FINAL
Site Inspection Report
Juneau Army Aviation Operating Facility
Juneau, Alaska

Site Inspections for Perfluorooctanoic Acid (PFOA), Perfluorooctanesulfonic Acid (PFOS), Perfluorohexanesulfonic Acid (PFHxS), Perfluorononanoic Acid (PFNA), Hexafluoropropylene oxide dimer Acid (HFPO-DA) and Perfluorobutanesulfonic Acid (PFBS)

September 2023

Prepared for:

Army National Guard Headquarters
111 S. George Mason Drive
Arlington, VA 22204

UNCLASSIFIED

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LIST OF ACRONYMS AND ABBREVIATIONS

°C	Degrees Celsius
°F	Degrees Fahrenheit
%	Percent
µg/kg	Microgram(s) per kilogram
™	Trademark
AAOF	Army Aviation Operating Facility
ADEC	Alaska Department of Environmental Conservation
AECOM	AECOM Technical Services, Inc.
AFFF	Aqueous film-forming foam
AKARNG	Alaska Army National Guard
amsl	Above mean sea level
AOI	Area of Interest
ARNG	Army National Guard
bgs	Below ground surface
btoc	Below top of casing
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSM	Conceptual site model
DoD	Department of Defense
DPT	Direct-push technology
DQO	Data Quality Objectives
DUA	Data Usability Assessment
EA	EA Engineering, Science, and Technology, Inc., PBC
ELAP	Environmental Laboratory Accreditation Program
ELLE	Eurofins Lancaster Laboratories Environmental LLC
EM	Engineer Manual
EB	Equipment blank
FB	Field blank
FD	Field duplicate
ft	Foot (feet)
FTC	Fire Training Center
GAC	granular activated carbon
GPS	global positioning system
HDPE	High-density polyethylene
ID	Identification
IDW	Investigation-derived waste

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

ITRC	Interstate Technology Regulatory Council
JIA	Juneau International Airport
K_{oc} values	normalized distribution coefficients
LC/MS/MS	liquid chromatography with tandem mass spectrometry
MIL-SPEC	Military Specification
MS	Matrix spike
MSD	Matrix spike duplicate
NELAP	National Environmental Laboratory Accreditation Program
ng/L	Nanogram(s) per liter
No.	Number
OSD	Office of the Assistant Secretary of Defense
PA	Preliminary Assessment
PFAS	Per- and polyfluoroalkyl substances
PFBS	Perfluorobutanesulfonic acid
PFNA	Perfluorononanoic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PFOSA	Perfluorooctanesulfonamide
PFTeDA	Perfluorotetradecanoic acid
PFTrDA	Perfluorotridecanoic acid
PID	Photoionization detector
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
QSM	Quality Systems Manual
RI	Remedial investigation
SI	Site Inspection
SL	Screening level
TOC	Total organic carbon
TPP	Technical Project Planning
UFP	Uniform Federal Policy
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
WWTP	Wastewater Treatment Plant

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EXECUTIVE SUMMARY

The Army National Guard (ARNG) G9 is performing Preliminary Assessments (PAs) and Site Inspections (SIs) at ARNG facilities nationwide based on the current or potential historical use of per- and polyfluoroalkyl substances (PFAS) with a focus on the six compounds presented in the memorandum from the Office of the Secretary of Defense (OSD) (Assistant Secretary of Defense) dated 6 July 2022. The six compounds listed in the OSD memorandum include perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), and perfluorobutanesulfonic acid (PFBS), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), and hexafluoropropylene oxide dimer acid (HFPO-DA)[1]. These compounds are collectively referred to as “relevant compounds” throughout the document and the applicable Screening Levels (SLs) are provided below in **Table ES-1**.

The PA identified one Area of Interest (AOI), where PFAS-containing material may have been stored, disposed, or released historically. The objective of the SI is to identify whether there has been a release to the environment from the sources identified in the PA and determine whether further investigation is warranted, a removal action is required to address immediate threats, or no further action is required based on a comparison of SI results to SLs for the relevant compounds. The SI was completed at the ARNG Juneau Army Aviation Operating Facility (AAOF) in Juneau, Alaska and determined further evaluation is not warranted at this time. Juneau AAOF will be referred to as the “Facility” throughout this document.

The Facility, operated by the Alaska ARNG, encompasses approximately 13,500 square feet in Juneau, Alaska. The facility is located near the Juneau International Airport and has its own aircraft hangar. The two-story metal frame building includes a large hangar and shop area on the ground level floor. Personnel offices, conference room, and a recreational room occupy the top floor.

The Department of Defense (DoD) has adopted a policy to retain facilities in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process based on risk-based SLs calculated by the OSD in soil and groundwater, (Assistant Secretary of Defense 2022). The ARNG program under which this SI was performed follows this DoD policy.

The PA identified two potential PFAS-containing material release areas at the Facility (AECOM Technical Services, Inc. 2020). The release areas identified in the PA were grouped into one AOI as part of the 2021 investigation: AOI 1, which includes the Western Fire Training Area and the Tri-Max™ 30 Storage Area. SI sampling results from the AOI 1 were compared to OSD SLs. **Table ES-2** summarizes the SI results for the AOI. Based on the results of this SI, further evaluation is not warranted at this time for AOI 1: Western Fire Training Area and Tri-Max™ 30 Storage Area.

[1] Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the conceptual site model (CSM) developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of military specification (MIL-SPEC) aqueous film forming foam (AFFF) and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

Table ES-1. Screening Levels (Soil and Groundwater)

Analyte[1,2]	Residential 0-2 feet bgs (Soil) (µg/kg)[1]	Industrial / Commercial Composite Worker 2-15 feet bgs (Soil) (µg/kg)[1]	Tap Water (Groundwater) (ng/L)[1]
PFOA	19	250	6
PFOS	13	160	4
PFBS	1,900	25,000	601
PFHxS	130	1,600	39
PFNA	19	250	6

Notes:
1. Assistant Secretary of Defense. July 2022. Risk Based Screening Levels Calculated for Groundwater and Soil using USEPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.
2. Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the conceptual site model (CSM) developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of MIL-SPEC AFFF and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

ng/L = nanogram(s) per liter
µg/kg = Microgram(s) per kilogram

Table ES-2. Summary of Site Inspection Findings and Recommendations

AOI	Potential Release Area	Soil Source Area	Groundwater Source Area	Groundwater Facility Boundary	Future Action
1	Western Fire Training Area and Tri-Max™ 30 Storage Area	○	●	●	No Further Action

Legend:
● = Detected; exceedance of screening levels
◐ = Detected; no exceedance of screening levels
○ = Not detected

1. INTRODUCTION

1.1 PROJECT AUTHORIZATION

The Army National Guard (ARNG) G9 is the lead agency in performing Preliminary Assessments (PAs) and Site Inspections (SIs) at ARNG facilities nationwide based on the current or potential historical use of per- and polyfluoroalkyl substances (PFAS) with a focus on six compounds presented in the memorandum from the Office of the Secretary of Defense (OSD) dated 6 July 2022 (Assistant Secretary of Defense 2022). The six compounds listed in the OSD memorandum will be referred to as “relevant compounds” throughout this document and include perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorobutanesulfonic acid (PFBS), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), and hexafluoropropylene oxide-dimer acid (HFPO-DA)[2] at ARNG facilities nationwide. The ARNG performed this SI at the Juneau Army Aviation Operating Facility (AAOF) in Juneau, Alaska. AAOF will be referred to as the “Facility” throughout this report.

The SI project elements were performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (U.S. Environmental Protection Agency [USEPA] 1980), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations Part 300; USEPA 1994), and in compliance with Army requirements and guidance for field investigations.

1.2 SITE INSPECTION PURPOSE

A PA was performed at the Facility (AECOM Technical Services, Inc. [AECOM] 2020) that identified two potential PFAS-containing material release areas, which were grouped into one Area of Interest (AOI). The objective of the SI is to identify whether there has been a release to the environment from the AOI identified in the PA and to determine whether further investigation is warranted, a removal action is required to address immediate threats, or no further action is required based on screening levels (SLs) for the relevant compounds.

[2] Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the conceptual site model (CSM) developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of military specification (MIL-SPEC) aqueous film forming foam (AFFF) and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

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2. SITE BACKGROUND

2.1 SITE LOCATION AND DESCRIPTION

The Facility was constructed in the mid-1980s and consists of a single hangar within the footprint of the Juneau International Airport (JIA), approximately 7 miles northwest of the City of Juneau, Alaska (**Figure 2-1**). A 1972 Alaska Tidelands Survey conducted by the City of Juneau depicts the majority of the airport land developed in its present-day configuration. Historically, pilots in World War II used what was then a strip of naturally occurring flat land in an otherwise rugged terrain. The land on which JIA sits was built out in multiple phases throughout the twentieth century, largely with sediments dredged from the Gastineau Channel (**Figure 2-2**) (AECOM 2020).

The Facility is visible in historic imagery from the 1980s and is depicted as Building 40 on the JIA Master Plan. In addition to the hangar, the Facility also includes a parking area (asphalt), a concrete pad, several oil/fuel storage tanks, underground piping, and a wash water recycling system within its approximately 1.25-acre area (AECOM 2020). Juneau AAOF is identified as being located on Lot 3 (which includes a fraction of Tract 13&14 and certain parcel or part of Tract 14&15 in accordance with U.S. Survey 1195 within Tideland Survey No. 716), which is part of the JIA. A 50-year lease was signed in 1987 by the Alaska Department of Military and Veterans Affairs, and the Alaska Army National Guard (AKARNG) has been the tenant of this land since the late 1980s; (AECOM 2020).

2.2 FACILITY ENVIRONMENTAL SETTING

The JIA is located directly on the Gastineau Channel, at the mouth of the Mendenhall River within what is considered the Mendenhall Wetlands State Game Refuge, established in 1976. This complex ecosystem is host to a large number of outdoor activities including fishing, hunting, boating, photography, and hiking. The AAOF is approximately 550 yards from the perimeter of JIA where fluvial sediments meet the tarmac, and 15 feet (ft) above sea level. The elevation gradient immediately to the north is steep, rising almost 900 ft over a half mile. The fill on which JIA stands was taken primarily from fine-grained sandy deltaic deposits, but also consists of clastic slate, greenstone, granite, silt, sawdust, and garbage. It ranges in thickness from 3 to 25 ft (AECOM 2020).

2.2.1 Geology

The Facility lies in the complex geological region of the southeast Alaska-Juneau gold lode system, an ore belt of significant economic interest. This region is geologically active and exhibits transverse plate movement, tectonic uplift, and volcanism (AECOM 2020).

The metamorphic belt in which the facility lies comprises a long geologic history with the deposition of protolithic sediments beginning as early as the Proterozoic. Deformation from regional metamorphism in the Late Cretaceous is recorded in rocks west of the Coast Mountains batholith, a large igneous plutonic suite emplaced in the Mesozoic. Ten unique terranes and metamorphic suites are recorded in the geologic record here, encompassing a wide variety of both sedimentary provenances and igneous structures, plutonic, and volcanic. The formations become older across strike to the west (AECOM 2020).

The tectonic plate boundary near the facility is primarily a transform fault. Regardless, a number of volcanoes, such as Mount Edgecumbe, have occurred as a result of volcanism due to the subduction of the Pacific Plate under the Aleutian Islands to the west. These volcanoes occur 130 miles to the southeast of the Facility but are unlikely to erupt and are unmonitored by the Alaska Volcano Authority (AECOM 2020).

The landscape has been glaciated numerous times and many of its high alpine peaks remain so today; the number one tourist attraction in Juneau, the Mendenhall Glacier, is 5 miles to the north. Due to present day receding of the glacier and subsequent isostatic rebound, along with an active tectonic margin, the southeastern Alaskan area is currently uplifting at rates of 10 millimeters per year. Southeastern Alaska's active tectonism has ensured its topography is dominated by high mountain peaks and glaciofluvial geomorphology (AECOM 2020).

The JIA property consists predominantly of mapping unit BeA, according to the U.S. Department of Agriculture. BeA is excessively drained, very gravelly sand with 0 to 3 percent (%) slopes. This soil is found on mostly level alluvial plains and terraces, along with spots of wet, sandy soils.

The geological data collected during the SI indicate a permeable and conductive environment with soils dominated by surficial poorly graded sand and subsurface well-graded sands with gravel.

2.2.2 Hydrogeology

The groundwater is believed to be hydrologically connected with surface soils. Due to the coastal proximity and seasonal glacial meltwater, the water table varies from 6 to 12 ft below ground surface (bgs) and includes a marine/freshwater interface whose depth and inland transgression changes with the tides and fluctuating glacial meltwater. Groundwater is expected to be shallower with increasing proximity to the shore. Groundwater flow is south/southeast directly into the Gastineau Channel (**Figure 2-3**).

There are multiple wells upgradient of the Facility, particularly to the northeast (**Figure 2-3)**. It is unknown if the upgradient wells are used for drinking water. There are no known downgradient wells. The aquifer underlying JIA is not used for drinking water. The JIA and surrounding area receive drinking water from the City and Borough of Juneau's Municipal Water Utility, which receive its water from the Last Chance Basin well field and Salmon Creek Watershed (**Figure 2-4**).

Depths to water measured in November 2021 during the SI ranged from 8 to 10 ft bgs and groundwater elevations ranged from 13.16 to 13.86 ft above mean sea level (amsl) across the Facility. Groundwater flow direction was determined to be south/southeast (**Figure 2-5**).

2.2.3 Hydrology

The JIA is situated on river sediments dredged from the Gastineau Channel and are believed to be hydrologically connected to its surrounding waterways (**Figure 2-4**). Drainage outside the Facility flows away from the hangar in all directions. Various storm drains and ditches catch surficial drainage in each direction, directing the water to proper catchments (AECOM 2020).

The western boundary at JIA is located at the mouth of the Mendenhall River, a meltwater river recharged primarily by the Mendenhall Glacier as well as several small tributaries. The Mendenhall River's daily mean discharge ranges from 10,000 cubic feet per second in the summer to several hundred cubic feet per second in the winter. Jordan Creek flows from northwest to southeast on JIA property, located southwest of the Facility boundary. Jordan Creek used to run through the Facility but was diverted in 1988 during construction of the gravel pad.

According to the U.S. Fish and Wildlife Service, the Facility grounds are classified as an emergent palustrine, or marshy, wetland subject to tidal influences. The Facility is approximately 500 yards from the "waterway," the runway used for landing seaplanes at JIA, and 550 yards from a nearby retaining pond. Despite the proximity to waterways, the Facility is not considered to be within the 0.2% or 1% annual floodplains (AECOM 2020).

Because of variable discharge from the Mendenhall Glacier and isostatic rebound affecting channel depth and sedimentation rates in the Gastineau Channel, hydrologic data in the area are difficult to quantify and can change drastically from season to season (AECOM 2020).

2.2.4 Climate

The average annual temperature is 42.8 degrees Fahrenheit (°F) with the warmest period occurring in the summer months with an average maximum temperature of 63.96°F, in June, July, and August. Winter has an average minimum temperature of 25.8°F, with February being the coldest month (AECOM 2020).

Total annual precipitation ranges from approximately 120 to 150 inches, with approximately 40% occurring as snowfall. Rainfall is fairly evenly distributed throughout the year with an average annual rainfall of 5 inches per month. Snowfall begins as early as October and continues well into April, with most winter months receiving over ten inches (AECOM 2020).

2.2.5 Current and Future Land Use

The property is currently under lease by the AKARNG and is operated as an AAOF, which services aircraft for the AKARNG. The AKARNG has leased the property from the City and Borough of Juneau for 50 years from 1987 until 2037. The Facility is located on the tarmac of JIA and access must be requested from AKARNG to pass through the fence and access the facility. Reasonably anticipated future land use is not expected to change from the current land use described above (AECOM 2020).

2.2.6 Sensitive Habitat and Threatened/Endangered Species

A wildlife survey has not occurred at the facility, and the facility does not have any significant areas of habitat.

The following species are listed as federally endangered, threatened, proposed, and/or candidate species in the Alaska Region (U.S. Fish and Wildlife Services 2021):

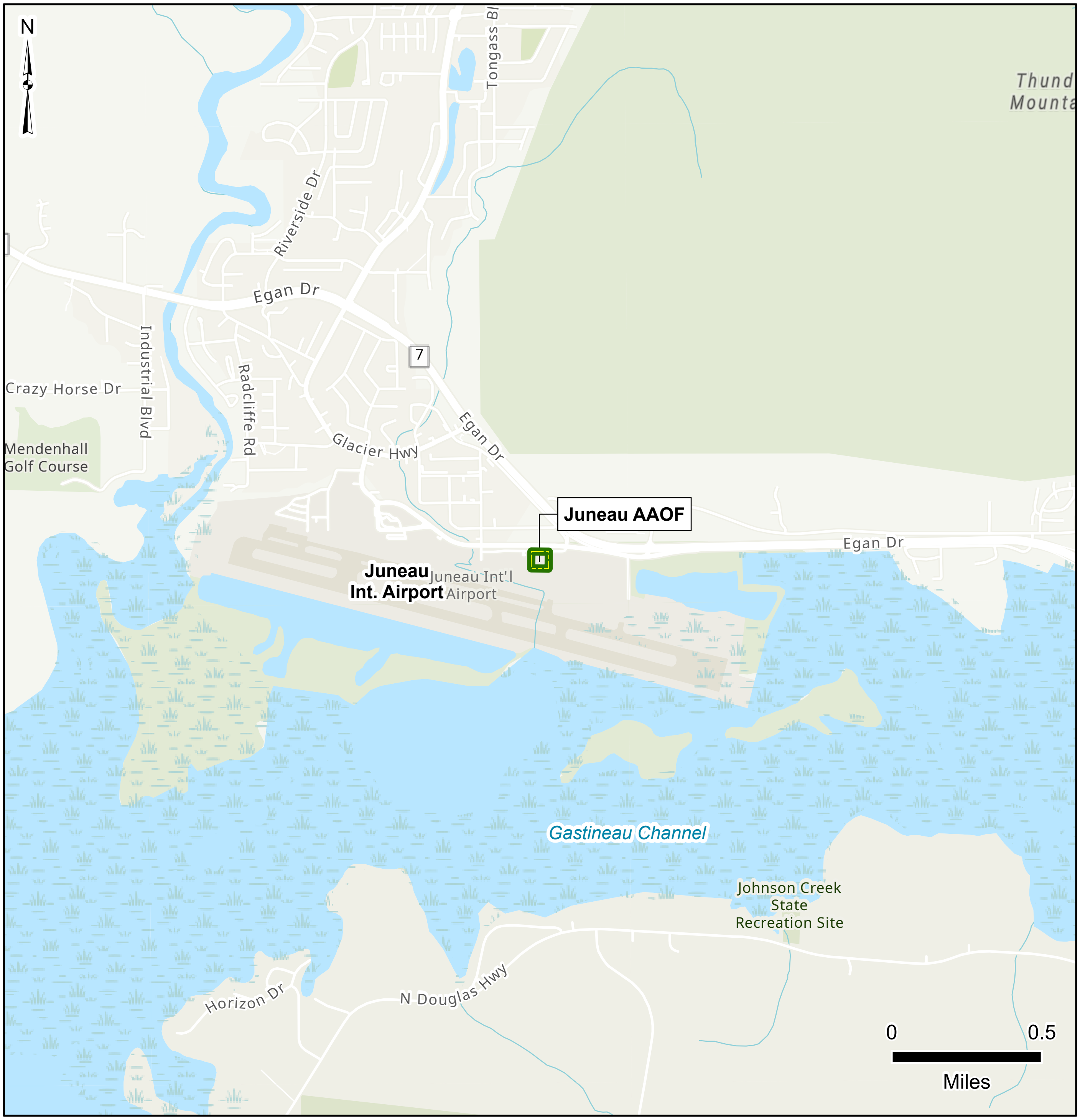
- Birds: Eskimo Curlew, Steller's Eider, Short-tailed Albatross, Spectacled Eider
- Plants: Aleutian Shield Fern
- Mammal: Northern Sea Otter, Polar Bear, Wood Bison.

2.3 HISTORY OF PFAS USE

Two potential PFAS release areas grouped into one AOI were identified on the Facility during the PA (AECOM 2020). The dates of potential releases for the AOI elements are estimated to have been between 2010 and 2011, based on secondary information sources. Exact dates of use are unknown. The PA conducted in 2018 consisted of a review of data sources, a site visit, and interviews with the former Juneau AAOF personnel and Facility Commander as well as the Assistant Fire Chief of Operations at Capital City Fire/Rescue. There is no evidence that HFPO-DA was used at the Facility. A description of the AOI is presented in **Section 3**.

Army National Guard Site Inspections
Site Investigation Report
Juneau AAOF, Alaska

Figure 2-1
Facility Location



Facility Data

Facility Boundary

Data Sources:
ESRI 2022
AECOM 2019

Date:..........................August 2022
Prepared By:.............................EA
Prepared For:....................USACE
Projection:........WGS 84 UTM 8N

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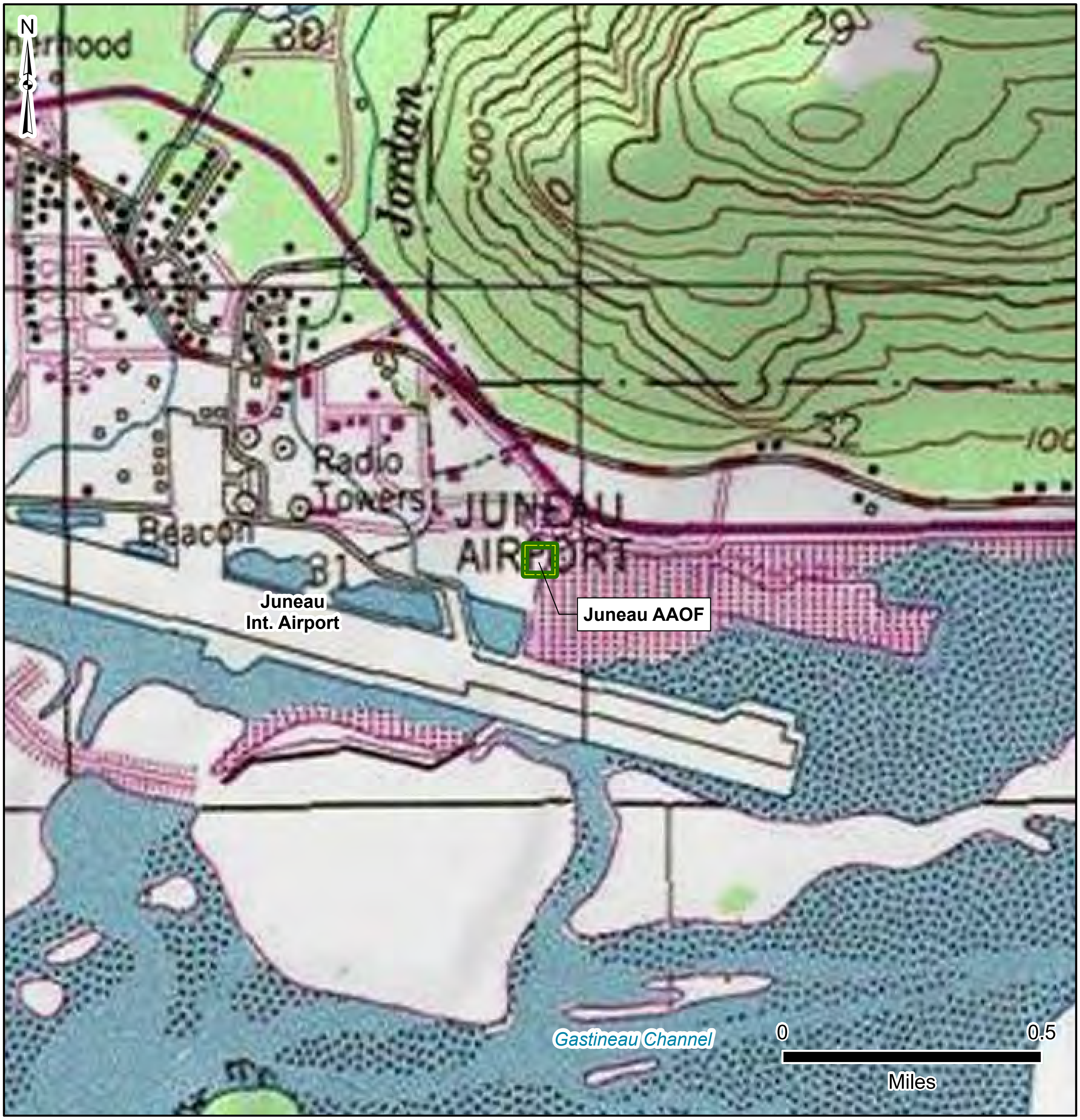
Army National Guard Site Inspections
Site Investigation Report
Juneau AAOF, Alaska

Figure 2-2
Topography



Facility Data

Facility Boundary

Data Sources:
ESRI 2022
AECOM 2019

Date:..........................August 2022
Prepared By:.............................EA
Prepared For:....................USACE
Projection:........WGS 84 UTM 8N

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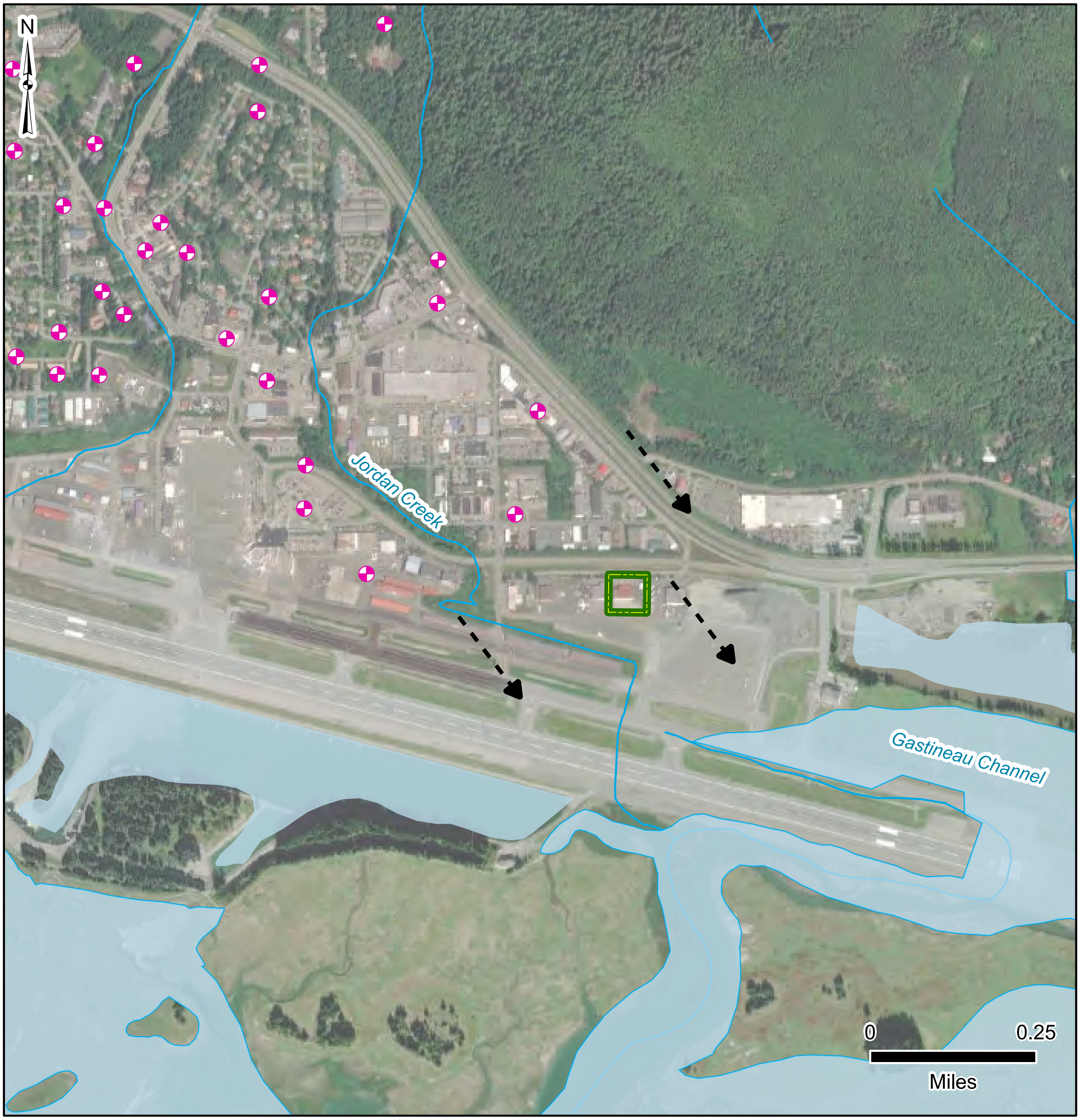
Site Investigation Report
Juneau AAOF, Alaska

Figure 2-3
Groundwater Features



Facility Data
Facility Boundary

Well Type
Unknown Well

Hydrology/Hydrogeology
Inferred Groundwater Flow Direction
Stream/Creek
Waterbody

Data Sources:
ESRI 2022
AECOM 2019

Date:..........................August 2022
Prepared By:............................EA
Prepared For:....................USACE
Projection:........WGS 84 UTM 8N

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Army National Guard Site Inspections
Site Investigation Report
Juneau AAOF, Alaska

Figure 2-4
Surface Water Features

Facility Data

Facility Boundary

Hydrology

Surface Water Flow Direction

Stream/Creek

Waterbody

Watershed Boundary

Data Sources:
ESRI 2022
AECOM 2019

Date:..........................August 2022
Prepared By:.............................EA
Prepared For:...................USACE
Projection:........WGS 84 UTM 8N

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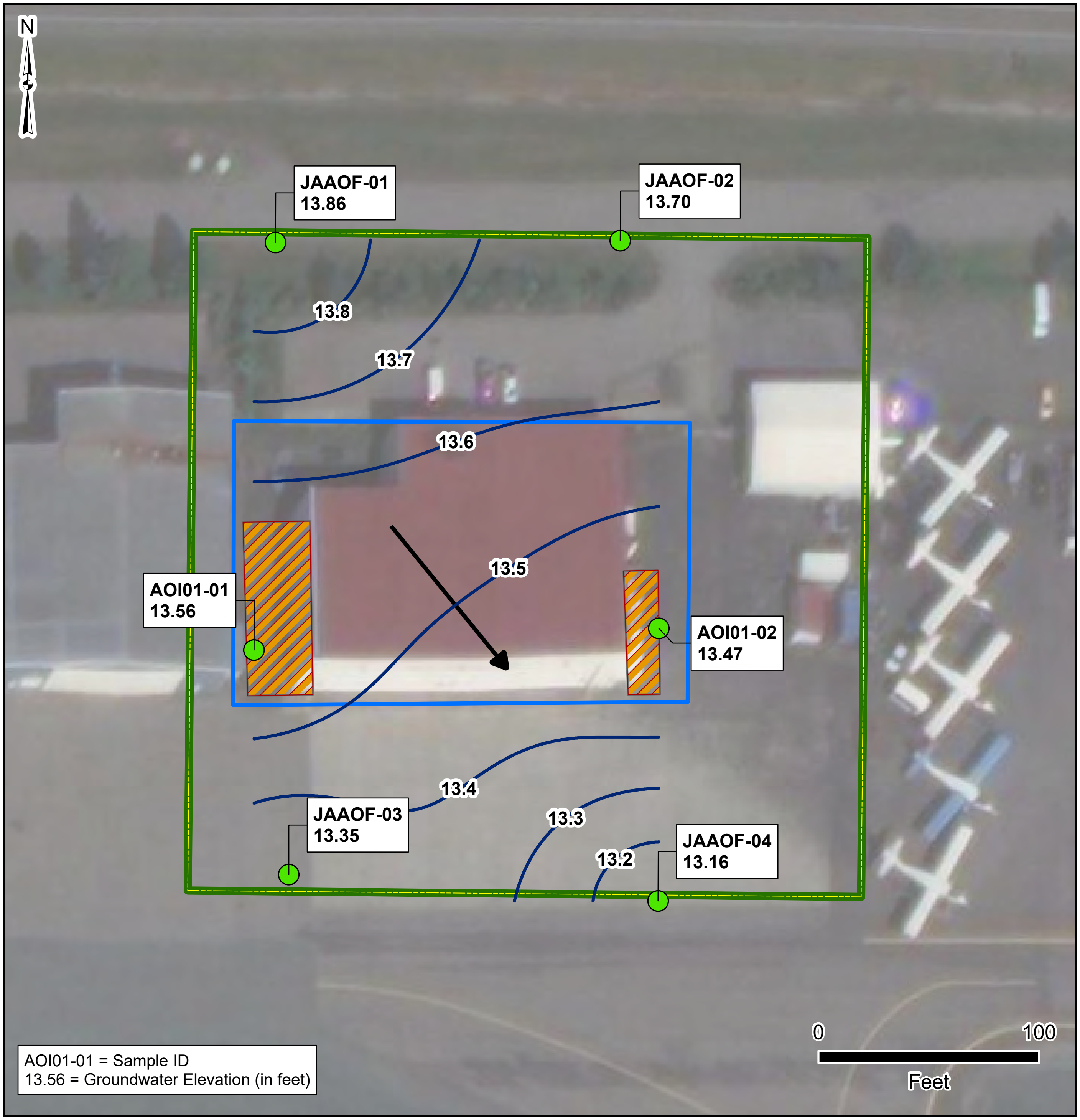
Army National Guard Site Inspections
Site Investigation Report
Juneau AAOF, Alaska

Figure 2-5
Groundwater Elevations, November 2021



Facility Boundary
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Sample Locations
- DPT

Hydrogeology
- Groundwater Flow Direction
- Groundwater Elevation Contour (0.1 foot interval)

Data Sources:
ESRI 2022
AECOM 2019

Date:..........................August 2022
Prepared By:............................EA
Prepared For:...................USACE
Projection:........WGS 84 UTM 8N

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3. SUMMARY OF AREAS OF INTEREST

The PA evaluated areas where PFAS-containing materials may have been used, stored, disposed, or released historically. Based on the PA findings, one AOI was identified at the Facility: Western Fire Training Area and Tri-Max™ 30 Storage Area. Additionally, potential off-facility sources adjacent to the Facility have been identified (**Figure 3-1**). Summaries of the AOI and the adjacent potential sources are presented below.

3.1 AOI 1 – WESTERN FIRE TRAINING AREA AND TRI-MAX™ 30 STORAGE AREA

3.1.1 Western Fire Training Area

A training Tri-Max™ 30 crash cart was historically stored outside of the Facility. Interviews with current and former employees are inconsistent as to if and when aqueous film-forming foam (AFFF) was used for testing and training. One full-time employee stated that training foam was used once around 2010 as a training measure on the west side of the hangar. A part-time employee stated that AFFF training foam was stored on Facility in 2008 but was never used. Additionally, it was mentioned that the reading on the pressure gauge for the training Tri-Max™ 30 never indicated anything less than full (AECOM 2020). Approximately 90% of the Facility contains asphalt or concrete with some areas of the Facility (approximately 10%) with grass adjacent to the Facility and within the drainage ditches.

3.1.2 Tri-Max™ 30 Storage Area

Emergency response Tri-Max™ 30 crash carts containing AFFF were historically stored outside on the east side of the Facility, with no more than a single cart being housed at the facility at a time. The Tri-Max™ 30 Storage Area has been enclosed under a roof; however, the carts are still exposed to outdoor elements. The date of the roof addition is unknown. Exposure to the outdoor elements and freeze-thaw weather cycles could cause failure in the hosing connections of the cart, potentially releasing AFFF to the environment (AECOM 2020).

3.2 ADJACENT SOURCES

Four potential off-facility sources of PFAS are adjacent to the Facility and are not under the control of the Juneau ARNG. A description of each off-facility source is presented below and shown on **Figure 3-1**.

3.2.1 JIA Settling Pond Fire Training Area

The Assistant Fire Chief indicated that the JIA Settling Pond is used by the City and Borough of Juneau for AFFF training and testing of the ARFF trucks. The JIA Settling Pond also functions as the seaplane runway. The JIA Settling Pond is a lined containment area, but no additional information was available on the liner design or when the liner was installed. The type, amount, and concentration of AFFF used during the training activities is unknown (AECOM 2020). This area is located hydraulically downgradient of the AOI.

3.2.2 Hagevig Regional Fire Training Area

The Assistant Fire Chief indicated that AFFF has been used at the Hagevig Regional Fire Training Center (FTC). Training occurs at the burn pit, where water and AFFF used for fire suppression collects in an underground storage tank. The tank is connected to the City's sewer management system, but it is unknown if this wastewater is tested for PFAS. It is possible that some AFFF used during training activities drains into the FTC's settling pond. This Facility is listed as "Active" in the Alaska Department of Environmental Conservation (ADEC) contaminated sites database, and most recent actions include the ADEC request for screening soil and groundwater for PFAS. This Facility is approximately 2 miles to the northwest of the Juneau Facility. The type, amount, and concentration of AFFF used during the training activities is unknown (AECOM 2020). This area is assumed to be hydraulically separated from the AOI by the Mendenhall River.

3.2.3 Mendenhall Wastewater Treatment Plant

Mendenhall Wastewater Treatment Plant (WWTP) is one of three WWTPs in Juneau and is located approximately 1 mile west of the Juneau Facility and 1 mile southeast of the Hagevig Regional FTC. The wastewater discharges from Hagevig Regional FTC may be treated at this WWTP. It is unknown if wastewater at the WWTP is tested or treated for PFAS. The Mendenhall WWTP is listed as an "Active" site in the ADEC contaminated sites database due to fuel leakage, but ADEC has not requested any actions for PFAS (AECOM 2020). This area is located hydraulically cross-gradient of the AOI.

3.2.4 CBJ Juneau Airport Capital City Fire Rescue Engine A3

On 21 April 2021, approximately 2.25 gallons of Ansulite AFC-3MS-C, 3% AFFF concentrate mixed with 200–300 gallons of water were accidentally released to the ground when the foam release button was left on during a weekly check of Capital City Fire Rescue aircraft rescue and firefighting vehicle A3. The release occurred at the City and Borough of Juneau International Airport, just west of Capital City Fire Rescue Glacier/Airport Station 3 and approximately 20 yards north of Jordan Creek. The estimated surface area affected was 20 by 40 square yards. The spill has ADEC File Number (No.): 1513.38.122 and Hazard ID: 27384. This area is located cross-gradient from the AOI (AECOM 2020).

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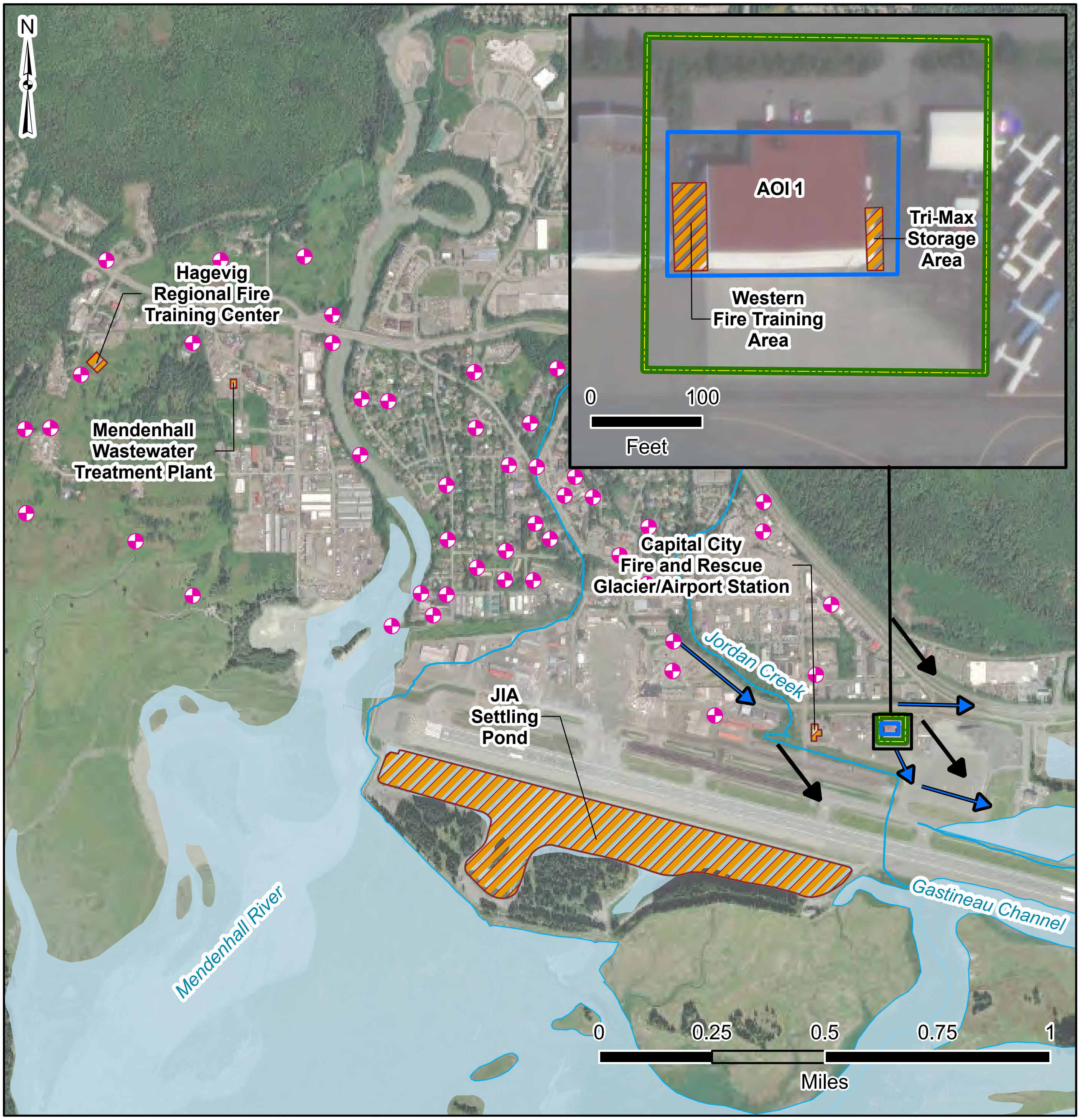
Juneau AAOF, Alaska

Figure 3-1
Areas of Interest



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Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Unknown Well
- Surface Water Flow Direction
- Groundwater Flow Direction
- Stream/Creek
- Waterbody
- Surface Water Flow Direction

Data Sources:
ESRI 2022
AECOM 2019

Date:..........................August 2022
Prepared By:.............................EA
Prepared For:....................USACE
Projection:........WGS 84 UTM 8N

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4. PROJECT DATA QUALITY OBJECTIVES

As identified during the data quality objective (DQO) process and outlined in the SI Uniform Federal Policy - (UFP) Quality Assurance Project Plan (QAPP) Addendum (EA Engineering, Science, and Technology, Inc., PBC [EA] 2021a), the objective of the SI is to identify whether there has been a release to the environment at the AOIs identified in the PA. For each AOI, ARNG determines if further investigation is warranted, a removal action is required to address immediate threats, or whether no further action is warranted. This SI evaluated groundwater and soil for presence or absence of relevant compounds at each of the sampled AOIs.

4.1 PROBLEM STATEMENT

ARNG will recommend AOIs for remedial investigation (RI) if site-related soil and groundwater samples have concentrations of the relevant compounds above the OSD risk-based screening levels. The SLs are presented in **Section 6.1** of this report.

4.2 INFORMATION INPUTS

Primary information inputs for the SI include the following:

- The PA Report for Juneau AAOF Alaska (AECOM 2020)
- Analytical data from groundwater and soil samples collected as part of this SI in accordance with the site-specific UFP-QAPP Addendum (EA 2021a)
- Field data collected including groundwater elevation and water quality parameters measured using a multi-parameter water quality meter.

4.3 STUDY BOUNDARIES

The SI was bounded horizontally by the property limits of the Facility (**Figures 2-1 and 2-2**). Off-Facility sampling was not included in the SI. If future off-Facility sampling is required, the proper stakeholders will be notified, and necessary rights of entry will be obtained by ARNG with property owner(s). Temporal boundaries were limited to the earliest available time field resources were available to complete the study.

4.4 ANALYTICAL APPROACH

Samples were analyzed by Eurofins Lancaster Laboratories Environmental LLC (ELLE), accredited under the Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP); (Accreditation No. 0001.01) PFAS data underwent 100 percent (%) Stage 2B validation in accordance with the DoD General Data Validation Guidelines (2019a) and DoD Data Validation Guidelines Module 3: Data Validation Procedure of Per- and Polyfluoroalkyl Substances Analysis by Quality Systems Manual (QSM) Table B-15 (2020). PFAS data were compared to applicable SLs and decision rules as defined in the UFP-QAPP Addendum (EA 2021a).

4.5 DATA USABILITY ASSESSMENT

The Data Usability Assessment (DUA), which is provided in **Appendix A**, is an evaluation at the conclusion of data collection activities that uses the results of both data verification and validation in the context of the overall project decisions or objectives. Using both quantitative and qualitative methods, the assessment determines whether project execution and the resulting data have met installation-specific DQOs. Both sampling and analytical activities are considered to assess whether the collected data are of the right type, quality, and quantity to support the decision-making (DoD 2019a, 2019b).

Based on the DUA, the environmental data collected during the SI were found to be acceptable and usable for this SI evaluation with the qualifications documented in the DUA and its associated data validation reports. These data are of sufficient quality to meet the objectives and requirements of the UFP-QAPP Addendum (EA 2021a).

5. SITE INSPECTION ACTIVITIES

This section describes the environmental investigation and sampling activities that occurred as part of the SI. The SI sampling approach was based on the findings of the PA and was implemented in accordance with the following approved documents:

- *Final Preliminary Assessment Report, Juneau Army Aviation Operating Facility Alaska*, dated October 2019 (AECOM 2020)

- *Final Site Inspection Programmatic Uniform Federal Policy-Quality Assurance Project Plan*, dated December 2020 (EA 2020a)

- *Final Site Inspection Uniform Federal Policy-Quality Assurance Project Plan Addendum, Juneau Army Aviation Operating Facility Alaska*, dated October 2021 (EA 2021a)

- *Final Programmatic Accident Prevention Plan Revision 1*, dated November 2020 (EA 2020b)

- *Final Accident Prevention Plan / Site Safety and Health Plan Addendum, Juneau Army Aviation Operating Facility Alaska*, dated October 2021 (EA 2021b).

The SI field activities were conducted from 15 to 19 November 2021 and consisted of direct-push technology (DPT) boring and soil sample collection, temporary well installation, grab groundwater sample collection, and a professional elevation survey. Field activities were conducted in accordance with the UFP-QAPP Addendum (EA 2021a), except as noted in **Section 5.8**.

The following samples were collected during the SI and analyzed for a subset of 24 PFAS via liquid chromatography/tandem mass spectrometry (LC/MS/MS) compliant with QSM Version 5.3 Table B-15 to fulfill the project DQOs:

- Eighteen (18) soil samples from 6 locations (soil borings locations)
- Six (6) grab groundwater samples from temporary well locations.
- Nine (9) quality assurance (QA)/quality control (QC) samples

Figure 5-1 provides the sample locations for all media across the Facility. **Table 5-1** presents a list of samples collected for each medium. Field documentation is provided in **Appendix B**. A log of Daily Notice of Field Activity was completed throughout the SI field activities, which is provided in **Appendix B1**, field sampling forms are provided in **Appendix B2**, and survey data are provided in **Appendix B3**. Additionally, a photographic log of field activities is provided in **Appendix C**.

5.1 PRE-INVESTIGATION ACTIVITIES

In preparation for the SI field activities, project team members participated in Technical Project Planning (TPP) meetings, performed utility clearance, and sampled decontamination source water. Details of these activities are presented below.

5.1.1 Technical Project Planning

The U.S. Army Corps of Engineers (USACE) TPP Process, Engineer Manual (EM) 200-1-2 (Department of Army 2016) defines four phases to project planning: (1) defining the project phase; (2) determining data needs; (3) developing data collection strategies; and (4) finalizing the data collection plan. The process encourages stakeholder involvement in the SI, beginning with defining overall project objectives, including DQOs, and formulating a sampling approach to address the AOIs identified in the PA.

A combined TPP Meeting 1 and 2 was held on 3 August 2021, prior to SI field activities with stakeholders. The combined TPP Meeting 1 and 2 was conducted in general accordance with EM 200-1-2. The stakeholders for this SI include ARNG, AKARNG, USACE, and the Alaska Department of Environmental Conservation (ADEC) representatives familiar with the Facility, the regulations, and the community. Stakeholders were provided the opportunity to make comments on the technical sampling approach and methods at the combined TPP Meeting 1 and 2. The outcome of the combined TPP Meeting 1 and 2 was memorialized in the UFP-QAPP Addendum (EA 2022).

A TPP Meeting 3 was held on 19 May 2023 to discuss the results of the SI. Meeting minutes for TPP 3 are included in **Appendix D** of this report. Future TPP meetings will provide an opportunity to discuss the results and findings, and future actions, where warranted.

5.1.2 Utility Clearance

EA contacted 811 Alaska, the Facility Manager, and the JAI Superintendent to notify them of intrusive work at the Facility. Utility clearance was performed at each of the proposed boring locations prior to the EA field team's arrival to the Facility. On 15 November 2021, the EA field team conducted a site walk locating marked out utilities and confirming their locations in relationship to the proposed sampling positions. Additionally, the first 5 ft of each boring were pre-cleared by EA's drilling subcontractor, GeoTek Alaska, using a hand auger to verify utility clearance in shallow subsurface where utilities would typically be encountered.

5.1.3 Source Water and PFAS Sampling Equipment Acceptability

The potable water source used for decontamination of drilling equipment was provided by EA's analytical laboratory (ELLE) and it was confirmed to be PFAS-free.

Materials that were used within the sampling zone were confirmed as acceptable for use in the PFAS sampling environment. The checklist of acceptable materials for use in the PFAS sampling environment was provided in the Standard Operating Procedures appendix to the Programmatic UFP-QAPP (EA 2020).

5.2 SOIL BORINGS AND SOIL SAMPLING

Soil samples were collected via DPT drilling methods in accordance with Standard Operating Procedure 047 *Direct-Push Technology Sampling* (EA 2021a). A hand auger was used to collect soil from the top 5 ft of the boring in compliance with utility clearance procedures. A Geoprobe® 6620DT dual-tube sampling system was used to collect continuous soil cores to the target depth.

Three discrete soil samples were planned to be collected for chemical analysis from each soil boring: one sample at the surface (0 to 2 ft bgs) and two subsurface soil samples. One subsurface soil sample was collected approximately 1 ft above the groundwater table, and one was collected at the mid-point between the surface and the groundwater table (not to exceed 15 ft bgs). Groundwater was encountered at depths ranging from 8 to 10 ft bgs during drilling. Total boring completion depths, to accommodate temporary well installation, ranged from 13 to 15 ft bgs.

All soil sample locations are shown on **Figure 5-1**, and boring sample depths are provided in **Table 5-2**. The soil boring locations were selected based on the AOI information provided in the PA (AECOM 2020) and as agreed upon by stakeholders during the TPP and review of the UFP-QAPP Addendum (EA 2021a).

During the drilling, the soil cores were continuously logged for lithological descriptions by a field geologist using the Unified Soil Classification System. A photoionization detector (PID) was used to screen the breathing zone during boring activities as a part of personal safety requirements. Observations and measurements were recorded on sampling forms (**Appendix B2**) and in a non-treated field logbook. Depth interval, recovery thickness, PID readings, moisture, relative density, Munsell color, and Unified Soil Classification System texture were recorded. The boring logs and well construction diagrams are provided in **Appendix E**.

Each sample was collected into a laboratory-supplied PFAS-free high-density polyethylene (HDPE) bottle and labeled using a PFAS-free pen. Samples were packaged with PFAS-free gel ice and transported via Federal Express (FedEx) under standard chain-of-custody procedures to the laboratory and analyzed for PFAS (LC/MS/MS compliant with QSM Version 5.3 Table B-15), total organic carbon (TOC) (USEPA Method 9060A) and pH (USEPA Method 9045D) in accordance with the UFP-QAPP Addendum (EA 2021a).

Field duplicate (FD) samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. MS/MSDs were collected at a rate of 5% and analyzed for the same parameters as the accompanying samples. In instances when non-dedicated sampling equipment was used, such as a hand auger for the shallow soil samples, equipment blanks (EBs) were collected per day when used and analyzed for the same parameters as the soil samples. A temperature blank was placed in each cooler to ensure that samples were preserved at or below 6 degrees Celsius (°C) during shipment.

DPT borings were converted to temporary wells, which were subsequently abandoned after sampling and surveying in accordance with the UFP-QAPP Addendum (EA 2021a). After removal of the casings, boreholes were abandoned using bentonite chips (hydrated with PFAS-free water) to 2 ft bgs, then sand to ground surface. Asphalt patch was used to repair surfaces where applicable.

5.3 TEMPORARY WELL INSTALLATION AND GROUNDWATER GRAB SAMPLING

Temporary wells were installed using a GeoProbe® 6620DT dual-tube sampling system. Once the borehole was advanced to the desired depth, a temporary well was constructed with a 5-ft section of 1-inch Schedule 40 polyvinyl chloride (PVC) screen with sufficient casing to reach the ground surface. New PVC pipe and screen were used at each location to avoid cross-contamination between locations. The screen intervals for the temporary wells are provided in **Table 5-2**.

Groundwater samples were collected, after a period of time following well installation (generally a couple hours between installation and sampling, although some periods were longer) to allow groundwater to infiltrate and recharge the temporary well intervals, using a peristaltic pump with PFAS-free HDPE tubing. Each sample was collected in laboratory-supplied PFAS-free HDPE bottles and labeled using a PFAS-free marker or pen. The temporary wells were purged at a rate determined in the field to reduce turbidity and draw down prior to sampling. Water quality parameters (e.g., temperature, specific conductance, pH, dissolved oxygen, and oxidation-reduction potential) were measured using a water quality meter and recorded on the field sampling form (**Appendix B2**) before each grab sample was collected in a separate container. In addition to groundwater samples, a subsample of each groundwater sample was collected, and a shaker test was performed to identify if any foaming was present. Shaker test results were documented in the field book. All shaker tests did not produce foam, with the exception of sample JAAOF-04-GW, where foam was observed. Samples were packaged with PFAS-free gel ice and transported via FedEx under standard chain-of-custody procedures to the laboratory and analyzed for PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 in accordance with the UFP-QAPP Addendum (EA 2021a).

FD samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. MS/MSDs were collected at a rate of 5% and analyzed for the same parameters as the accompanying samples. Five field blanks (FBs) were collected in accordance with the UFP-QAPP Addendum (EA 2021a). A temperature blank was placed in each cooler to ensure that samples were preserved at or below 6°C during shipment.

5.4 SYNOPTIC WATER LEVEL MEASUREMENTS

Groundwater levels were used to monitor Facility-wide groundwater elevations and assess groundwater flow. Synoptic water level elevation measurements were collected from the newly installed temporary monitoring wells 16 through 19 November 2021. Water level measurements were taken from the survey mark on the northern side of the well casing. Groundwater elevation data is provided in **Table 5-3**. A groundwater flow contour map is provided as **Figure 2-4**.

5.5 SURVEYING

The northern side of each new temporary well casing was surveyed by an Alaskan Professional Land Surveyor from DOWL on 18 and 19 November 2021 using a real-time kinematic global positioning system (GPS) observation using a Trimble R12i high precision Global Navigation Satellite Systems receiver. Positions were collected in the applicable Universal Transverse Mercator zone projection with World Geodetic System 1984 datum (horizontal) and North American Vertical Datum 1988 (vertical). Surveying data are provided in **Appendix B3**.

5.6 INVESTIGATION-DERIVED WASTE

As of the date of this report, the disposal of PFAS investigation-derived waste (IDW) is not regulated federally. PFAS IDW generated during the SI is considered non-hazardous waste and was managed in accordance with the UFP-QAPP Addendum (EA 2021a).

Soil IDW (i.e., soil cuttings) was placed back into the soil boring location from where they originated. Liquid IDW (i.e., purge water and decontamination fluids) generated during the SI activities was pumped through a 5-gallon granular activated carbon (GAC) filter and discharged directly to the ground surface. Approximately 10 gallons of liquid IDW were treated onsite with GAC filtration near sample location JAAOF-02. The discharge location was carefully selected by the field team to minimize erosion in an area of infiltration capabilities with sufficient distance from any surface body waters. Coordinates of the liquid IDW disposal area were collected with a GPS and are shown on **Figure 5-1**. The GAC filter unit was removed from the Facility and it is awaiting disposition in a subtitle C landfill.

Other solids such as spent personal protective equipment, plastic sheeting, tubing, rope, unused monitoring well construction materials, and other environmental media generated during the field activities were disposed of in a licensed solid waste dumpster.

5.7 LABORATORY ANALYTICAL METHODS

Samples were analyzed for a subset of 24 PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 at ELLE, in Lancaster, Pennsylvania, a DoD ELAP and National Environmental Laboratory Accreditation Program (NELAP)-certified laboratory.

Soil samples were also analyzed for TOC using USEPA Method 9060A and pH by USEPA Method 9045D.

5.8 DEVIATIONS FROM UFP-QAPP ADDENDUM

One deviation from the UFP-QAPP Addendum occurred based on field conditions. This deviation was discussed between EA, ARNG, USACE, and the ADEC post field effort. One deviation from the UFP-QAPP Addendum is noted below:

- The GAC filter was used during sampling to filter liquid IDW before the treated water was disposed to the ground surface. At the completion of the field work, the intention was to retain the GAC filter for use in future investigations at the Facility. The GAC filter was then transported to Anchorage for storage. However, USACE later decided that the GAC filter was not needed and should be disposed of. The GAC filter was then sampled, and a “Contaminated Media Transport and Treatment or Disposal Approval Form” was prepared. The form was approved by ADEC and the GAC filter will be disposed of in a Subtitle C landfill.

**Table 5-1. Samples by Medium
Juneau AAOF, Juneau, Alaska
Site Inspection Report**

Sample Identification	Sample Collection Date	Sample Depth (ft bgs)	PFAS (USEPA Method 537 Modified)	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Comments
Soil Samples						
AOI01-01-SB-00-02	11/16/2021	0-2	X	X	X	
AOI01-01-SB-04-05	11/16/2021	4-5	X	X	X	
AOI01-01-SB-08-09	11/16/2021	8-9	X	X	X	
AOI01-02-SB-00-02	11/17/2021	0-2	X	X	X	
AOI01-02-SB-04-05	11/17/2021	4-5	X	X	X	
AOI01-02-SB-09-10	11/17/2021	9-10	X	X	X	
JAAOF-98	11/17/2021	0-2	X	X	X	FD
JAAOF-01-SB-00-02	11/17/2021	0-2	X	X	X	
JAAOF-01-SB-04-05	11/17/2021	4-5	X	X	X	
JAAOF-01-SB-08-09	11/17/2021	8-9	X	X	X	
JAAOF-02-SB-00-02	11/17/2021	0-2	X	X	X	
JAAOF-02-SB-04-05	11/17/2021	4-5	X	X	X	
JAAOF-02-SB-08-09	11/17/2021	8-9	X	X	X	
JAAOF-03-SB-00-02	11/17/2021	0-2	X	X	X	
JAAOF-03-SB-03-04	11/17/2021	3-4	X	X	X	
JAAOF-03-SB-07-08	11/17/2021	7-8	X	X	X	
JAAOF-04-SB-00-02	11/17/2021	0-2	X	X	X	
JAAOF-04-SB-02-03	11/17/2021	2-3	X	X	X	
JAAOF-04-SB-04-05	11/17/2021	4-5	X	X	X	
JAAOF-99	11/16/2021	4-5	X	X	X	FD
Groundwater Samples						
AOI01-01	11/19/2021	11.24	X			
AOI01-02	11/18/2021	12.50	X			
JAAOF-01	11/18/2021	11.79	X			
JAAOF-02	11/18/2021	11.07	X			
JAAOF-03	11/18/2021	11.05	X			
JAAOF-04	11/19/2021	11.56	X			
JAAOF-97	11/18/2021	None	X			FD
Blank Samples						
JAAOF-FB-01	11/16/2021	None	X			FB
JAAOF-EB-01	11/17/2021	None	X			EB
JAAOF-FB-02	11/17/2021	None	X			FB
JAAOF-EB-02	11/17/2021	None	X			EB
JAAOF-FB-03	11/18/2021	None	X			FB
JAAOF-96	11/19/2021	None	X			FB

**Table 5-2. Soil Boring Depths and Temporary Well Screen Intervals
Juneau AAOF, Alaska
Site Inspection Report**

Area of Interest	Boring Location	Soil Boring Total Depth (ft bgs)	Temporary Well Screen Interval (ft bgs)
1	AOI01-01	15	9-14
	AOI01-02	15	10-15
	JAAOF-01	14	9-14
	JAAOF-02	14	9-14
Facility Boundary	JAAOF-03	10	8-13
	JAAOF-04	10	10-15

**Table 5-3. Groundwater Elevation
Juneau AAOF, Alaska
Site Inspection Report**

Monitoring Well ID	Top of Casing Elevation (ft amsl)	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)
AOI01-01	25.28	11.72	13.56
AOI01-02	26.00	12.53	13.47
JAAOF-01	26.46	12.60	13.86
JAAOF-02	25.83	12.13	13.70
JAAOF-03	24.54	11.19	13.35
JAAOF-04	26.40	13.24	13.16

Notes:
btoc = below top of casing

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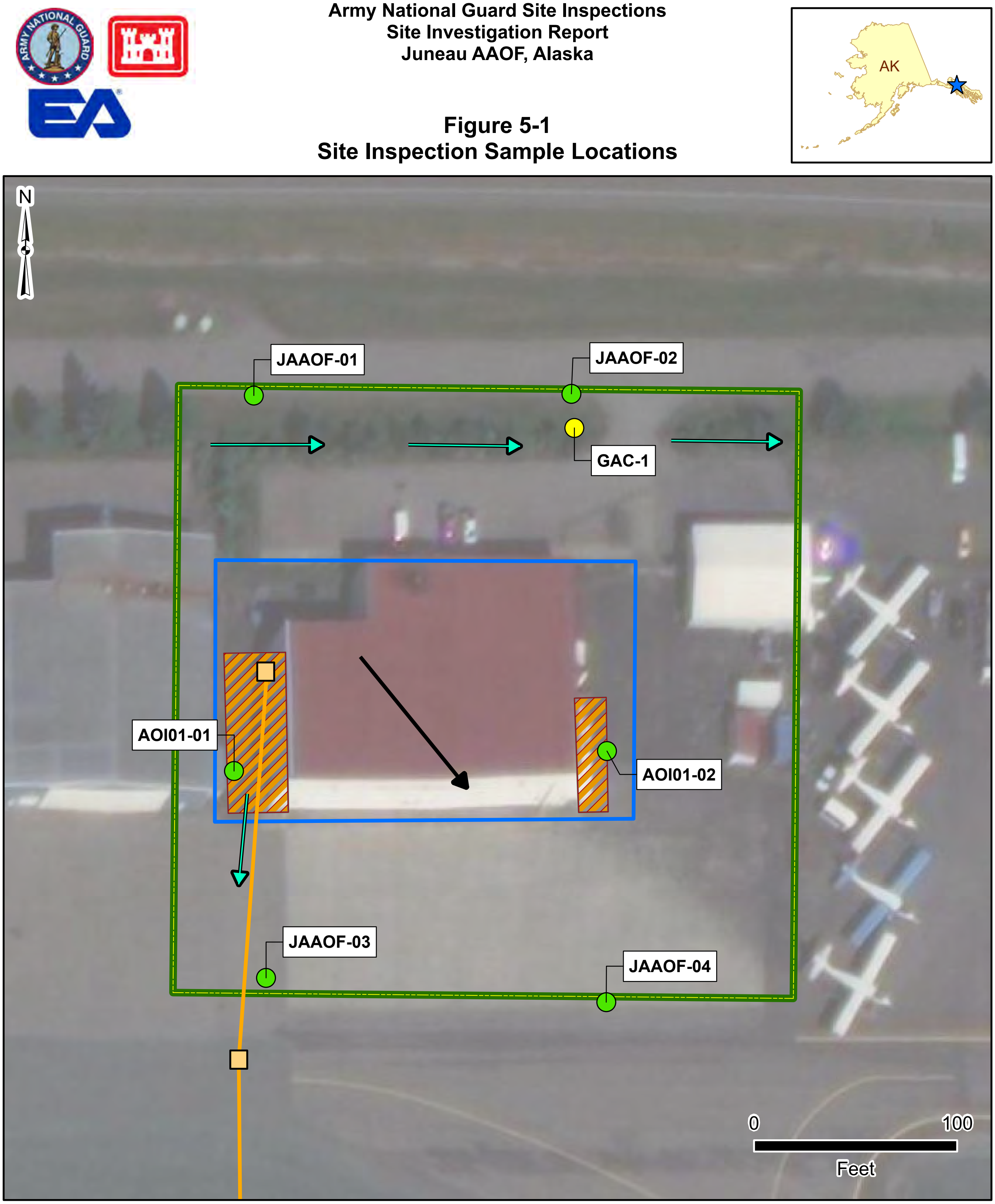
Army National Guard Site Inspections
Site Investigation Report
Juneau AAOF, Alaska

Figure 5-1
Site Inspection Sample Locations



Path: C:\Users\kwheatley\Desktop\PFAS\Juneau_AK\PROJECTS\JuneauSI_AAOF.aprx

Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Sample Locations
- DPT
- Liquid IDW Application/GAC Filtration to Ground Surface

Hydrology/Hydrogeology
- Groundwater Flow Direction
- Stormwater Flow Direction
- Stormwater Discharge System
- Catch Basin

Data Sources:
ESRI 2022
AECOM 2019

Date:..........................August 2022
Prepared By:.............................EA
Prepared For:....................USACE
Projection:........WGS 84 UTM 8N

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6. SITE INSPECTION RESULTS

This section presents the analytical results of the SI. The SLs used in this evaluation are presented in **Table 6-1**. A discussion of the results for the AOI and boundary areas is provided in **Section 6.3**. **Tables 6-2 through 6-5** present results for soil or groundwater for the relevant compounds. Tables that contain all results are provided in **Appendix F**, and the laboratory reports are provided in **Appendix G**.

6.1 SCREENING LEVELS

The SLs established in the OSD memorandum apply to the five compounds presented on **Table 6-1**.

Table 6-1. Screening Levels (Soil and Groundwater)

Analyte[1,2]	Residential 0 to2 feet bgs (Soil) (µg/kg)[1]	Industrial/Commercial Composite Worker 2 to 15 feet bgs (Soil) (µg/kg)[1]	Tap Water (Groundwater) (ng/L)[1]
PFOA	19	250	6
PFOS	13	160	4
PFBS	1,900	25,000	601
PFHxS	130	1,600	39
PFNA	19	250	6

Notes:

1. Assistant Secretary of Defense. July 2022. Risk Based Screening Levels Calculated for Groundwater and Soil using USEPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. May 2022.
2. Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the CSM developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of MIL-SPEC AFFF and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

µg/kg = microgram(s) per kilogram
ng/L = nanogram(s) per liter

The data in the subsequent sections are compared against the SLs presented in **Table 6-1**. The SLs for groundwater are based on direct ingestion. The SLs for soil are based on incidental ingestion and are applied to the depth intervals reasonably anticipated to be encountered by the receptors identified at the facility: the residential scenario is applied to surface soil results (0 to 2 ft bgs) and the industrial/commercial worker scenario is applied to shallow subsurface soil results (2 to 15 ft bgs). The SLs are not applied to deep subsurface soil results (greater than 15 ft bgs) because 15 ft is the anticipated limit of construction activities.

6.2 SOIL PHYSICOCHEMICAL ANALYSES

To provide basic soil parameter information, soil samples were analyzed for TOC and pH, which are important for evaluating transport through the soil medium. **Appendix F** contains the results of the TOC and pH sampling.

The data collected in this investigation will be used in subsequent investigations, where appropriate, to assess fate and transport of PFAS contaminants. According to the Interstate Technology Regulatory Council (ITRC), several important PFAS partitioning mechanisms include hydrophobic and lipophobic effects, electrostatic interactions, and interfacial behaviors. At relevant environmental pH values, certain PFAS are present as organic anions; and are therefore, relatively mobile in groundwater (Xiao et al. 2015) but tend to associate with the organic carbon fraction that may be present in soil or sediment (Higgins and Luthy 2006; Guelfo and Higgins 2013). When sufficient organic carbon is present, organic carbon normalized distribution coefficients (K_{oc} values) can help in evaluating transport potential, though other geochemical factors (for example, pH and presence of polyvalent cations) may also affect PFAS sorption to solid phases (ITRC 2018).

6.3 AOI 1

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 1: Western Fire Training Area and Tri-Max™ 30 Storage Area. The soil and groundwater results are summarized in **Table 6-2** through **Table 6-5**. Soil and groundwater results are presented on **Figure 6-1** through **Figure 6-7**. Note that the figures also include the direction of surface water flow and the location of stormwater drains. These features may indicate potential flow directions for contamination that is carried by surface water.

6.3.1 AOI 1 – Soil Analytical Results

Figures 6-1 through **6-5** present the ranges of detections in soil. **Tables 6-2** through **6-4** summarize the soil results.

Soil was sampled from six boring locations associated with potential release areas at AOI 1. Soil was sampled from three intervals including surface (0-2 ft bgs), shallow subsurface (2-3 ft bgs, 3-4 ft bgs, or 4-5 ft bgs, depending on the location) and deep subsurface (4-5 ft bgs, 7-8 ft bgs, or 8-9 ft bgs, depending on the location). PFOA, PFOS, PFBS, PFHxS, and PFNA were not detected in any surface or subsurface soils at AOI 1.

6.3.2 AOI 1 – Groundwater Analytical Results

Figure 6-6 and Figure 6-7 presents the ranges of detections in groundwater. **Table 6-5** summarizes the groundwater results.

Groundwater samples were collected from six temporary wells at AOI 1 during the SI.

PFOS was detected above the SL of 4 ng/L in all six temporary wells at AOI 1. PFOS was detected at concentrations ranging from 5 ng/L (AOI01-02) to 21 ng/L (JAAOF-04). The highest concentration (JAAOF-04) was from a downgradient location, JAAOF-04.

PFOA, PFBS, PFHxS, and PFNA were detected at concentrations less than their respective SLs of 6 ng/L, 601 ng/L, 39 ng/L, and 6 ng/L, respectively.

PFOA was detected at concentrations below the SL in all six temporary wells, ranging from 1.6 J to 2.8 ng/L, with the highest concentration in a downgradient location, JAAOF-04.

PFBS was detected at concentrations below the SL in all six temporary wells, ranging from 1.1 J to 3.5 ng/L, with the highest concentration in a downgradient location, JAAOF-03.

PFHxS was detected at concentrations below the SL in all six temporary wells, ranging from 1.7 J to 4.7 ng/L, with the highest concentration in a downgradient location, JAAOF-03.

PFNA was detected at concentrations below the SL in all six temporary wells, ranging from 0.6 J to 1.1 J ng/L, with the highest concentration in JAAOF-02.

6.3.3 AOI 1 – Conclusions

Based on the results of the SI, PFOS was detected in groundwater at concentrations above the SL. Exceedances at the upgradient boundary are evidence of an offsite source impacting groundwater at the facility. There were no detections of relevant compounds in surface and subsurface soil, thus no evidence of a PFAS release to the environment at the facility. Based on the exceedances of the SL for PFOS at the upgradient boundary and the lack of detections of relevant compounds in surface and subsurface soil, no further evaluation at AOI 1 is warranted at this time, as the relevant compounds encountered in groundwater at the facility are not the result of ARNG activities.

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Table 6-2. PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil
Site Inspection Report, Juneau AAOF

		Location ID	AOI01-01		AOI01-02		AOI01-02		JAAOF-01		JAAOF-02		JAAOF-03		JAAOF-04	
		Sample Name	AOI01-01-SB-00-02		AOI01-02-SB-00-02		JAAOF-98-DUP		JAAOF-01-SB-00-02		JAAOF-02-SB-00-02		JAAOF-03-SB-00-02		JAAOF-04-SB-00-02	
		Parent Sample ID					AOI01-02-SB-00-02									
		Sample Date	11/16/2021		11/17/2021		11/17/2021		11/17/2021		11/17/2021		11/17/2021		11/16/2021	
		Depth (ft bgs)	0-2		0-2		0-2		0-2		0-2		0-2		0-2	
Analyte	**Screening Level[1,2]**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)																
Perfluorobutanesulfonic acid (PFBS)	1900	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	130	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	19	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	13	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	19	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U

Notes:
U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
µg/kg = Microgram(s) per kilogram.
1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. July 2022.
2. The Screening Levels for soil are based on a residential scenario for direct ingestion of contaminated soil.
Values exceeding the Screening Level are shaded gray.
ft bgs = Feet below ground surface.
Qual = Qualifier.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).

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Table 6-3. PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Shallow Subsurface Soil
Site Inspection Report, Juneau AAOF

		Location ID	AOI01-01		AOI01-02		JAAOF-01		JAAOF-02		JAAOF-03		JAAOF-04	
		Sample Name	AOI01-01-SB-04-05		AOI01-02-SB-04-05		JAAOF-01-SB-04-05		JAAOF-02-SB-04-05		JAAOF-03-SB-03-04		JAAOF-04-SB-02-03	
		Parent Sample ID												
		Sample Date	11/16/2021		11/17/2021		11/17/2021		11/17/2021		11/17/2021		11/16/2021	
		Depth (ft bgs)	4-5		4-5		4-5		4-5		3-4		2-3	
Analyte	**Screening Level[1,2]**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)														
Perfluorobutanesulfonic acid (PFBS)	25000	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	1600	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	250	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	160	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	250	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U

Notes:
U = The analyte was not detected at a level greater than or equal to the adjusted Limit of Detection (LOD).
µg/kg = Microgram(s) per kilogram.
1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA’s Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. July 2022.
2. The Screening Levels for soil are based on incidental ingestion of soil in a industrial/commercial worker scenario.
Values exceeding the Screening Level are shaded gray.
ft bgs = Feet below ground surface.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.

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Table 6-4. PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Deep Subsurface Soil
Site Inspection Report, Juneau AAOF

Location ID		AOI01-01		AOI01-02		JAAOF-01		JAAOF-02		JAAOF-03		JAAOF-04		JAAOF-04	
Sample Name		AOI01-01-SB-08-09		AOI01-02-SB-09-10		JAAOF-01-SB-08-09		JAAOF-02-SB-08-09		JAAOF-03-SB-07-08		JAAOF-04-SB-04-05		JAAOF-99-DUP	
Parent Sample ID														JAAOF-04-SB-04-05	
Sample Date		11/16/2021		11/17/2021		11/17/2021		11/17/2021		11/17/2021		11/16/2021		11/16/2021	
Depth (ft bgs)		8-9		9-10		8-9		8-9		7-8		4-5		4-5	
Analyte	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (µg/kg)															
Perfluorobutanesulfonic acid (PFBS)	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorohexanesulfonic acid (PFHxS)	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorononanoic acid (PFNA)	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanesulfonic acid (PFOS)	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
Perfluorooctanoic acid (PFOA)	µg/kg	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U

Notes:
U = The analyte was not detected at a level greater than or equal to the adjusted Limit
µg/kg = Microgram(s) per kilogram.
ft bgs = Feet below ground surface.
LOD = Limit of Detection.
LOQ = Limit of Quantitation.
Qual = Qualifier.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix

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Table 6-5. PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Groundwater
Site Inspection Report, Juneau AAOF

		Location ID	AOI01-01		AOI01-02		JAAOF-01		JAAOF-01		JAAOF-02		JAAOF-03		JAAOF-04	
		Sample Name	AOI01-01-GW		AOI01-02-GW		JAAOF-01-GW		JAAOF-97-DUP		JAAOF-02-GW		JAAOF-03-GW		JAAOF-04-GW	
		Parent Sample ID							JAAOF-01-GW							
		Sample Date	11/19/2021		11/18/2021		11/18/2021		11/18/2021		11/18/2021		11/18/2021		11/19/2021	
Analyte	**Screening Level[1]**	**Unit**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
PFAS by LC/MS/MS compliant with QSM Version 5.3 Table B-15 (ng/L)																
Perfluorobutanesulfonic acid (PFBS)	601	ng/L	2.8		1.1	J	2.8		3.1		1.3		3.5		1.5	J
Perfluorohexanesulfonic acid (PFHxS)	39	ng/L	2.9		1.7	J	2.9		3.2		4.2		4.7		4.5	
Perfluorononanoic acid (PFNA)	6	ng/L	0.6	J	0.82	J	0.88	J	1		1.1	J	0.98	J	0.9	J
Perfluorooctanesulfonic acid (PFOS)	4	ng/L	5.3		5		8.1		8.3		9.7		8.7		21	
Perfluorooctanoic acid (PFOA)	6	ng/L	1.7		1.6	J	1.9	J	2.4		2.2		2		2.8	

Notes:
J = Estimated concentration.
ng/L = Nanogram(s) per liter.
1. Assistant Secretary of Defense. July 2022. Risk-Based Screening Levels in Groundwater and Soil using EPA's Regional Screening Level Calculator. Hazard Quotient (HQ)=0.1. July 2022.
Values exceeding the Screening Level are shaded gray.
ND = Analyte not detected above the LOD (LOD values are presented in Appendix F).
Qual = Qualifier.

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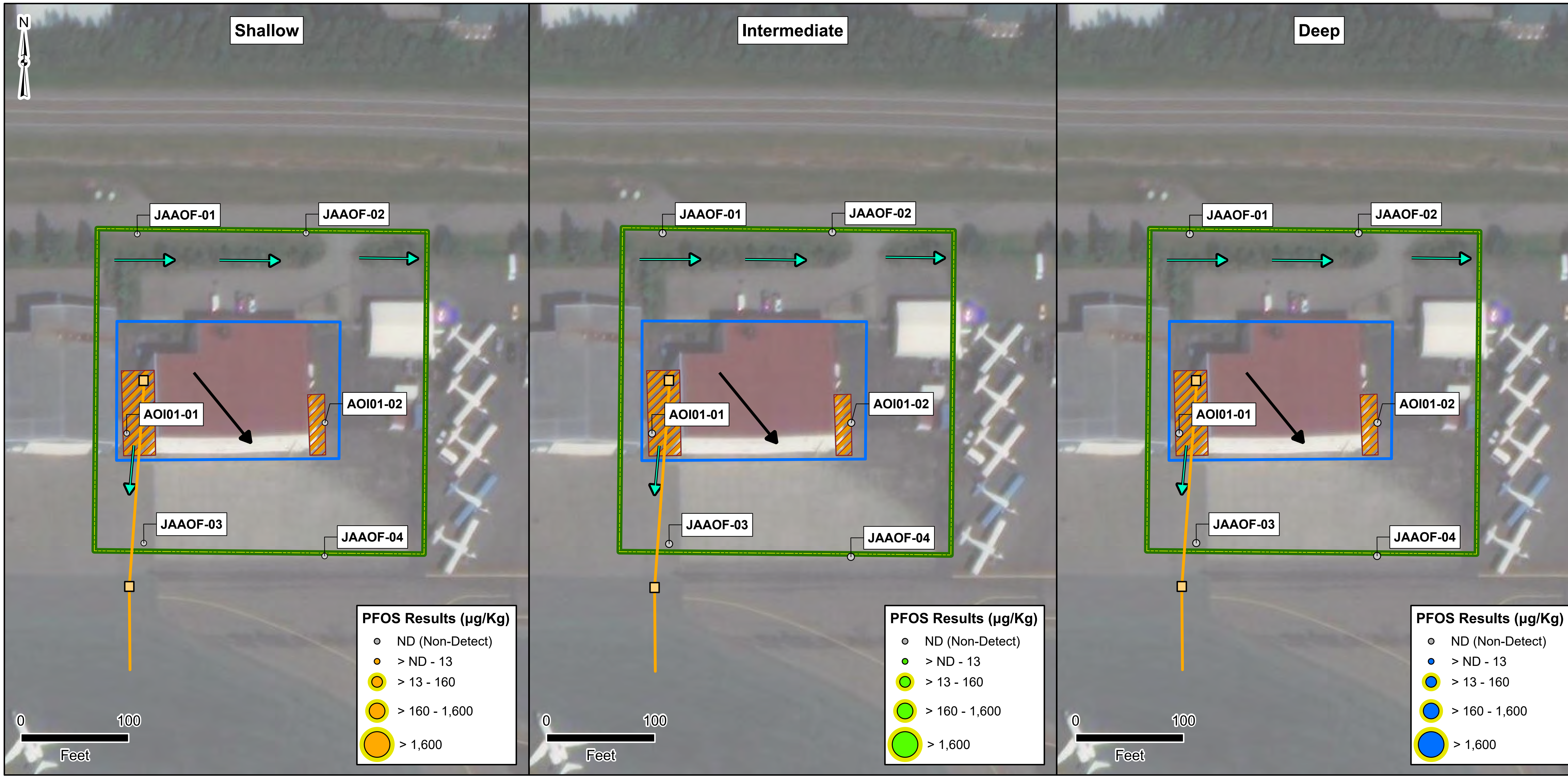
Army National Guard Site Inspections
Site Investigation Report
Juneau AAOF, Alaska

Figure 6-1
PFOS Detections in Soil



Facility Boundary

- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology

- Groundwater Flow Direction
- Stormwater Flow Direction
- Stormwater Discharge System
- Catch Basin

Notes:
PFOS = Perfluorooctanesulfonic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
ESRI 2022
AECOM 2019

Date:..........................August 2022
Prepared By:............................EA
Prepared For:....................USACE
Projection:........WGS 84 UTM 8N

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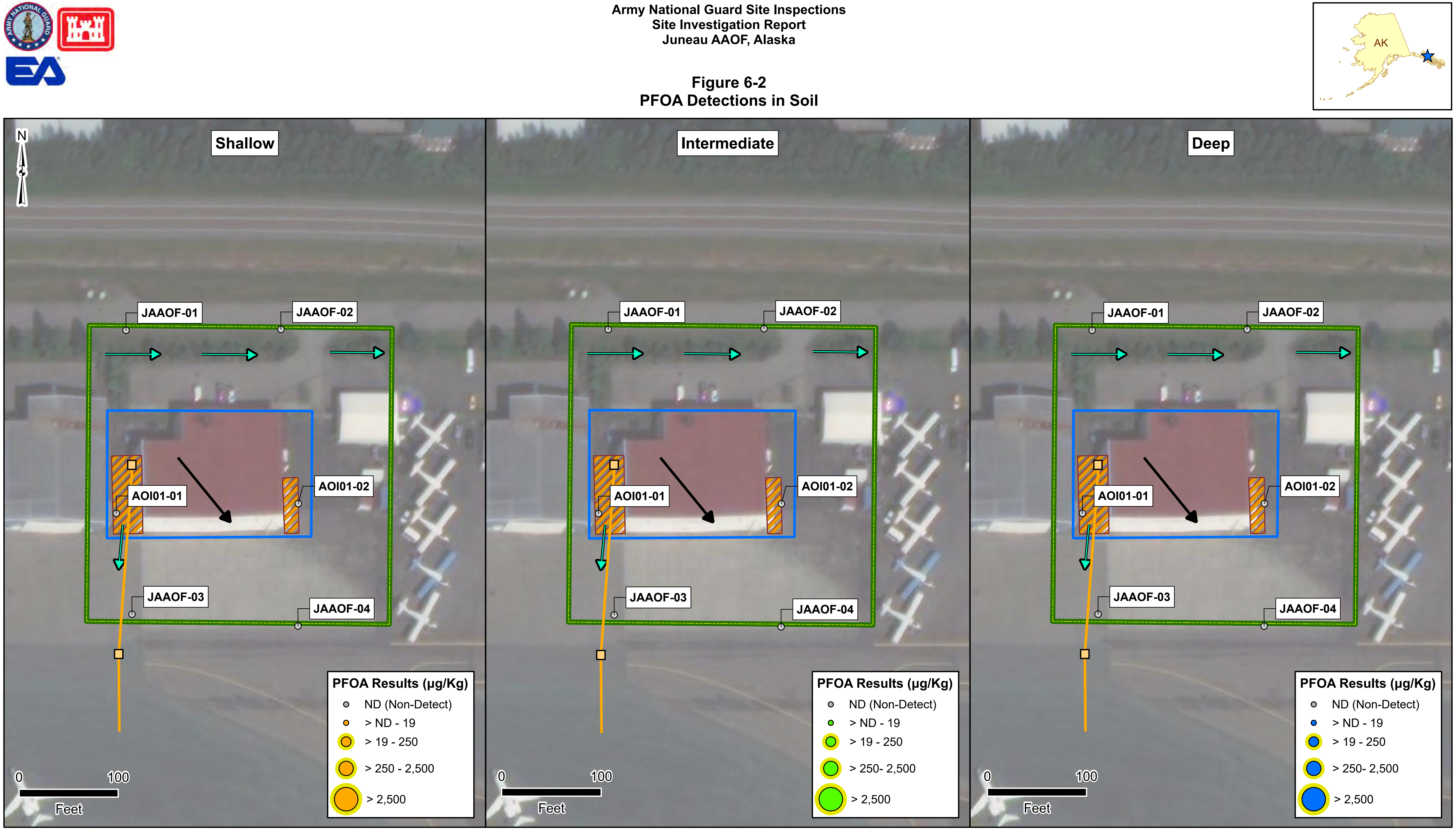
Army National Guard Site Inspections
Site Investigation Report
Juneau AAOF, Alaska

Figure 6-2
PFOA Detections in Soil



Facility Boundary
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Groundwater Flow Direction
- Stormwater Flow Direction
- Stormwater Discharge System
- Catch Basin

Notes:
PFOA = Perfluorooctanoic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
ESRI 2022
AECOM 2019

Date:..........................August 2022
Prepared By:............................EA
Prepared For:...................USACE
Projection:........WGS 84 UTM 8N

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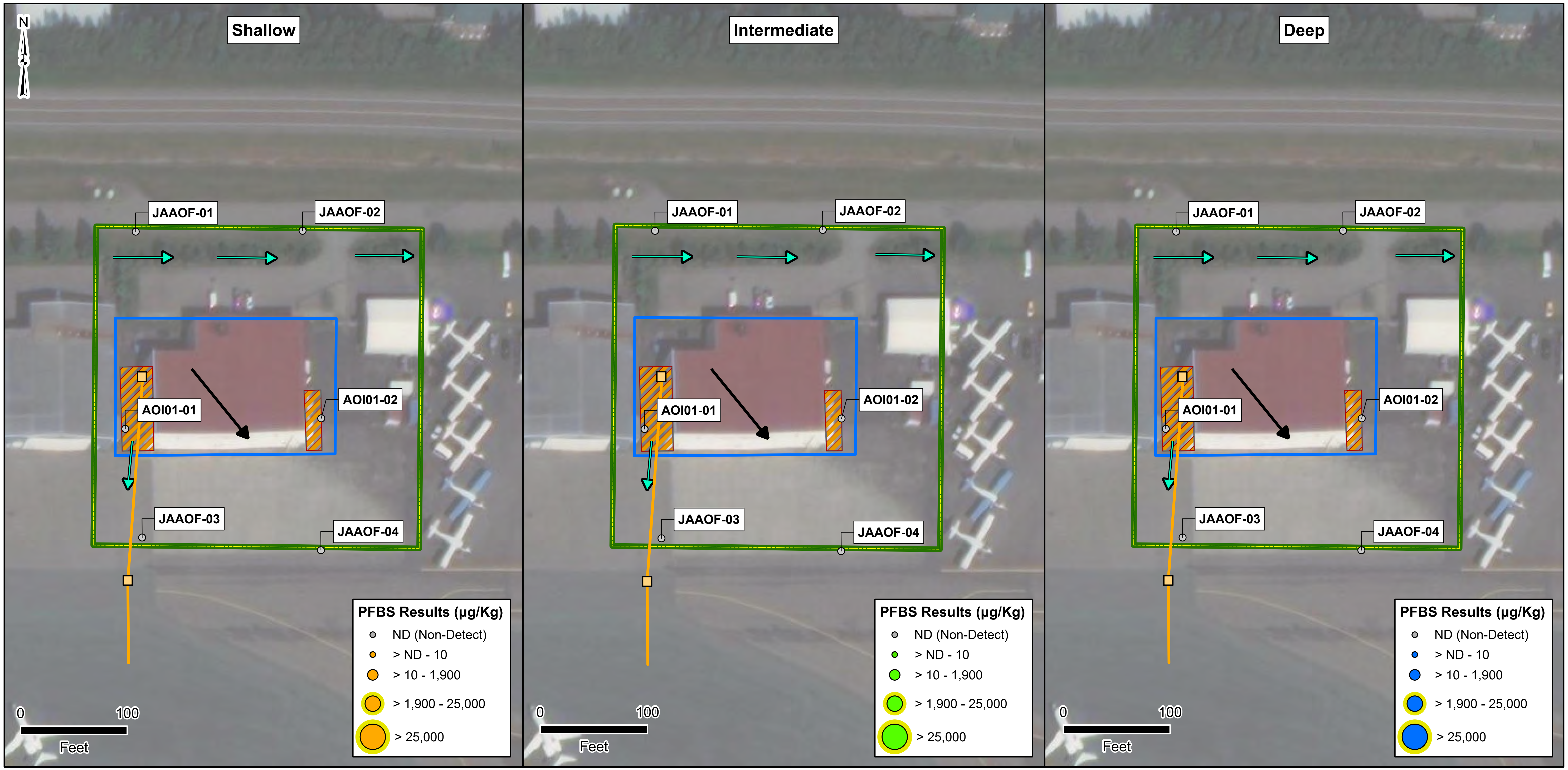
Army National Guard Site Inspections
Site Investigation Report
Juneau AAOF, Alaska

Figure 6-3
PFBS Detections in Soil



Facility Boundary
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Groundwater Flow Direction
- Stormwater Flow Direction
- Stormwater Discharge System
- Catch Basin

Notes:
PFBS = Perfluorobutanesulfonic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
ESRI 2022
AECOM 2019

Date:..........................August 2022
Prepared By:..............................EA
Prepared For:...................USACE
Projection:........WGS 84 UTM 8N

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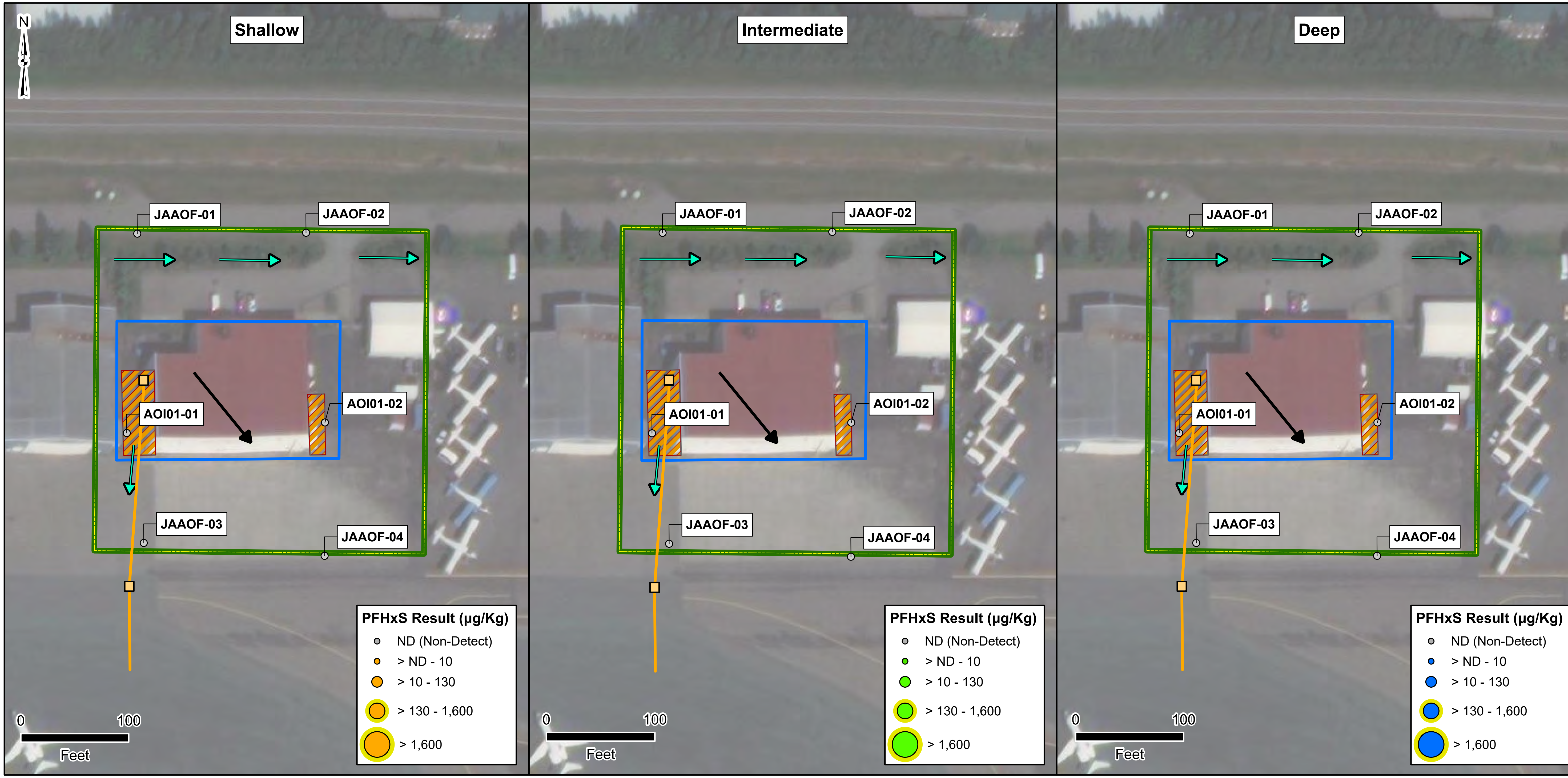
Army National Guard Site Inspections
Site Investigation Report
Juneau AAOF, Alaska

Figure 6-4
PFHxS Detections in Soil



Facility Boundary

- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology

- Groundwater Flow Direction
- Stormwater Flow Direction
- Stormwater Discharge System
- Catch Basin

Notes:
PFHxS = Perfluorohexanesulfonic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
ESRI 2022
AECOM 2019

Date:..........................August 2022
Prepared By:............................EA
Prepared For:...................USACE
Projection:........WGS 84 UTM 8N

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Army National Guard Site Inspections
Site Investigation Report
Juneau AAOF, Alaska

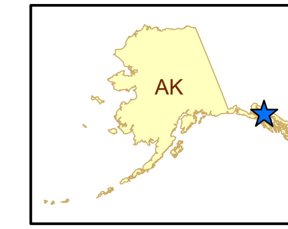
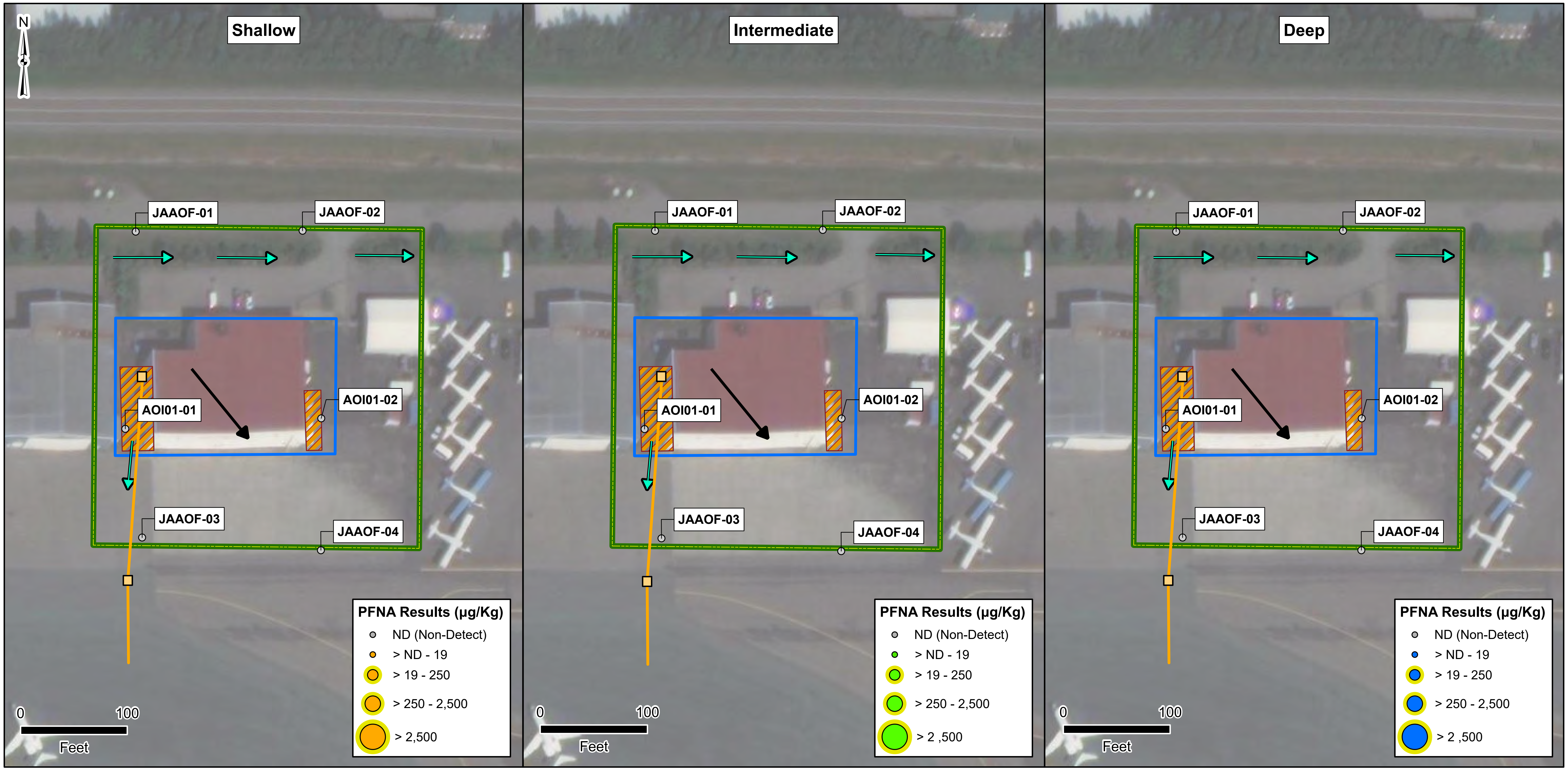


Figure 6-5
PFNA Detections in Soil



Facility Boundary

- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology

- Groundwater Flow Direction
- Stormwater Flow Direction
- Stormwater Discharge System
- Catch Basin

Notes:
PFNA = Perfluorononanoic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
ESRI 2022
AECOM 2019

Date:..........................August 2022
Prepared By:............................EA
Prepared For:...................USACE
Projection:........WGS 84 UTM 8N

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Army National Guard Site Inspections
Site Investigation Report
Juneau AAOF, Alaska

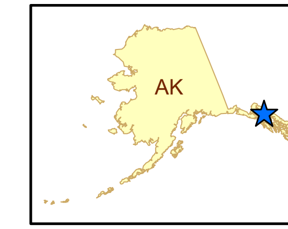
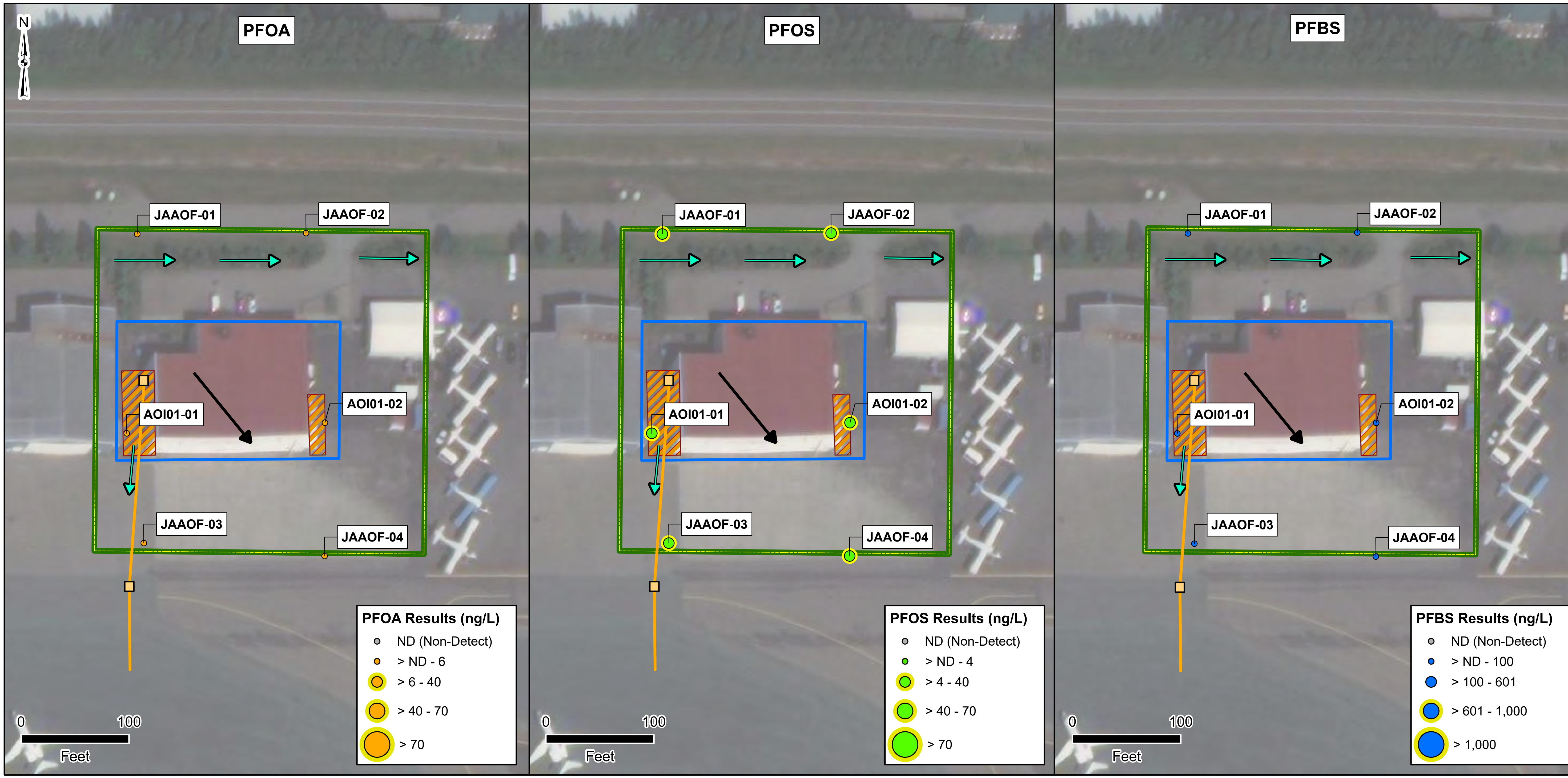


Figure 6-6
PFOA, PFOS and PFBS Detections in Groundwater



Facility Boundary
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Groundwater Flow Direction
- Stormwater Flow Direction
- Stormwater Discharge System
- Catch Basin

Notes:
PFOA = Perfluorooctanesulfonic acid
PFOS = Perfluorooctanoic acid
PFBS = Perfluorobutanesulfonic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
ESRI 2022
AECOM 2019

Date:............................April 2022
Prepared By:............................EA
Prepared For:.....................USACE
Projection:........WGS 84 UTM 8N

Path: C:\Users\kwheatley\Desktop\PFAS\Juneau_AK\PROJECTS\JuneauSI_AAOF.aprx

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Army National Guard Site Inspections
Site Investigation Report
Juneau AAOF, Alaska

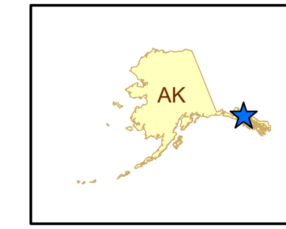
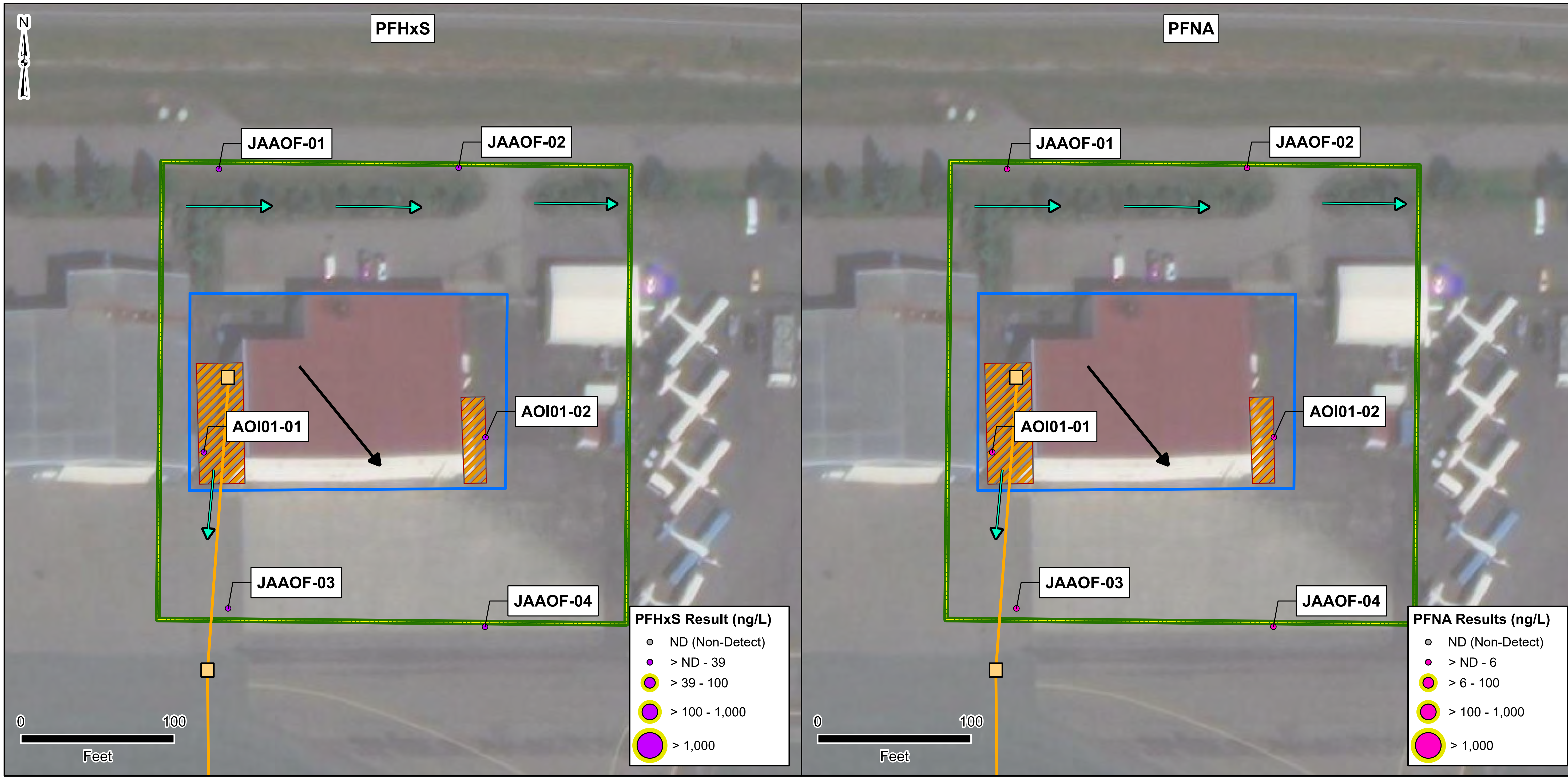


Figure 6-7
PFHxS and PFNA Detections in Groundwater



Facility Data
- Facility Boundary
- Area of Interest
- Potential PFAS Release

Hydrology/Hydrogeology
- Groundwater Flow Direction
- Stormwater Flow Direction
- Stormwater Discharge System
- Catch Basin

Notes:
PFHxS = Perfluorohexanesulfonic acid
PFNA = Perfluorononanoic acid
Exceedances of the OSD SL are depicted with a yellow halo.

Data Sources:
ESRI 2022
AECOM 2019

Date:..........................August 2022
Prepared By:.............................EA
Prepared For:...................USACE
Projection:........WGS 84 UTM 8N

Path: C:\Users\kwheatley\Desktop\PFAS\Juneau_AK\PROJECTS\JuneauSI_AAOF.aprx

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7. EXPOSURE PATHWAYS

The conceptual site model (CSM) for AOI 1, revised based on the SI findings, is presented on **Figure 7-1**. Please note that while the CSM discussion assists in determining if a receptor may be impacted, the decision to move from SI to remedial investigation (RI) or interim action is determined solely based upon exceedances of the SLs for the relevant compounds and whether the release is more than likely attributable to the DoD. A CSM presents the current understanding of the site conditions with respect to known and suspected sources, potential transport mechanisms and migration pathways, and potentially exposed human receptors. A human exposure pathway is considered potentially complete when the following conditions are present. SLs are presented in **Section 6.1** of this report.

1. Contaminant source
2. Environmental fate and transport
3. Exposure point
4. Exposure route
5. Potentially exposed populations.

If any of these elements are missing, the pathway is incomplete. The CSM figures use an empty circle symbol to represent an incomplete exposure pathway. Areas with no identified complete pathway generally warrant no further action. However, the pathway is considered potentially complete if the relevant compounds are detected, in which case the CSM figure uses a half-filled circle symbol to represent a potentially complete exposure pathway. Additionally, a completely filled circle symbol is used to indicate when a potentially complete exposure pathway has detections of relevant compounds above the SLs. Areas with an identified potentially complete pathway that have detections of the relevant compounds above the SLs may warrant further investigation. Although the CSM indicates whether potentially complete exposure pathways may exist, the recommendation for future study in a remedial investigation (RI) or no action at this time is based on the comparison of the SI analytical results for the relevant compounds to the SLs.

In general, the potential routes of exposure to the relevant compounds are incidental ingestion of dust and groundwater, and inhalation of dust. Human exposure via the dermal contact pathway may occur, and current risk practice suggests it is an insignificant pathway compared to ingestion; however, exposure data for dermal pathways are sparse and continue to be the subject of toxicological study. The receptors evaluated are consistent with those listed in USEPA guidance for risk screening (USEPA 2001). Receptors at the Facility include site workers (e.g., Facility staff and visiting soldiers), construction workers, trespassers, residents outside the facility boundary, and recreational users outside of the facility boundary.

7.1 SOIL EXPOSURE PATHWAY

The SI results for soil were used to determine whether a potentially complete pathway exists between the source and potential receptors at each AOI based on the aforementioned criteria.

7.1.1 AOI 1

A training Tri-Max™ 30 crash cart was historically stored outside of the Facility. One full-time employee stated that training foam was used once around 2010 as a training measure on the west side of the hangar; however, interviews with current and former employees are inconsistent as to if and when AFFF was used for testing and training. In addition, Emergency response Tri-Max™ 30 crash carts containing AFFF were historically stored outside on the east side of the Facility, with no more than a single cart being housed at the facility at a time. There were no documented releases of PFAS to the ground surface.

PFOA, PFOS, PFBS, PFHxS, and PFNA were not detected in surface or subsurface soil samples; therefore, the exposure pathways for soil are incomplete for the Facility worker, construction worker, and/or trespasser receptors. There was no source area or release confirmed with the soil data. The CSM for AOI 1 is presented in **Figure 7-1**.

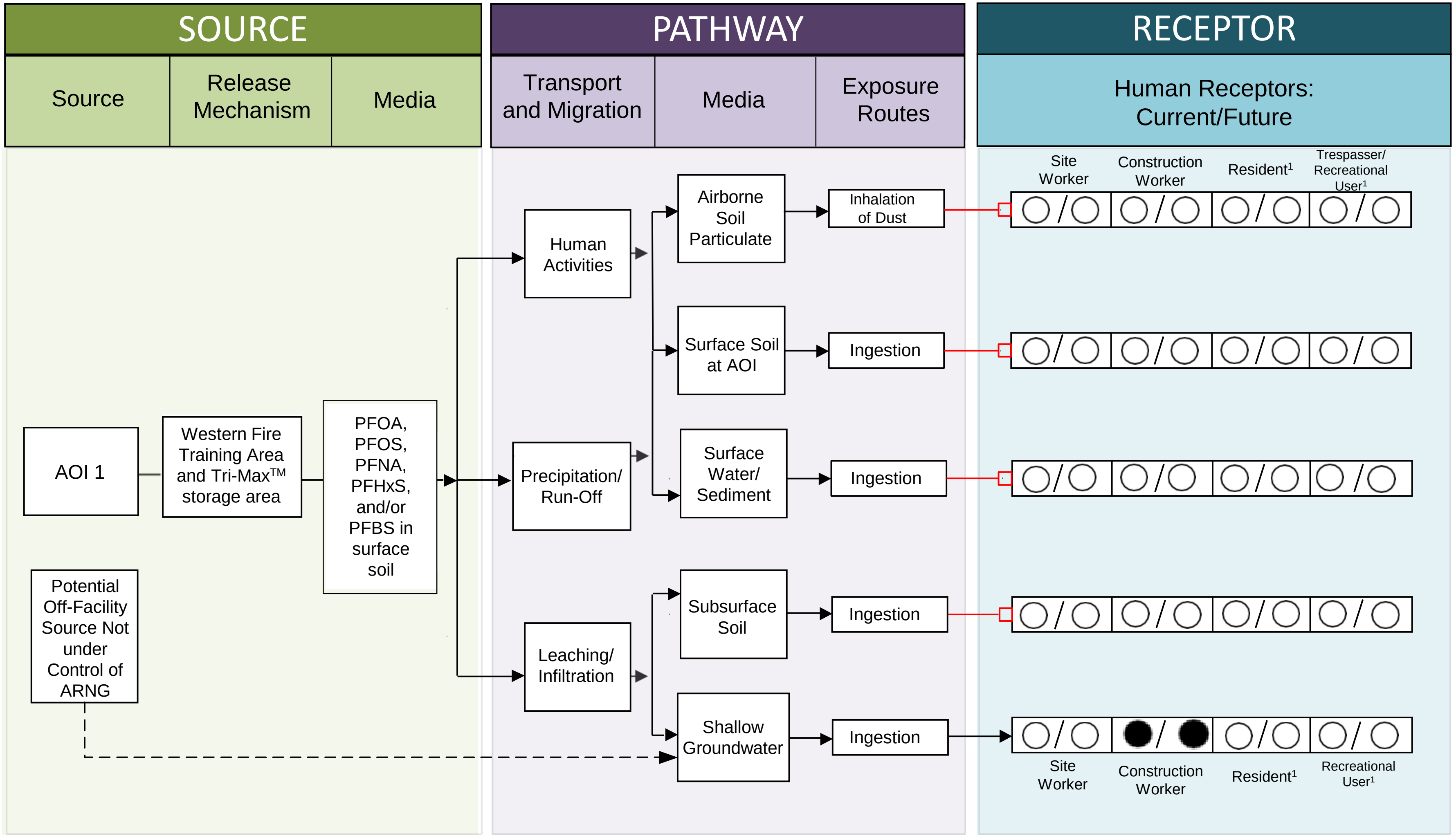
7.2 GROUNDWATER EXPOSURE PATHWAY

The SI results for the relevant compounds in groundwater were used to determine whether a potentially complete pathway exists between the source and potential receptors at each AOI based on the aforementioned criteria.

7.2.1 AOI 1

A training Tri-Max™ 30 crash cart was historically stored outside of the Facility. One full-time employee stated that training foam was used once around 2010 as a training measure on the west side of the hangar; however, interviews with current and former employees are inconsistent as to if and when AFFF was used for testing and training. In addition, Emergency response Tri-Max™ 30 crash carts containing AFFF were historically stored outside on the east side of the Facility, with no more than a single cart being housed at the facility at a time. There were no documented releases of PFAS to the ground surface.

PFOA, PFBS, PFHxS, and PFNA were detected in groundwater at levels below SLs at all six temporary monitoring well locations completed at AOI 1. PFOS was detected above the SL of 4 ng/L in all six temporary wells at AOI 1. Detections of PFAS in groundwater at upgradient boundary samples are evidence that there is a presence of PFAS in the local groundwater that may be unrelated to ARNG activities. Concentrations of PFOS, PFOA, and PFHxS were found to increase from the upgradient to downgradient boundaries, suggesting a potential PFAS source on the Facility. PFAS exceeding SLs in local groundwater, with potential additional PFAS contributions on the Facility, represent a potentially complete exposure pathway for both on- and off-Facility construction workers. No confirmed onsite source/release area was identified. Based on the results of the SI at AOI 1, ground disturbing activities that extend to the water table (approximately 15 ft bgs) could result in construction worker exposure to relevant compounds via incidental ingestion. The CSM for AOI 1 is presented in **Figure 7-1**.



LEGEND

Flow-Chart Stops

Flow-Chart Continues

Partial / Possible Flow

Incomplete Pathway

Potentially Complete Pathway

Potentially Complete Pathway with Exceedance of Screening Level

Notes:

1. The resident and recreational users refer to off-site receptors.
2. Dermal contact exposure pathway is incomplete for PFAS.

Figure 7-1
Conceptual Site Model
AOI 1 Juneau AAOF

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8. SUMMARY AND OUTCOME

This section summarizes SI activities and findings. The most significant findings are summarized in this section and are reproduced directly or abstracted from information contained in this report. The outcome provides general and comparative interpretations of the findings relative to the SLs.

8.1 SITE INSPECTION ACTIVITIES SUMMARY

The SI field activities at the Facility were conducted from 15 to 19 November 2021. The SI field activities included soil and groundwater sampling. Field activities were conducted in accordance with the UFP-QAPP Addendum (EA 2021a), except as previously noted in **Section 5.8**.

To fulfill the project DQOs set forth in the approved SI UFP-QAPP Addendum (EA 2021a), samples were collected and analyzed for a subset of 24 compounds by LC/MS/MS compliant with QSM 5.3 Table B-15 as follows:

- Eighteen (18) soil grab samples from six boring locations
- Six (6) grab groundwater samples from six temporary well locations
- Nine (9) QA/QC Samples.

An SI is conducted when the PA determines an AOI exists based on probable use, storage, and/or disposal of PFAS-containing materials. The SI includes multi-media sampling at AOIs to determine whether or not a release has occurred. The SI may conclude further investigation is warranted, a removal action is required to address immediate threats, or no further action is required. Additionally, the CSM was refined to assess whether a potentially complete pathway exists between the source and potential receptors for potential exposure at the AOI, described in **Section 7**.

8.2 OUTCOME

Based on the results of this SI, no further evaluation is warranted at this time for AOI 1. Based on the CSM developed and revised based on the SI findings, ground disturbing activities that extend to the water table could result in construction worker exposure and exposure to residential drinking water receptors from possible releases from off-facility sources.

Sample analytical concentrations collected during this SI were compared against the project SLs for soil and groundwater, as described in **Table 6-1**. A summary of the results of the SI data relative to SLs:

- AOI 1:

    — PFOA, PFBS, PFHxS, and PFNA were detected in groundwater at concentrations below the SLs at all six temporary monitoring well locations completed at AOI 1. PFOS was detected above the SL of 4 ng/L in all six temporary monitoring wells at AOI 1.

- PFOA, PFOS, PFBS, PFHxS, and PFNA were not detected in surface or subsurface soils at AOI 1.

- The boundary:

  - PFOS was detected in temporary groundwater wells JAAOF-01 and JAAOF-02 at concentrations above the SL of 4 ng/L. These wells are upgradient and near the northeastern boundary of the Facility. PFOA, PFBS, PFHxS, and PFNA were detected below the SLs in groundwater samples from temporary wells JAAOF-01 and JAAOF-02. Detections of PFAS in groundwater at upgradient boundary samples are evidence that there is a presence of PFAS in local groundwater that may be unrelated to ARNG activities.

  - PFOS was detected in temporary groundwater wells JAAOF-03 and JAAOF-04 at concentrations above the SL of 4 ng/L. These wells are downgradient and near the southeastern boundary of the Facility. PFOA, PFBS, PFHxS, and PFNA were detected below the SLs in groundwater samples from temporary wells JAAOF-03 and JAAOF-04. Given detections of PFAS and exceedances of the SL for PFOS in groundwater at the upgradient boundary wells JAAOF-01 and JAAOF-02, detections of PFAS at JAAOF-03 and JAAOF-04 may be the result of off-site sources and unrelated to ARNG activities.

  - PFOA, PFOS, PFBS, PFHxS, and PFNA were not detected in surface or subsurface soil at any sample locations.

  - Based on the results of the SI, PFOS was detected in groundwater at concentrations above the SL. Exceedances at the upgradient boundary are evidence of an offsite source impacting groundwater at the facility. There were no detections of relevant compounds in surface and subsurface soil, thus no evidence of a PFAS release to the environment at the facility. Based on the exceedances of the SL for PFOS at the upgradient boundary and the lack of detections of relevant compounds in surface and subsurface soil, no further evaluation at AOI 1 is warranted at this time, as the relevant compounds encountered in groundwater at the facility are not the result of ARNG activities.

Of the six PFAS compounds presented in the 6 July 2022 OSD memorandum, HFPO-DA (commonly referred to as GenX) was not included as an analyte at the time of this SI. Based on the CSM developed during the PA and revised based on SI findings, the presence of HFPO-DA is not anticipated at the facility because HFPO-DA is generally not a component of MIL-SPEC AFFF and based on its history including distribution limitations that restricted use of GenX, it is generally not a component of other products the military used. In addition, it is unlikely that GenX would be an individual chemical of concern in the absence of other PFAS.

Table 8-1 summarizes the SI results for soil and groundwater used to determine if the AOI should be considered for further investigation under CERCLA and undergo an RI.

Table 8-1. Summary of Site Inspection Findings and Recommendations

AOI	Potential Release Area	Soil Source Area	Groundwater Source Area	Groundwater Facility Boundary	Future Action
1	Western Fire Training Area and Tri-Max™ 30 Storage Area	○	●	●	No Further Action

Legend:
● = Detected; exceedance of screening levels
◐ = Detected; no exceedance of screening levels
○ = Not detected

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9. REFERENCES

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