Paine Field Master Plan 2040

Chapter 8 | Environmental Overview

8

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PREPARED FOR
Snohomish County

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8 Environmental Overview

8.1 Introduction

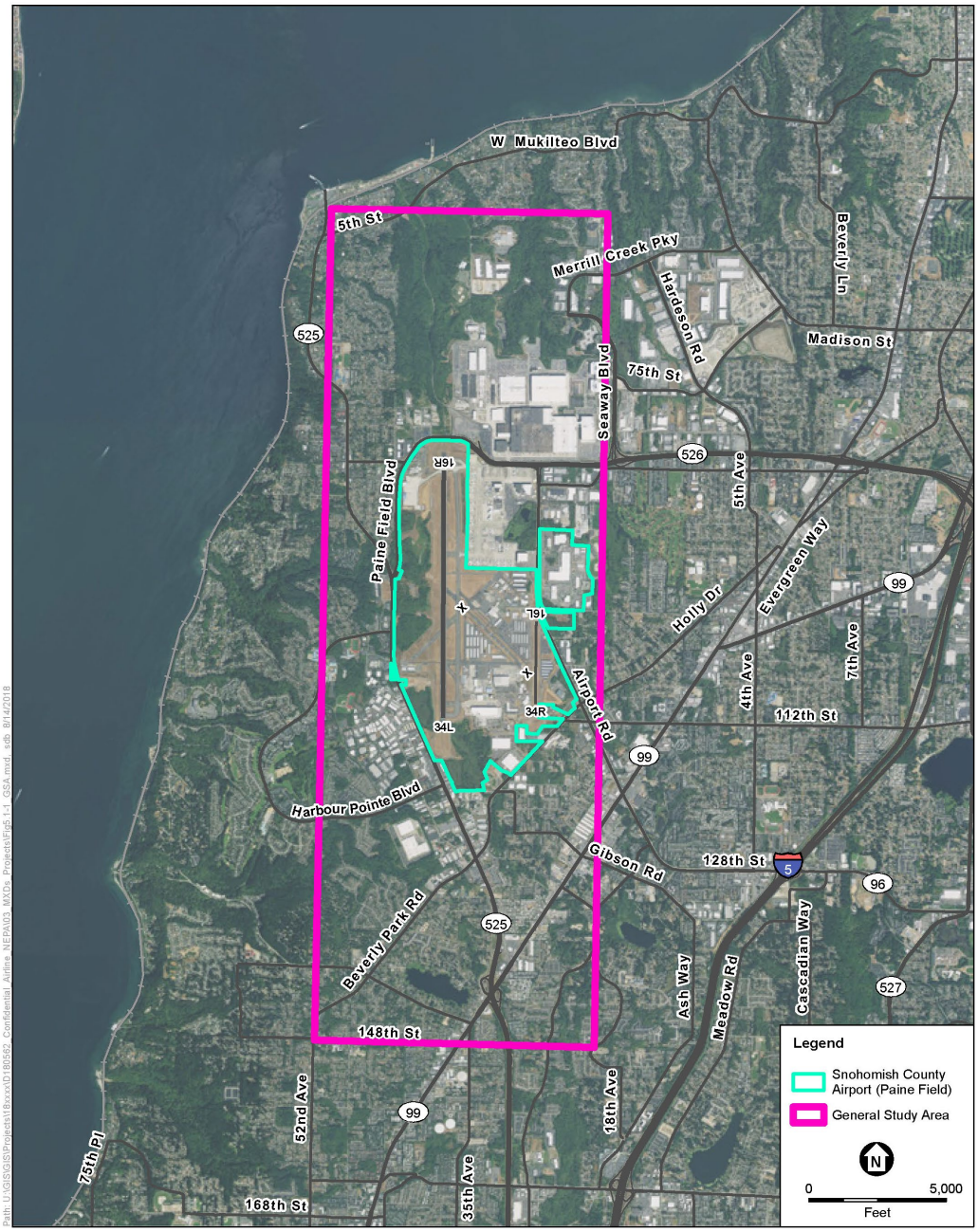
This chapter provides a preliminary review of the existing environmental conditions at Paine Field Airport (PAE), including an overview of the environmental issues including updated existing and future (2030 and 2040) noise contours. The purpose of considering environmental factors in airport master planning is to help the airport sponsor evaluate airport development alternatives and to provide information that will help subsequent environmental processing.[1]

8.2 Existing Environmental Conditions

The following section on environmental conditions at PAE is based primarily on the 2019 Final Supplemental Environmental Assessment (EA) for Amendment to the Operations Specifications for Air Carrier Operations and Amendment to a Part 139 Airport Operating Certificate (2019 Final EA) prepared for Alaska Airlines, United Airlines, and the Federal Aviation Administration (FAA). The 2019 Final EA was developed to evaluate the environmental impacts of providing commercial airline service at PAE and approved by the FAA in 2019. This section also based on available data from other previous studies, as well as information easily accessible from agencies and other public sources. Resources not evaluated in the 2019 EA include wild and scenic rivers and farmland, and, as such, are not evaluated in this review. The exhibit showing the study areas is provided in **Appendix B** (Attachment A), defined as the Snohomish County Airport (detailed study area) and the General Study Area (GSA), depicted in Exhibit 8.1-1, General Study Area.

[1] U.S. Department of Transportation (USDOT), Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, *Change 1*; May 1, 2007

Exhibit 8.2-1 General Study Area



SOURCE: ESRI; USDA NAIP (Aerial Imagery); ESA, 2018
NOTE: Runway 11-29 closed indefinitely.

Figure 5.1-1
General Study Area
Snohomish County Airport (Paine Field)

Source: 2019 EA

8.2.1 Air Quality

The U.S. Environmental Protection Agency (USEPA) has established air quality standards for a set of criteria pollutants known as the National Ambient Air Quality Standards (NAAQS). The NAAQS set limits on emissions for ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb). The Washington Department of Ecology (Ecology) and Puget Sound Clean Air Agency (PSCAA) have adopted state and local standards for the same criteria pollutants as the NAAQS.

PAE currently complies with all criteria pollutants as designated by USEPA (USEPA 2020). The southwestern portion of PAE had been part of larger regional maintenance areas for O_3 and CO; however, in 2016 the regional areas were designated as in attainment (Ecology 2021a). As reported in the 2019 Final EA for PAE, recent monitoring from 2016, 2017, and 2018 of O_3, NO_2, CO, PM_{10}, and $PM_{2.5}$ has shown the area to comply, based on USEPA Outdoor Air Quality Data (FAA 2019).

The topography, climate, and meteorology of the PAE site allows for generally rapid dispersion and deposition of pollutants due to relatively windy conditions and frequency of precipitation. The 2018 Draft and 2019 Final EA modeled the following air emissions for the 2019 operating year, which is being used as baseline conditions for the purposes of this analysis (see **Table 8.2-1, *Criteria Pollutant Emissions – Proposed Action (2019)***). The total amount of emissions was anticipated to be greater in 2019 than in 2024.

Table 8.2-1 Criteria Pollutant Emissions – Proposed Action (2019)

Emissions Source	Criteria Pollutant Emissions (Tons per year)					
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.4}$
Aircraft	613.10	29.64	119.13	12.66	1.25	1.25
Auxiliary Power Units	0.15	0.01	0..21	0.03	0.02	0.02
Ground Support Equipment	5.44	0.69	4.30	0.04	0.34	0.33
Surface Traffic	7,672.57	1,177.91	561.59	0.57	19.98	17.67
Stationary Sources	1.72	0.18	1.70	<0.01	0.07	0.07
Total Emissions	8,292.99	1,208.44	686.92	13.30	21.66	19.34

Source: FAA, 2019

8.2.2 Biological Resources

This section discusses biological resources for the general study area (GSA) as mapped in the 2019 Final EA (FAA 2019). Data resources include the following:

- 2019 Final EA
- The U.S. Fish and Wildlife Service's (USFWS') online Information for Planning and Consultation system
- The National Marine Fisheries Service's (NMFS') website

- Locations of priority habitats and species mapped by the Washington Department of Fish and Wildlife (WDFW)
- Fish distribution information from the Northwest Indian Fisheries Commission's (NWIFC's) Statewide Washington Integrated Fish Distribution dataset

8.2.2.1 Land Cover, Habitat Types, and Wildlife

The 2019 Final EA identified the predominant land cover type at and near PAE as "urban matrix." This continues to be the case. The urban matrix land cover type is dominated by maintained grassy airfield; aviation, commercial, and industrial buildings; runways, taxiways, aircraft parking aprons, roads, and highways; and scattered drainage ways, streams, and wetlands. Plant communities consist primarily of maintained grassy airfield with a mix of native and ornamental trees and shrubs around buildings and along fence lines. These plant communities provide limited wildlife habitat. Habitat types near PAE are characterized by mixed coniferous and deciduous forested ravines extending north and west of the airfield, which likely provide wildlife habitat for a variety of urban species.

Snohomish County continues to implement an FAA-required Wildlife Hazard Management Plan at PAE. The purpose of the plan is to enhance safety by minimizing the risk of collisions involving wildlife and aircraft. The plan includes measures for minimizing habitat that could be attractive to wildlife, such as ponds and wetlands, grassy fields, and forested areas. Species considered to present the greatest threats to aviation at PAE are birds with flocking tendencies (e.g., gulls, waterfowl) or of relatively large size (e.g., raptors). Large mammals such as deer may also present a hazard, but they are not as common, and the perimeter wildlife fencing acts as a deterrent. Snohomish County recently updated the Wildlife Hazard Management Plan in 2022 and approved by the FAA in October 2022.

8.2.2.2 Federally Protected Species and Critical Habitat

Section 7(a)(2) of the Endangered Species Act (ESA) requires each federal agency to ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the adverse modification or destruction of designated critical habitat. For projects that may affect ESA-listed species or critical habitat, the federal action agency must consult with USFWS and NMFS. For projects that will have no effect on ESA listed species or critical habitat, no such consultation is necessary.

Based on information obtained from USFWS and NMFS (**Appendix B**, Attachment B), the following ESA-listed species could use habitats in the GSA:

Species in terrestrial habitats:

- Marbled Murrelet (*Brachyramphus marmoratus*) – Listed as threatened. The GSA does not include any areas designated as critical habitat for this species.
- Yellow-billed Cuckoo (*Coccyzus americanus*) – Listed as threatened. The GSA does not include any areas proposed for designation as critical habitat for this species.
- North American Wolverine (*Gulo gulo luscus*) – Proposed for listing as threatened. Critical habitat has not been proposed or designated for this species.

Species in aquatic habitats:

- Bull Trout (*Salvelinus confluentus*) – Listed as threatened. The GSA does not include any areas designated as critical habitat for this species. However, contaminants in stormwater runoff from the airport could degrade water quality outside the GSA, including waters that have been designated as critical habitat.
- Chinook Salmon (*Oncorhynchus tshawytscha*), Puget Sound evolutionarily significant unit – Listed as threatened. The GSA does not include any areas designated as critical habitat for this species. However, contaminants in stormwater runoff from the airport could degrade water quality outside the GSA, including waters that have been designated as critical habitat.
- Steelhead (*Oncorhynchus mykiss*), Puget Sound distinct population segment – Listed as Threatened. The GSA does not include any areas designated as critical habitat for this species. However, contaminants in stormwater runoff from the airport could degrade water quality outside the GSA, including waters that have been designated as critical habitat.

The species list provided by USFWS does not identify the gray wolf as an ESA-listed species potentially present in the project area. This may be a product of a rule issued by USFWS on November 3, 2020 (85 Federal Register 69778), removing gray wolves from the list of species protected under the ESA. However, on February 10, 2022, the U.S. District Court for the Northern District of California vacated and remanded USFWS' delisting rule. The court's decision effectively reinstated the listing status the species had before USFWS issued the delisting rule in 2020. As a result, gray wolves in western Washington have a listing status of endangered. Critical habitat has not been designated for gray wolves in Washington State.

According to the Statewide Washington Integrated Fish Distribution dataset, the only ESA-listed species that may use aquatic habitats in the GSA are Puget Sound Chinook salmon and Puget Sound steelhead (NWIFC 2021). Chinook salmon have been documented in Swamp Creek in the southeastern corner of the GSA. The lower reaches of Japanese Gulch at the northern end of the GSA are classified as accessible to both Chinook salmon and steelhead.

The 2019 Final EA identified the streaked horned lark as the only federally listed species that could potentially be present at PAE. Grassy areas near runways and taxiways could potentially provide suitable habitat for this species. However, streaked horned larks are not expected to be present at PAE because their current range in Washington State is not believed to extend north of Tacoma Narrows. The GSA does not include potentially suitable habitat for any of the other terrestrial species identified above. The Airport Environmental and Wildlife Manager for PAE confirmed that no ESA-listed endangered or threatened species have been observed at PAE since the publication of the 2019 Final EA (Snohomish County Dec 2022). In addition, no critical habitat for any ESA-listed species has been designated or proposed for designation on or adjacent to PAE.

The Bald and Golden Eagle Protection Act (16 USC 668 et seq.) protects bald and golden eagles by prohibiting take (which is defined to include pursuing, shooting, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing), possession, or commerce of these species, except under certain specified conditions. A permit from USFWS may be required for vegetation clearing and other construction activities within 660 feet of an active eagle nest between January 1 and August 31. Bald eagles have occasionally been seen at PAE, but no signs of nesting have been observed (Snohomish County 2022).

8.2.2.3 Essential Fish Habitat

The GSA overlaps portions of several streams that are currently or were historically accessible to salmon species belonging to the Pacific Coast salmon fishery managed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). As such, these streams are classified as essential fish habitat (EFH). The Magnuson-Stevens Act requires federal agencies to consult with NMFS on all activities or proposed activities authorized, funded, or undertaken by the agency that may adversely affect EFH. Activities with the potential to adversely affect EFH may include projects that create or replace pollution-generating impervious surfaces (PGIS) that could deliver contaminants to fish-bearing waters.

Additionally, on September 12th, 2019, PAE received conditional Salmon-Safe certification, which is an ecolabel certification for infrastructure sites that demonstrate their "commitment to environmental sustainability and stewardship". PAE is the third airport in the world to receive the honor. The process for this certification included an assessment by the Salmon-Safe staff and an interdisciplinary team of scientists. The assessment consisted of a gap analysis (review of PAE policies and documents) and field review of stormwater management facilities (stormwater detention ponds, maintenance and wash facilities, pilot-phase stormwater treatment projects, etc.). Following the assessment, Salmon-Safe summarized their general observations and conclusions for PAE. The conclusions resulted in the conditions of PAE's Salmon-Safe certification, which are grouped by the categories specified in the Infrastructure Standards developed by Salmon-Safe. This evaluation determined that PAE's stormwater management system "appears to be generally effective for both quantity and quality control".

8.2.2.4 State and County Listed Species

In Snohomish County, fish and wildlife habitat conservation areas are regulated through the local critical area ordinance [Snohomish County Code (SCC 30.62A)]. Fish and wildlife habitat conservation areas include the following:

- Lakes, streams, and marine waters
- Habitat areas for species the state has listed as endangered, threatened, or sensitive
- Habitat areas for federally listed endangered or threatened species
- Habitat areas for species of local importance[2]

Further, SCC 30.62A requires that proposed development that occurs on a site that contains habitat for critical species (state and federally threated or endangered, sensitive [state only], or species of local importance) must prepare a habitat management plan for their protection.

8.2.3 Climate

Greenhouse gases (GHGs) include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). **Table 8.2-2, *Conditions (2017) Greenhouse Gas Emissions (Annual Metric Tons)*** shows GHG emissions at PAE as of 2017. These emissions were calculated in terms of carbon dioxide equivalence

[2] Species of local importance are species of local concern in Snohomish County due to their population status or their sensitivity to habitat manipulation. This designation may include game species that may have a seasonal range or require a certain habitat-type that, if altered, may reduce their longevity.

(CO_2e) using AEDT Version 2d to calculate CO_2 for aircraft operations; the FAA Aviation Emissions and Air Quality Handbook for CH_4 and N_2O for aircraft and CO_2, CH_4, and N_2O for ground support equipment; and MOVES2014 for GHG emissions for light-duty vehicles.

Table 8.2-2 Existing Conditions (2017) Greenhouse Gas Emissions (Annual Metric Tons)

Source	Carbon Dioxide Equivalent (CO_2e) (metric tons)
Aircraft	26,409
Ground Support Equipment	298
Off-road Equipment[1]	79
Mobile Sources (traffic)	92,897
Area Sources[2]	306
Stationary Sources[3]	39
Electricity Use	64
Solid Waste	137
Water and Wastewater	60
2017 TOTAL	**120,288**

1 Emergency fire rescue equipment
2 Natural gas combustion.
3 Fire pumps and emergency generators
Source: Environmental Science Associates

Anticipated GHG emissions for 2019 are shown in **Table 8.2-3, *Estimated Greenhouse Gas Emissions (2019),*** which is being used as a baseline condition for this report.

Table 8.2-3 Estimated Greenhouse Gas Emissions (2019)

Source	Carbon Dioxide Equivalent (CO_2e) (metric tons)
No Action Alternative	119,761
Proposed Action	140,370
Net Change	**20,610**

Source: FAA, 2019

8.2.4 Coastal Resources

Snohomish County is included among the 15 counties that comprise the Washington State Coastal Zone. In Washington, federal agencies and federal license or permit applicants must demonstrate consistency with Washington's Coastal Zone Management Program (WCZMP) by submitting either a Consistency Determination, if the proponent is a federal agency, or a Consistency Certification, if the proponent is seeking a federal license or permit, to Ecology. The specific type of federal action will determine whether a consistency determination or certification is required.

8.2.5 Section 4(f) and 6(f)

Section 4(f) refers to the original section of the U.S. Department of Transportation (USDOT) Act of 1966 that requires consideration of publicly owned parks, trails, and other recreation facilities; wildlife and waterfowl refuges; or public and private historic properties that are listed in or eligible for listing in the National Register of Historic Places (NRHP) during transportation project development. Where federal lands or other public land holdings have multiple, administrative-statute-designated uses, Section 4(f) applies only to those portions of the lands that function for, or that are designated in the plans of the administering agency as being for, significant park, recreation, or wildlife and waterfowl refuge purposes (Code of Federal Regulations [CFR] Title 23, 774.11).

According to Section 4(f), the FAA must determine that there is no feasible and prudent alternative that avoids Section 4(f) properties and that the project includes all possible planning to minimize harm to the Section 4(f) properties, or FAA makes a finding that the project has a *de minimis* impact on the Section 4(f) property. A *de minimis* impact involves the use of Section 4(f) property that is generally minor in nature and that, after considering avoidance, minimization, mitigation, and enhancement measures, results in no adverse effect to the activities, features, or attributes qualifying lands or facilities for protection under Section 4(f).

Section 6(f) of the Land and Water Conservation Fund (LWCF) Act protects land acquired or improved with LWCF grants. LWCF funds are used to acquire or develop parks and recreation areas. Properties containing in-progress or completed LWCF-funded projects require additional steps for the land to be converted to a transportation use.

Information from the city of Everett, city of Mukilteo, Snohomish County, and other sources was used to identify potential Section 4(f) and 6(f) resources in or near the project area. The location of each resource is provided in **Table 8.2-4, *Section 4(f) and 6(f) Properties in the GSA***. See **Appendix B** (Attachment C) for a map of resource locations.

Table 8.2-4 Section 4(f) and 6(f) Properties in the GSA

Facility	Location	Owner	Amenities	Resource Type
Paine Field Community Park	11928 Beverly Park Road, Everett, WA	Snohomish County	Athletic fields (soccer, baseball, softball), picnic shelters and tables, and playground	4(f)
Kasch Park and Athletic Complex	8811 Airport Road, Everett, WA	City of Everett	Athletic fields (soccer, baseball), picnic shelter and tables, playground, and trails	4(f) & 6(f)
Loganberry Lane Park	18th Avenue West, Everett, WA	City of Everett	Trails, off-leash pet areas	4(f)
Walter E. Hall Park and Golf Course	1226 W. Casino Road, Everett, WA	City of Everett	Athletic fields (baseball, soccer, softball), golf course, playground, and skate park	4(f) & 6(f)
Big Gulch Trail Park	Access via 4800 92nd Street SW, Mukilteo, WA	City of Mukilteo	Multiple trails and boardwalks throughout the gulch	4(f) & 6(f)
92nd Street Park	4800 92nd Street SW, Mukilteo, WA	City of Mukilteo	Playground, grassed field, picnic tables, and trails Access to the Big Gulch Park's trail system	4(f) & 6(f)
Japanese Gulch Park	4407 76th St SW, Mukilteo, WA 98275	City of Mukilteo	Trails, park, and off-leash pet area	4(f)
Mukilteo Athletic Fields	10600 47th Place West, Mukilteo, WA	City of Mukilteo (leased to Mukilteo Boys and Girls Club)	Athletic fields, activities building	6(f)
Harbour Pointe Village Park	12215 Possession Way, Mukilteo, WA	City of Mukilteo	Playground, grassy area	4(f)
Narbeck Wetland Park	6900 Seaway Boulevard in Everett, WA	Snohomish County	Trails, interpretive signs, viewpoints, picnic tables, and restrooms	4(f) & 6(f)

Sources: City of Everett, City of Mukilteo, Snohomish County

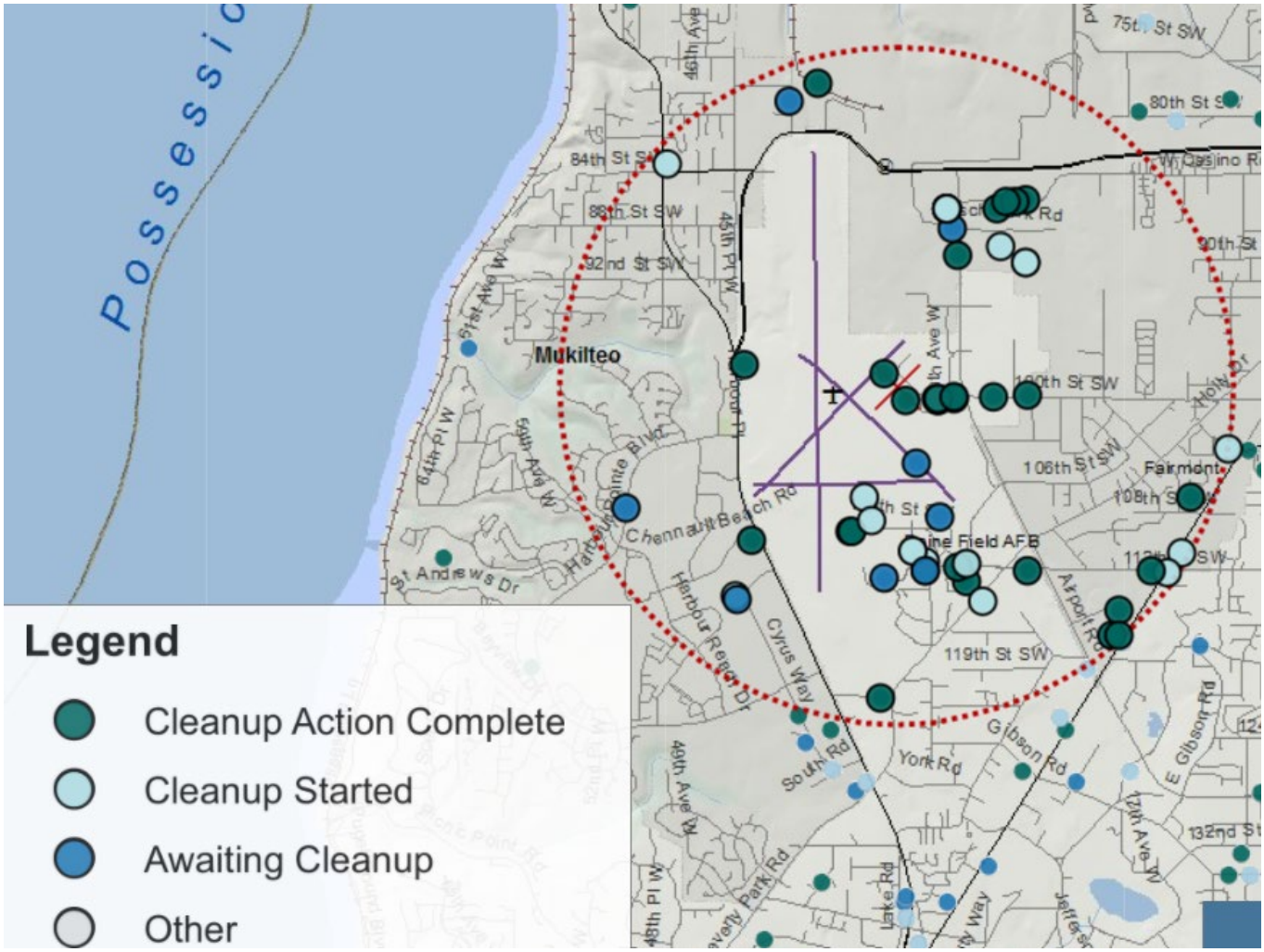
8.2.6 Hazardous Materials, Solid Waste, and Pollution Prevention

8.2.6.1 Hazardous Materials

The 2019 Final EA emphasized only those hazardous waste concerns for the "Detailed Study Area." To understand the extent of potential hazardous material sites near PAE, hazardous materials as mapped by Ecology on its "What's in My Neighborhood" website were identified within a 1.5-mile radius of the center of PAE. Sixty-eight sites are identified, as shown in **Exhibit 8.2-2, *Hazardous Materials Sites***

within 1.5 Miles of Airport (Ecology). A more detailed analysis of hazardous materials and cleanup sites would be conducted to identify areas where airport improvements may have the potential to encounter contaminated soil and/or groundwater based on their proximity to such sites prior to projects moving forward. Information used in this analysis would include procuring EDR data and accessing the online Ecology Cleanup Site Search Tool. The EDR would be reviewed for Superfund (National Priorities List [NPL]) sites, as well as underground storage tank (UST), leaking underground storage tank (LUST), and Confirmed and Suspected Contaminated Sites List (CSCSL) sites.

Exhibit 8.2-2 Hazardous Materials Sites within 1.5 Miles of Airport (Ecology)



Source: Ecology 2020b

8.2.6.2 Fuel Storage

The predominant types and overall largest quantities of materials and substances used at PAE that are classifiable as hazardous, are regulated, or have the potential to cause environmental contamination include aircraft and motor vehicle fuels. The aircraft fuel types stored and used at PAE include Jet-A fuel and aviation gasoline (Avgas). Aircraft fuel storage is regulated under state petroleum storage and handling regulations, and fuels are discussed here as potential environmental contaminants.

8.2.6.3 Pollution Prevention

The Pollution Prevention Act of 1990 requires prevention and reduction of pollution at the source, when possible, so that waste has a reduced impact on the environment. Source reduction includes practices that reduce hazardous substances from being released into the environment prior to recycling, treatment, or disposal.

8.2.7 Historic, Architectural, Archaeological, and Cultural Resources

The 2019 Final EA reported no resources eligible for listing in the NRHP within or near PAE based on an Environmental Assessment completed for PAE in 2012. The nearest NRHP-listed properties are the Point Elliott Treaty Monument, Mukilteo Lighthouse, and Fowler Pear Tree just outside the general study area northwest of PAE (FAA 2019). There is one archaeological site (45-SN-595) within the study area. It consists of demolished remains of housing and other structures built as part of a naval housing complex in 1956 at the south end of PAE. However, this has been recommended not eligible for the NRHP (Snohomish County 2014, FAA 2019).

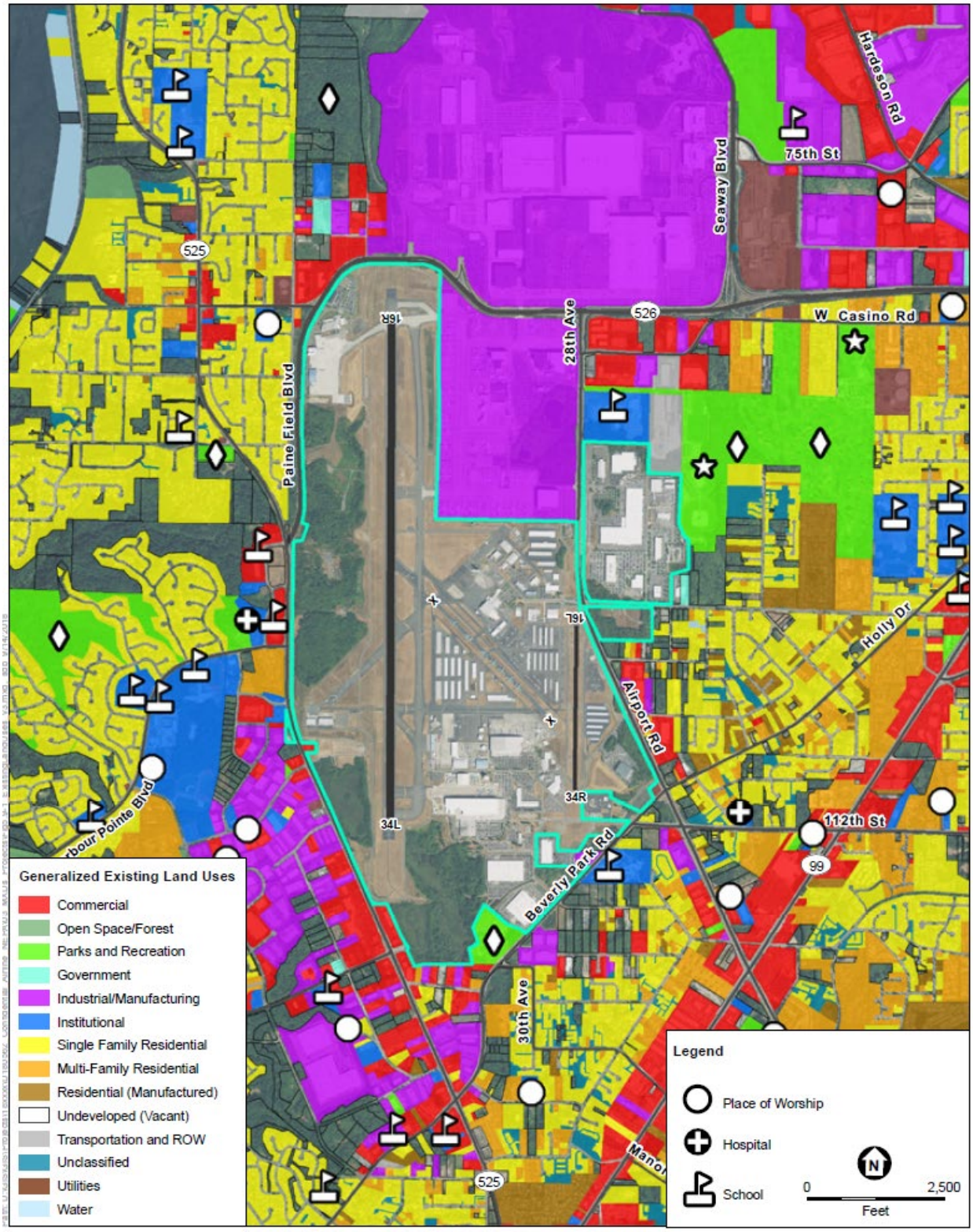
Since the 2019 Final EA refers to an assessment done in 2012, there may now be historic period-built environment resources that could be eligible for the NRHP or other local historic registries within or near PAE. A survey of built environment resources would be done as part of the future environmental review at the time a project is proposed.

8.2.8 Land Use and Zoning

8.2.8.1 Land Use

PAE is in Snohomish County, and it is adjacent to the cities of Everett and Mukilteo. PAE is discussed in the comprehensive plans for each community. The 2019 Final EA describes land uses surrounding PAE as predominantly industrial/manufacturing and commercial land uses, particularly to the north and south/southwest of PAE. East and west of PAE there is commercial and industrial/manufacturing, as well as open space, with single and multi-family residential beyond those areas. The area generally northwest of PAE is primarily single family residential. **Exhibit 8.2-3, *Existing Land Uses*** depicts an existing land use map prepared for the 2019 Final EA.

Exhibit 8.2-3 Existing Land Uses



Source: FAA, 2019

The Snohomish County, Everett, and Mukilteo Comprehensive Plans all contain policies relating to PAE. In general, all the comprehensive plans include policies that support compatible land uses and economic development. At the time of plan development and recent updates (2018), the City of Mukilteo Comprehensive Plan does not support expansion of commercial passenger services at PAE. The plan asserts that, if allowed, appropriate measures would be necessary to mitigate all negative impacts associated with commercial passenger service, such as excessive noise at inappropriate times of the day and increased vehicular traffic on roadways (Mukilteo 2015). The City of Everett and Snohomish County Comprehensive Plans do not indicate opposition to the expansion of commercial passenger services. **Appendix B** (Attachment D) includes the specific policies as outlined by Snohomish County, Everett, and Mukilteo.

Zoning

Snohomish County and City of Everett zoning designations adjacent to PAE support manufacturing and industrial land uses. Both their zoning codes include specific sections for airport compatibility. The airport compatibility requirements regulate development activities, which are mapped as airport influence area (AIA) and the airport compatibility area (ACA) in **Table 8.2-5, *Airport Influence Area (AIA) and Airport Compatibility Area (ACA)*** and further depicted in **Exhibit 8.2-4, *Airport Influence and Compatibility Areas***.

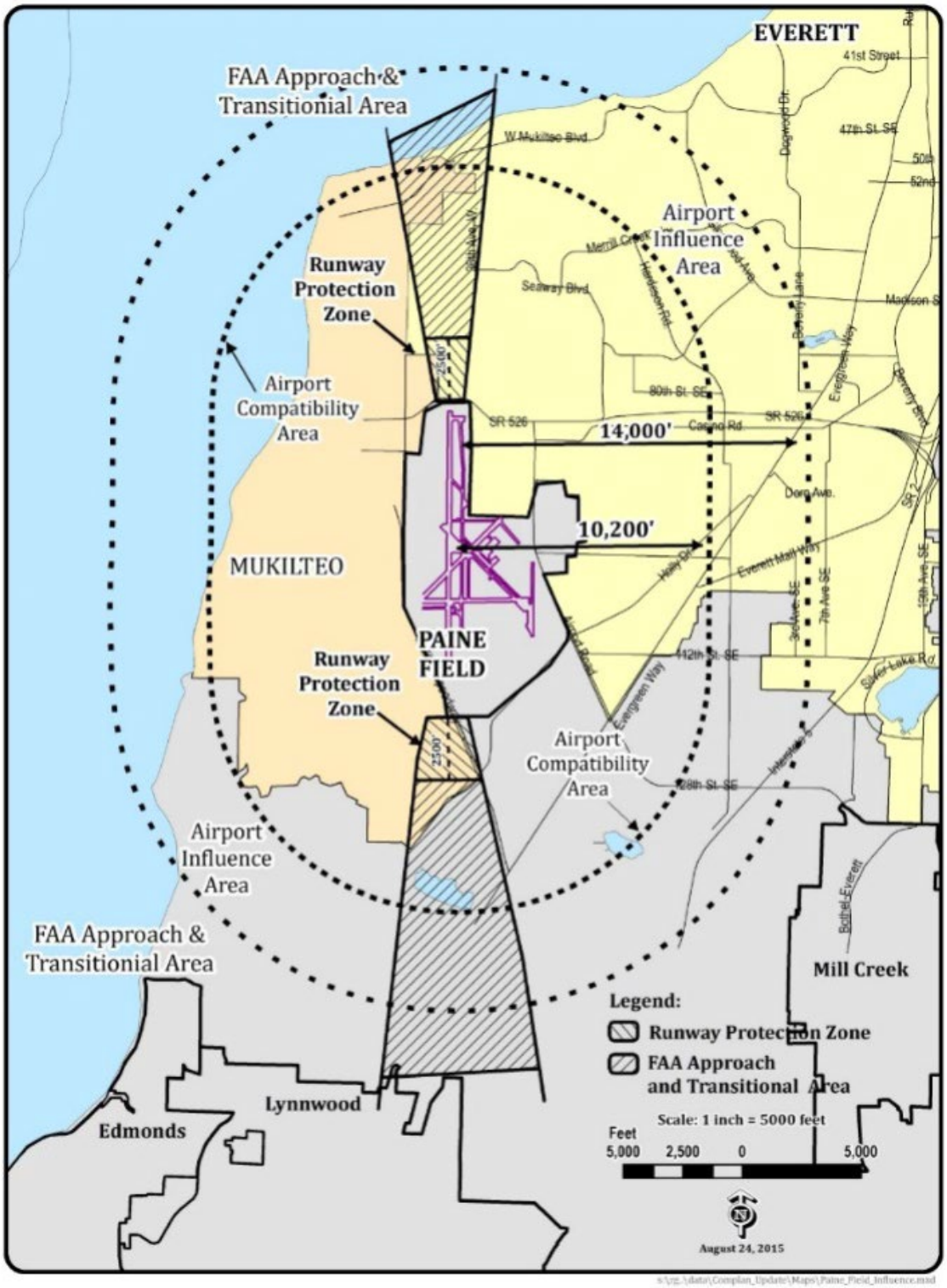
Table 8.2-5 Airport Influence Area (AIA) and Airport Compatibility Area (ACA)

Runways	Runway Alignment	Runway Length	ACA Distance	AIA Distance
16R/34L	N/S, West	9,010 feet	10,200 feet	14,000 feet
16L/34R	N/S, East	3,004 feet	7,200 feet	9,000 feet

Source: City of Everett, 2021

The AIA is an area within a specified distance of a public use airport that may experience impacts from airport operations. The ACA is an area adjacent to a public use airport where land uses that are incompatible with airport operations are discouraged. Snohomish County (SCC 30.32) and City of Everett (EMC 19.17) codes discuss exemptions, guidelines for preexisting uses, height limitations, permit requirements, and disclosure notices.

Exhibit 8.2-4 Airport Influence and Compatibility Areas



Source: City of Everett

The city of Mukilteo's zoning designations west of PAE are a mix of single family, commercial, and industrial. Unlike the other two jurisdictions, the City of Mukilteo Municipal Code (MMC) does not include a specific section focused on airport compatibility. PAE is discussed in the development regulations as an essential facility, specifically under requirements for siting or expansion (MMC 17.18). Wireless communication facilities must obtain FAA approval demonstrating they are not sited in restricted airspace (MCC 17.17).

8.2.9 Natural Resources and Energy Supply

There are no natural resource extractive activities on PAE property or within the study area. PAE is served by Snohomish County PUD #1 for electricity, Puget Sound Energy for natural gas, Verizon for telephone and internet service, and the Mukilteo Water and Wastewater District for water and sewer. None of the utility providers have concerns over capacity that would limit new development at PAE. The Snohomish County PUD and Puget Sound Energy are large regional utility providers for electricity and natural gas, and Verizon is a national telephone and internet service provider. According to its Comprehensive Water and Wastewater plans, the Mukilteo Water and Wastewater District currently provides a projected 1.9 million gallons of drinking water daily in 2021 and contemplates treating a peak of 250,000 gallons of wastewater per day from PAE (MWWD 2015, 2017).

PAE has several fuel storage tanks located onsite which are owned and operated by Propeller Aero Services, including six 60,000-gallon tanks containing Jet-A fuel, a 20,000-gallon tank containing aviation gasoline, and a 4,000-gallon tank containing unleaded and diesel fuel.

8.2.10 Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks

According to the Economic Alliance of Snohomish County, the Boeing Company is the largest private employer in the County, with approximately 35,300 employees. The largest public employer in the County is the Tulalip Tribe, with approximately 3,880 employees (Economic Alliance 2020).

Tables 8.2-6, *Population Estimates* through **8.2-8, Race and Ethnicity – 2019 American Community Survey**, show the estimated population in Snohomish County, Everett, and Mukilteo over time, along with race and ethnicity data from the 2010 census and the 2019 estimates from the American Community Survey.

Table 8.2-6 Population Estimates

Area	2012	2017	2019
Snohomish County	731,997	801,633	822,083
City of Everett	104,516	110,079	111,475
City of Mukilteo	20,551	21,469	21,441

Source: U.S. Census, 2020

Table 8.2-7 Race and Ethnicity – 2010 Census Summary

	Snohomish County		City of Everett		City of Mukilteo	
Total Population (2010 Census)	**713,335**		**103,019**		**20,254**	
Race						
White	559,011	79.4%	76,844	74.6%	15,172	74.9%
Black or African American	18,168	2.5%	4,198	4.1%	346	1.7%
American Indian and Alaska Native	9,793	1.4%	1,108	1.4%	115	0.6%
Asian	63,385	8.9%	8,056	7.8%	3,457	17.1%
Native Hawaiian and Other Pacific Islander	3,135	0.4%	735	0.7%	34	0.2%
Some Other Race	27,121	3.8%	6,313	6.1%	227	1.1%
Two or More Races	37,722	4.6%	5,465	5.3%	903	4.5%
Ethnicity						
Hispanic or Latino (of any race)	62,249	9.0%	14,595	14.2%	882	4.4%

Source: U.S. Census Bureau, American Fact Finder, 2018

As of the 2010 Census, Tract 419.01, which contains PAE, had a total minority population of 41.9 percent, compared to 28 percent for the County as a whole. Census Tracts 419.03 and 419.05 directly to the east of PAE each have a minority population of 46 percent or greater.

Table 8.2-8 Race and Ethnicity – 2019 American Community Survey

Label	Snohomish County		City of Everett		City of Mukilteo	
	Estimate	%	Estimate	%	Estimate	%
Total population	798,808		109,766		21,336	
Race						
White	601,915	75.4%	79,608	72.5%	14,929	70.0%
Black or African American	24,369	3.1%	5,380	4.9%	364	1.7%
American Indian and Alaska Native	7,353	0.9%	898	0.8%	113	0.5%
Asian	86,121	10.8%	10,109	9.2%	4,226	19.8%
Native Hawaiian and Other Pacific Islander	4,197	0.5%	1,287	1.2%	38	0.2%
Some other race	24,764	3.1%	5,508	5.0%	546	2.6%
Two or more races	50,089	6.3%	6,976	6.4%	1,120	5.2%
Ethnicity						
Hispanic or Latino (of any race)	81,495	10.2%	16,581	15.1%	1,311	6.1%

Source: U.S. Census Bureau, American Community Survey, 2019

According to the American Community Survey 2019 estimates, Census Tract 419.01 that contains PAE has a total minority population of 41.2 percent, compared to 24.6 percent for the County as a whole. Census Tracts 419.03 and 419.05, directly to the east of PAE, have minority populations of 36.5 and 38.1, respectively.

Table 8.2-9, Poverty Status Estimates (2016) and **Table 8.2-10, Poverty Status Estimates (2019)**, show median household income and family poverty rates for 2016 taken from the 2019 Final EA and updated for 2019 based on American Community Survey data.

Table 8.2-9 Poverty Status Estimates (2016)

Area	Median Household Income	Families with Incomes below the Poverty Level	People in Families with Incomes below the Poverty Level
Snohomish County	$73,528	6.2%	9.3%
City of Everett	$50,933	13.5%	17.6%
City of Mukilteo	$98,823	2.2%	3.4%

Source: U.S. Census Bureau, 2012-2016; American Community Survey 5-Year Estimates, 2018.

Table 8.2-10 Poverty Status Estimates (2019)

Area	Median Household Income	Percent of Families with Incomes below the Poverty Level
Snohomish County	$86,691	4.20%
City of Everett	$60,759	7.10%
City of Mukilteo	$108,536	1.70%

Source: U.S. Census Bureau, American Community Survey, 2019

The closest schools to PAE are the Fairmount Elementary (Mukilteo School) located adjacent to the airport, Sno-Isle Technical High School on Airport Road in Everett and the Harbour Pointe Montessori School on Harbour Place in Mukilteo, both less than a mile from the passenger terminal building. The Sno-Isle Technical High School is approximately 4,200 feet from the terminal building and either of the runways; Harbour Pointe Montessori School is approximate 2,400 feet from runway 16R/34L and 4,100 feet from the terminal building.

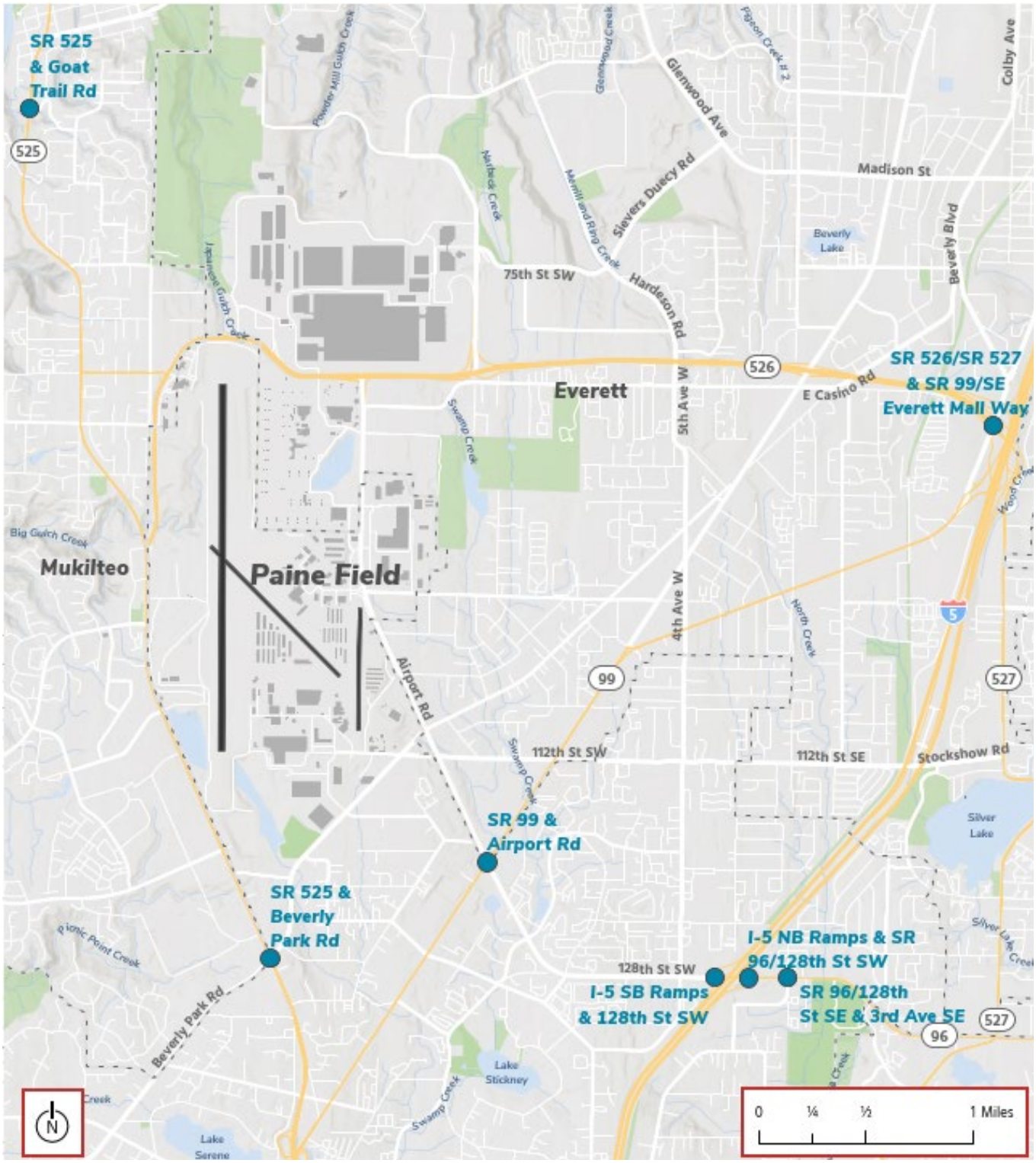
8.2.11 Transportation

Major roads in the vicinity of PAE include Interstate 5 (I-5), State Road (SR) 526 (Boeing Freeway), Paine Field Blvd, SR 525 (Mukilteo Speedway), and SR 99. The most direct access to the terminal entrance is via the Airport Road/128th Street NW corridor.

Based on the 2019 Final EA, seven intersections were identified that would operate at deficient levels of service (LOS) under both the Action and the No action Alternatives for commercial air service. These intersections, shown in **Exhibit 8.2-5, *Intersections Operating Under a Deficient Level of Service*** are assumed to continue operating at a deficient LOS for the purposes of describing the environmental baseline. As no other intersections were anticipated to operate at deficient LOS as a result of commercial airline service, the following list is the same as that reported in the 2019 Final EA.

- SR 525 at Beverly Park Road (WSDOT intersection, currently operating at a deficient LOS)
- SR 99 at Airport Road (City of Everett intersection, currently operating at a deficient LOS)
- I-5 Southbound Ramps at 128th St SW (WSDOT intersection)
- I-5 Northbound Ramps at SR 96/128th St SW (WSDOT intersection, currently operating at a deficient LOS)
- 3rd Avenue SE at SR 96/132nd St SE (WSDOT intersection)
- SR 525 at Goat Trail Road (City of Mukilteo intersection)
- SR 526 at SR 99/SE Everett Mall Way (WSDOT intersection, currently operating at a deficient LOS)

Exhibit 8.2-5 Intersections Operating Under a Deficient Level of Service



Sources: WSDOT, King County, Snohomish County, Mapbox, OpenStreetMap

8.2.12 Visual

As summarized in the 2019 Final EA, PAE is bordered by the city of Everett, the city of Mukilteo, and unincorporated Snohomish County. It is surrounded by both industrial and residential areas. These land uses generate light emissions.

Existing light sources at PAE primarily include runway and taxiway lights and lighted airfield directional signage. PAE also has a rotating beacon that emits alternating white and green flashes of light and identifies the location of PAE from a distance at night. Other light sources include aircraft ramp lighting and lighting to illuminate buildings, parking areas, and roads.

8.2.13 Water Resources

8.2.13.1 Wetlands/Steams

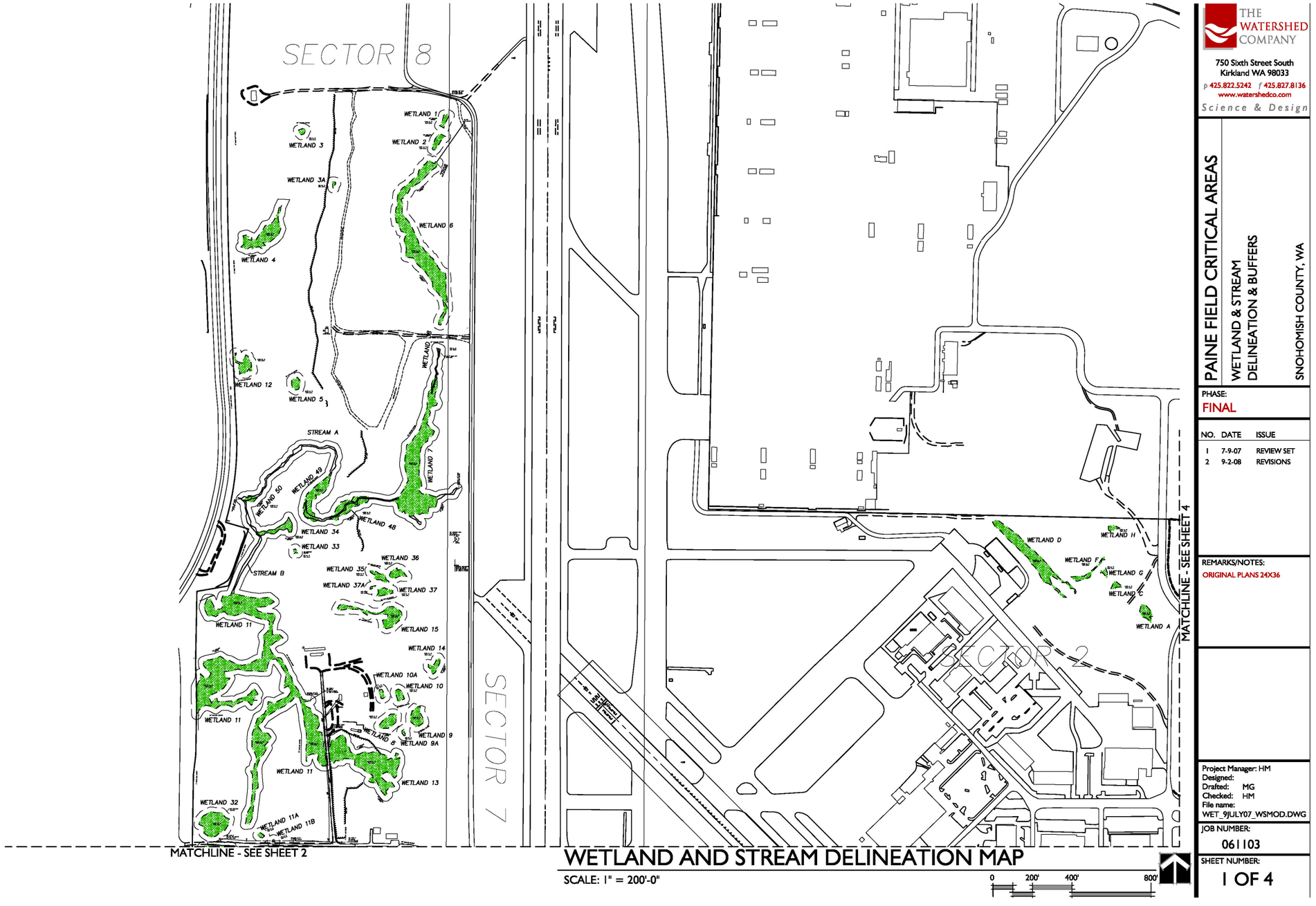
According to the 2019 Final EA, PAE completed a Critical Areas Study[3] of PAE in 2008, determined the presence of wetlands on airport property. The study determined a total of 56 delineated wetlands identified on airport property. The two largest wetlands are located in the south. Wetland 24 classifies as a palustrine forested/scrub-shrub/emergent (PFO/PSS/PEM) wetland covering approximately 17 acres. Wetland 25 classifies as a palustrine aquatic bed/forested/scrub-shrub/emergent wetland (PAB/PFO/PSS/PEM) covering approximately 20 acres. The majority of the other wetlands are located along the western edge of Runway 16R-34L.

The 2008 Critical Area Study of Paine Field identified a total of 4 streams on airport. The on-site portion of the North Fork of Big Gulch Creek receives stormwater runoff inputs at various points in the stream corridor along the east side of the PAE West area. The North Fork of Big Gulch Creek is referred to as Stream A in the report. Stream B is located in this area as well, connecting Wetlands 11 and 34. Seasonal streams C and D are located in the Navy Housing area. The stream channels are shallow and drain into Wetland 25.

Exhibits 8.2-6, *Delineated Wetlands and Streams, Sheet 01 from 2008 Critical Areas Study* through **8.2-9, *Delineated Wetlands and Streams, Sheet 04 from 2008 Critical Areas Study*** depict the location of the wetlands and streams documented in the 2008 Critical Areas Study.

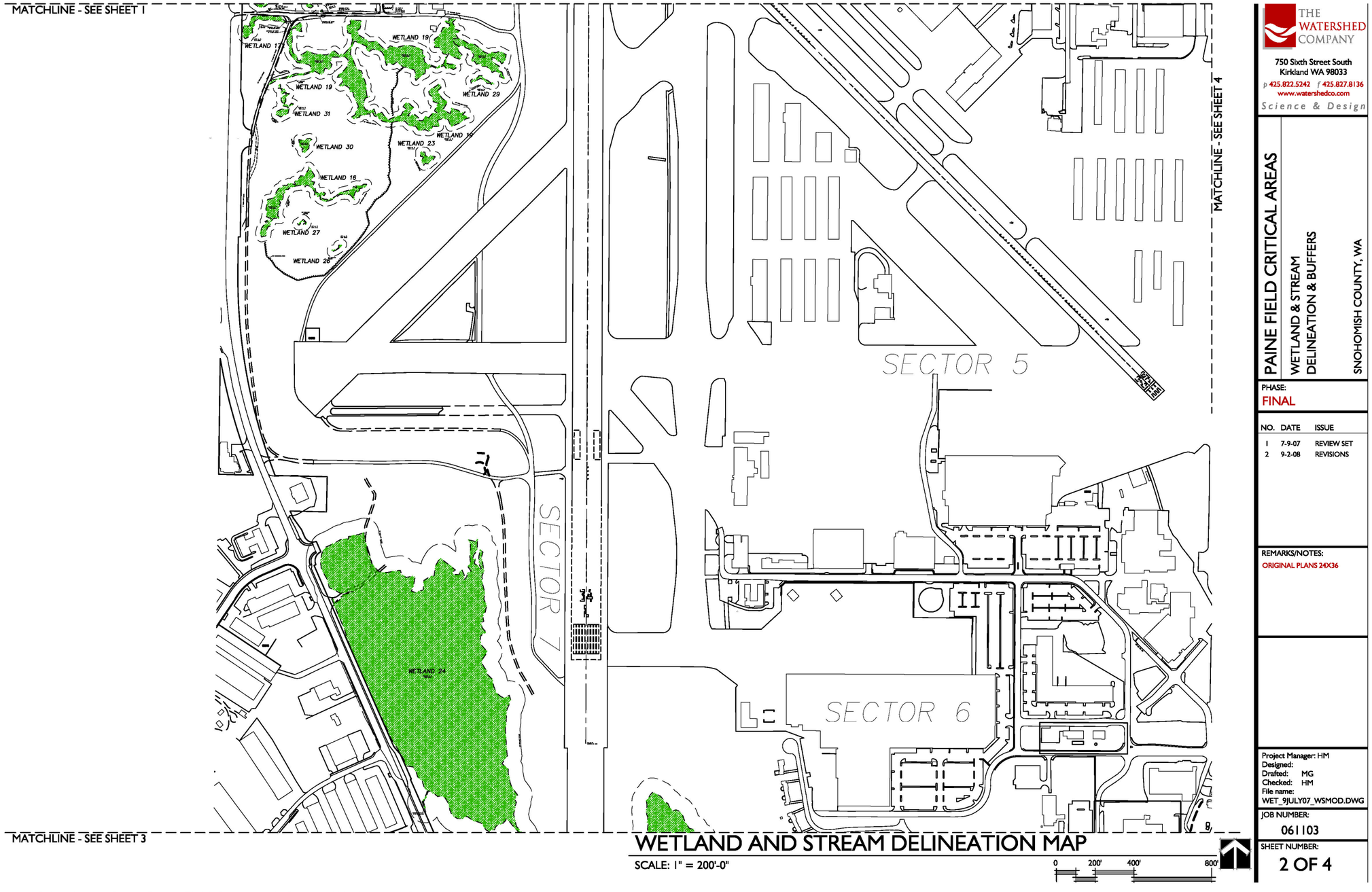
[3] *Critical Area Study Paine Field*, Snohomish County, Washington. December 2008.

Exhibit 8.2-6 Delineated Wetlands and Streams, Sheet 01 from 2008 Critical Areas Study



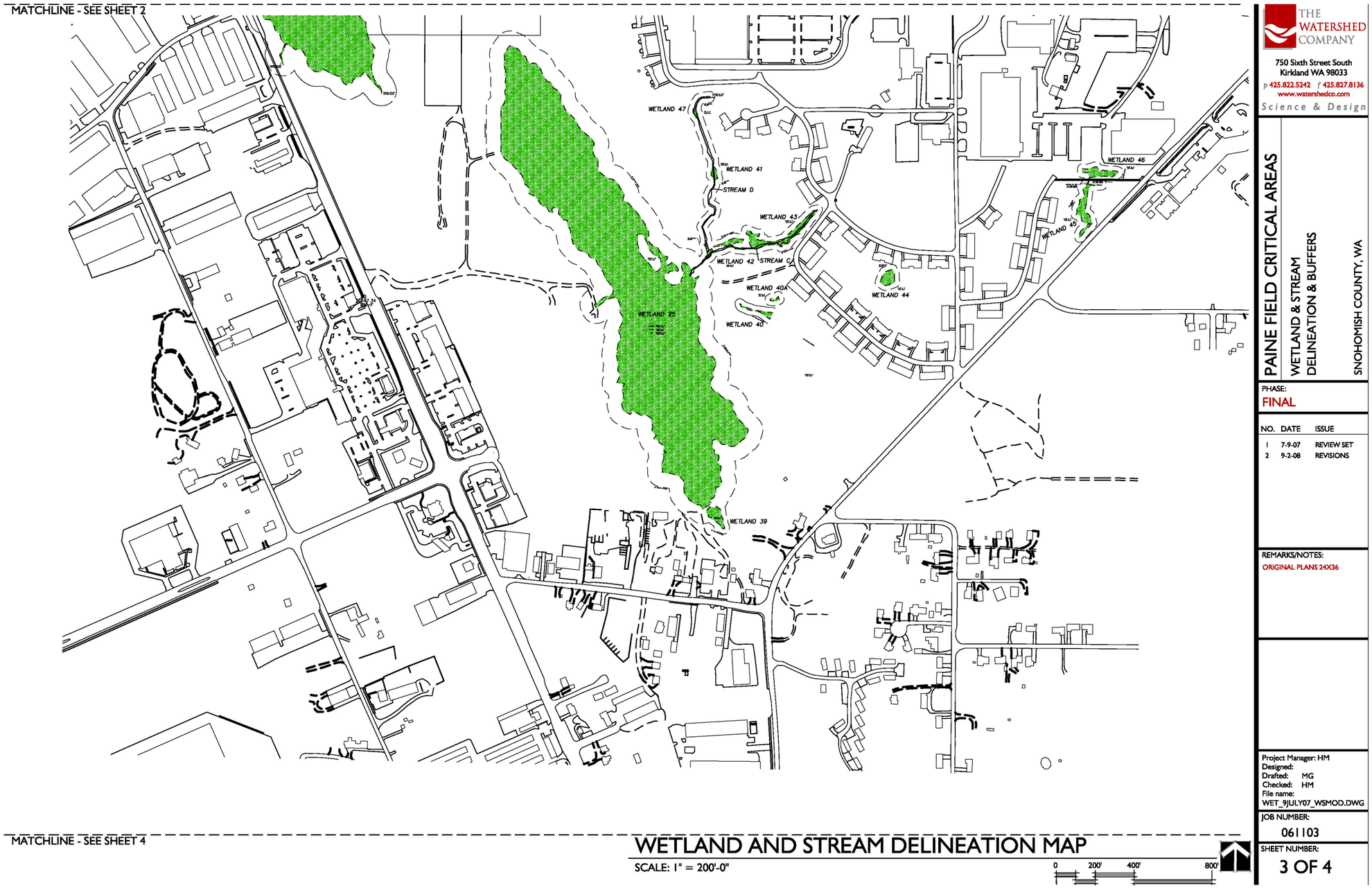
Source: *Critical Area Study Paine Field*, Snohomish County, Washington. December 2008

Exhibit 8.2-7 Delineated Wetlands and Streams, Sheet 02 from 2008 Critical Areas Study



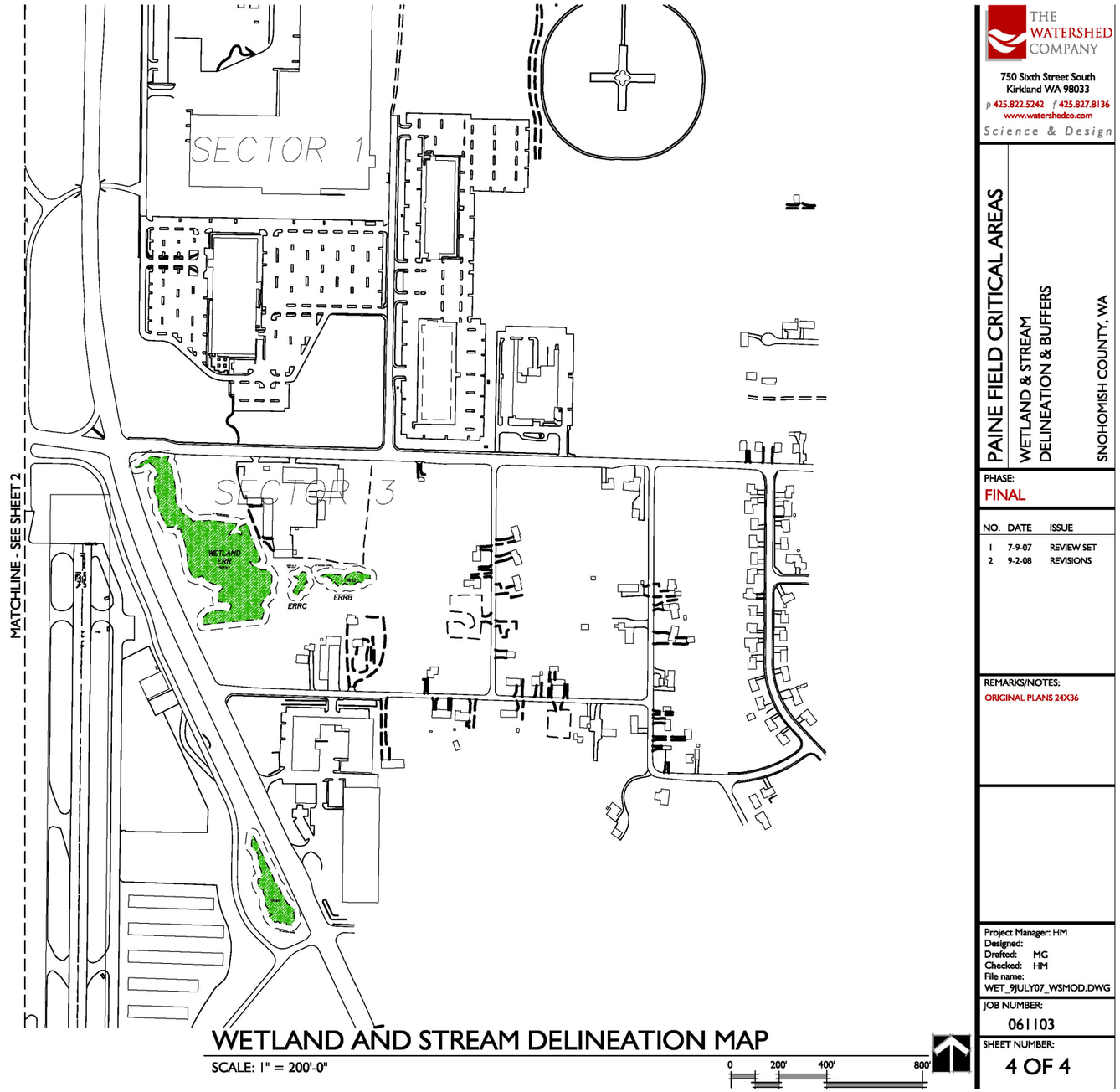
Source: *Critical Area Study Paine Field*, Snohomish County, Washington. December 2008

Exhibit 8.2-8 Delineated Wetlands and Streams, Sheet 03 from 2008 Critical Areas Study



Source: *Critical Area Study Paine Field*, Snohomish County, Washington. December 2008

Exhibit 8.2-9 Delineated Wetlands and Streams, Sheet 04 from 2008 Critical Areas Study



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PAINE FIELD CRITICAL AREAS
WETLAND & STREAM DELINEATION & BUFFERS
SNOHOMISH COUNTY, WA

PHASE: FINAL

NO.	DATE	ISSUE
1	7-9-07	REVIEW SET
2	9-2-08	REVISIONS

REMARKS/NOTES:
ORIGINAL PLANS 24X36

Project Manager: HM
Designed:
Drafted: MG
Checked: HM
File name: WET_9JULY07_WSMOD.DWG

JOB NUMBER: 061103

SHEET NUMBER: 4 OF 4

Source: *Critical Area Study Paine Field*, Snohomish County, Washington. December 2008

8.2.13.2 Floodplains

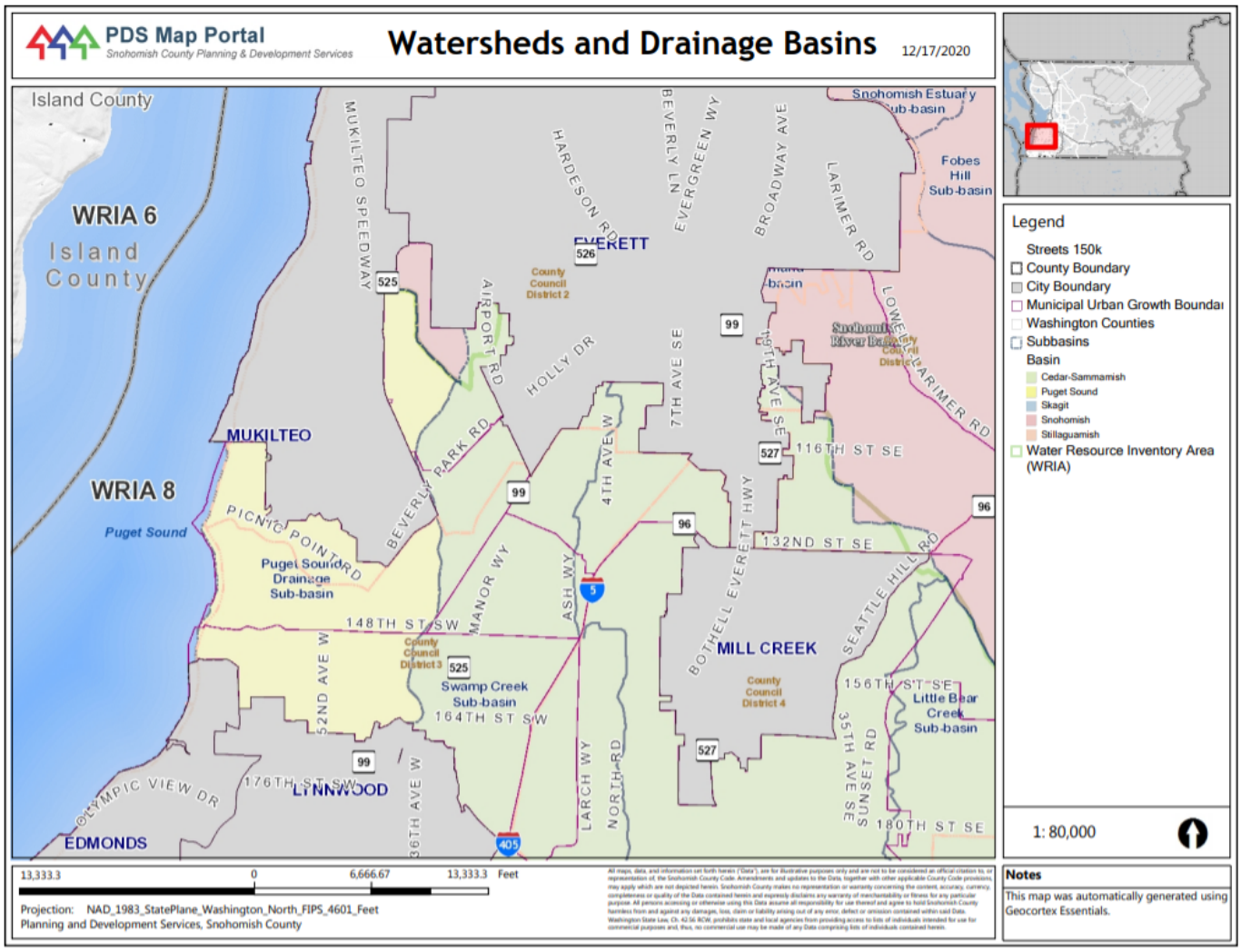
As reported in the 2019 Final EA, the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) show that that most of PAE is located within Zone X, or areas determined to be outside of the 500-year floodplain; therefore, PAE is not located within a regulatory (100-year) floodplain. The closest 100-year floodplains are the floodplain associated with Possession Sound approximately 2 miles northwest and the floodplains associated with Stickney Lake located slightly more than 2 miles southeast of the DSA. Review of Snohomish County interactive mapping showing 2019 FEMA Flood Hazard Data (effective 06/13/2020) confirms this (Snohomish County 2020a).

Watersheds

As mapped by Snohomish County in **Exhibit 8.2-10, *Snohomish County Mapped Watersheds and Drainage Basins*** PAE lies within Water Resource Inventory Area (WRIA) 7 Snohomish Watershed. It is also located in the following basins: Puget Sound, Snohomish, and Cedar-Sammamish, as well as the following subbasins: Everett Drainages, Puget Sound Drainage, and Swamp Creek (Snohomish County 2020a).

The 2019 Final EA reports several local watersheds, including Japanese Gulch, Smuggler's Gulch, and Big Gulch, which drain directly to Puget Sound through the cities of Mukilteo and Everett; as well as Swamp Creek, which drains to the south to Lake Washington (**Appendix B**, Attachment E). Japanese Gulch Creek and Big Gulch Creek are both in the vicinity of PAE (WDNR 2018a). For both Japanese and Big Gulch Creeks, Snohomish County designates the upper stream sections closest to the field as Type Ns (non-fish bearing stream, seasonal flow), while their lower reaches are designated as Type F (fish-bearing stream) (2016c and 2016d).

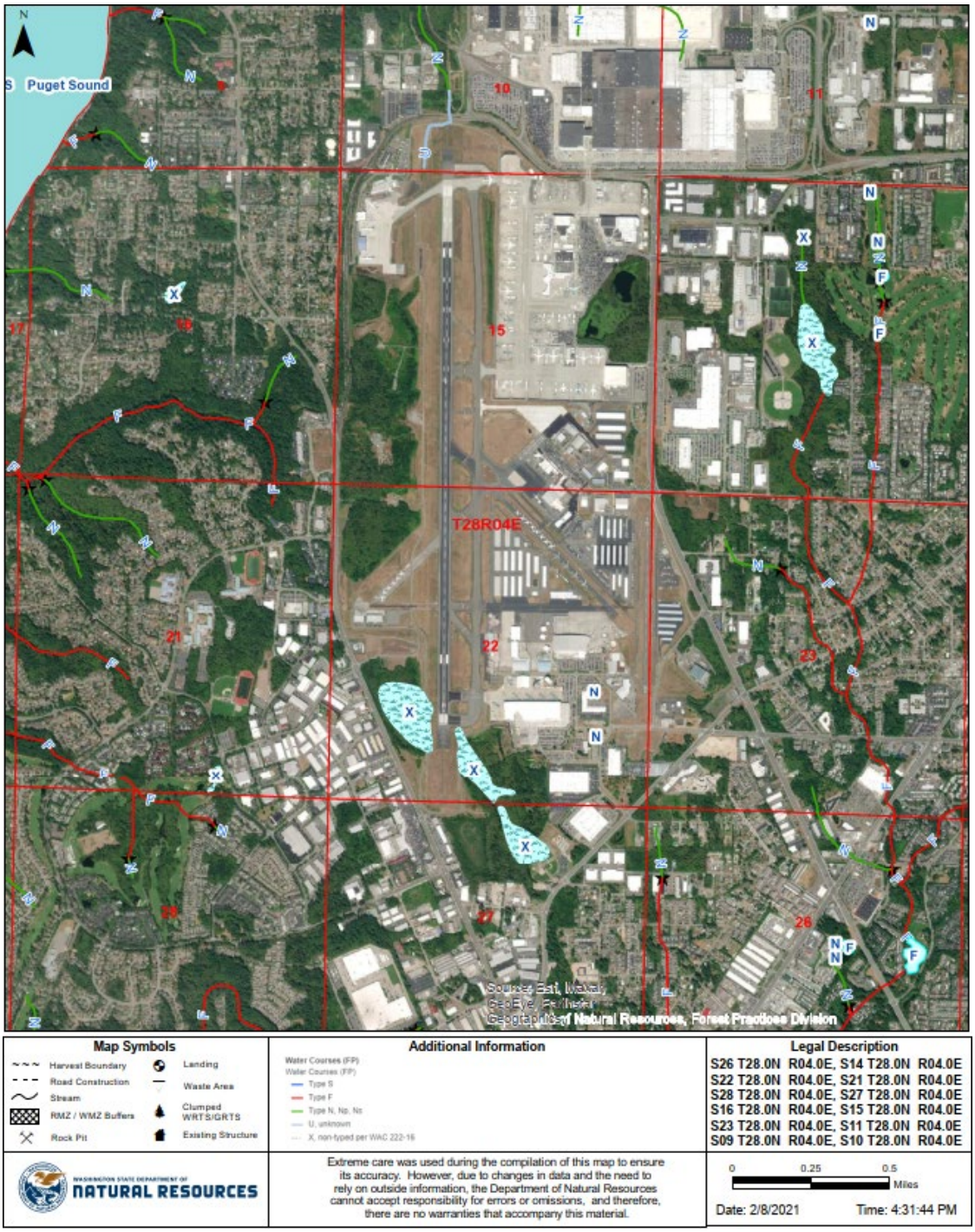
Exhibit 8.2-10 Snohomish County Mapped Watersheds and Drainage Basins



Source: Snohomish County 2020a

Review of the current WDNR online mapping shows several stream types in the Type F (fish bearing), Type N (non-fish bearing) and Type U (unknown fish presence) in or near the project, shown in **Exhibit 8.2-11*, WDNR Fish Type Map***.

Exhibit 8.2-11 WDNR Fish Type Map



Source: WDNR

8.2.13.3 Stormwater and Drainage

Most of the approximately 1,252-acre PAE site is covered with buildings and pavement. Surface water and stormwater runoff are captured and conveyed in a series of constructed bioswales, storm drainpipes, catch basins, detention facilities, and constructed stormwater ponds through the area. Based upon information provided in the Snohomish County Airport/Paine Field 2022 Stormwater Pollution Prevention Plan (SWPPP) developed for PAE, portions of PAE drain to each of the four basins, as described in **Table 8.2-11*, Drainage Basin Areas for PAE***. **Appendix B** (Attachment E) includes a map of airport drainage areas to each basin (Landau Associates 2022).

Table 8.2-11 Drainage Basin Areas for PAE

Basin Name	Basin Area	Percentage
Japanese Gulch	357	29%
Smuggler's Gulch	26	2%
Big Gulch	637	51%
Swamp Creek	226	18%
Total	**1,246**	**100**

Source: Landau Associates

PAE currently operates under Snohomish County's 2022Stormwater Management Program Plan, which includes stormwater detention and water quality requirements that meet those of the National Pollutant Discharge Elimination System (NPDES) Phase I Municipal Stormwater Permit (MS4). PAE manages, in cooperation with the county's Surface Water Management Division, its own ongoing program for mapping and documenting the MS4 located within the Airport property boundary. The primary focus of this program is to maintain and update detailed maps and an associated database describing all known MS4 outfalls, discharge points, receiving waters, stormwater treatment and flow control BMPs/facilities, and tributary conveyances that are owned, operated, or maintained by PAE. The stormwater data is updated as development and redevelopment at the airport occurs, and the information is maintained and stored in the airport engineer's office (Snohomish County Stormwater Management Program Plan 2022b).

PAE operates under an NPDES Industrial Stormwater General Permit (Permit #WAR000428) issued to Snohomish County by the Washington State Department of Ecology. PAE implements many practices to reduce stormwater impacts associated with runoff from paved areas. Examples include stormwater conveyance cleaning, culvert cleaning, and ditch maintenance to remove obstructions to stormwater flow to avoid flooding and subsequent erosion and downstream deposition of adjacent material. PAE conducts an intensive street, parking lot, and taxiway sweeping operation to remove foreign object debris that could impact aircraft safety. This sweeping operation also improves stormwater quality by removing potential pollutants to stormwater (Landau Associated 2022b).

PAE annually inspects the MS4 located within airport property boundaries for illicit connections and discharges during operations and maintenance inspections of stormwater management facilities and catch basins. Similar inspections are also conducted during routine inspections of stormwater discharge

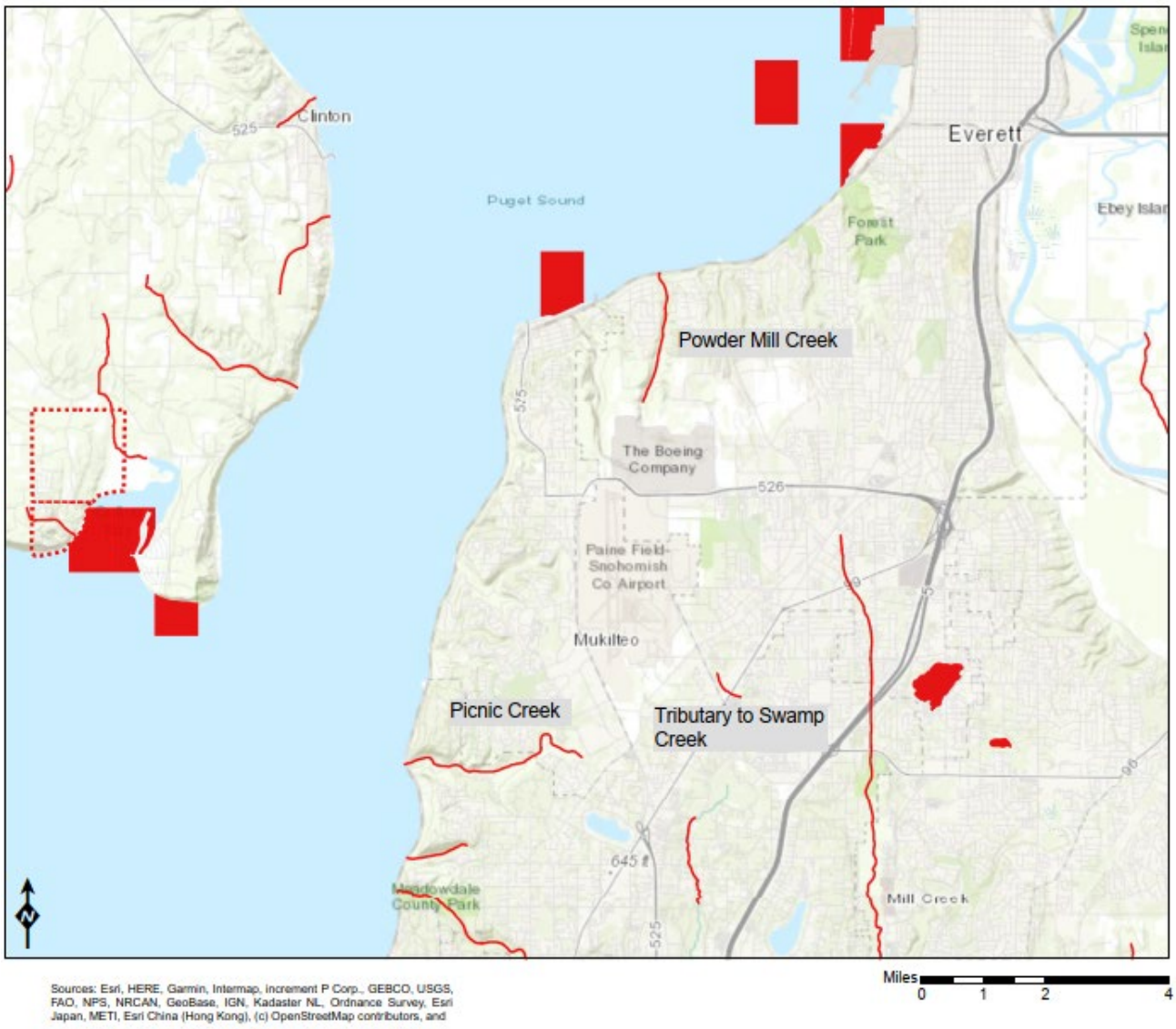
points and outfalls in response to requirements of PAE's Industrial Stormwater General Permit (Landau Associates 2022b).

8.2.13.4 Water Quality

As reported in the 2019 Final EA, the USEPA requires water quality assessments of each state's waterbodies. The current water quality assessment for Washington was approved by the USEPA in July 2016. The Federal Clean Water Act requires that all states restore their waters to be "fishable and swimmable." Section 303(d) of the Clean Water Act establishes a process to identify and clean up polluted waters.

According to the Water Quality Atlas provided by Ecology, several waterbodies in the vicinity of PAE appear on the Clean Water Act Section 303d list as impaired waters. Waters designated as Category 5 on the 303d list are those waters with data indicating that the water quality violates the USEPA standards for water quality for a particular parameter, shown in **Exhibit 8.2-12, *Ecology Category 5 Water Quality Listings*** (Ecology 2020a). The Stormwater and Drainage section of this narrative describes the requirements for stormwater management and water quality protection.

Exhibit 8.2-12 Ecology Category 5 Water Quality Listings

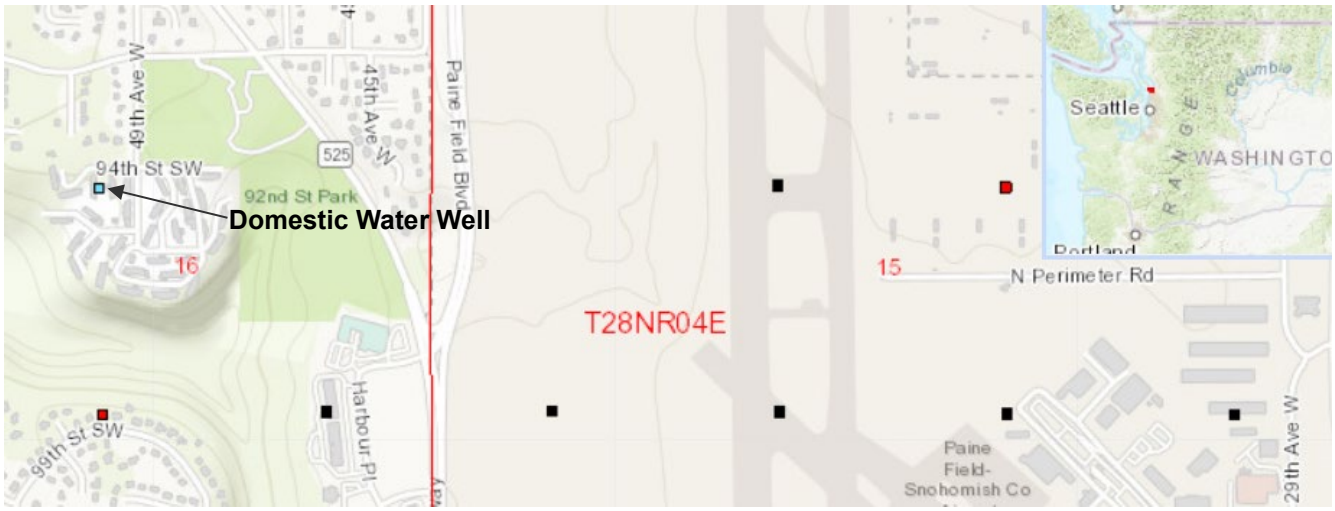


Source: Ecology 2020a

8.2.13.5 Ground Water

Under the Safe Drinking Water Act of 1974, the USEPA is authorized to designate aquifers as sole source, meaning the aquifer supplies 50 percent of the drinking water for its service area, or there is no reasonably available alternative drinking water sources should the aquifer become contaminated. The project site is not located in an USEPA-designated sole source aquifer area. Review of Ecology's Well Construction and Licensing Search Tool shows one domestic drinking water well in the GSA, west of PAE in the city of Mukilteo shown in **Exhibit 8.2-13*, Domestic Water Well in Project Vicinity*** (Ecology 2021b).

Exhibit 8.2-13 Domestic Water Well in Project Vicinity



Source: Ecology 2021b

Ecology also regulates groundwater. Areas with a critical recharging effect on aquifers used for potable water are called Critical Aquifer Recharge Areas (CARAs). These are protected as critical areas within Snohomish County Code. No mapped CARAs are shown in the County's on-line mapping tool for the airport vicinity (Snohomish County 2020a). The closest known aquifer is located approximately 220-feet below PAE. Due to the underlying geology of the area, there are no significant groundwater resources (FAA 2019).

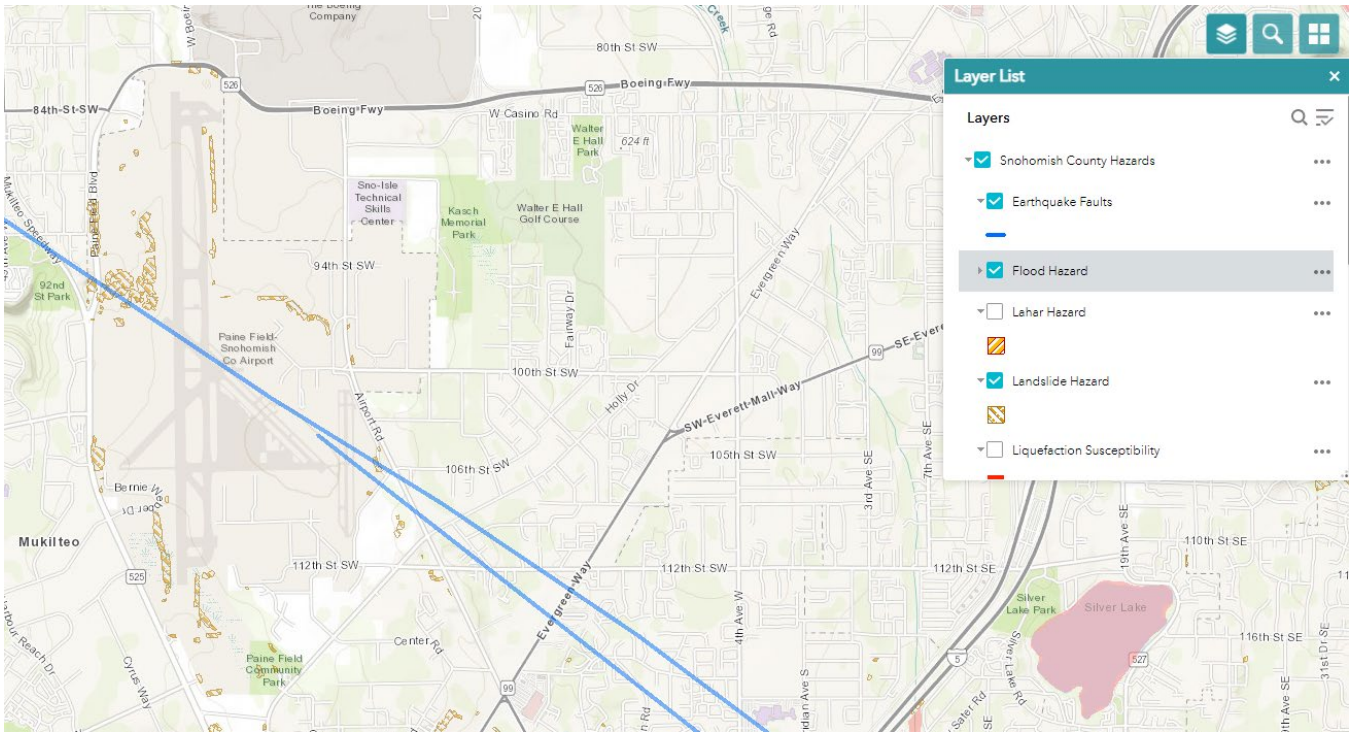
8.2.14 Earth

PAE is generally flat with slopes less than 2 percent within any developed areas. The site is classified as Urban Land by the Natural Resources Conservation Service, and most of the site is developed with concrete and asphalt paved areas, buildings, and other structures. There are vegetated and open water areas, as well. According to the Snohomish County GIS, there are some steep slope (greater than 33 percent) areas in and around the undeveloped sections of PAE (Snohomish County 2020a).

8.2.15 Geology

The site is in an area of low liquefaction potential; there is no known history of unstable soils (Snohomish County 2016b). According to the Snohomish County Hazards online map, there are identified earthquake fault lines associated with the Southern Whidbey Island Fault Zone that cross the airport property shown in **Exhibit 8.2-14*, Snohomish County Hazards Map*** (Snohomish County 2020a). However, PAE and its surroundings have "Very Low" susceptibility to liquefaction. There are some GIS-modeled landslide hazard areas identified associated with steep slope areas within the undeveloped portions of PAE (FAA 2019).

Exhibit 8.2-14 Snohomish County Hazards Map



Source: Snohomish County 2020a

8.3 Potential Environmental Effects of Master Plan Recommendations

As described in **Chapter 6, *Development Plan***, the PAE Master Plan 2040 recommends several projects across three Planning Activity Levels (PALs), summarized in **Tables 8.3-1, *Potential Environmental Concerns of Master Plan Recommendations for PAL 1*** through **8.3-3,** Environmental Concerns of Master Plan Recommendations for PAL 3 below. These projects include improvements to the airfield, terminal, ground transportation, and support facilities. Based on the locations, nature, and extent of the proposed improvements, the primary environmental concerns from Master Plan recommendations are related to increases in pollution-generating impervious surfaces (PGIS) and stormwater management, and to a lesser degree development that could impact water bodies, wetlands, or other critical areas. Activities with the potential to adversely affect ESA-listed fish, critical habitat, or EFH may include projects that create or replace PGIS that could deliver contaminants to fish-bearing waters.

The recommended improvements are not anticipated to result in any disproportionate impacts to environmental justice populations, or adverse impacts related to biological resources, climate, coastal resources, Section 4(f) or 6(f) resources, land use and zoning, natural resources or energy supply, transportation, aesthetics (visual resources), earth, or geology. Therefore, these elements of the environmental are not discussed further. Noise impacts are discussed separately in Section 8.4.

This section provides a high-level, qualitative summary of the environmental concerns. Additional and more specific environmental analysis will be conducted under the National Environmental Policy Act (NEPA) and Washington State Environmental Policy Act (SEPA) at a project level prior to the construction of any improvements.

Table 8.3-1 Potential Environmental Concerns of Master Plan Recommendations for PAL 1

Project	Airport Facility	Description	Potential Environmental Concerns
Implement Airport Preferred Alternative to Resolve Hot Spot 2	Airfield	Lighting, signage, and taxiway marking changes to prevent airline conflicts along Taxiways A and A1	unlikely
Remote Pad (ADG-V)	Airfield	New parking position located at the interaction of Taxiway A and W, estimated 100,000 sf of new apron	New PGIS; stormwater management
Terminal Area Taxilanes	Terminal	Reconfigure existing terminal area taxilanes and remote positions to allow future terminal expansion	New PGIS; stormwater management
Expand Terminal Curb	Ground Transportation	Extend terminal loop road to the north to be aligned with the future terminal expansion envelope. Expand roadway from two to three lanes. Includes new curb fronts and expansion of the premier parking lot within the new limits of the terminal loop road.	New PGIS; stormwater management; air emissions
Expand Premier Surface Lot			
Expand Terminal Loop Road – 100th St SW			
Relocate Airport Administration to ERC	Support Facilities	Relocate portion of airport administration staff to the ERC building in the Bomarc Office Park	unlikely

Source: Landrum & Brown Team

Projects recommended for the PAL 1 program would result in additional PGIS, particularly the expansion of the Terminal Loop Road and associated parking area, and the new remote pad. The increase in PGIS could require additional stormwater management requirements, including possible flow control or treatment. The expansion of the Terminal Loop Road could result in an increase in air emissions—including greenhouse gases—through increasing the capacity and length of the roadway.

Table 8.3-2 Potential Environmental Concerns of Master Plan Recommendations for PAL 2

Project	Airport Facility	Description	Potential Environmental Concerns
Provide high speed exits for Runway 16R arrivals (Taxiway A6)	Airfield	Removes existing Taxiway A6 and reconstructs into a high-speed exit	New PGIS; stormwater management
Provide high speed exits for Runway 16R arrivals (Taxiway A8)	Airfield	Removes existing Taxiway A8 and reconstructs into a high-speed exit	New PGIS; stormwater management
Expand Passenger Terminal building to the north (+1 Contact Gates)	Terminal	Expansion of the terminal to the north to add an additional contact gate	unlikely
Expand Passenger Terminal building to the north (+4 Contact Gates)	Terminal	Further expansion of the terminal to the north to add an additional 4 contact gates	New PGIS; stormwater management
Construct Apron to Accommodate 4 Additional Remote Gates	Terminal	Construct new apron around expanded terminal to accommodate additional contact and remote positions	New PGIS; stormwater management
Ground Service Equipment (GSE) Staging Expansion	Support Facilities	Use of existing building C-1 for GSE storage and maintenance needs	unlikely
Relocate and Develop Aircraft Deicing Facilities	Support Facilities	Construct centralized deicing facility near terminal facility	New PGIS; manage stormwater and deicing runoff
Reserve land for additional GA facilities	Support Facilities	Set aside future development area; no additional action until a business case can be undertaken	unlikely
Police/Security Expansion	Support Facilities	Maintain a portion of building C-3 for Sheriff's and Operation's offices	unlikely

Source: Landrum & Brown Team

Projects recommended for the PAL 2 program would similarly result in additional PGIS, particularly the expansion of the terminal, the surrounding apron around the terminal, and the development of a centralized deicing facility. As with the PAL 1 projects, these improvements could require additional stormwater management requirements, including possible flow control or treatment. In addition, runoff from deicing activities would need to be coordinated with the City of Everett sewer system.

Table 8.3-3 Potential Environmental Concerns of Master Plan Recommendations for PAL 3

Project	Airport Facility	Description	Environmental Concerns
Taxiway A9 Removal	Airfield	Remove Taxiway A9 and replace with grassy airfield	unlikely
Develop Flexible Ramp in Decommissioned Runway Site	Airfield	Reconstruct decommissioned runway 11-29 into flexible use space for future airside parking	New PGIS; stormwater management
Provide two high speed exits for Runway 34L arrivals (Taxiway A2)	Airfield	Removes existing Taxiway A2 and reconstructs into a high-speed exit	New PGIS; stormwater management
Provide two high speed exits for Runway 34L arrivals (Taxiways A4 and A5)	Airfield	Removes existing Taxiways A4 and A5 and reconstructs into a high-speed exit	New PGIS; stormwater management
Relocate Taxiway A3	Airfield	Relocates Taxiway A3 to the north to avoid new north flow high-speed exit	unlikely (likely same amount of PGIS)
Reconfigure Intersection - Taxiway G5 and Runway 34R end	Airfield	Realign Taxiway G5 to intersect runway 16L/34R at 90-degree angle	Minor new PGIS; stormwater management
Relocate Taxiway A7 and K7	Airfield	Shift Taxiway A7 and K7 to the north to prevent direct access to runway from Taxilane E	Minor new PGIS; stormwater management
Expand Signalized Intersection - Airport Road and 100th St SW Intersection	Ground Transportation	Add dual northbound and eastbound left-turn lanes and appurtenant receiving lanes; convert the southbound right-turn lane to a yield movement.	New PGIS; stormwater management; adjacent to steep slopes and stream and wetland buffer areas; increase in air emissions
Expand Terminal Loop Road – 100th St SW	Ground Transportation	Continued expansion of Terminal Loop Road to meet passenger demand	Minor new PGIS; stormwater management; air emissions
Expand Entrance Road – 100th St SW	Ground Transportation	Construct additional east and west bound lanes as passengers increase	New PGIS; stormwater management; increase in air emissions
Reprogram Access and Construct Back-of-House Road (associated fence, gate)	Ground Transportation	Construct second access point from Airport Road to create loop system serving inbound and outbound traffic along 100th St SW	unlikely
Construction Parking Structure	Ground Transportation	Construct 6-level parking garage in current location of Premier Lot 2	New PGIS; stormwater management
Convert Economy Lot 4 into Staging Lot for Ride-Share/Valet	Ground Transportation	Change use of existing parking area	unlikely

Ground Service Equipment (GSE) Staging Expansion	Support Facilities	Use of existing building C-1 for GSE storage and maintenance needs	unlikely
Police/Security Expansion	Support Facilities	Maintain a portion of building C-3 for Sheriff's and Operation's offices	unlikely
Reserve land for additional GA facilities (no additional actions are required until a business case can be undertaken)	Support Facilities	Set aside future development area; no additional action until a business case can be undertaken	unlikely
Flight Catering Facilities	Support Facilities	Either develop new facility on currently vacant parcel or use existing building C-2, which would require some renovation	New impervious surface with new development; potential hazmat concerns with building C-2
Airport Maintenance Expansion (to Air National Guard Site)	Support Facilities	Options include retaining buildings 219 and 221 and either consolidating remaining facilities off site or expanding to new facilities southeast of runway 34L.	No concerns about moving facilities off site: on-site expansion has development near freshwater wetlands and a stream; increase in impervious surface; stormwater management

Source: Landrum & Brown Team

In several cases, projects recommended for the PAL 3 program are continuations or expansions of projects recommended in PAL 1 and 2. The primary environmental concern would be continued increase in PGIS, which could require additional stormwater management requirements, including flow control or treatment. PAL 3 includes several improvements to 100th St SW between the terminal loop and the intersection with Airport Rd, which could result in additional air emissions through improvements to increase vehicle capacity. The addition of turning lanes at the 100th St SW/Airport Rd intersection is in close proximity to steep slope and wetland buffer areas as well. Lastly, if PAE maintenance facilities expand on-site, the proposed area for development is adjacent to a freshwater stream and its associated wetlands, which could require mitigation for vegetation and tree removal.

8.4 Summary of Noise and Noise-Compatible Land Use Considerations

The following section provides noise modeling results for the Existing (2019) and future (2030 and 2040) Noise Exposure Contours for the PAE Master Plan 2040. The future noise contour are based on the approved FAA aviation activity forecast prepared for this Master Plan. A technical report detailing the development of the noise contours can be found in **Appendix E**.

8.4.1 Existing (2019) Noise Exposure Contour Modeling Results

The Existing (2019) Noise Exposure Contour is presented on **Exhibit 8.4-1, *Existing (2019) Noise Exposure Contour***. The area within each five-decibel noise exposure contour interval is shown in **Table 8.4-1, *Existing (2019) Area (In Square Miles) Within Noise Contour Bands***. The noise

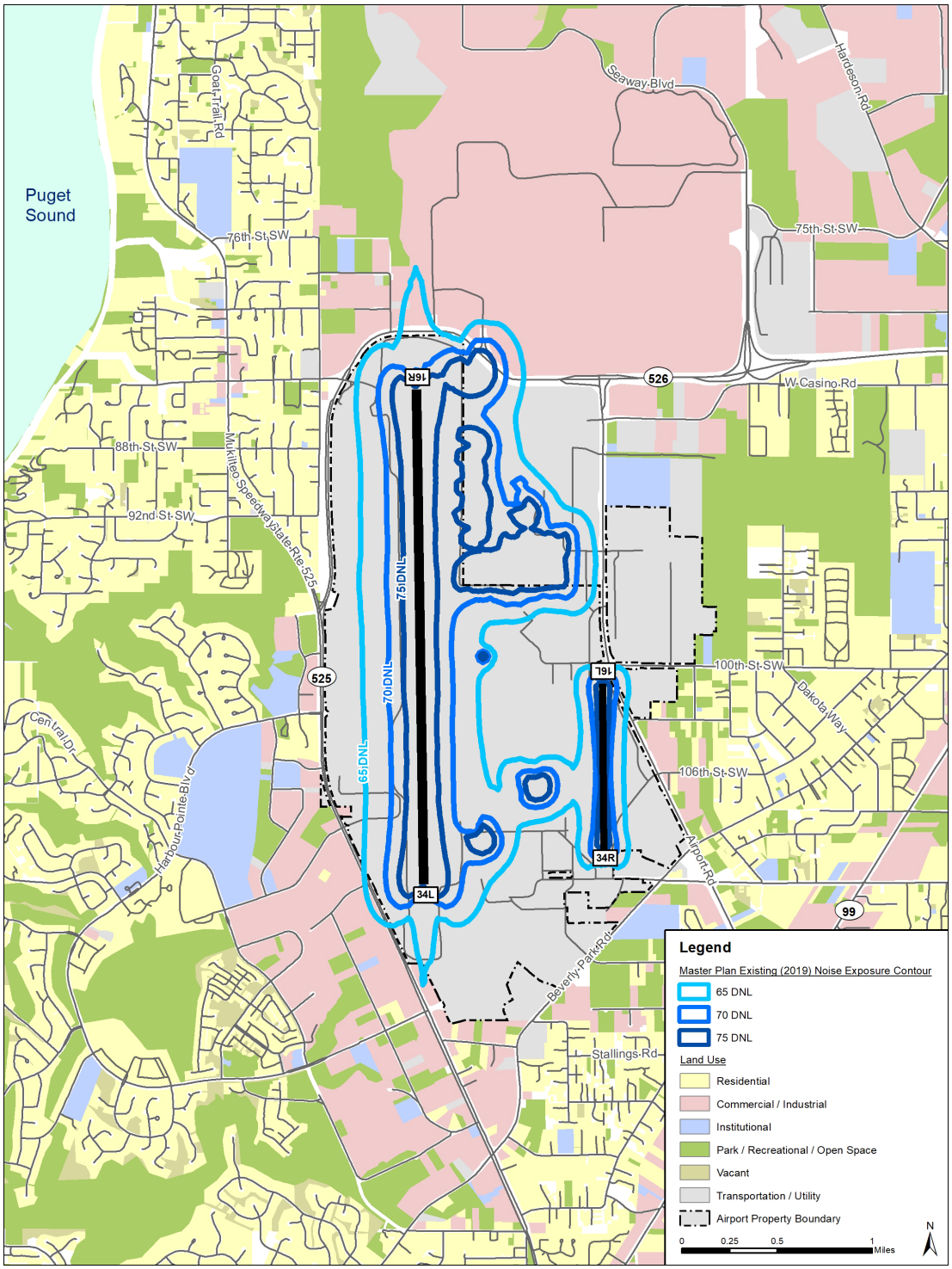
exposure contour reflects the average-annual day runway use patterns at PAE. The noise exposure contour extends outward from the parallel runway ends. The noise exposure contour extends further out from Runway 16R-34L due to the greater usage of this runway compared to Runway 16L-34R. The 65 DNL noise exposure contour is visible surrounding various areas on the east side of PAE due to the run-ups that are performed on the ramp areas east of Runway 16R-34. The 65+ DNL of the Existing (2019) Noise Exposure Contour encompasses approximately 1.35 square miles. The 65 DNL of the Existing (2019) Noise Exposure Contour is located over Airport property, highway right-of-way, commercial property, or vacant land. No residential or other noise-sensitive land uses are located within the 65 DNL of the Existing (2019) Noise Exposure Contour.

Table 8.4-1 Existing (2019) Area (In Square Miles) Within Noise Contour Bands

Contour Range	Existing (2019) Noise Exposure Contour Area (Square Miles)
65-70 DNL	0.58
70-75 DNL	0.36
75 + DNL	0.41
65 + DNL	1.35

Note: Figures are rounded to the nearest tenth of a square mile.
Source: Landrum & Brown

Exhibit 8.4-1 Existing (2019) Noise Exposure Contour



Sources: Land use data from Snohomish County Assessor, February 2022; Master Plan Existing (2019) Noise Exposure Contour from FAA Aviation Environmental Design Tool (AEDT) Version 3d, Landrum & Brown

8.4.2 Future (2030) Noise Exposure Contour Modeling Results

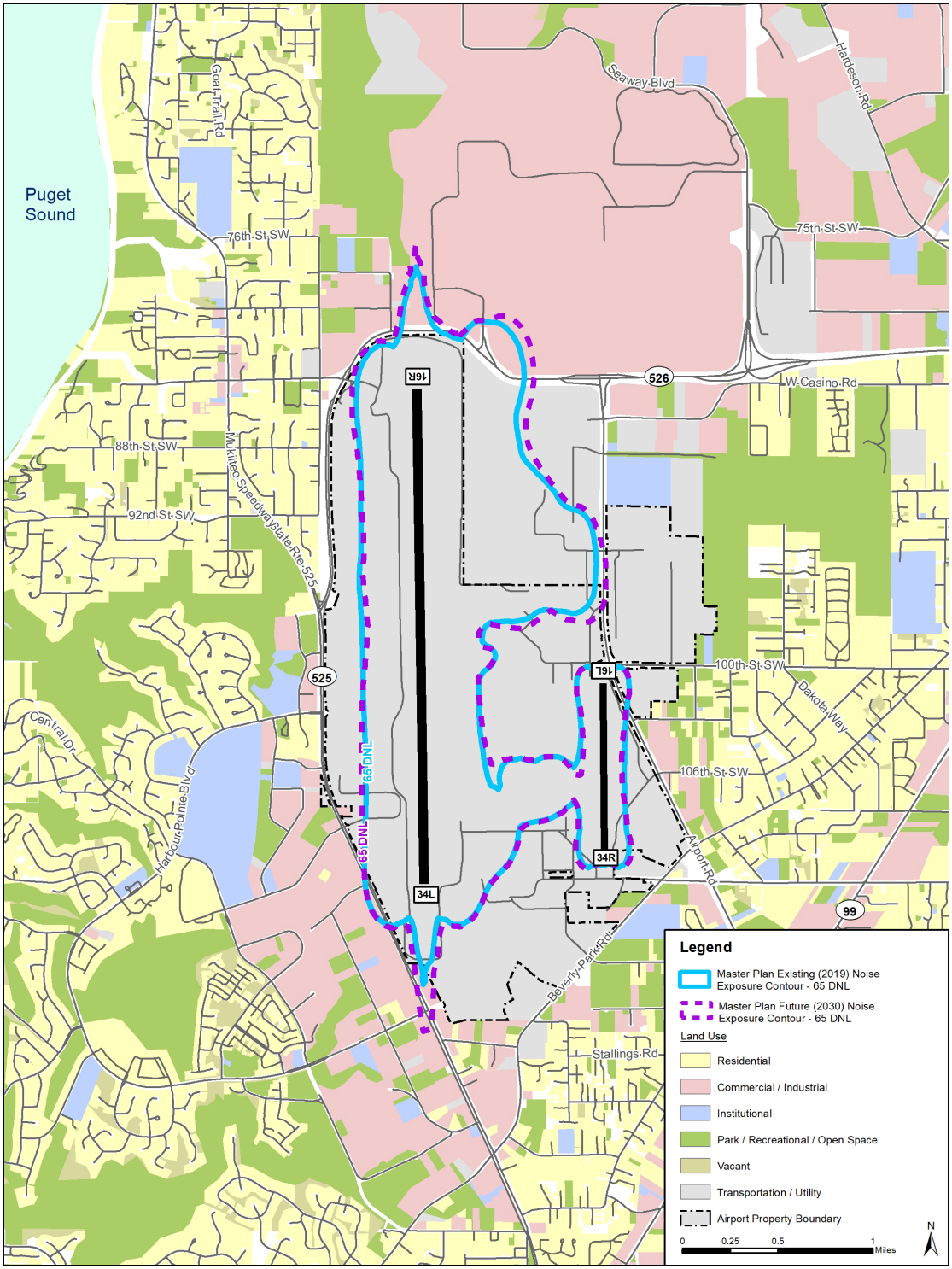
The Future (2030) Noise Exposure Contour is presented on **Exhibit 8.4-2, *Future (2030) Noise Exposure Contour Compared to Existing (2019) Noise Exposure Contour*,** compared to the baseline. The area within each five-decibel noise exposure contour interval is shown in **Table 8.4-2, *Future (2030) Area (In Square Miles) Within Noise Contour Bands***. The noise exposure contour reflects the average-annual day runway use patterns at PAE. The noise exposure contour extends outward from the parallel runway ends. The noise exposure contour extends further out from Runway 16R-34L due to the greater usage of this runway compared to Runway 16L-34R. The 65 DNL noise exposure contour is visible surrounding various areas on the east side of PAE due to the run-ups that are performed on the ramp areas east of Runway 16R-34. The 65+ DNL of the Future (2030) Noise Exposure Contour encompasses approximately 1.43 square miles. The 65 DNL of the Future (2030) Noise Exposure Contour is located over Airport property, highway right-of-way, commercial property, or vacant land. No residential or other noise-sensitive land uses are located within the 65 DNL of the Future (2030) Noise Exposure Contour.

Table 8.4-2 Future (2030) Area (In Square Miles) Within Noise Contour Bands

Contour Range	Future (2030) Noise Exposure Contour Area (Square Miles)
65-70 DNL	0.61
70-75 DNL	0.37
75 + DNL	0.45
65 + DNL	1.43

Note: Figures are rounded to the nearest tenth of a square mile.
Source: Landrum & Brown

Exhibit 8.4-2 Future (2030) Noise Exposure Contour Compared to Existing (2019) Noise Exposure Contour



Sources: Land use data from Snohomish County Assessor, February 2022 Land use data from Snohomish County Assessor, February 2022; Master Plan Existing (2019) and Future (2030) Noise Exposure Contours from FAA Aviation Environmental Design Tool (AEDT) Version 3d, Landrum & Brown

8.4.3 Future (2040) Noise Exposure Contour Modeling Results

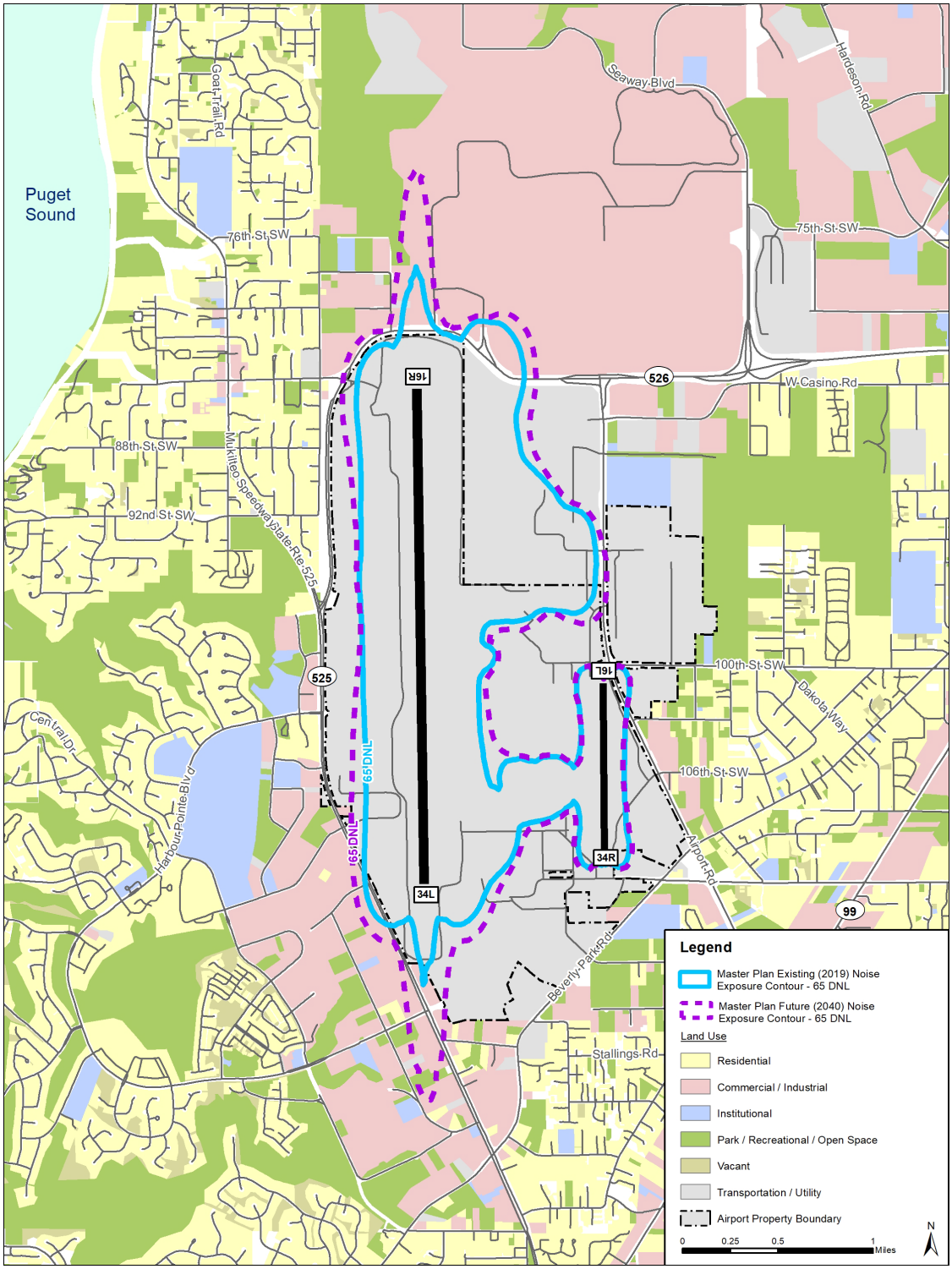
The Future (2040) Noise Exposure Contour is presented on **Exhibit 8.4-3, *Future (2040) Noise Exposure Contour Compared to Existing (2019) Noise Exposure Contour*** compared to the baseline. The area within each five-decibel noise exposure contour interval is shown in **Table 8.4-3, *Future (2040) Area (In Square Miles) Within Noise Contour Bands***. The noise exposure contour reflects the average-annual day runway use patterns at PAE. The noise exposure contour extends outward from the parallel runway ends. The noise exposure contour extends further out from Runway 16R-34L due to the greater usage of this runway compared to Runway 16L-34R. The 65 DNL noise exposure contour is visible surrounding various areas on the east side of PAE due to the run-ups that are performed on the ramp areas east of Runway 16R-34. The 65+ DNL of the Future (2040) Noise Exposure Contour encompasses approximately 1.66 square miles. The 65 DNL of the Future (2040) Noise Exposure Contour is located over Airport property, highway right-of-way, commercial property, or vacant land. No residential or other noise-sensitive land uses are located within the 65 DNL of the Future (2040) Noise Exposure Contour.

Table 8.4-3 Future (2040) Area (In Square Miles) Within Noise Contour Bands

Contour Range	Future (2040) Noise Exposure Contour Area (Square Miles)
65-70 DNL	0.78
70-75 DNL	0.39
75 + DNL	0.49
65 + DNL	1.66

Note: Figures are rounded to the nearest tenth of a square mile.
Source: Landrum & Brown

Exhibit 8.4-3 Future (2040) Noise Exposure Contour Compared to Existing (2019) Noise Exposure Contour



Sources: Land use data from Snohomish County Assessor, February 2022 Land use data from Snohomish County Assessor, February 2022; Master Plan Existing (2019) and Future (2040) Noise Exposure Contours from FAA Aviation Environmental Design Tool (AEDT) Version 3d, Landrum & Brown

8.5 Waste Management Plan

The purpose of this section is to provide an overview of the current waste reduction and recycling practices at PAE, as well as to identify opportunities where the recycling efforts could be increased. Specifically, the following was undertaken.

- Review current waste management conditions at PAE.
- Review current recycling practices at PAE.
- Recommend strategies to help minimize waste and increase recycling at PAE.

Waste management at PAE falls under the responsibility of the Snohomish County Public Works Solid Waste Administration. The Administration recently published a draft update to the Snohomish County Solid Waste Management Plan (2021) with a vision that states two major goals:

- Support actions to reduce climate change and promote sustainability.
- Ensure efficient services for a growing and changing customer base.

On September 30, 2014, the FAA provided guidance on preparing airport recycling, reuse, and waste reduction plans as an element of a master plan or master plan update (2014). This guidance was in response to the FAA Modernization and Reform Act of 2012 (U.S. Code Title 49, Sections 132 and 133) that added a requirement for all master plans and master plan updates to include a plan for "recycling and minimizing the generation of airport solid waste" to be consistent with the local recycling laws.

8.5.1 Current Solid Waste and Recycling

e Snohomish County Public Works Solid Waste Administration oversees waste collection, recycling, and disposal operation for Snohomish County including the County's operations at PAE. PAE staff manage the disposal of the waste County operations generate onsite at PAE, and individual tenants (approximately 50, including the terminal) are responsible for managing their own solid waste and recycling streams. PAE staff have no legal authority at this time to dictate how solid waste and recycling is managed by the tenants. Waste Management NW provides collection services on airport property. The County-operated Airport Road Recycling and Transfer Station is in the southeast area of PAE property at 107000 Minuteman Drive. The transfer station collects garbage and yard/clean wood debris for a fee from haulers and residents and provides free recycling for residential customers only. Waste collected at the Airport Road Recycling and Transfer Station is hauled by truck, placed on trains at the Riverside Business Park in Everett, and transported to a private landfill in Klickitat County, Washington, for disposal.

Waste management at PAE includes many components and can be quite complex. There are various tenants, legal agreements, operational requirements, and disposal processes that all contribute to the waste stream at PAE. Level of control varies by generator. **Table 8.5-1*, Summary of PAE's Waste Management Scope of Influence and Significant Tenants Onsite*** identifies PAE's level of control or influence over the generators.

Table 8.5-1 Summary of PAE's Waste Management Scope of Influence and Significant Tenants Onsite

Generator	Scope of Influence by PAE Staff
Airport Facilities operated by Snohomish County	Direct Control
Propeller (passenger terminal)	No control - minimal Influence
Facilities controlled by tenants (examples) • ATS (Hangar 1) • Boeing (EMC and BOMARC buildings)	No control - minimal Influence
Deplaned waste • Alaska Airlines/McGhee	No control - minimal Influence

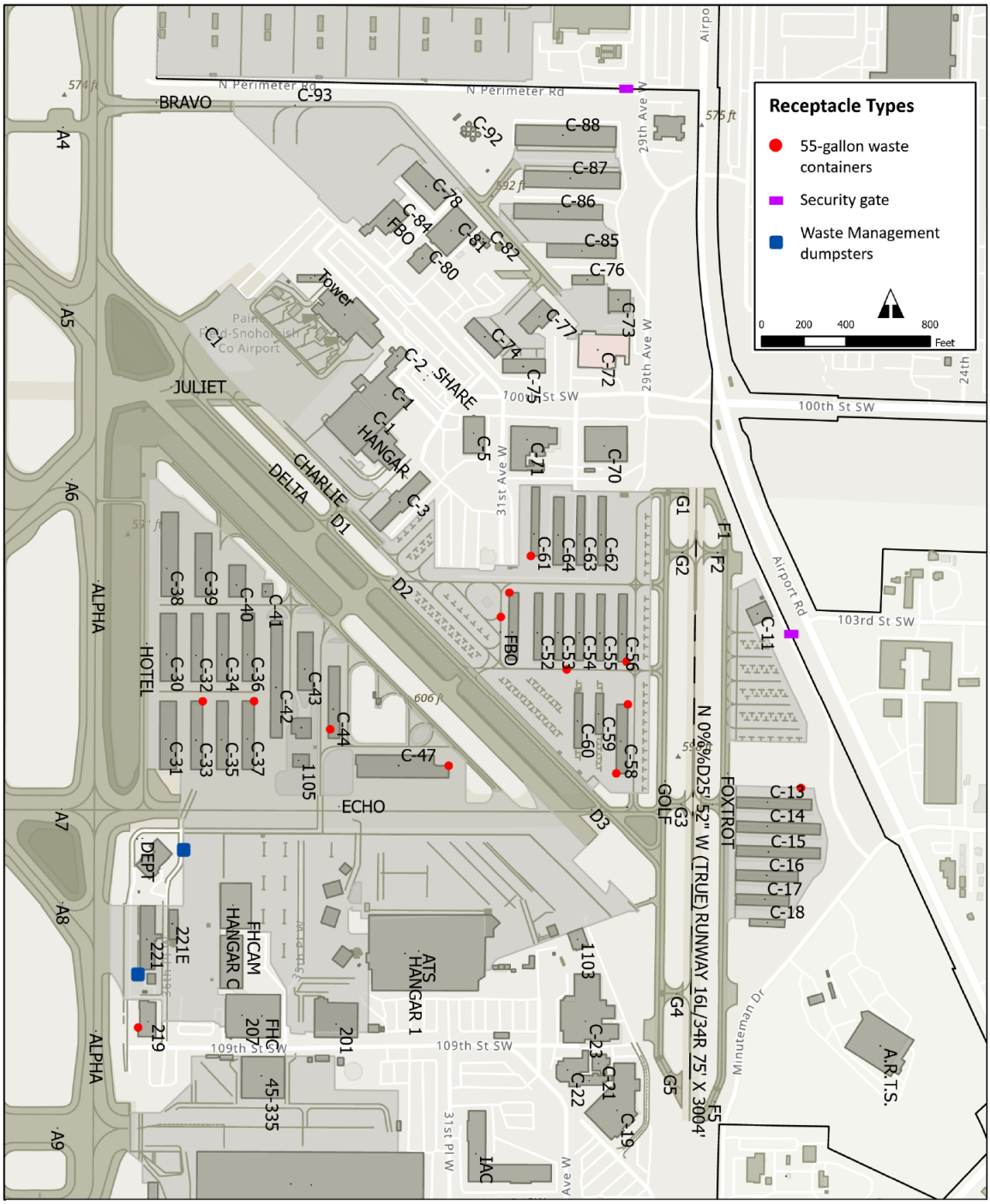
Source: Rardin 2022a

8.5.2 Collection and Handling of Municipal Solid Waste

Collection of municipal solid waste at PAE originates through one of two primary pathways. Front-of-house (FOH) containers are used by the passengers and some tenants in publicly accessible areas. Back-of-house (BOH) containers are used by Airport employees, contractors (including janitorial), and tenants in areas not open to the general public. Container signage could be improved, especially at FOH locations, to improve sorting waste from recycled materials and how to avoid contaminating recycling with liquids and food. It is recommended to standardize bins and providing clear signage at these locations.

Seventeen 55-gallon waste-only containers are dispersed throughout PAE general aviation ramps to serve hangar tenants and general aviation hangar waste only. t (see **Exhibit 8.5-2, *Airport Managed Receptacles***). The Maintenance and Fire Department have both waste and recycling Waste Management dumpsters ranging from three to six yards. Airport Maintenance staff removes waste from the seventeen 55-gallon containers (red dots in Exhibit 8.5-2) twice a week to the larger capacity dumpsters at the Maintenance and Fire Department areas (blue rectangles in **Exhibit 8.5-2**). Waste Management collects both the waste and recycling dumpsters once a week. It is recommended to add recycling receptacles along with the 17 waste containers to encourage more recycling opportunities by hangar tenants.

Exhibit 8.5-2 Airport Managed Receptacles



Sources: Rardin 2022a; Rardin 2022b

Each generator has their own contract to haul out waste and recycled materials:

- Boeing, a prominent tenant at PAE, has contracts with Waste Management NW for landfill waste, Cedar Grove Composting for compost collection, DTG Recycle for recycling, and Rubatino Refuse Removal for cardboard.
- ATS has a contract with Waste Management NW for landfill waste and recycled materials. They also separate regulated dangerous waste to be shipped offsite. Unused jet fuel is recycled into diesel onsite and used in ATS diesel powered equipment.
- Propeller, who manages the passenger terminal, has a contract with Waste Management NW for their landfill and recycled waste collection.
- PAE also has its own Waste Management NW contract for landfill and recycled materials collection.

Table 8.5-2, *Frequency and Waste Bin Capacity by Significant Contributors of Waste at PAE* summarizes the waste collection frequency and dumpster capacity of each significant tenant at PAE.

Table 8.5-2 Frequency and Waste Bin Capacity by Significant Contributors of Waste at PAE

Waste and Recycle Capacity	Number of Bins	Collection Frequency
PAE Staff		
• 6-yard waste bin	4	1 time a week
• 1-yard waste bin	1	1 time a week
• 6-yard recycle bin	1	1 time a week
• 3-yard recycle bin	2	1 time a week
• 96-gal recycle bin	1	2 times a month
• 30-yard waste bin (on call)	1	used twice in 2022 so far
Propeller		
• 8-yard waste bin	1	4 times a week
• 8-yard recycling bin	1	3 times a week
ATS		
• 30-yard waste bin	6	3 times a week
• 40-yard recycling bin	1	2 times a week
Boeing		
• 30-yard waste bin	1	2 times a month
• 4-yard waste bin	2	3 times a week
• 40-yard waste bin	2	10 times a month
• 40-yard recycling bin	4	1 time a week
• 6-yard cardboard bin	1	1 time a week
• 4-yard compost bin	2	5 times a week

• 3-yard compost bin	2	3 times a week
• 2-yard compost bin	2	5 times a week

Sources: Rardin 2022a; Snohomish County 2017; Snohomish County 2022

The main generators of waste at PAE are tenants (Boeing and ATS), the passenger terminal building (public spaces, airport dining and concessions), and aircraft and ground support (deplaned waste). PAE staff and its significant tenants currently have the capacity to contribute up to 5,560 tons to landfill waste in a year and may divert up to 1,465 tons to recycling in a year. It is recommended to set a goal to reduce waste disposal capacity while increase recycling capacity. There currently is no information from McGhee, who contracts with Alaska Airlines to collect deplaned waste from passenger airplanes.

8.5.3 Airport Recycling Practices

PAE currently has an undefined recycling program. PAE has containers available for each employee for paper and comingled recycling. The Airport passenger terminal is managed by Propeller, and each sub-tenant manages their own waste stream. There is not a standard set of goals or policies for recycling that apply to all tenants, due to lack of authority by PAE staff.

Boeing, which leases the EMC and office buildings with the BOMARC office park, has internal enterprise sustainability goals to reduce solid waste 20 percent by 2025 (based on 2017 actuals), reduce overall waste 30 percent by 2030 (based on 2025 actuals), and send zero waste to landfills certified for major manufacturing sites by 2030.

PAE staff and most of the tenants contract with Waste Management NW for their recycling and waste hauling needs. Waste Management NW offers commercial comingled recycling of the following materials:

- **Plastic bottles and containers.** Clean and dry bottles, jars, jugs, and tubs.
- **Food and beverage cans**. Empty tin, aluminum, and steel cans. Empty aerosol cans without the plastic lid.
- **Paper**. Dry paper, newspaper, magazines.
- **Cardboard**. Flatten cardboard and paperboard.
- **Food and Beverage Containers**. Empty of all liquid and food.
- **Glass jars and bottles**. Empty of all liquid and food.

ATS contracts with DTG Recycle for metal and plastic and with Rubatino Refuse Removal for cardboard. ATS also contracts with Cedar Grove Composting to pick up food waste and soiled paper and packaging to compost.

The passenger terminal has three combination receptacle bins in the main passenger terminal for waste, paper, and cans and bottles, one combination receptacle in the employee break room and ground transportation building, and four combination receptacles in the hold room. There are three waste receptacles at the Transportation Security Administration (TSA) check point, two small waste receptacles in each bathroom, three waste receptacles on the ramp, one waste receptacle in the ground transportation lot and four waste receptacles and four recycling receptacles at the Beecher's concession stand.

8.5.4 Waste Characterization

To date, neither PAE, Boeing, ATS, nor Propeller have conducted any joint waste or recycling characterization studies; however, Boeing is currently coordinating a study that is expected to take place later in 2022. It is recommended that PAE staff work to amend its leases with tenants to establish a formal waste and recycling program. In a waste characterization study, solid waste is collected over the course of a week, weighed and measured in pounds or tons, and separated into categories: fibers, containers, other recyclables, and non-recyclables. Results will reveal materials collected and how much these materials contribute to the waste stream. These categories can be further divided into subcategories, like compostable and types of recycling items. Waste and recycled material studies will inform PAE staff and its tenants on how to reduce waste, set up robust recycling and composting programs, set realistic and achievable goals, conserve money and resources, and divert materials from the landfill. Goals and metrics can be set to help educate and motivate staff and the public to reduce the waste stream to the landfill and positively impact the community's environmental health.

8.5.5 Recycling Feasibility and Recommended Strategies at PAE

Although PAE does not have a formal waste reduction program in place, PAE staff and its major tenants voluntarily recycle a variety of materials at a variety of locations. Office spaces, the passenger terminal, tenant-occupied hangars and Airport buildings, and ground transportation lots have recycling receptacles. Container sizes range from 35 gallons to eight cubic yards and hauler pick-up frequency ranges from once a week to four times a week. Propeller should continue to explore recycle options and conduct a composting study as the terminal traffic increases.

A complicating issue for PAE to implement a recycling program is that PAE staff have various tenant leases, and each tenant has differing operational requirements and disposal processes that all contribute to the waste stream at PAE. It is recommended that PAE develop a standard set of recycling criteria that would apply to all tenants at PAE. These criteria would be incorporated into new or renewed tenant leases moving forward.

8.5.6 Minimizing Solid Waste Generation and Recommended Recycling and Composting Strategies

PAE staff and many of its tenants have voluntarily adopted recycling practices of various materials, such as paper, cardboard, bottles, and cans. PAE staff and its tenants should continue their current collection programs and adopt new strategies to maximize key recycling materials. There are other steps PAE staff and its tenants can implement to improve their existing waste management. **Table 8.5-3, *Recommendations for PAE's Recycling Strategies*** briefly lists some recommendations for strategies to improve recycling practices. The feasibility to implement these strategies will depend not only on cost, but tenant participation and management commitment.

Table 8.5-3 Recommendations for PAE's Recycling Strategies

Strategies to Reduce Waste and Increase Recycling	Recommendation Analysis	Reason/Discussion for Recommendation

1. Going forward, include contractual language in tenant lease agreements to participate in a recycling program or require recycling in their waste management accounts.	PAE staff have no direct control over tenants but should exert their influence to participate in a recycling program.	Formalize participation in recycling by the tenants to divert more waste from the landfill.
2. Conduct a waste and recycling characterization study.	Recommend conducting a study and using results to outline waste reduction and implement a recycling program.	This study has a high potential to provide accurate data to inform PAE and its tenants when implementing policies.
3. Implement a formal recycling program.	Set up a formal recycling program for PAE staff and its tenants based on realistic goals and metrics gathered from the waste and recycling study.	Improve their existing voluntary recycling program, set goals, and track and monitor progress.
5. Based on data from the Waste and Recycling Characterization Study, recommend offering composting at PAE and passenger terminal.	As traffic increases and is warranted, Propeller can provide compost bins near the terminal concession area as well as break rooms in the office spaces with clear signage on what organics are acceptable.	Composting organic materials diverts more waste from the landfill. Cedar Grove has a nearby composting facility in Everett, close to PAE.
6. Increase education on recycling and composting at the passenger terminal, office spaces, and tenant locations to improve sorting effectiveness. Improve and incorporate signage to simplify passenger and tenant sorting. Include prominent images or lists of materials accepted in bins.	Provide clear signage at waste and recycle receptacles, expand employee and tenant training, and provide clean-up and food donation events.	As part of the formal recycling program, increase outreach to the public with information and provide tenant and employee with resources to improve passenger, tenants, and staff behavior in separating waste from recoverable materials; provide motivation and incentives to make greener choices through donation drives.
7. Establish liquid collection stations at security lanes and/or purchase a bottle puncturing system to drain liquid-filled	Allows passengers to empty and recycle plastic or glass containers before entering TSA security checkpoints and reduce Propeller's waste stream.	Liquid contaminates all recyclable materials, meaning the material is no longer recyclable and must go to the landfill. This will alleviate contamination of recoverable materials.

containers at security checkpoints.		
8. Set up an award program that recognizes tenants and partners for environmental performance, education and outreach, and innovation.	Award winners receive commemorative plaques and recognition in the PAE and County's press release, PAE and County's websites, and other publicity.	Public recognition incentives can motivate tenants and business partners to reduce waste and increase recycling.
9. Within the recycling program, provide tools to track and monitor the progress and success of the program. Build an online dashboard through PAE's website that tracks tonnage of diverted waste, quantify their greenhouse emissions, and energy or cost savings resulting from implementing recycling practices.	Data can be collected and analyzed within the recycling program and presented to management, the public, and stakeholders. Progress will be tracked and monitored, and refinements can be made to achieve PAE's goals of waste reduction.	Data from the recycling program visualized in graphs and charts to easily monitor goals and report to stakeholders and the public are an effective way to communicate PAE's waste reduction success.
10. Establish a recycling coordinator.	A formal recycling program would benefit from a recycling coordinator to manage and run the program.	Recycling program challenges, like buy-in from all Airport stakeholders and the public, may be overcome; the coordinator would be a central point of contact; the coordinator can consider new waste management practices for further waste reduction at PAE.

Source: Landrum & Brown

8.5.7 Conclusion

Although PAE staff and most of its tenants voluntarily recycle, PAE staff and its tenants will benefit from conducting a waste and recycling characterization study to discover more recycling opportunities. These studies will allow PAE staff to set goals and implement policies for both PAE staff and its tenants to reduce waste and increase recycling. Additionally, reporting data and metrics measured from the recycling program via an online dashboard would allow staff, tenants, management, and the public an up-to-date look at the program's success and motivate them to change their behavior to reduce greenhouse gas emissions.

8.5.7.1 References

FAA (Federal Aviation Administration). 2014. Memorandum, Guidance on Airport Recycling, Reuse, and Waste Reductions Plan. U.S. Department of Transportation, Federal Aviation Administration,

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Snohomish County. 2021. Comprehensive Solid and Hazardous Waste Management Plan, Preliminary Draft Copy. Snohomish County Solid Waste Division, Everette, WA. Available at: https://snohomishcountywa.gov/DocumentCenter/View/83227/SnoCoCompSolidHazWastePlanCombinedDRAFT20210628. Accessed August 2022.