. Mesic north-facing slopes and level areas in the interior of the islands are generally occupied by forest communities with Douglas-fir, grand fir (*Abies grandis*), and western redcedar (*Thuja plicata*) being dominant. Understory species include salal, snowberry (*Symphoricarpos albus*) and Nootka rose (*Rosa nutkana*). The moistest sites in interior valleys are occupied by western redcedar and grand fir with swordfern (*Polystichum munitum*) understories. Disturbed areas commonly support red alder (*Alnus rubra*), bigleaf maple (*Acer macrophyllum*), and salmonberry (*Rubus spectabilis*) communities (Franklin and Dyrness 1988).

The majority of the SWDA is paved, grassland, or has been cleared of vegetation. Tree and shrub species are concentrated along the fringes of the SWDA, primarily to the south and west. Grassland species include red fescue (*Festuca rubra*), tall false ryegrass (*Schedonorus arundinaceus*), velvetgrass (*Holcus lanatus*), and timothy (*Phleum pratense*). Shrub communities include snowberry, oneseed hawthorn (*Crataegus monogyna*), salmonberry, and peafruit rose (*Rosa pisocarpa*). Forested communities are dominated by Douglas-fir. The riparian habitat of the onsite stream included red alder, willow species (*Salix* spp.), twinberry (*Lonicera involucreta*), salmonberry, skunk cabbage (*Lysichiton americanus*), and swordfern.

No rare plants or ecosystems are mapped within the vicinity of the SWDA (DNR n.d.-b).

4.4 Soils

NRCS maps the following six soil types within the SWDA:

- Bazal-Mitchellbay complex, 0 to 5 percent slopes.
- Mitchellbay gravelly sandy loam, 0 to 5 percent slopes.
- Mitchellbay gravelly sandy loam, 5 to 15 percent slopes.
- Mitchellbay-Sholander-Bazal complex, 0 to 8 percent slopes.
- Roche-Killebrew-Rock Outcrop complex, 5 to 35 percent slopes.
- Roche-Mitchellbay complex, 3 to 15 percent slopes.

All soil types have parent material from glacial drift over dense glacial sediment deposits in marine waters. Bazal-Mitchellbay complex, 0 to 5 percent slopes forms in swales and valleys. Mitchellbay

gravelly sandy loam and Mitchellbay-Sholander-Bazal complex soils are formed on valley sides. Roche-Killebrew-Rock Outcrop complex and Roche-Mitchellbay complex form on hillslopes. Bazal components of the soil complexes listed above are rated as hydric soils. Also, Mitchellbay gravelly sandy loam, 0 to 5 percent slopes has a minor component of Coupeville, which is also rated as a hydric soil (NRCS 2024c).

In general, wetlands soils examined during the June and July 2024 field investigation were predominantly dark (value 3 or less with a chroma of 2 or less) sandy loam soils within 10 inches of the soil surface. Below 10 inches, soils were depleted (value of 4 or greater with a chroma of 2 or less) sandy loam soils with redoximorphic concentrations in the matrix. Upland soils were dark sandy loam soils with no redoximorphic features within the matrix. Wetland soils met hydric soil indicators Depleted Matrix (F3), Redox Dark Surface (F6), and Depleted Below Dark Surface (A11) (NRCS 2024b).

4.5 Wetlands

Available online resources – NWI and San Juan County – map two palustrine emergent temporarily flooded wetlands within the SWDA (USFWS 2020; San Juan County 2024).

ESA biologists identified five wetlands (Wetlands A through E) within the SWDA during the June 18 and 19 and July 9, 2024 field investigation. Five wetland sample plots and five upland sample plots were established to determine the wetland boundaries. Each wetland is summarized in **Table 2** and discussed in more detail below. This discussion groups wetlands based on where they occur within the SWDA, as well as physical characteristics. Wetland A is within a topographically confined depression north of Shelter Road. Wetlands B and C are immediately west of Cattle Point Road, bisected by Store More Road. Wetlands D and E occur on the large, relatively flat area in the western portion of the SWDA. Wetlands A through D are depressional wetlands, while Wetland E is a slope wetland.

TABLE 2
WETLAND SUMMARY

Wetland	Cowardin ¹	HGM	Wetland Rating Score (Category)	San Juan County Buffer (feet) ²	
				Water Quality	Habitat
Wetland A	PSS, PEM	Depressional	15 (IV)	50	50
Wetland B	PSS, PEM	Depressional	15 (IV)	50	50
Wetland C	PEM	Depressional	14 (IV)	50	50
Wetland D	PEM	Depressional	13 (IV)	50	50
Wetland E	PFO, PSS, PEM	Slope	11 (IV)	50	50

Notes:

1. PFO = palustrine forested, PSS = palustrine scrub-shrub, PEM = palustrine emergent.
2. SJCC 18.35.100 establishes wetland buffers based on wetland rating category, land use intensity, and impacts on both water quality and habitat. A 'high' land use intensity is assumed for all wetlands; however, this will be confirmed by San Juan County during the permit process.

Wetland A

Wetland A (**Appendix A, Figures 2 and 3; Appendix C, Photos C-1 – C-5**) is a topographically confined depression in the southern portion of the SWDA, northwest of the intersection Shelter Road and a gravel driveway. The wetland is approximately 13,504 square feet.

Vegetation

Wetland A contains palustrine scrub-shrub (PSS) and palustrine emergent (PEM) Cowardin cover classes. The wetland passed the dominance test for hydrophytic vegetation, with all dominant vegetation having a Facultative (FAC) or wetter (e.g., Facultative Wet [FACW], Obligate [OBL]) Wetland Indicator Status [WIS]). The dominant scrub-shrub species include peafruit rose (FAC) and oneseed hawthorn (FAC). The emergent cover class is dominated by red fescue (FAC) and soft rush (*Juncus effusus* [FACW]). Other emergent species within the wetland include velvetgrass (FAC) and crested dog-tail (*Cyanosurus cristatus* [Facultative Upland (FACU)]).

Soils

Four soil layers were observed in Wetland A. From 0 to 5 inches below the ground surface, soils consist of a very dark gray (10YR 3/1) silt loam. From 5 to 8 inches below the ground surface is dark brown (7.5YR 3/2) with 7 percent strong brown (7.5YR 4/6) redoximorphic concentrations within the matrix. From 8 to 13 inches below the ground surface is dark gray (10YR 4/1) with 20 percent strong brown (7.5YR 4/6) redoximorphic concentrations within the matrix. From 13 to 16 inches below the ground surface is a dark gray gleyed layer (N 4/1) with 25 percent strong brown (7.5YR 4/6) redoximorphic concentrations within the matrix. Soils within Wetland A meet the hydric soil indicator Depleted Matrix (F3).

Hydrology

The primary source of hydrology for Wetland A is from groundwater and surface flows from precipitation. No surface water, water table, or saturation were observed in the soil test pit. Signs of ponding were observed within the lowest elevations of the depression. The hydrology indicator Water Marks (B1) was met.

Wetlands B and C

Wetlands B and C (**Appendix A, Figures 2 and 4; Appendix C, Photos C-6 – C-12**) are topographic depressions in the southeastern portion of the SWDA, west of Cattle Point Road. Store More Road bisect the wetlands; Wetland B is north of the road and Wetland C to the south. Wetland B is approximately 64,469 square feet and Wetland C is approximately 16,117 square feet.

Vegetation

Wetlands B contains PSS and PEM Cowardin cover classes and Wetland C only contains a PEM Cowardin cover class. The emergent cover class in both wetlands is dominated by tall false ryegrass (FAC), velvetgrass (FAC), and red fescue (FAC). Other emergent species within the wetlands include timothy (FAC), crested dog-tail (FACU), and soft rush (FACW). The dominant scrub-shrub species in

Wetland B include peafruit rose (FAC) and oneseed hawthorn (FAC). The wetlands passed the dominance test for hydrophytic vegetation, with all dominant vegetation having a WIS of FAC or wetter.

Soils

Two soil layers were observed in Wetland B. From 0 to 10 inches below ground surface, soils consist of a black (10YR 2/1) loam. From 10 to 16 inches below ground surface is dark grayish brown (10YR 4/2) sandy loam with 15 percent dark yellowish brown (10YR 4/4) redoximorphic concentrations within the matrix. Soils within Wetland B meet the hydric soil indicator Depleted Matrix (F3).

Two soil layers were also observed in Wetland C. From 0 to 7 inches below ground surface, soils consist of a black (10YR 2/1) loam. From 7 to 18 inches below the ground surface is black (10YR 2/1) sandy loam with 15 percent dark yellowish brown (10YR 3/4) redoximorphic concentrations within the matrix. Soils within Wetland C meet the hydric soil indicator Redox Dark Surface (F6).

Hydrology

The primary source of hydrology for Wetlands B and C is from groundwater and surface flows from precipitation. No surface water or water table was observed in the soil test pits. Saturation was present within 7 inches of the soil surface in Wetland B and 10 inches in Wetland C at the time of the field investigation. Signs of ponding were observed within the lowest elevations of the depression. Hydrology indicator Saturation (A3) was met.

Wetland D

Wetland D (**Appendix A, Figures 2 and 5; Appendix C, Photos C-13 – C-17**) is in the western portion of the SWDA. In general, the topography is flat with microtopography that rise and fall throughout the area. Several narrow ditches run west to east throughout the area. Wetland D is approximately 32,234 square feet.

Vegetation

Wetland D contains a PEM Cowardin cover class. Dominant species include velvetgrass (FAC), soft rush (FACW), and tall false ryegrass (FAC). Reed canarygrass (*Phalaris arundinacea* [FACW]) was also present but not a dominant species. The wetland passed the dominance test for hydrophytic vegetation, with all dominant vegetation having a WIS of FAC or wetter.

Soils

Two soil layers were observed in Wetland D. Zero to 8 inches below soil surface consists of a black (10YR 2/1) loam, with the same black color from 8 to 16 inches below the ground surface; however, the soil is a sandy loam and included 7 percent strong brown (7.5YR 5/6) redoximorphic concentrations within the matrix. Soils within Wetland D meet the hydric soil indicator Redox Dark Surface (F6).

Hydrology

The primary source of hydrology for Wetland D is from groundwater and surface flows from precipitation. No surface water or water table was observed in the soil test pit. Saturation was present within 9 inches of the soil surface at the time of the field investigation. The wetland had several depression that likely hold water during wetter times of the year based on the signs of ponding (e.g., water marks and cracks in the soil surface) that were observed throughout the wetland. Hydrology indicator Saturation (A3) was met.

Wetland E

Wetland E (**Appendix A, Figures 2 and 5; Appendix C, Photos C-18 – C-20**) is a slope wetland north of Wetland D in the western portion of the SWDA. An excavated farm pond is behind a berm to the north of the wetland, and likely supports the hydrology of Wetland E. Wetland E is approximately 9,583 square feet.

Vegetation

Wetland E contains palustrine forested (PFO), PSS, and PEM Cowardin cover classes. The PFO cover class was vegetated with shore pine (FAC). The dominant scrub-shrub was oneseed hawthorn (FAC). The dominant species within the PEM cover class were velvetgrass (FAC) and tall false ryegrass (FAC). The non-native invasive species reed canarygrass (FACW) was also dominant within the PEM cover class. The wetland passed the dominance test for hydrophytic vegetation, with all dominant vegetation having a WIS of FAC or wetter.

Soils

Two soil layers were observed in Wetland E. From 0 to 10 inches below ground surface, soils consists of a black (10YR 2/1) loam. From 10 to 16 inches below the ground surface is grayish brown (2.5YR 5/2) sandy loam with 25 percent dark yellowish brown (10YR 4/6) redoximorphic concentrations within the matrix. Soils within Wetland E meet the hydric soil indicator Depleted Matrix (F3).

Hydrology

The primary source of hydrology for Wetland E is subsurface flow from an excavated farm pond to the north of the wetland. Water from the impoundment is likely expressed under the berm associated with the pond. Precipitation also likely supports wetland hydrology during the wetter portions of the growing season. Saturation was observed at 8 inches from the ground surface, meeting the hydrology indicator Saturation (A3).

Wetland Functional Assessment

All wetlands delineated in the SWDA are Category IV wetlands. Wetlands A through D are depressional wetlands that impound water from the surrounding landscape. Wetland E is a slope wetland where groundwater and precipitation collect on the surface before slowly sloping across the wetland. The wetlands either have no outlet or a constricted outlet, impounding water and limiting the flow downgradient of the wetlands. These factors provide a low to moderate hydrologic function. Wetlands A, D, and E are vegetated with persistent, unmanaged vegetation that absorbs and removes sediment and

pollutants in the water that enters the wetlands. Wetlands B and C are regularly mowed, which limits their ability to remove pollutants and sediment. No water resources downgradient of the wetlands are on Ecology’s 303(d) list, and there are no approved Water Quality Improvement Projects or Total Maximum Daily Load projects within the subbasin (Ecology n.d.-b). These factors result in a low to moderate level of water quality function. The wetlands are in an area dominated by rural residential land uses resulting in low to moderate disturbances to habitat. Adjacent to these rural residential land uses are relatively undisturbed forested communities. These adjacent areas provide wildlife habitat for shelter and foraging. The highest level of disturbance comes from the Airport and its operations. Within each wetland, habitat diversity and structure is low. Overall, the wetlands provide a low to moderate level of habitat function.

4.6 Streams

One stream, Stream A (**Appendix A, Figures 2 and 6; Appendix C, Photos C-21—C-22**), was delineated within the SWDA. Stream A flows west to east through the southern portion of the SWDA. Approximately 1,500 feet downstream of the stream’s origin, Stream A enters an excavated impoundment. The stream then appears to flow subsurface under a berm associated with the impoundment and continues east. The stream flows into a second excavated impoundment immediately adjacent to the west side of Cattle Point Road before entering a culvert under the road. From Cattle Point Road, Stream A flows for approximately 1,000 feet before discharging into North Bay. Based on a review of LiDAR data, Stream A flows within a steep ravine with a gradient of approximately 5 percent (San Juan County 2024). Stream A has a forested riparian corridor of shore pine and willow with a well-developed understory of salmonberry, snowberry, and swordfern. Streambed material consists of fine sediments, sand, and gravel with several portions of the streambanks being incised with signs of erosion. The channel and impoundments had water during the June 2024 field investigation. However, the majority of the channel and the impoundments were dry by the July 2024 field investigation. Based on a site meeting with Washington Department of Fish and Wildlife (WDFW) on October 25, 2023, despite several artificial barriers that exist in the system, the stream does qualify as fish habitat and therefore is regulated as a fish-bearing (Type F) stream. Stream-related information is summarized in Table 3.

TABLE 3
STREAM SUMMARY TABLE

Stream Name	Stream Type	Stream Buffer (feet) ¹
Stream A	Type F	100/110 ²

Notes:

1. Stream buffers are determined based on land use intensity and its effect on water quality and condition of riparian corridors. A ‘high’ land use intensity is assumed for Stream A; however, this will be confirmed by San Juan County during the permit process.
2. 100-foot water quality buffers are applied to high intensity land uses and 110-foot tree protection zones are applied to Type F streams.

5.0 Regulatory Considerations

Wetlands and streams are regulated at the federal, state, and local levels. Agencies with jurisdiction for the proposed project include the USACE, Ecology, WDFW, and San Juan County. Regulatory implications associated with development in wetlands and streams include, but may not be limited, to

those described in this section. All applicable permits should be obtained prior to developing or otherwise altering streams, or their buffers.

5.1 Federal Regulatory Requirements

The USACE regulates discharges of dredged or fill materials into “waters of the United States,” including wetlands and streams, under Section 404 of the Clean Water Act. The purpose of the Clean Water Act is to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters” (33 U.S. Code §1251 et seq. 1972). A Section 404 permit may be required if a project involves filling wetlands or altering streambeds or other waters of the United States.

Since its inception, the definition of waters of the United States has been a litigious issue. Most recently, the Supreme Court, ruling in *Sackett v. Environmental Protection Agency*, sharply limited the scope of the federal protection for the nation’s waters under the Clean Water Act. As a result of this decision, the U.S. Environmental Protection Agency (EPA) and USACE issued a final rule that amends the “Revised Definition of ‘Waters of the United States’” to conform key aspects of the regulatory text to the U.S. Supreme Court’s decision (90 *Federal Register* 52498–52546, November 20, 2025).

Under the “Revised Definition of ‘Waters of the United States’; Conforming” rule, the term “waters of the United States” is defined as follows (33 CFR 328.3[a]):

- (1) *Waters which are:*
 - (i) *Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;*
 - (ii) *The territorial seas; or*
 - (iii) *Interstate waters;*
- (2) *Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section; To meet this category, you must be able to demonstrate that the current impoundment would have met the criteria of a water of the U.S. at the time of impoundment. Meaning that prior to the impoundment the feature would have met a(1), a(3), a(4) or a(5). This usually requires using historic aerial photos/maps or historic topo maps.*
- (3) *Tributaries of waters identified in paragraph (a)(1) or (2) of this section that are relatively permanent, standing or continuously flowing bodies of water;*
- (4) *Wetlands adjacent to the following waters:*
 - (i) *Waters identified in paragraph (a)(1) of this section; or*
 - (ii) *Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;*
- (5) *Intrastate lakes and ponds not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of*

water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section.

Under the Sackett ruling, the required continuous surface connection in Number 4(ii) above must be sufficiently substantial to “make it difficult to determine where the ‘water’ ends, and the ‘wetland’ begins.” All wetlands at the SWDA site appear to be isolated from other waters. No observable surface or subsurface connections were present. Wetland E likely had a subsurface connection to an excavated farm pond to the north. However, the farm pond was also isolated from other waters. It is likely that the USACE would not consider these wetlands jurisdictional under the Sackett ruling, although Ecology would likely regulate these features (see Section 5.2). Due to the stream’s connection to North Bay, the USACE would likely take jurisdiction over Stream A. If direct impacts on wetlands or streams are proposed, it is recommended that the Port request a jurisdictional determination (JD) from the USACE to verify the presence or absence of a water of the United States in the study area. A JD is defined in the USACE’s regulations at 33 CFR 331.2 and is an official determination that there are, or that there are not, jurisdictional aquatic resources within the study area. A JD will specify what aquatic resources are present within the study area for the purposes of computation of impacts, compensatory mitigation requirements, and other resource protection measures. JDs remain viable for 5 years and can be administratively appealed. Generally, the applicant requesting a JD presents the USACE with a wetland delineation or critical areas report, and the USACE then conducts a site visit to determine jurisdictional authority when time and staffing allow. The information provided in this Wetland and Stream Delineation Report meets USACE requirements for a JD request.

5.2 State Regulatory Requirements

The state certification process under Section 401 of the federal Clean Water Act is usually triggered through a Section 404 permit application. Section 401 directs each state to certify that proposed in-water activities will not adversely affect water quality or violate state aquatic protection laws. In Washington State, Ecology is responsible for administering the state certification program. Any conditions attached to the Section 401 certification become part of the Section 404 permit. However, Ecology may also conduct the state certification process outside of a Section 404 permit application for wetlands that are not considered waters of the United States under the recent rule. Under the state’s Water Pollution Control Act (Revised Code of Washington [RCW] 90.48), Ecology has jurisdiction to control and prevent pollution in waters of the state. According to RCW 90.48.020, waters of the state include “lakes, rivers, ponds, streams, inland waters, underground waters, salt waters and all other surface waters and watercourses within the jurisdiction of the state of Washington.”

Additionally, any project constructed in or near state waters that will “use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the state” will require an Hydraulic Project Approval (HPA) from WDFW (Revised Code of Washington [RCW] 77.55.011(11)).

5.3 San Juan County Regulatory Requirements

San Juan County regulates wetlands, streams, and their associated buffers through SJCC 18.35.100 *Wetlands – Protection standards* and SJCC 18.35.130 *Protection standards for aquatic fish and wildlife*

habitat conservation areas (FWHCA). Table 2 identifies required wetland buffers and Table 3 identifies required stream buffers.

General and reasonable use exceptions pertaining to allowed alterations and impacts on wetlands and streams are described in SJCC 18.35.030 and SJCC 18.35.035. Structures, uses, and activities allowed within wetlands and their buffers are listed in SJCC Table 18.35.100-4. Structures, uses, and activities allowed within streams and their buffers are listed in SJCC Table 18.35.130-3. Mitigation requirements are outlined in SJCC 18.35.040.

6.0 Limitations

Within the limitations of schedule, budget, scope of work, and seasonal constraints, we warrant that this investigation was conducted in accordance with accepted environmental science practices, including the technical guidelines and criteria in effect at the time this investigation was performed. The results and conclusions of this report represent the authors' best professional judgment, based on information provided by the project proponent in addition to that obtained during this study. No other warranty, expressed or implied, is made.

7.0 References

- Anderson, P.S., S. Meyer, P. Olson, E. Stockdale. 2016. *Determining the Ordinary High Water Mark for Shoreline Management Act Compliance in Washington State*. Shorelands and Environmental Assistance Program, Washington Department of Ecology. Publication No. 16-06-029. October.
- Brinson, M.M. 1993. *A Hydrogeomorphic Classification for Wetlands*. Technical Report WRP-DE-4. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS. Final Report August. <https://wetlands.el.erdc.dren.mil/pdfs/wrpde4.pdf>.
- Coffman and Precision (Coffman Associates and Precision Approach Engineering). 2020. *Airport Master Plan for Friday Harbor Airport*. Prepared for the Port of Friday Harbor. <https://www.portfridayharbor.org/friday-harbor-regional-airportmaster-plan>.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service PUBL. FWS/OBS-79/31. <https://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf>.
- DNR (Washington State Department of Natural Resources). n.d.-a. *Forest Practices Application Mapping Tool*. <https://www.dnr.wa.gov/forest-practices-water-typing>. Accessed March 2024.
- DNR. n.d.-b. *Washington Natural Heritage Program WNHP Data Explorer: Rare Plant and Ecosystem Locations*. Available online at: <https://experience.arcgis.com/experience/174566100f2a47bebe56db3f0f78b5d9/page/Rare-Plant-and-Ecosystem-Locations/> Accessed February 10, 2024.
- Ecology (Washington State Department of Ecology). n.d.-a. *Washington Tool for Online Rating (2004 to 2014 versions with July 2018 modifications)*. <https://ecology.wa.gov/Water-Shorelines/Wetlands/Tools-resources/Rating-systems>.
- Ecology. n.d.-b. *Water Quality Atlas*. <https://apps.ecology.wa.gov/waterqualityatlas/wqa/map>. Accessed November 2024.
- Ecology. 2023. *WRIA 2 San Juan Watershed Water Availability*. Water Resource Program. <https://apps.ecology.wa.gov/publications/documents/2011022.pdf>
- Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS. Final Report January. <https://usace.contentdm.oclc.org/digital/collection/p266001coll1/id/4532/>.
- Franklin, J.E., and C.T. Dyrness. 1988. *National Vegetation of Oregon and Washington*. Oregon State University Press, Corvallis, OR.
- Hruby, Thomas, and Amy Yahnke. 2023. *Washington State Wetland Rating System for Western Washington: 2014 Update Version 2.0*. Publication No. 23-06-009. October 2014 (Updated July 2023). Shorelands and Environmental Assistance Program, Washington State Department of Ecology. Olympia, WA. <https://apps.ecology.wa.gov/publications/documents/2306009.pdf>.

- NRCS (Natural Resource Conservation Service). 2024a. *WETS Table from the Agricultural Applied Climate Information System for Friday Harbor, San Juan County, WA*. Available online at: <http://agacis.rcc-acis.org/?fips=53061>. Accessed May 2024.
- NRCS. 2024b. *Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineating Hydric Soils, Version 9.0*. Available online at: <http://agacis.rcc-acis.org/?fips=53061>. Accessed March 2024.
- NRCS. 2024c. *Web Soil Survey*. Available online at: <http://websoilsurvey.sc.egov.usda.gov/>. Accessed April 2024.
- San Juan County. 2024. Polaris Property Search – online GPS mapping and database. Available online at: <https://sjcgis.maps.arcgis.com/apps/webappviewer/index.html?id=39b87792947e40a5aa0fcb8af5910bd1>. Accessed: April 2024.
- USACE (U.S. Army Corps of Engineers). 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*. ERDC/EL TR 10-3. U.S. Army Engineer Research and Development Center, Vicksburg, MS.
- USACE. 2011. Components of a Complete Wetland Delineation Report. January 20, 2011. Available online at: [https://www.nws.usace.army.mil/Portals/27/docs/regulatory/Forms/Components%20of%20a%20Wetland%20Delineation%20Report%20\(1-20-11\).pdf](https://www.nws.usace.army.mil/Portals/27/docs/regulatory/Forms/Components%20of%20a%20Wetland%20Delineation%20Report%20(1-20-11).pdf). Accessed January 2026.
- USACE. 2014. *Occurrence and Distribution of Ordinary High Water Mark (OHWM) Indicators in Non-perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States*. Prepared by M.K. Mersel and R.W. Lichvar. Available online at: <https://www.hsd.org/?view&did=760394>. Accessed April 2024.
- USACE. 2022. National Wetland Plant List, Version 3.5. Updated 2022. <https://wetland-plants.sec.usace.army.mil/>. Accessed April 2024.
- USFWS (U.S. Fish and Wildlife Service). 2020. *National Wetlands Inventory Wetland Mapper*. Data last modified October 1, 2020. Available online at: <https://www.fws.gov/program/national-wetlands-inventory/wetlands-mapper>. Accessed April 2024.
- WDFW (Washington Department of Fish and Wildlife). 2024. Priority Habitats and Species online mapping. Available online at: <http://wdfw.wa.gov/mapping/phs/>. Accessed: April 2024.

Appendix A

Figures

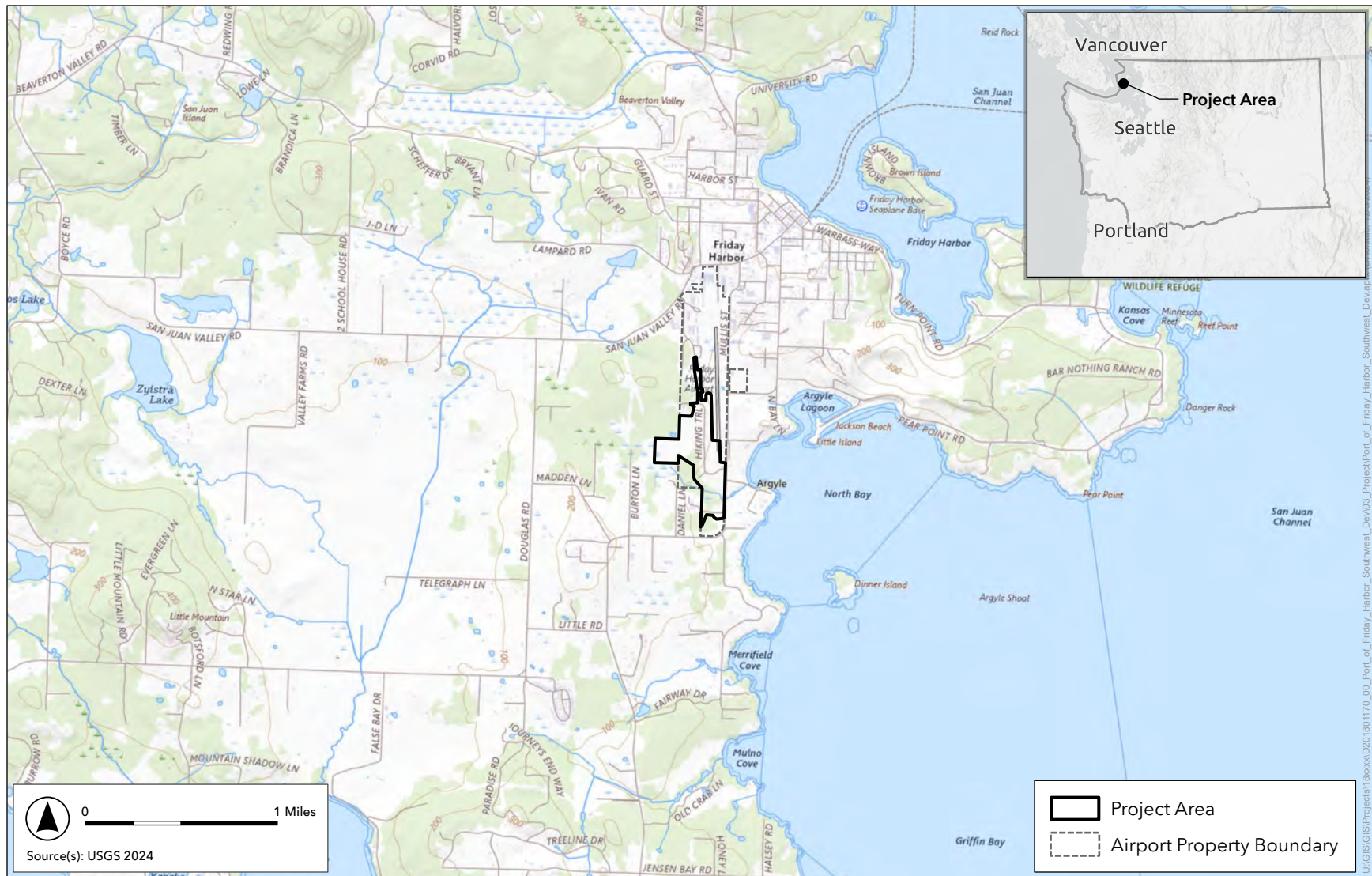


Figure 1
Project Location

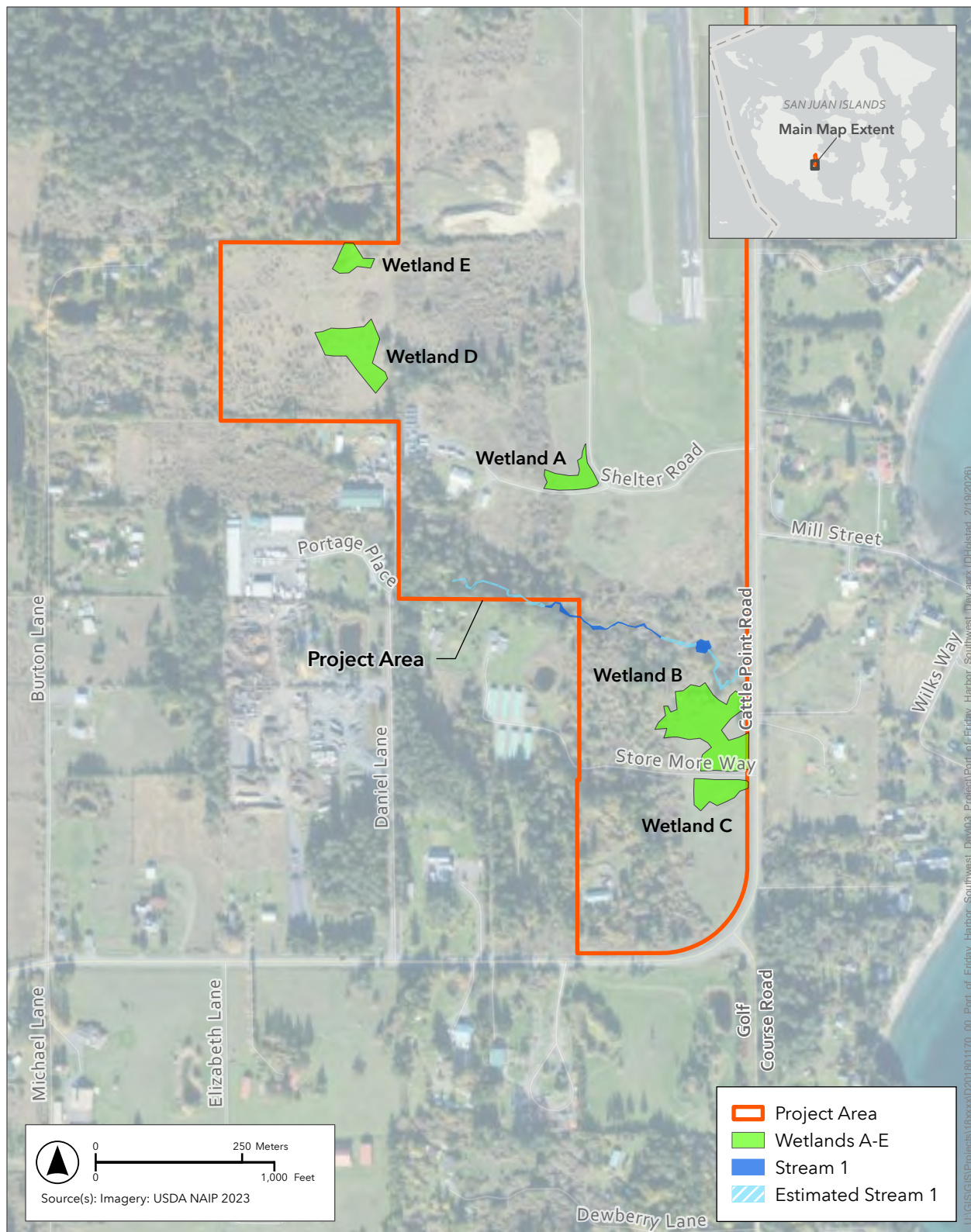


Figure 2
Wetlands & Stream Overview
Port of Friday Harbor Airport



Figure 3
Wetland A
Port of Friday Harbor Airport

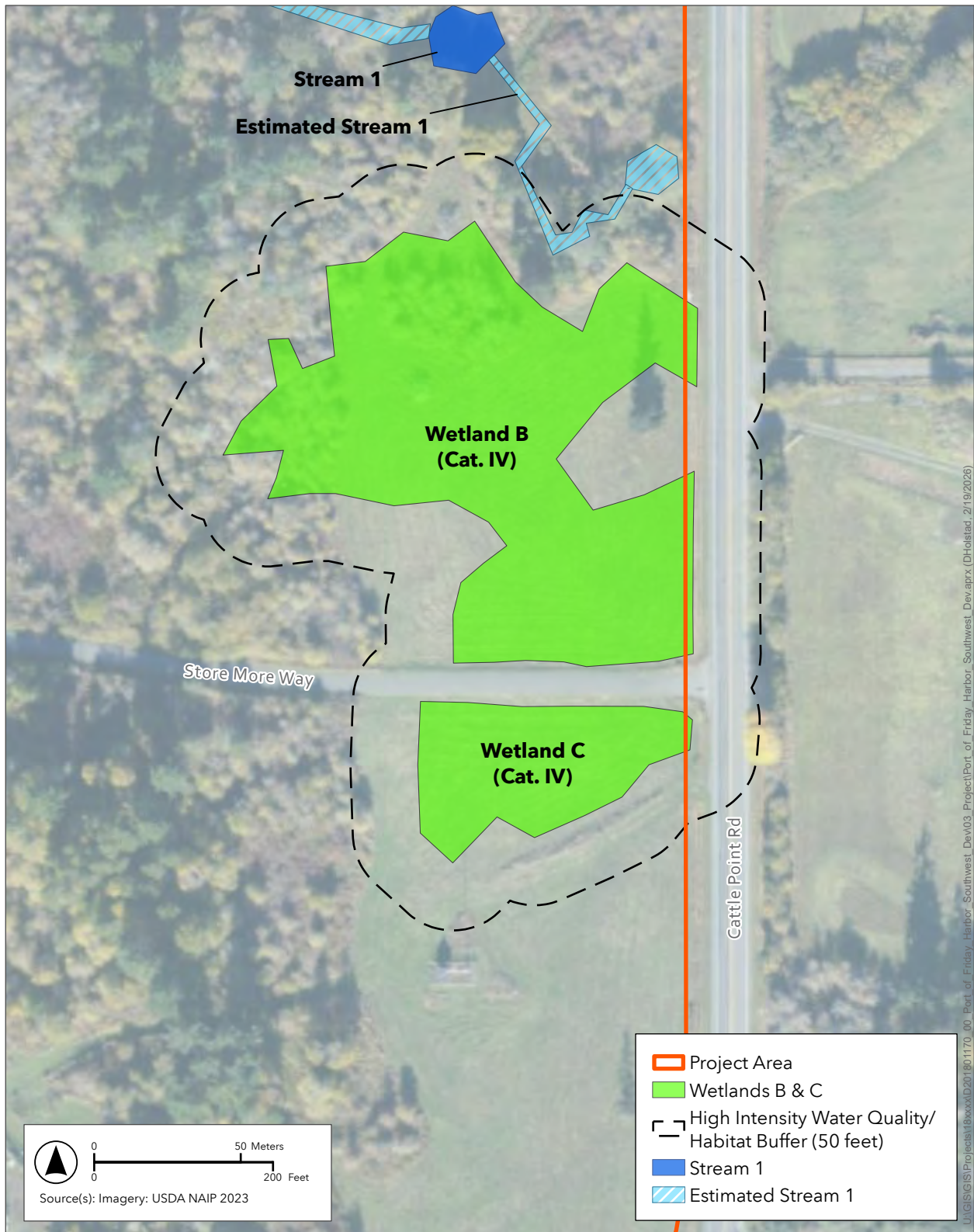


Figure 4
Wetlands B & C
Port of Friday Harbor Airport

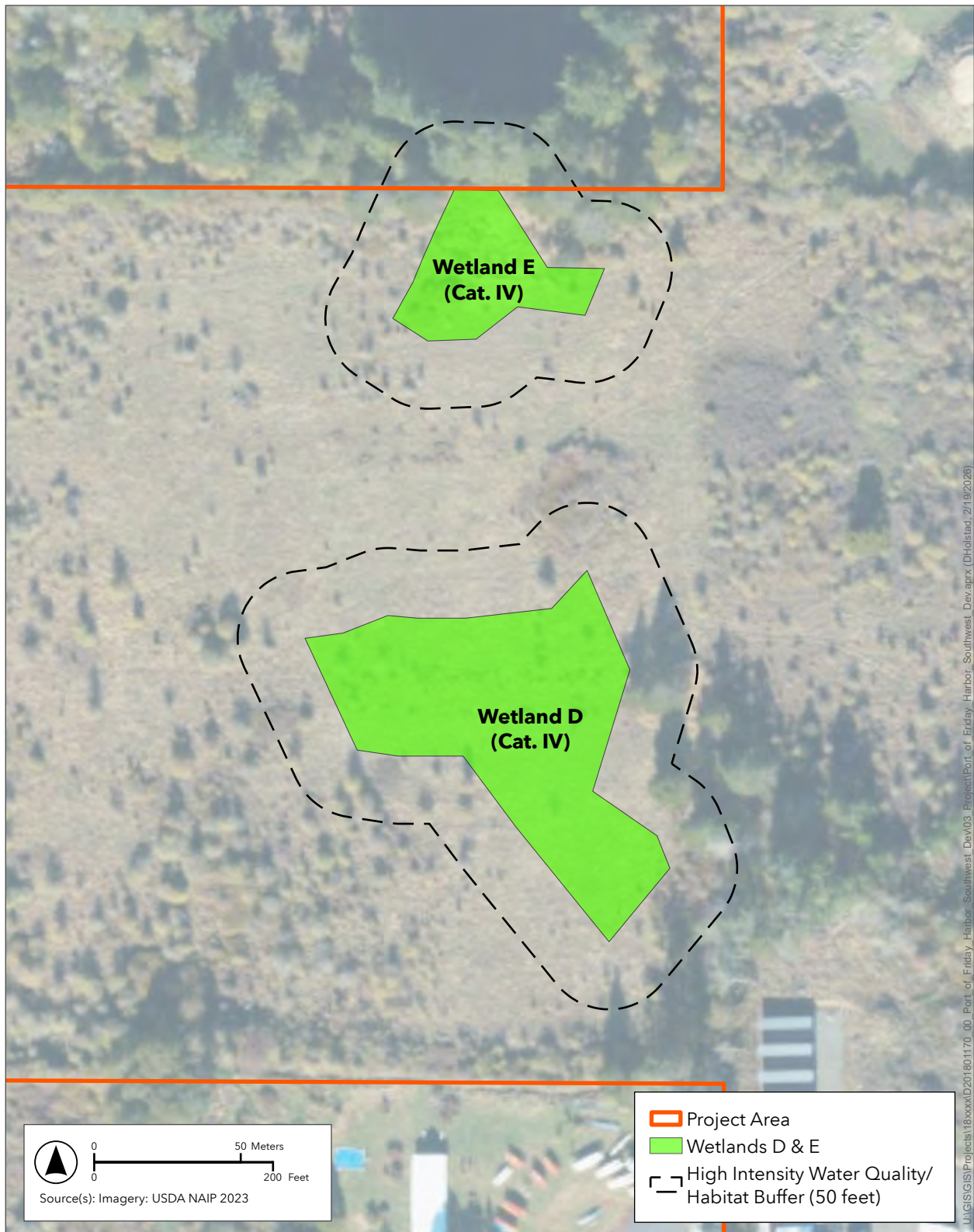


Figure 5
Wetlands D & E
Port of Friday Harbor Airport

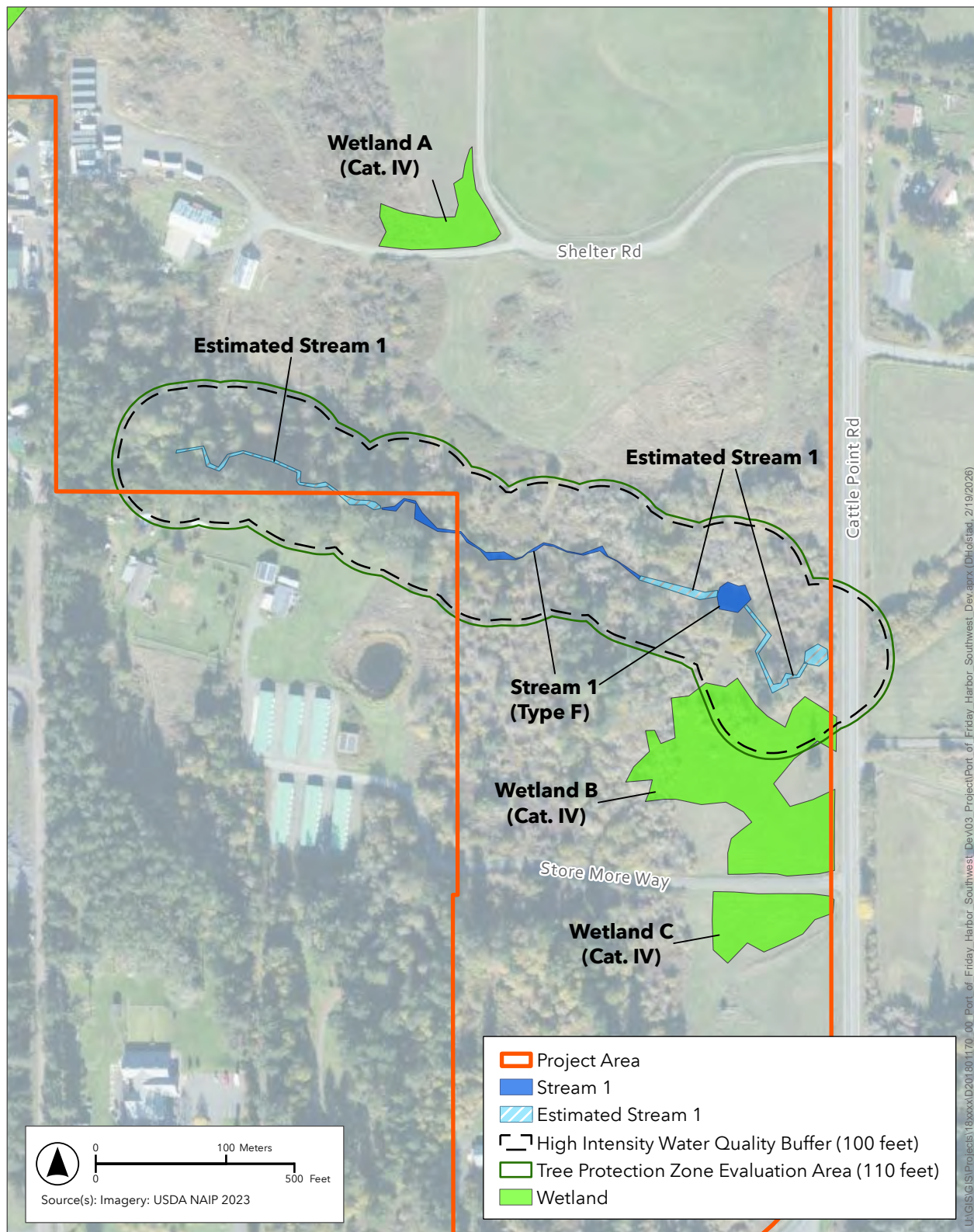


Figure 6
Stream 1
Port of Friday Harbor Airport

Appendix B

Existing Resource Information



United States
Department of
Agriculture

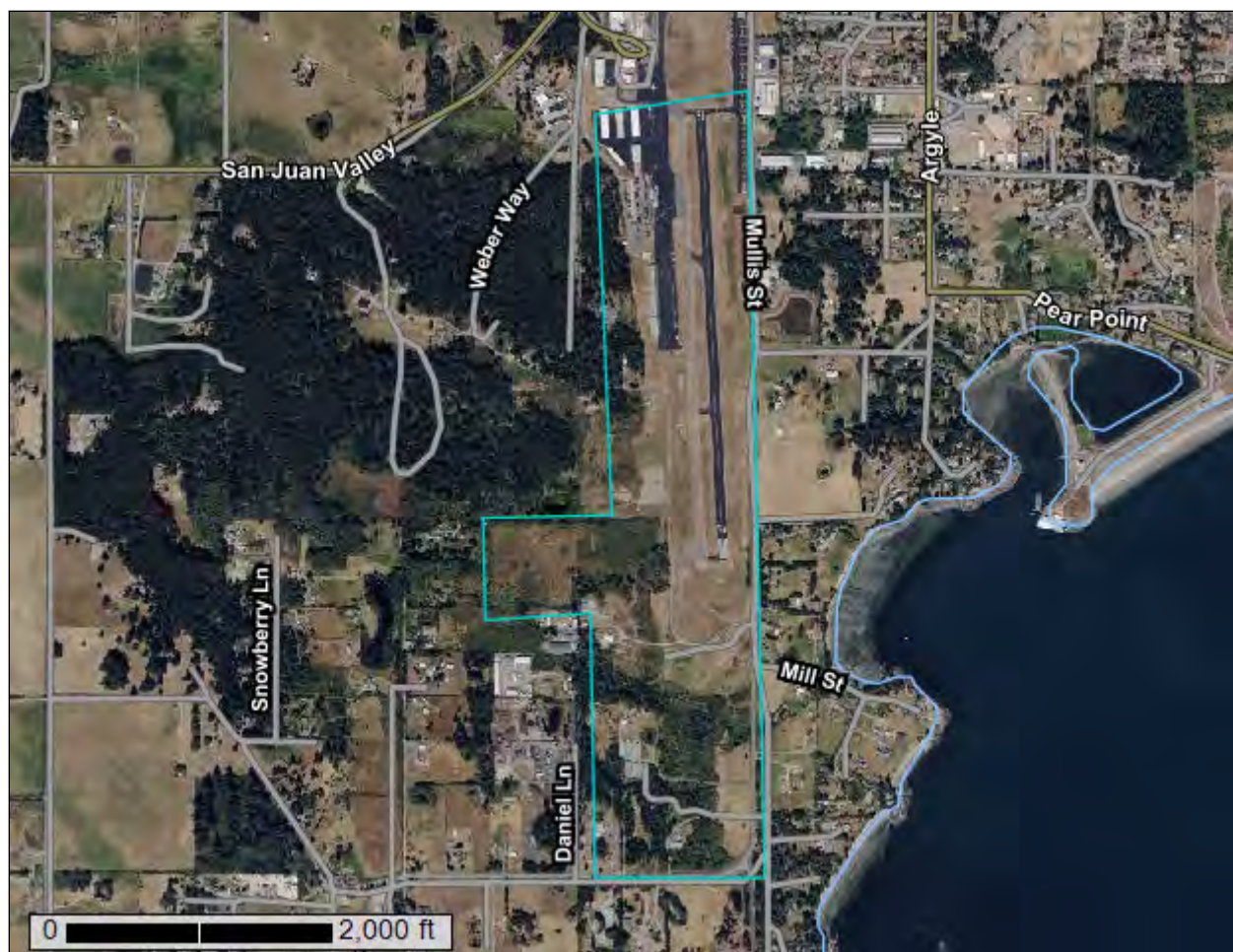
NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **San Juan County, Washington**

FHR SWDA



January 29, 2026

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map (Friday Harbor Regional Airport SWDA).....	9
Legend.....	10
Map Unit Legend (Friday Harbor Regional Airport SWDA).....	11
Map Unit Descriptions (Friday Harbor Regional Airport SWDA).....	11
San Juan County, Washington.....	13
1013—Bazal-Mitchellbay complex, 0 to 5 percent slopes.....	13
2001—Mitchellbay gravelly sandy loam, 5 to 15 percent slopes.....	15
2004—Mitchellbay gravelly sandy loam, 0 to 5 percent slopes.....	16
2008—Mitchellbay-Sholander-Bazal complex, 0 to 8 percent slopes.....	17
4000—Roche-Killebrew-Rock Outcrop complex, 5 to 35 percent slopes....	20
4007—Roche-Mitchellbay complex, 3 to 15 percent slopes.....	23
References	26

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report

Soil Map (Friday Harbor Regional Airport SWDA)



Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Juan County, Washington

Survey Area Data: Version 26, Aug 28, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 14, 2022—Sep 1, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Friday Harbor Regional Airport SWDA)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1013	Bazal-Mitchellbay complex, 0 to 5 percent slopes	16.8	9.7%
2001	Mitchellbay gravelly sandy loam, 5 to 15 percent slopes	23.5	13.6%
2004	Mitchellbay gravelly sandy loam, 0 to 5 percent slopes	69.3	39.9%
2008	Mitchellbay-Sholander-Bazal complex, 0 to 8 percent slopes	33.0	19.0%
4000	Roche-Killebrew-Rock Outcrop complex, 5 to 35 percent slopes	27.8	16.0%
4007	Roche-Mitchellbay complex, 3 to 15 percent slopes	3.0	1.7%
Totals for Area of Interest		173.4	100.0%

Map Unit Descriptions (Friday Harbor Regional Airport SWDA)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the

scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Juan County, Washington

1013—Bazal-Mitchellbay complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 17nnf
Landscape: Drift plains
Elevation: 0 to 300 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Bazal, undrained, and similar soils: 50 percent
Mitchellbay, briefly ponded, and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bazal, Undrained

Setting

Landscape: Drift plains
Landform: Valleys, Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Glacial drift over dense glaciomarine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 4 inches: mucky loam
A2 - 4 to 10 inches: loam
Bw - 10 to 17 inches: loam
E - 17 to 24 inches: loamy coarse sand
Btg - 24 to 39 inches: loam
2Cd - 39 to 59 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 8 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D

Custom Soil Resource Report

Ecological site: F002XN904WA - Sitka spruce - red alder/salmonberry/field horsetail
Forage suitability group: Wet Soils (G002XN102WA)
Other vegetative classification: Wet Soils (G002XN102WA)
Hydric soil rating: Yes

Description of Mitchellbay, Briefly Ponded

Setting

Landscape: Drift plains
Landform: Valley sides, Valleys
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glacial drift over dense glaciomarine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: gravelly sandy loam
Bw - 6 to 15 inches: sandy loam
E - 15 to 20 inches: sandy loam
2Btg1 - 20 to 26 inches: loam
2Btg2 - 26 to 38 inches: loam
2Cd - 38 to 59 inches: loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 8 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F002XN903WA - Western redcedar - Douglas-fir/salal/swordfern
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Other vegetative classification: Seasonally Wet Soils (G002XN202WA)
Hydric soil rating: No

Minor Components

Bazal, drained

Percent of map unit: 10 percent
Landscape: Drift plains
Landform: Valleys, Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F002XN904WA - Sitka spruce - red alder/salmonberry/field horsetail
Other vegetative classification: Seasonally Wet Soils (G002XN202WA)

Hydric soil rating: Yes

2001—Mitchellbay gravelly sandy loam, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: 17nmx

Landscape: Drift plains

Elevation: 0 to 350 feet

Mean annual precipitation: 25 to 40 inches

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 200 to 240 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Mitchellbay and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mitchellbay

Setting

Landscape: Drift plains

Landform: Valley sides, Valleys

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Glacial drift over dense glaciomarine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 6 inches: gravelly sandy loam

Bw - 6 to 15 inches: sandy loam

E - 15 to 20 inches: sandy loam

2Btg1 - 20 to 26 inches: loam

2Btg2 - 26 to 38 inches: loam

2Cd - 38 to 59 inches: loam

Properties and qualities

Slope: 5 to 15 percent

Depth to restrictive feature: 20 to 39 inches to densic material

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: About 4 to 12 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Custom Soil Resource Report

Hydrologic Soil Group: C/D

Ecological site: F002XN903WA - Western redcedar - Douglas-fir/salal/swordfern

Forage suitability group: Limited Depth Soils (G002XN302WA)

Other vegetative classification: Limited Depth Soils (G002XN302WA)

Hydric soil rating: No

Minor Components

Killebrew

Percent of map unit: 10 percent

Landscape: Drift plains

Landform: Valley sides, Valleys

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: F002XN901WA - Douglas-fir - Pacific madrone/oceanspray/
rattlesnake plantain

Other vegetative classification: Limited Depth Soils (G002XN302WA)

Hydric soil rating: No

Rock outcrop

Percent of map unit: 5 percent

Landscape: Hills

Landform: Hillslopes

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

2004—Mitchellbay gravelly sandy loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 17nmy

Landscape: Drift plains

Elevation: 0 to 300 feet

Mean annual precipitation: 25 to 40 inches

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 200 to 240 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Mitchellbay, briefly ponded, and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mitchellbay, Briefly Ponded

Setting

Landscape: Drift plains

Landform: Valley sides, Valleys

Down-slope shape: Linear

Across-slope shape: Linear

Custom Soil Resource Report

Parent material: Glacial drift over dense glaciomarine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 6 inches: gravelly sandy loam
Bw - 6 to 15 inches: sandy loam
E - 15 to 20 inches: sandy loam
2Btg1 - 20 to 26 inches: loam
2Btg2 - 26 to 38 inches: loam
2Cd - 38 to 59 inches: loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 8 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F002XN903WA - Western redcedar - Douglas-fir/salal/swordfern
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Other vegetative classification: Seasonally Wet Soils (G002XN202WA)
Hydric soil rating: No

Minor Components

Coupeville, undrained

Percent of map unit: 10 percent
Landscape: Drift plains
Landform: Valleys
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F002XN904WA - Sitka spruce - red alder/salmonberry/field horsetail
Other vegetative classification: Wet Soils (G002XN102WA)
Hydric soil rating: Yes

2008—Mitchellbay-Sholander-Bazal complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1r43c
Landscape: Drift plains
Elevation: 0 to 350 feet
Mean annual precipitation: 25 to 40 inches

Custom Soil Resource Report

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 200 to 240 days

Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Mitchellbay and similar soils: 35 percent

Sholander and similar soils: 30 percent

Bazal, briefly ponded, and similar soils: 20 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mitchellbay

Setting

Landscape: Drift plains

Landform: Valley sides, Valleys

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Glacial drift over dense glaciomarine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 6 inches: gravelly sandy loam

Bw - 6 to 15 inches: sandy loam

E - 15 to 20 inches: sandy loam

2Btg1 - 20 to 26 inches: loam

2Btg2 - 26 to 38 inches: loam

2Cd - 38 to 59 inches: loam

Properties and qualities

Slope: 2 to 8 percent

Depth to restrictive feature: 20 to 39 inches to densic material

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: About 4 to 12 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Ecological site: F002XN903WA - Western redcedar - Douglas-fir/salal/swordfern

Forage suitability group: Seasonally Wet Soils (G002XN202WA)

Other vegetative classification: Seasonally Wet Soils (G002XN202WA)

Hydric soil rating: No

Description of Sholander

Setting

Landscape: Drift plains

Landform: Valleys

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Glacial outwash over dense glaciomarine deposits

Typical profile

A - 0 to 8 inches: gravelly loam
E - 8 to 16 inches: gravelly sandy loam
Bg1 - 16 to 28 inches: gravelly loamy sand
Bg2 - 28 to 51 inches: gravelly sand
2Cd - 51 to 59 inches: loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 39 to 59 inches to densic material
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 4 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Ecological site: F002XN903WA - Western redcedar - Douglas-fir/salal/swordfern
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Other vegetative classification: Seasonally Wet Soils (G002XN202WA)
Hydric soil rating: No

Description of Bazal, Briefly Ponded

Setting

Landscape: Drift plains
Landform: Valleys, Drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Glacial drift over dense glaciomarine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 4 inches: mucky loam
A2 - 4 to 10 inches: loam
Bw - 10 to 17 inches: loam
E - 17 to 24 inches: loamy coarse sand
Btg - 24 to 39 inches: loam
2Cd - 39 to 59 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 8 inches
Frequency of flooding: None
Frequency of ponding: Frequent

Custom Soil Resource Report

Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: C/D

Ecological site: F002XN904WA - Sitka spruce - red alder/salmonberry/field horsetail

Forage suitability group: Wet Soils (G002XN102WA)

Other vegetative classification: Wet Soils (G002XN102WA)

Hydric soil rating: Yes

Minor Components

Killebrew

Percent of map unit: 10 percent

Landscape: Drift plains

Landform: Valley sides, Valleys

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: F002XN901WA - Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain

Other vegetative classification: Seasonally Wet Soils (G002XN202WA)

Hydric soil rating: No

Hoypus

Percent of map unit: 5 percent

Landscape: Drift plains

Landform: Hillslopes

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: F002XN901WA - Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain

Other vegetative classification: Droughty Soils (G002XN402WA)

Hydric soil rating: No

4000—Roche-Killebrew-Rock Outcrop complex, 5 to 35 percent slopes

Map Unit Setting

National map unit symbol: 17nms

Landscape: Drift plains

Elevation: 0 to 500 feet

Mean annual precipitation: 20 to 35 inches

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 200 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Roche and similar soils: 40 percent

Rock outcrop: 25 percent

Killebrew and similar soils: 25 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Roche

Setting

Landscape: Drift plains

Landform: Hillslopes

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Glacial drift over dense glaciomarine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 5 inches: loam

Bw1 - 5 to 15 inches: gravelly sandy loam

2Bw2 - 15 to 23 inches: loam

2Bg - 23 to 39 inches: loam

2Cd - 39 to 59 inches: silt loam

Properties and qualities

Slope: 5 to 15 percent

Depth to restrictive feature: 20 to 39 inches to densic material

Drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: About 12 to 20 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C/D

Ecological site: F002XN901WA - Douglas-fir - Pacific madrone/oceanspray/
rattlesnake plantain

Forage suitability group: Limited Depth Soils (G002XN302WA)

Other vegetative classification: Limited Depth Soils (G002XN302WA)

Hydric soil rating: No

Description of Rock Outcrop

Typical profile

R - 0 to 59 inches: unweathered bedrock

Properties and qualities

Slope: 10 to 35 percent

Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: No

Description of Killebrew

Setting

Landscape: Drift plains

Landform: Valley sides, Valleys

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Glacial drift over dense glaciomarine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 5 inches: sandy loam

Bw - 5 to 9 inches: sandy loam

2E - 9 to 17 inches: gravelly sandy loam

2Btg - 17 to 27 inches: silt loam

2Cd - 27 to 59 inches: loam

Properties and qualities

Slope: 5 to 15 percent

Depth to restrictive feature: 20 to 39 inches to densic material

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: About 4 to 12 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Ecological site: F002XN901WA - Douglas-fir - Pacific madrone/oceanspray/
rattlesnake plantain

Forage suitability group: Limited Depth Soils (G002XN302WA)

Other vegetative classification: Limited Depth Soils (G002XN302WA)

Hydric soil rating: No

Minor Components

Cady

Percent of map unit: 10 percent

Landscape: Mountains, hills

Landform: Mountain slopes, Hillslopes

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Mountaintop, mountainflank, side slope,
crest

Down-slope shape: Linear

Across-slope shape: Linear

Ecological site: F002XN901WA - Douglas-fir - Pacific madrone/oceanspray/
rattlesnake plantain

Other vegetative classification: Limited Depth Soils (G002XN302WA)
Hydric soil rating: No

4007—Roche-Mitchellbay complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1r444
Landscape: Drift plains
Elevation: 0 to 300 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Roche and similar soils: 60 percent
Mitchellbay and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Roche

Setting

Landscape: Drift plains
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glacial drift over dense glaciomarine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 5 inches: loam
Bw1 - 5 to 15 inches: gravelly sandy loam
2Bw2 - 15 to 23 inches: loam
2Bg - 23 to 39 inches: loam
2Cd - 39 to 59 inches: silt loam

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 20 inches
Frequency of flooding: None
Frequency of ponding: None

Custom Soil Resource Report

Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C/D

Ecological site: F002XN901WA - Douglas-fir - Pacific madrone/oceanspray/
rattlesnake plantain

Forage suitability group: Limited Depth Soils (G002XN302WA)

Other vegetative classification: Limited Depth Soils (G002XN302WA)

Hydric soil rating: No

Description of Mitchellbay

Setting

Landscape: Drift plains

Landform: Valleys, Valley sides

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Glacial drift over dense glaciomarine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 6 inches: gravelly sandy loam

Bw - 6 to 15 inches: sandy loam

E - 15 to 20 inches: sandy loam

2Btg1 - 20 to 26 inches: loam

2Btg2 - 26 to 38 inches: loam

2Cd - 38 to 59 inches: loam

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 20 to 39 inches to densic material

Drainage class: Somewhat poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately
low (0.00 to 0.06 in/hr)

Depth to water table: About 4 to 12 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Ecological site: F002XN903WA - Western redcedar - Douglas-fir/salal/swordfern

Forage suitability group: Seasonally Wet Soils (G002XN202WA)

Other vegetative classification: Seasonally Wet Soils (G002XN202WA)

Hydric soil rating: No

Minor Components

Everett, warm

Percent of map unit: 10 percent

Landscape: Drift plains

Landform: Hillslopes

Down-slope shape: Linear

Custom Soil Resource Report

Across-slope shape: Linear

Ecological site: F002XN903WA - Western redcedar - Douglas-fir/salal/swordfern

Other vegetative classification: Droughty Soils (G002XN402WA)

Hydric soil rating: No

References

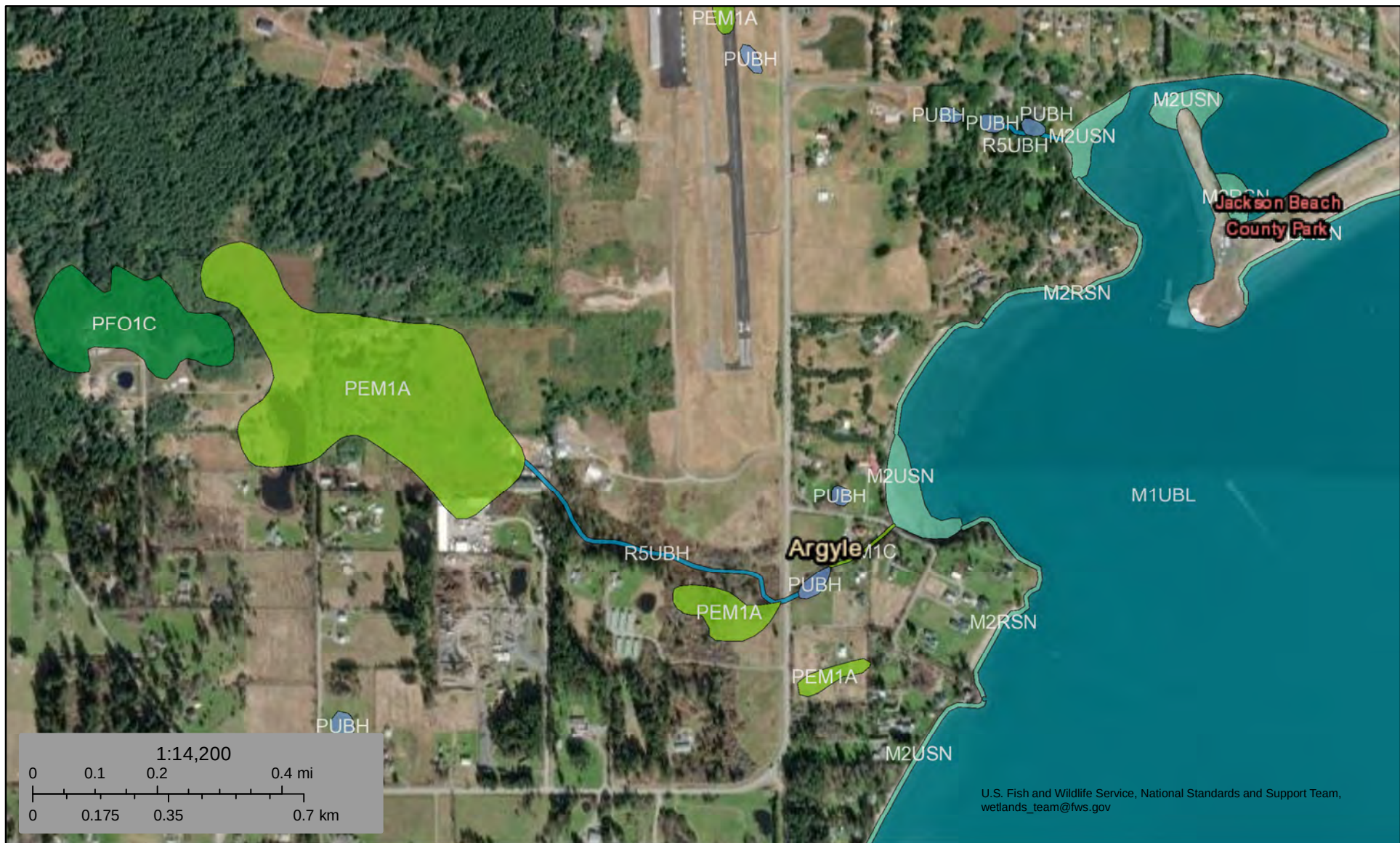
- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf



January 29, 2026

Wetlands

- | | | |
|--|---|--|
|  Estuarine and Marine Deepwater |  Freshwater Emergent Wetland |  Lake |
|  Estuarine and Marine Wetland |  Freshwater Forested/Shrub Wetland |  Other |
| |  Freshwater Pond |  Riverine |

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Appendix C

Representative Photographs



Photo C-1. Wetland A, facing northwest



Photo C-2. Wetland A, facing south



Photo C-3. Wetland A, facing south



Photo C-4. Wetland A, facing north



Photo C-5. Wetland A, facing southwest



Photo C-6. Wetland B, facing west



Photo C-7. Wetland B, facing north



Photo C-8. Wetland B, facing southeast



Photo C-9. Wetland B, facing southwest



Photo C-10. Wetland C, facing east



Photo C-11. Wetland C, facing south



Photo C-12. Wetland C, facing southwest



Photo C-13. Wetland D, facing northeast



Photo C-14. Wetland D, facing southeast



Photo C-15. Wetland D, facing north



Photo C-16. Wetland D, facing north



Photo C-17. Wetland D, facing north



Photo C-18. Wetland E, facing west



Photo C-19. Wetland E, facing northeast



Photo C-20. Wetland E, facing north



Photo C-21. Stream A



Photo C-22. Upper impoundment in Stream A

Appendix F

Public Involvement

**F1 McAlpine Trail Port
Commission and
San Juan Trails Committee
Meeting Materials**

Port of Friday Harbor Friday Harbor Airport

Southwest Development Area - Clark McAlpine Trail Realignment and Environmental Assessment Update

April 12, 2024



1

Introductions and Study Background

Project Team



- ESA
 - John Vlastelicia - Project Manager



- Precision Approach Engineering
 - Corley McFarland – Preliminary Engineering Design

Southwest Development Area (SWDA) Environmental Assessment (EA)

- Funded by the FAA Airport Improvement Program (AIP), AIP Grant No. 3-53-0152-043-2023
- Purpose of study - Conduct the FAA required National Environmental Policy Act (NEPA) review necessary to support the follow-on design and construction of the short-term development of the Southwest Development Area (SWDA) to accommodate current Airport Reference Code B-I demand.



2

Project Status Update

- Following development of the preliminary layout in 2023, potential incompatibility with FAA design criteria for the existing Automated Surface Observation System (ASOS) was identified.
- In September 2023, the EA was paused to allow discussions with the FAA and National Weather Service (NWS) regarding ASOS/SWDA development compatibility. Discussions with FAA and NWS indicated ASOS relocation would be needed to maintain reasonable weather reporting accuracy and allow development of the SWDA.
- Additionally, a change in National Marine Fisheries (NMFS) policy now requires the project to undergo a formal consultation with NMFS which will take approximately 18 months once initiated.
- The EA is currently scheduled for completion in the Fall of 2026, contingent upon an 18-month NMFS review.

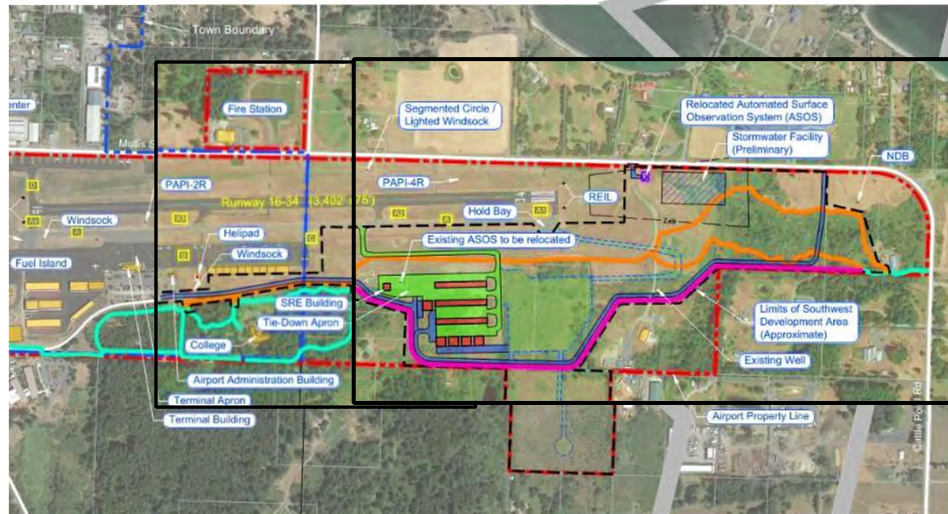
The map illustrates the proposed airport expansion area near Friday Harbor. It features several key elements:

- FRIDAY HARBOR**: Labeled at the top left of the map.
- NEW ASOS SITE SELECTED**: Indicated by a purple box and arrow pointing to a new location.
- Existing ASOS**: Indicated by a red arrow pointing to the current site.
- Alternate ASOS Clear Area (1.000R)**: Multiple areas labeled with this radius, indicating clear zones around the proposed sites.
- Other Labels**: Airport Administration Building, Control Tower Building, Weather Station Location, and ASOS Siting Criteria.
- Scale Bar**: Located at the bottom right, indicating distances from 0 to 100 feet.

2

Southwest Development Area Work Elements and Preliminary Layout

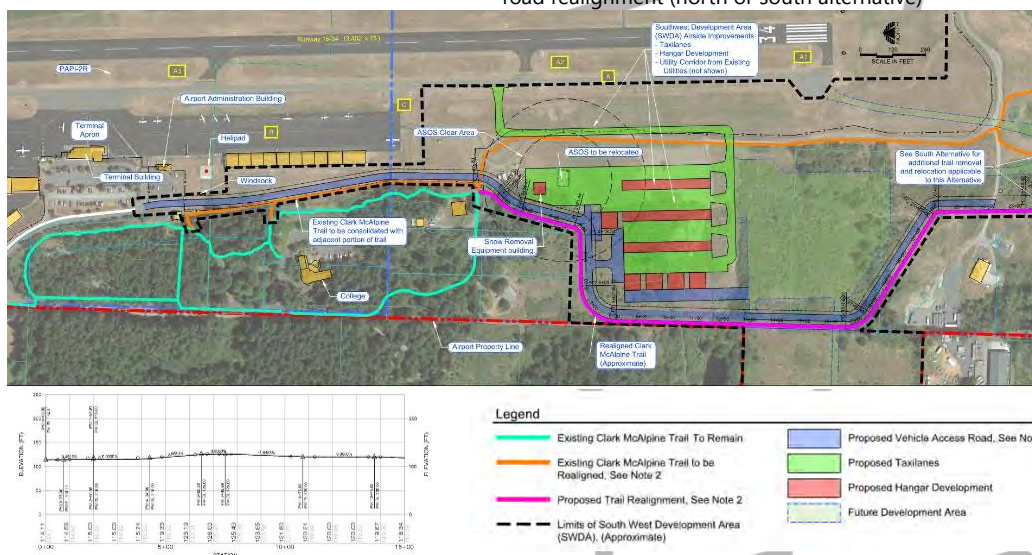
- SWDA access taxi lane and hangar taxi lanes
- Hangar development
- Snow removal equipment building
- Utilities
- Vehicle access road (north and south alternatives)
- Clark McAlpine Trail Realignment



5

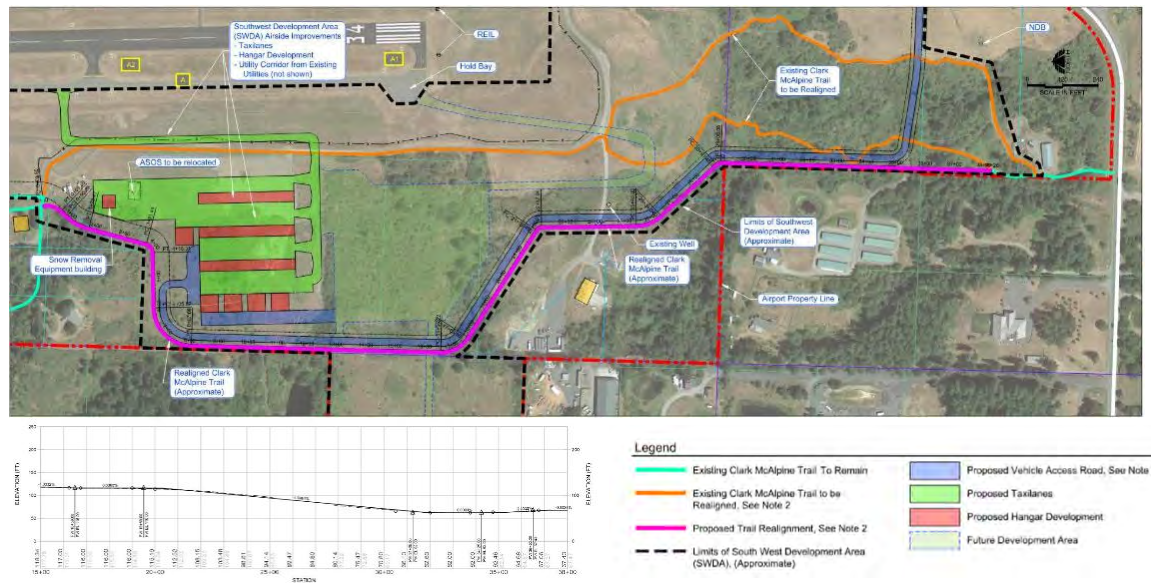
Clark McAlpine Trail Realignment - SWDA North Access Road Alignment

- Section of Trail requires realignment compatible with SWDA Airport Operations Area
- Potential Section 4(f) resource of the Transportation Act
- Trail realignment depends upon selected vehicle access road realignment (north or south alternative)



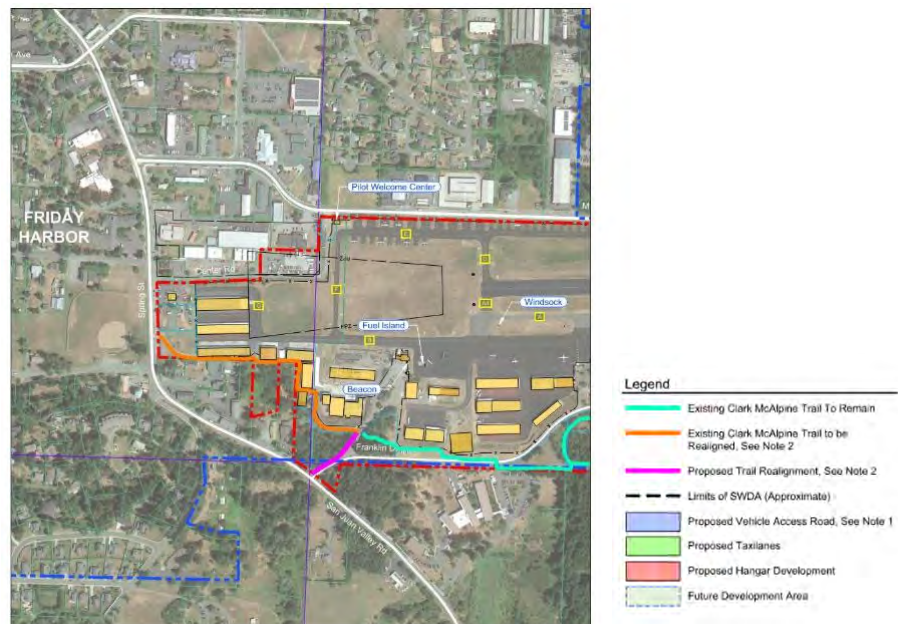
6

Clark McAlpine Trail Realignment - SWDA South Access Road Alignment



7

Clark McAlpine Trail Realignment - North End of Airport



8

Trails Committee Sign-In Sheet 5/2/24

Name

E-mail

Mark Noyes

marknoyes@gmail.com

Tom Donnelly

tom.donle@gmail.com

Robin Donnelly

do otterhead56@gmail

Allison Moalli

IR Commissioner
allimoalli@gmail.com

Todd Nicholson Todd@PortFt.org

Tanya Williams

John Parkey

john.parkey@me.com

Corley McFarland - Precision Approach Engineering

cmcfarland@preappinc.com

John V - ESA

F2 Public Comments and Responses

***Draft EA Comments and Responses
will be included in the Final EA***