FINAL
Site Inspection Report
E.J. Garn Aviation Complex
West Jordan, Utah

Site Inspection for Perfluorooctanoic acid (PFOA), Perfluorooctanesulfonic acid (PFOS), Perfluorohexanesulfonic acid (PFHxS), Perfluorononanoic acid (PFNA), Hexafluoropropylene oxide dimer acid (HFPO-DA), and Perfluorobutanesulfonic acid (PFBS) at ARNG Installations, Nationwide

September 2023

Prepared for:

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Table of Contents

Appendices

Figures

Tables

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Acronyms and Abbreviations

%	percent
°C	degrees Celsius
°F	degrees Fahrenheit
µg/kg	micrograms per kilogram
AASF	Army Aviation Support Facility
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
amsl	above mean sea level
AOI	Area of Interest
ARNG	Army National Guard
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CoC	chain of custody
CSM	conceptual site model
DA	Department of the Army
DO	dissolved oxygen
DoD	Department of Defense
DQI	data quality indicator
DQO	data quality objective
DUA	data usability assessment
DVR	data validation report
EDR	Environmental Data Resources, Inc.™
ELAP	Environmental Laboratory Accreditation Program
ELU	Equivalent Livestock Unit
FedEx	Federal Express
FRB	field reagent blank
HAZMAT	hazardous materials
HDPE	high-density polyethylene
HFPO-DA	hexafluoropropylene oxide dimer acid
HSA	hollow stem auger
IDW	investigation-derived waste\
ITRC	Interstate Technology Regulatory Council
LC/MS/MS	liquid chromatography with tandem mass spectrometry\
MIL-SPEC	military specification
MS	matrix spike
MSD	matrix spike duplicate
NCO	Non-Commissioned Officer
NELAP	National Environmental Laboratory Accreditation Program
ng/L	nanograms per liter
ORP	oxidation-reduction potential
OSD	Office of the Secretary of Defense
PA	Preliminary Assessment
PFAS	per- and polyfluoroalkyl substances

PFBS	perfluorobutanesulfonic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PID	photoionization detector
PQAPP	Programmatic UFP-QAPP
PVC	polyvinyl chloride
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual
RI	Remedial Investigation
RPD	relative percent differences
SI	Site Inspection
SL	screening level
SOP	standard operating procedure
TOC	total organic carbon
TPP	Technical Project Planning
UDEQ	Utah Department of Environmental Quality
UDWR	Utah Division of Water Rights
UFP	Uniform Federal Policy
US	United States
USACE	United States Army Corps of Engineers
USCS	Unified Soil Classification System
USDA	US department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UTARNG	Utah Army National Guard

Executive Summary

The Army National Guard (ARNG) G-9 is performing Preliminary Assessments (PAs) and Site Inspections (SIs) 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) dated 6 July 2022 (Assistant Secretary of Defense, 2022). The six compounds listed in the OSD memorandum include perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), perfluorohexanesulfonic acid (PFHxS), hexafluoropropylene oxide dimer acid (HFPO-DA)[1], and perfluorobutanesulfonic acid (PFBS). These compounds are collectively referred to as "relevant compounds" throughout the document and the applicable screening levels (SLs) are provided in **Table ES-1**.

The PA identified three Areas of Interest (AOIs) where PFAS-containing materials may have been used, stored, disposed, or released historically (see **Table ES-2** for AOI locations). The objective of the SI is to identify whether there has been a release to the environment from the AOIs 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 SLs for relevant compounds. This SI was completed at the E.J. Garn Aviation Complex in West Jordan, Utah and determined further evaluation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is warranted for AOI 1 and AOI 2; no further evaluation is warranted for AOI 3 at this time. The E.J. Garn Aviation Complex will also be referred to as the "facility" throughout this document.

The E.J. Garn Aviation Complex occupies approximately 57 acres located at 7563 Airport Rd, West Jordan, Utah, 84084, within Salt Lake County. The facility was established in 1989 and serves as the base operations for military helicopter maintenance and support (Kleinfelder, 2018). The facility consists of two main ARNG areas divided by Airport Road, which runs through the middle of the facility; the Army Facility Maintenance Support-2 (the Armory) is located on the west side, and the Army Aviation Support Facility (AASF) is located on the east side.

The PA identified three AOIs for investigation during the SI phase. SI sampling results from the three AOIs were compared to OSD SLs. **Table ES-2** summarizes the SI results for each AOI. Based on the results of this SI, further evaluation under CERCLA is warranted in a Remedial Investigation (RI) for AOI 1 and AOI 2; no further evaluation is warranted for AOI 3 at this time.

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

Notes:
bgs = below ground surface; µg/kg = micrograms per kilogram; ng/L = nanograms per liter

a.) Assistant Secretary of Defense, 2022. Risk Based Screening Levels in Groundwater and Soil using United States Environmental Protection Agency's (USEPA's) Regional Screening Level Calculator. Hazard Quotient (HQ) = 0.1. 6 July 2022.

b.) 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 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	North Hangar	●	●	●	Proceed to RI
	Dry Well	●	N/A	N/A	
2	Hangar/Ramp Area	●	●	●	Proceed to RI
	Tent Storage Area	●	●	●	
3	Armory Dumpster Fire	◐	◐	◐	No Further Action

Legend:
N/A = not applicable
● = detected; exceedance of the screening levels
◐ = detected; no exceedance of the screening levels
○ = not detected

1. Introduction

1.1 Project Authorization

The Army National Guard (ARNG) G-9 is the lead agency in performing Preliminary Assessments (PAs) and Site Inspections (SIs) 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) 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 perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA), hexafluoropropylene oxide dimer acid (HFPO-DA)[1], and perfluorobutanesulfonic acid (PFBS) at ARNG facilities nationwide. The ARNG performed this SI at the E.J. Garn Aviation Complex in West Jordan, Utah. The E.J. Garn Aviation Complex is also referred to as the "facility" throughout this document.

The SI project elements were performed in compliance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; United States [US] 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 US Department of the Army (DA) requirements and guidance for field investigations.

1.2 SI Purpose

A PA was performed at E.J. Garn Aviation Complex (AECOM Technical Services, Inc. [AECOM], 2019) that identified three Areas of Interest (AOIs) where PFAS-containing materials may have been used, stored, disposed, or released historically. The objective of the SI is to identify whether there has been a release to the environment from the AOIs 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 screening levels (SLs) for the relevant compounds.

[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.

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2. Facility Background

2.1 Facility Location and Description

The E.J. Garn Aviation Complex is located at 7563 Airport Rd, West Jordan, Utah, 84084, within Salt Lake County. The facility was established in 1989 and serves as the base operations for military helicopter maintenance and support (Kleinfelder, 2018). The facility consists of two main ARNG areas divided by Airport Road, which runs through the middle of the facility; the Army Facility Maintenance Support-2 (the Armory) is located on the west side, and the Army Aviation Support Facility (AASF) is located on the east side.

West Jordan is a suburb of Salt Lake City, bordered on the west by the Oquirrh Mountains and on the east by the Jordan River. The facility borders the South Valley Regional Airport to the east and is situated west of Interstate 15 (**Figure 2-1**). The facility is about 9.3 miles southwest of Salt Lake City.

2.2 Facility Environmental Setting

The E.J. Garn Aviation Complex occupies approximately 57 acres, approximately 77 percent (%) of which is composed of impervious surfaces. The areas surrounding the facility are primarily the railroad to the west, and general aviation facilities at the South Valley Regional Airport to the north and east. Other surrounding areas include self-storage and manufacturing companies to the northwest, a Utah Department of Transportation facility to the southwest, and a water tank facility for the City of West Jordan to the east. The facility sits at an elevation of 4,620 feet above mean sea level (amsl), with a slight general topographic gradient to the east. There are no significant natural topographic features immediately surrounding the facility (**Figure 2-2**).

2.2.1 Geology

The E.J. Garn Aviation Complex is located within the Jordan Valley, at the eastern margin of the Basin and Range physiographic province. The valley is bounded on the east by the Wasatch Range, on the south by the Traverse Mountains, on the west by the Oquirrh Mountains, and on the north by the Great Salt Lake and a low east-west salient of the Wasatch Range (Marine and Price, 1964). At the facility, Holocene-aged alluvium and Pleistocene-aged silt and clay deposits of the regressive Phase of Lake Bonneville overlie volcanic and sedimentary rocks of the Salt Lake Formation of Tertiary age, which were largely of mud-rock flow origin (Marine and Price, 1964). Geologic units are depicted on **Figure 2-3**.

The uppermost geologic units at the facility are comprised of massive to thinly bedded silt and clay deposits (7-16 feet), with boulder to pebble gravel, sand, silt, and clay deposited in channels and flood plain of streams (US Department of Agriculture [USDA], 2019). The Jordan Narrows unit of the Salt Lake Formation commonly underlies the alluvial or lacustrine material and consists of fine-grained sediments with a few thin gravel lenses, principally of andesite. The fine-grained sediments are mostly volcanic tuff, freshwater limestone, and clay, and they can be 300 to 2,000 feet thick (Marine and Price, 1964).

Soil borings completed during the SI found various mixtures of silt, clay, and sand deposits as the dominant lithology of the unconsolidated sediments below the E.J. Garn Aviation Complex. The borings were completed at depths between 40 and 70 feet below ground surface (bgs). Many of the logs also reported varying percentages of gravel included in the sand packages. Samples for grain size analyses were collected at two locations where monitoring wells were installed, EJG-MW006 and EJG-MW005, and analyzed via American Society for Testing and Materials (ATSM) Method D-422. The results indicated that the soil samples are comprised primarily of silt (59.05%

to 61.78%) and clay (21.27% to 29.17%). These facility observations are consistent with the understood alluvial or lacustrine depositional environment. Boring logs are presented in **Appendix E**, and grain size results are presented in **Appendix F**.

2.2.2 Hydrogeology

The complex pattern of sediment deposition in the Jordan Valley resulted in a widely-varying groundwater reservoir. Specific aquifers are generally not distinguishable over large areas, and they are underlain, overlain, and graded into beds with lesser permeability. The Jordan Valley has been divided into six groundwater districts based on geology and hydrology. The facility is in the West Slope District, within the North Pediment subdistrict (Marine and Price, 1964).

In the North Pediment subdistrict, groundwater wells obtain water that is perched on the relatively impermeable beds of the Jordan Narrows Unit. Most of the ground water in the subdistrict is confined in the Jordan Narrows unit or in the overlying Pleistocene or late Tertiary gravel. Shallow wells screened in gravel layers, especially those in the lower part of the subdistrict near the facility, appear to be under artesian pressure and flow at the land surface. Deep wells (deeper than 150 feet) set within the Jordan Narrows unit may be under artesian pressure, however, they generally do not flow to the land surface. Much of the recharge to the gravel beds comes from irrigation water obtained from surface sources (Marine and Price, 1964).

According to Marine and Price, groundwater in the North Pediment subdistrict generally moves toward the northeast. Based on the topography and water bodies in the vicinity of the facility, it is assumed groundwater moves from west to east, towards the Jordan River.

Drinking water is supplied at the E.J. Garn Aviation Complex by the local municipal water authority. However, a number of groundwater wells exist in the vicinity of the facility. An Environmental Data Resources, Inc. (EDR)™ report conducted a well search for a 1-mile radius surrounding the facility (EDR™, 2019). Additional online resources, such as state and local geographic information systems databases, were utilized to research wells within a 4-mile radius of the facility. The Utah Division of Water Rights (UDWR) interactive map was reviewed to determine the status of many water rights. The information from UDWR and EDR indicates approximately 500 wells within a 4-mile radius of the facility, 302 of which are potentially down or cross-gradient of the facility. Of the wells within a 4-mile radius, 1 is domestic, 2 are municipal, 45 are monitoring, and the remaining are other/unknown use. Active wells located down or cross-gradient to the facility are described below and in **Figure 2-3**.

- Water Right 59-2123 is an active point of diversion located approximately 1,750 feet southeast and cross-gradient of the facility. The well is used for stock water, with a beneficial use amount of 400 Equivalent Livestock Units (ELUs).
- Water Rights 59-1615 and 59-5157 are tied to an active point of diversion located approximately 2,400 feet south and cross-gradient of the facility. The well (also known as Steadman Well), when active, is used for municipal water for the City of West Jordan, limited to the use of 750 families. The well was finished to a depth of 400 feet bgs.
- Water Right 59-2122 is an active point of diversion water well located approximately 2,700 feet southeast and cross-gradient of the facility. The well is used for the domestic water supply for a single family.
- Water Right 59-2733 is an active point of diversion located approximately 3,800 feet east and downgradient of the facility. The well is used for stock water, with a beneficial use amount of 50 ELUs to be used for 45 cattle and 5 horses.

During the site visit, it was reported that a groundwater well serving the City of West Jordan was located approximately 1,300 feet east and downgradient of the facility, near the water tanks, identified as Water Right 59-2024 in the EDR™. According to the UDWR, this well was formerly used for stock water since 1886; however, in 1976, the water right (59-2024) was disallowed, and the well was abandoned (UDWR, 2019). According to the facility Utilities Manager, none of the wells within the area supply municipal water for West Jordan. The adjacent tanks are supplied by piped water from the Jordan Valley Water Conservancy District. Twenty percent of Jordan Valley Water's supply is groundwater, pumped from wells scattered around the Salt Lake Valley (Jordan Valley Water Conservancy District [JVWCD], 2022).

Based on a review of well logs for supply wells located in the vicinity of E.J. Garn Aviation Complex, perched water-bearing lenses have been observed above the regional aquifer. Several well logs recorded water as shallow as 40-60 feet bgs and were capable of pumping at least 2 gallons per minute (UDWR, 2019). It is likely these lenses are not continuous across the area and are highly influenced by seasonal changes in precipitation.

Three federal United States Geological Survey (USGS) monitoring wells were identified within 1 mile of the facility. The wells are inactive; however, according to the most recent groundwater levels measured in each well, groundwater in the area ranges from approximately 28 feet bgs to 68 feet bgs (UDWR, 2019). Several off-facility municipal, domestic, and stock water wells have been identified in the vicinity of the facility. Groundwater features are presented on **Figure 2-3**.

Depths to water measured in November 2021 during the SI ranged from 26.61 to 60.16 feet bgs. Groundwater elevation contours from the SI are presented on **Figure 2-4** and indicate groundwater flow direction is generally to the east.

2.2.3 Hydrology

Based on a desktop review of the National Wetlands Inventory online mapping system (US Fish and Wildlife Service [USFWS], 2021), the facility does not contain any mapped wetlands or surface waters, although the southern portion is located within the 100-year flood zone. Topographic maps depict a portion of Barney's Creek on the west and south borders of the property. The creek follows the location of a historic irrigation system/stormwater discharge canal described by the ARNG Environmental Manager, which was reportedly dry 90% of the time and filled in circa 2013/2014. No surface water was observed during the site visit.

Surface water runoff generally drains from west to east, with certain drainage areas draining north to south (Kleinfelder, 2018). There is a series of unlined catch basins along the east side of the facility, between the airfield and the runways. The catch basins also receive snow plowed from the Hangar/Ramp Area in the winter.

The facility sits within the Jordan River and Utah Lake Watershed Management Unit. According to the Industrial Stormwater Pollution Prevention Plan for the facility, stormwater from the facility enters Barney's Creek along the southerly perimeter. The creek was observed to be dry during the site visit. Barney's Creek discharges into a large detention pond/sedimentation basin to the east, where stormwater velocity is slowed, particulates are allowed to settle, and water is discharged through a restricted outfall. Ultimately, the stormwater runoff from the facility discharges to the Jordan River, which flows in a north to south direction to Utah Lake (Kleinfelder, 2018). Surface water features are presented on **Figure 2-5**.

2.2.4 Climate

The E.J. Garn Aviation Complex is located in a semi-arid, temperate climate zone with four distinct seasons. West Jordan receives some precipitation, on average, 88 days per year. The average annual precipitation is 15.52 inches. Summer temperatures peak in July, with an average high of

94 degrees Fahrenheit (°F) and an average low of 68°F. Winter temperatures are lowest in January with an average high of 39°F and an average low of 24°F. With the exception of two months of westerly winds in the spring, prevailing winds are southerly for the majority of the year (National Oceanic and Atmospheric Administration [NOAA], 2022).

2.2.5 Current and Future Land Use

The E.J. Garn Aviation Complex serves as a Utah ARNG (UTARNG) base of operations for military helicopter maintenance and support. The Armory consists of an office building, a garage dedicated to light vehicle maintenance, and parking areas. The AASF is comprised of a hangar, maintenance and storage areas, operations and administrative buildings, and related infrastructure including parking lots, aircraft parking areas, and refueling pads. Reasonably anticipated future land use is not expected to change from the current land use described above.

2.2.6 Sensitive Habitat and Threatened/ Endangered Species

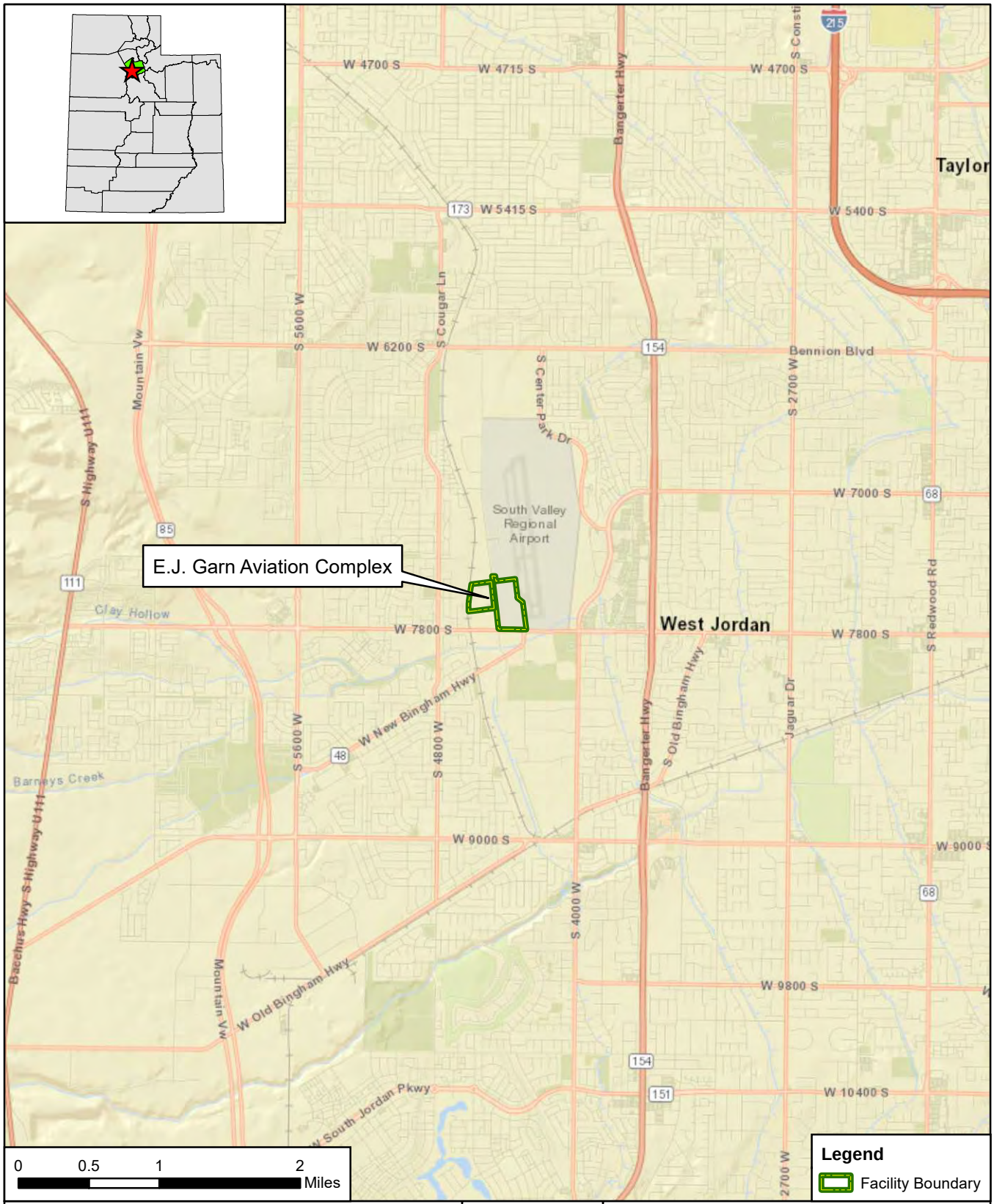
A wildlife survey has not occurred at the facility, and the facility does not have any significant areas of habitat. The following species have not been identified at the facility but may be present in the surrounding area.

The following insects, mammals, fishes, plants, and birds are federally endangered, threatened, proposed, and/ or are listed as candidate species in Salt Lake County, Utah (USFWS, 2022).

- **Insects:** Monarch butterfly, *Danaus plexippus* (candidate)
- **Mammals**: Little brown bat, *Myotis lucifugus* (under review); Canada Lynx, *lynx canadensis* (threatened)
- **Fishes:** Least chub, *Iotichthys phlegethontis* (resolved taxon)
- **Flowering plants:** Ute ladies'-tresses, *Spiranthes diluvialis* (threatened)
- **Birds:** Yellow-billed Cuckoo, *Coccyzus americanus* (threatened); Greater sage-grouse, *Centrocercus urophasianus* (resolved taxon)

2.3 History of PFAS Use

A total of 11 potential release areas were identified and grouped into three AOIs at the E.J. Garn Aviation Complex during the PA where AFFF may have been used or released historically (AECOM, 2020). PFAS-containing materials were potentially released to soil and groundwater within the boundary of the E.J. Garn Aviation Complex through fire training exercises, fire suppression system testing, and emergency response with confirmed discharges of AFFF to the ground surface across the Hangar/Ramp Area. Three AOIs were identified based on preliminary data and assumed groundwater flow directions. A description of the AOIs is presented in **Section 3**.



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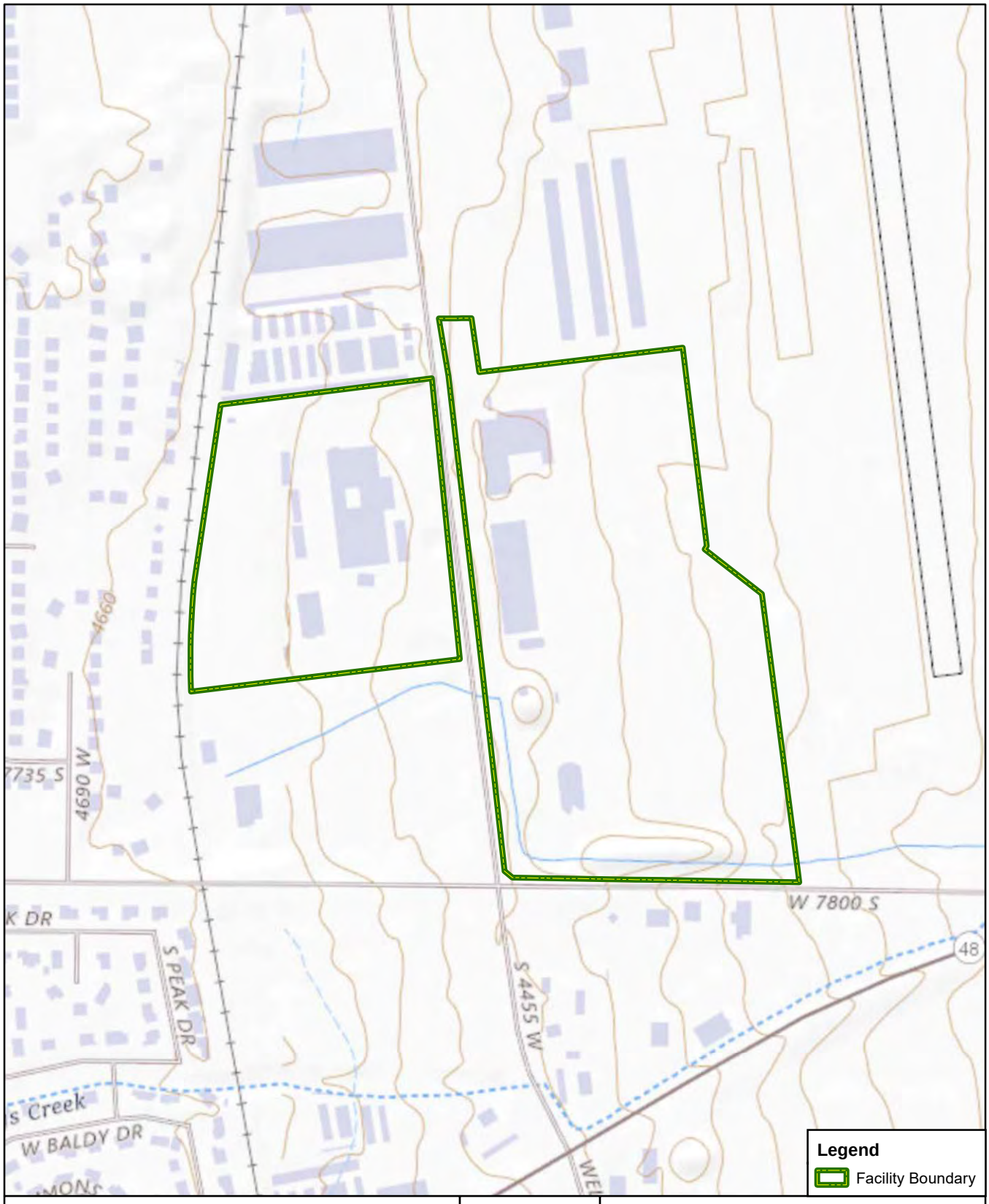
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	CM	8/2/2022

Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-1



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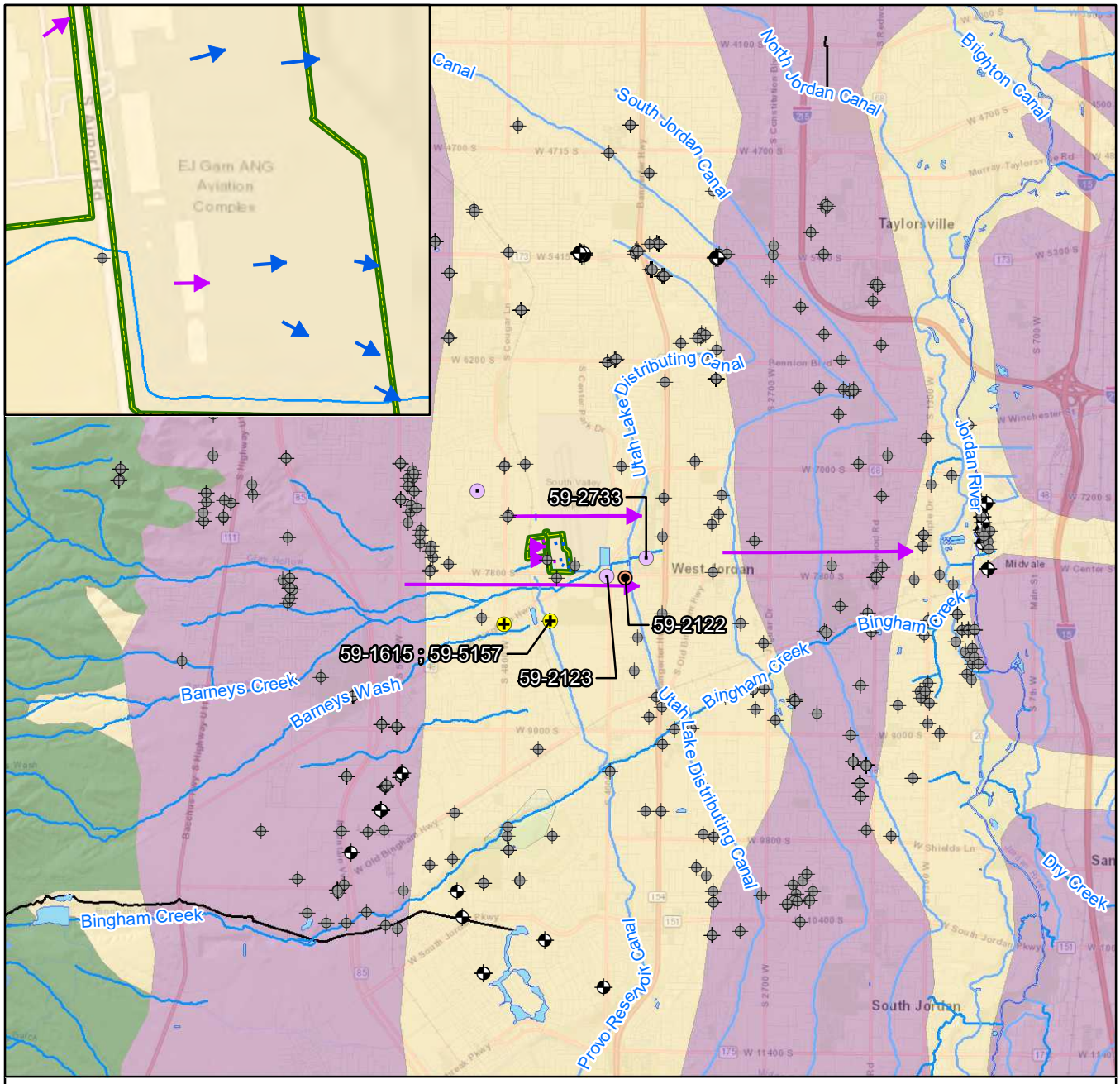
Base Map: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program,		PM	CM	8/2/2022

N

Facility Topography

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-2



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Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	CM	8/2/2022

N

Groundwater Features

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-3

CLIENT	ARNG			
PROJECT	Site Inspection at E.J. Garn Aviation Complex, UT			
REVISED	10/20/2022	GIS BY	MS	10/20/2022
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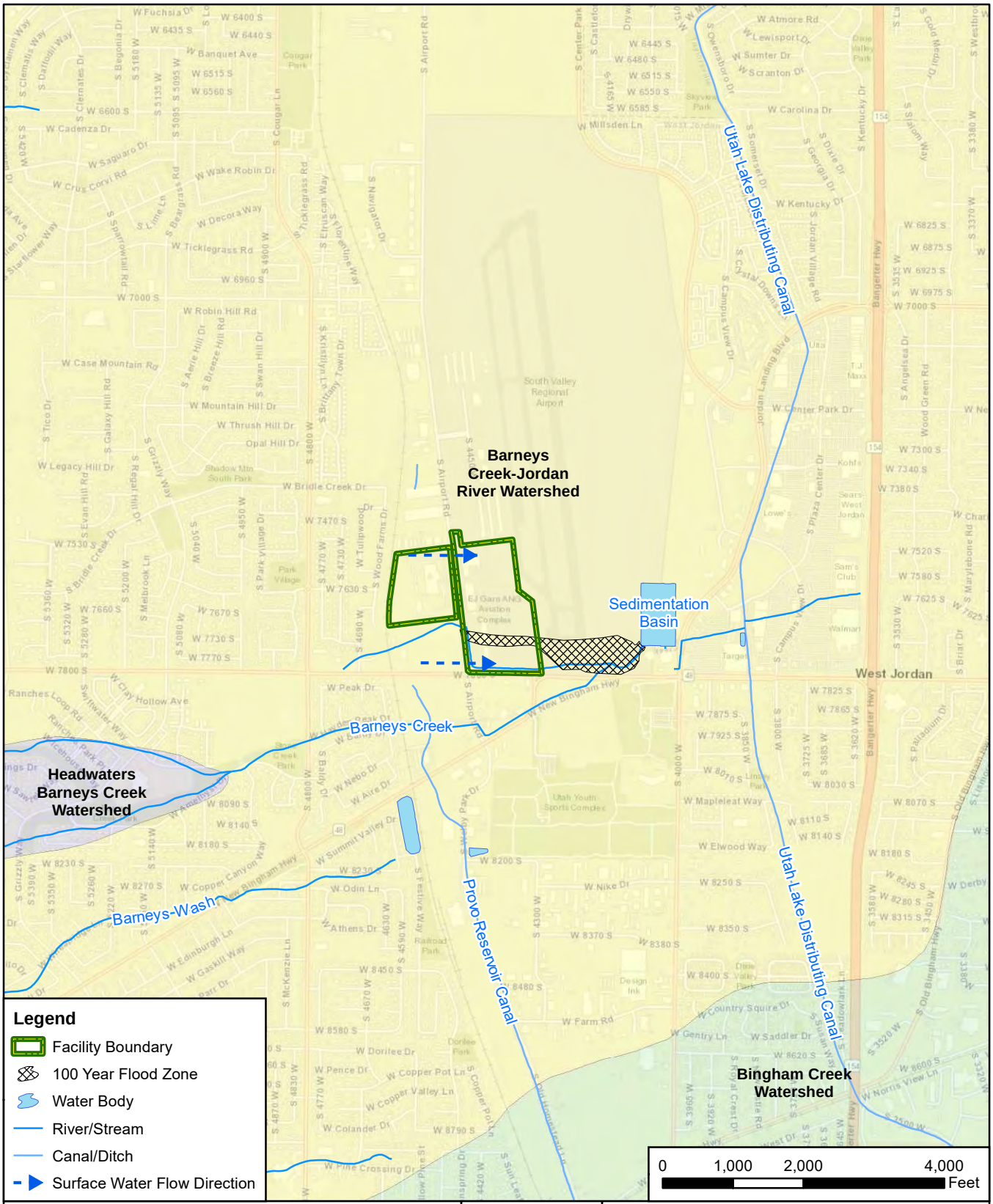
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	CM	10/20/2022

Groundwater Elevations, November 2021

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-4



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Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	CM	8/2/2022

Surface Water Features

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-5

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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, 11 potential release areas were identified at E.J. Garn Aviation Complex and grouped into three AOIs (AECOM, 2019; 2021a). The potential release areas are shown on **Figure 3-1**. This figure also shows nearby off-facility potential releases for informational purposes.

3.1 AOI 1 North Hangar

AOI 1 comprises the area to the east and southeast of the North Hangar (Building 00001), including four potential releases at the firetruck bay/foam storage area and the wash down area. Potential releases consist of the North Hangar fire suppression system (no known releases); firetruck washing in the fire truck bay; oil/water separator and sanitary sewer drains within the hangar; and the former dry well east of the hangar.

The North Hangar is an approximately 52,000 square foot building. The hangar had a fire suppression system; however, during AECOM's site visit, it was under construction, and the facility personnel stated that no known releases have occurred.

A firetruck bay that housed an AFFF-capable firetruck was historically located in the southeast corner of the North Hangar. The firetruck was washed in the firetruck bay, or to an area to the south of the firetruck bay. Potential discharges of AFFF in the wash down area for an unknown time period may have resulted in a release to the ground surface and subsequently to the catch basins to the east of the building.

Drains in the North Hangar currently discharge to the oil/water separator to the east, and then to the municipal sanitary sewer system serviced by the City of West Jordan (SVW, 2019). However, it is not clear that the drains have always been connected to the sanitary sewer. According to UTARNG staff, drains from a different section of the North Hangar were discovered to be connected to a dry well to the northeast of the building. It is unknown if a similar pathway ever existed for the piping in the firetruck bay. Therefore, potential discharges of AFFF in the firetruck bay could have released AFFF to the dry well for an unknown time period prior to 2009.

3.2 AOI 2 Hangar/Ramp Area

AOI 2 comprises the Hangar/Ramp Area east of the South Hangar (Building 00002) and Cold Storage building (Building 00004), including six potential releases from the South Hangar, Cold Storage Building, and the Tri-Max Fire Area. Potential releases include the South Hangar (Building 00002) fire suppression system tests from 1991 to 2016; Cold Storage Building (Building 00004) fire suppression system tests from 1991 to 2016; a Tri-Max™ 30-gallon unit discharged in 1998; fire training activities from 1995 to 1999; emergency response activities using AFFF dating back to 1989; and the storage of 5-gallon 3% AFFF containers in Tent Storage (Building 00010), which was formerly located east of its current location.

The South Hangar is an approximately 52,000 square feet building. The Cold Storage Building is an approximately 31,025 square feet building located on the western installation boundary. These buildings are equipped with AFFF fire suppression systems. Releases of the fire suppression systems in both buildings from approximately 1991 to 2016 resulted in AFFF being pushed onto the Hangar/Ramp Area concrete and left in place to evaporate or disperse with the wind. In addition, fire training activities were conducted around the Hangar/Ramp Area from at least 1995 to 1999, and emergency responses using foam may have occurred on the same area since 1989.

The Tent Storage area (Building 00010) is also located within AOI 2. According to the PA Report, 3% AFFF was stored as concentrate in 5-gallon containers within tent storage (which was formerly located east of its current location) from at least 1989 to 2009; however, no releases were known to have occurred (AECOM, 2019).

3.3 AOI 3 Armory Dumpster Fire

AOI 3 is located directly west of Building 00003 and comprises one potential release area from a former dumpster fire. According to the Safety Non-Commissioned Officer/Hazardous Materials (NCO/HAZMAT) Training Manager, the dumpster fire occurred at the Armory in 1997, which he extinguished with an AFFF mobile unit. It is unknown how many gallons were discharged. The dumpster was located on asphalt, with a grassy area directly to the north of the dumpster. The surface drainage in the vicinity of AOI 3 was designed to flow south into a catch basin.

3.4 Adjacent Sources

Several potential off-facility sources of PFAS adjacent to the E.J. Garn Aviation Complex were identified during the PA. A description of each adjacent source is presented below, and the adjacent sources are shown on **Figure 3-1**.

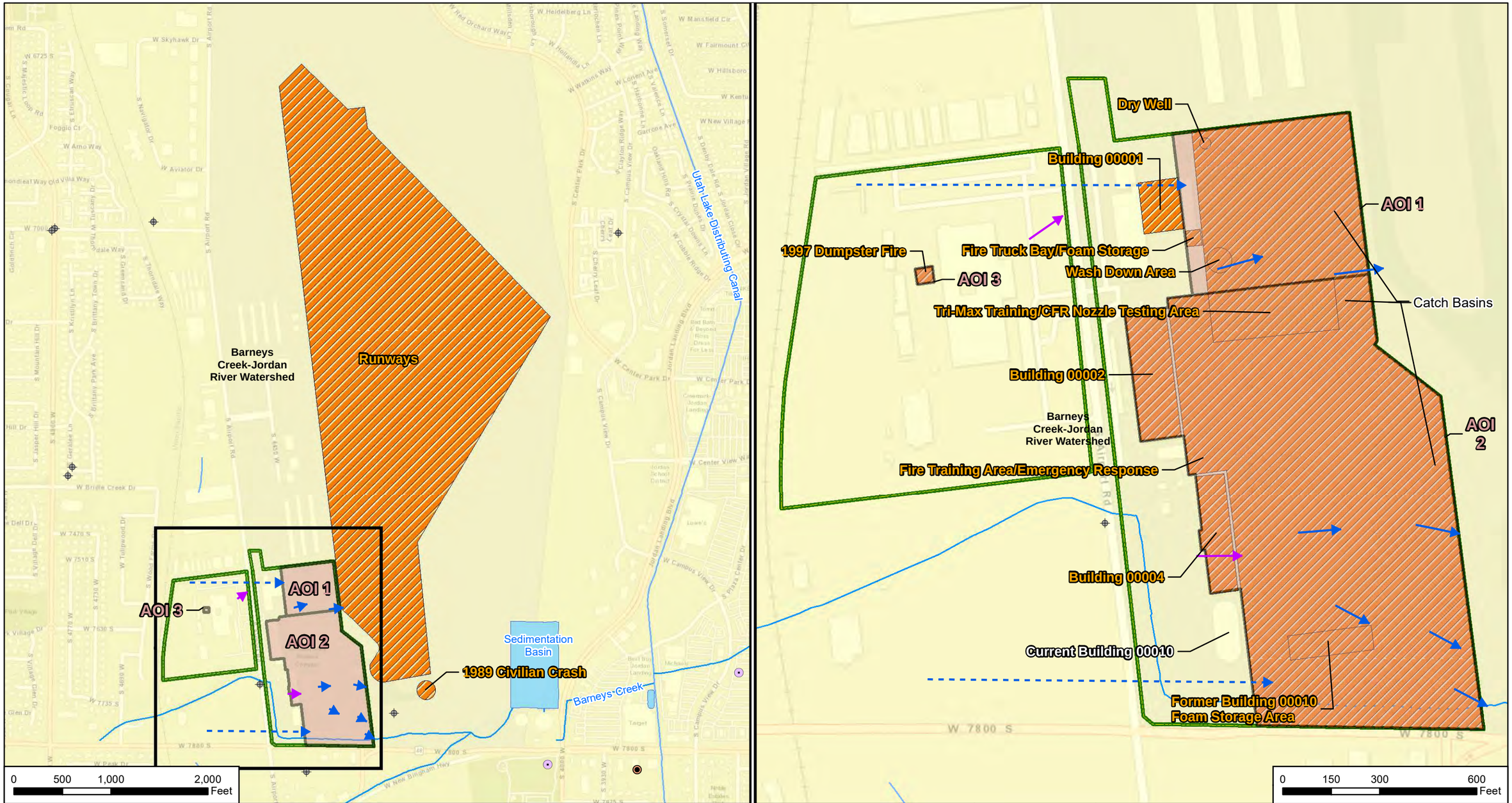
3.4.1 Emergency Response Area

Many air crashes have occurred on the runway; however, only one incident is known to have been handled by the AASF emergency services. In 1989 a civilian plane crashed on the runway east of the AASF and west of the city water supply. The crash included a fire suppressed by the AASF emergency services. It is presumed they used a fire truck equipped with 3% AFFF, although the quantity used is unknown (AECOM, 2019).

3.4.2 Private Aviation Companies at South Valley Regional Airport

The South Valley Regional Airport (U42) Fixed Base Operator (FBO) is located north of the West Jordan AASF and shares the adjacent runway. The airport is located at 7799 Airport Rd, West Jordan, UT 84084. The FBO currently supports business-related flying, law enforcement/fire/rescue flying services, recreational flying, flight training, and air charters. Flight training is conducted by Randon Aviation and Utah Helicopter, both located at 7220 S 4450 W, West Jordan, UT 84084. Two additional aviation companies are reportedly located at 7365 South Airport Drive, West Jordan, UT 84084. The exact location of these facilities within the South Valley Regional Airport could not be determined (AECOM, 2019).

The use or storage of AFFF at the airport facilities could not be determined during the PA; however, none of the facilities have their own emergency services and are under the municipal emergency services. The municipal fire department is located approximately 0.5 miles east of the facility at 7602 Jordan Landing Blvd, West Jordan, UT 84084.



CLIENT	ARNG			
PROJECT	Site Inspection at E.J. Garn Aviation Complex, UT			
REVISED	9/20/2022	GIS BY	MS	9/20/2022
SCALE	1:12,000	CHK BY	AD	9/20/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	9/20/2022

- Area of Interest
- Potential Release Area
- Facility Boundary
- Water Body
- River/Stream
- Canal/Ditch
- Surface Water Flow Direction
- Groundwater Flow Direction
- Inferred Groundwater Flow Direction
- Domestic
- Irrigation/Stockwatering
- Municipal
- Other/Unknown

N

Area of Interest

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 3-1

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4. Project Data Quality Objectives

As identified during the Data Quality Objective (DQO) process and outlined in the SI Quality Assurance Project Plan (QAPP) Addendum (AECOM, 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 an AOI for Remedial Investigation (RI) if related soil and groundwater samples have concentrations of the relevant compounds above the OSD risk-based SLs. The SLs are presented in **Section 6.1** of this report.

4.2 Information Inputs

Primary information inputs included:

- The PA for E.J. Garn Aviation Complex (AECOM, 2019);
- Analytical data from groundwater and soil samples collected as part of this SI in accordance with the site-specific Uniform Federal Policy (UFP)-QAPP Addendum (AECOM, 2021a); and
- Field data collected during the SI, including groundwater elevation and water quality parameters measured at the time of sampling.

4.3 Study Boundaries

The scope of the SI was bounded by the property limits of the facility (**Figure 2-2**). Off-facility sampling was not included in the scope of this 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). The SI scope was bounded vertically by the observed depths of the surficial groundwater table. Temporal boundaries of the study were limited to the Fall to avoid winter storms and freezing conditions.

4.4 Analytical Approach

Samples were analyzed by Pace Analytical Gulf Coast, accredited under the Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP; Accreditation Number 74960) and the National Environmental Laboratory Accreditation Program (NELAP; Certificate Number 01955). Data were compared to applicable SLs within this document and decision rules as defined in the SI QAPP Addendum (AECOM, 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; DoD, 2019b; USEPA, 2017).

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 SI QAPP Addendum (AECOM, 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 implemented in accordance with the following approved documents:

- *Final Site Inspection Programmatic Uniform Federal Policy-Quality Assurance Project Plan (PQAPP)* dated March 2018 (AECOM, 2018a);
- *Final Programmatic Accident Prevention Plan* dated July 2018 (AECOM, 2018b);
- *Final Preliminary Assessment Report, E.J. Garn Aviation Complex, West Jordan,* Utah dated December 2019 (AECOM, 2019);
- *Final Site Inspection Uniform Federal Policy-Quality Assurance Project Plan Addendum, E.J. Garn Aviation Complex, West Jordan, Utah,* dated June 2021 (AECOM, 2021a); and
- *Final Site Safety and Health Plan, E.J. Garn Aviation Complex, West Jordan, Utah* dated October 2021 (AECOM, 2021b).

The SI field activities were conducted from 25 October to 10 November 2021 and consisted of utility clearance, hollow stem auger (HSA) drilling, rotary sonic drilling, soil sample collection, permanent monitoring well installation, grab groundwater sample collection, and land surveying. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2021a), except as noted in **Section 5.10**.

The following samples were collected during the SI and analyzed for a subset of 18 compounds by liquid chromatography with tandem mass spectrometry (LC/MS/MS) compliant with Quality Systems Manual (QSM) 5.3 Table B-15 to fulfill the project DQOs:

- Twenty-five (25) soil samples from ten (10) boring locations;
- Seven (7) grab groundwater samples from seven (7) permanent wells; and
- Twenty-one (21) quality assurance (QA) samples.

Figure 5-1 provides the sample locations for all media across the facility. **Table 5-1** presents the list of samples collected for each media. 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**. Sampling forms are provided in **Appendix B2**, Field Change Request Forms are provided in **Appendix B3**, Nonconformance and Corrective Action Reports are provided in **Appendix B4**, land survey data are provided in **Appendix B5**, and investigation-derived waste (IDW) polygons are provided in **Appendix B6**. 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 for each of these activities are presented below.

5.1.1 Technical Project Planning

The US Army Corps of Engineers (USACE) TPP Process, Engineer Manual (EM) 200-1-2 (USACE, 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 22 December 2020, prior to SI field activities. The meeting was conducted in general accordance with Engineering Manual (EM) 200-1-2. The stakeholders for this SI include the ARNG, UTARNG, USACE, Utah Department of Environmental Quality (UDEQ), and representatives familiar with the facility and the regulations. 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 SI QAPP Addendum (AECOM, 2021a).

A TPP Meeting 3 was held on 27 July 2023 after the field event 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

AECOM's drilling subcontractor, Cascade Technical Services, LLC placed a ticket with the Blue Stakes of Utah 811 utility clearance provider to notify them of intrusive work on 19 October 2021. AECOM also contracted ESI Engineering, Inc., a private utility location service, who performed utility clearance of the proposed boring locations on 13 October 2021 with input from the AECOM field team and E.J. Garn Aviation Complex facility staff. General locating services and ground-penetrating radar were used to complete the clearance. Additionally, the first 5 feet of each boring were pre-cleared using a hand auger to verify utility clearance in shallow subsurface where utilities would typically be encountered.

5.1.3 Source Water and Sampling Equipment Acceptability

The potable water source used for decontamination of drilling equipment was confirmed to be acceptable for use in a PFAS investigation prior to the start of field activities. A sample from a potable water source at E.J. Garn Aviation Complex was collected on 12 May 2021, prior to mobilization, and analyzed for PFAS by LC/MS/MS compliant with QSM 5.3 Table B-15. The results of the decontamination water sample are provided in **Appendix F**. A discussion of the results is presented in the DUA (**Appendix A**).

Materials that were used within the sampling zone were confirmed as acceptable for use in the sampling environment. The checklist of acceptable materials for use in the sampling environment was provided in the Standard Operating Procedures (SOPs) appendix to the SI QAPP Addendum (AECOM, 2021a). Prior to the start of field work each day, a Sampling Checklist was completed as an additional layer of control. The checklist served as a daily reminder to each field team member regarding the allowable materials within the sampling environment.

5.2 Soil Borings and Soil Sampling

Soil samples were collected via HSA rig at AOI01-01, EJG-MW006, and EJG-MW001, in accordance with the SI QAPP Addendum (AECOM, 2021a). Due to heaving sands in EJG-MW001, the HSA rig was replaced with a sonic drill rig for the installation of EJG-MW001 and the remaining boring locations (EJG-MW002 to EJG-MW005 and EJG-MW007); the field change request is provided in **Appendix B3**. A hand auger was used to collect soil from the top 5 feet of each boring, in accordance with AECOM utility clearance procedures. A hand auger was also used for the two surface soil sample locations (AOI03-01 and AOI03-02) in accordance the QAPP Addendum (AECOM, 2021a). The soil boring locations are shown on **Figure 5-1**, and

sample depths are provided in **Table 5-1**. The soil boring depths are provided in **Table 5-2** and **Table 5-3**.

In general, three discrete soil samples were collected from the vadose zone for chemical analysis from each soil boring: one surface soil sample (0 to 2 feet bgs), one subsurface soil sample approximately 2 feet above the groundwater table, and one subsurface soil sample at the mid-point between the surface and the groundwater table. At AOI01-01, only two soil samples were collected, and only one sample was collected at AOI03-01 and AOI03-02, in accordance with the QAPP Addendum (AECOM, 2021a).

The soil cores were continuously logged for lithological descriptions by an AECOM field geologist using the Unified Soil Classification System (USCS). A photoionization detector (PID) was used to screen the breathing zone during boring activities as part of personal safety requirements. Observations and measurements were recorded on boring logs (**Appendix E**) and in a non-treated field logbook (i.e., composition notebook). Depth interval, recovery thickness, PID concentrations, moisture, relative density, color (using a Munsell soil color chart), and texture (using the USCS) were recorded. The boring logs are provided in **Appendix E**.

Soil borings completed during the SI found various mixtures of silt, clay, and sand deposits as the dominant lithology of the unconsolidated sediments below the E.J. Garn Aviation Complex. The borings were completed at depths between 40 and 70 feet bgs. Many of the logs also reported varying percentages of gravel included in the sand packages. These facility observations are consistent with the understood alluvial or lacustrine depositional environment.

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

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. Matrix spike (MS)/MS duplicate (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 rinsate blanks should have been collected at a rate of 5% and analyzed for the same parameters as the soil samples. However, collection of this blank for the hand auger was accidently missed and is discussed in **Section 5.8** below. A temperature blank was placed in each cooler to ensure that samples were preserved at or below 6 degrees Celsius (°C) during shipment. The laboratory received one of the coolers above the method temperature requirement for preservation, as described in **Section 5.8** below.

The seven borings deeper than 8 feet (EJG-MW001 to EJG-MW007) were converted to permanent wells. All but two of the borings were installed in grass areas to avoid disturbing concrete or asphalt surfaces.

5.3 Permanent Well Installation and Groundwater Sampling

During the SI, seven permanent monitoring wells (EJG-MW001 to EJG-MW007) were installed within or downgradient of potential source areas. The locations of the wells are shown on **Figure 5-1**.

An HSA drill rig system was used at EJG-MW006, and a sonic drill rig system was used at the remaining six wells (EJG-MW001 through EJG-MW005 and MW007) to install the seven 2-inch diameter monitoring wells. Water was not added during the drilling of the wells. The monitoring

wells were constructed with Schedule 40 PVC, flush threaded 10-foot sections of riser, 0.010-inch slotted well screen, and a threaded bottom cap. A filter pack of 20/40 silica sand was installed in the annulus around the well screen to a minimum of 2-foot above the well screen. A 2-foot-thick bentonite seal was placed above the filter sand and hydrated with water. Bentonite grout was placed in the well annulus from the top of the bentonite seal to ground surface. The bentonite grout was allowed to set for 24 hours prior to well completion in accordance with the SI QAPP Addendum (AECOM, 2021a). All monitoring wells were completed with flush mount well vaults. The screen interval of each of the groundwater monitoring wells is provided in **Table 5-3**.

Development and sampling of wells was completed in accordance with the SI QAPP Addendum (AECOM, 2021a). The newly installed monitoring wells were developed no sooner than 24 hours following installation by pumping and surging using a variable speed submersible pump. Samples were collected no sooner than 24 hours following development via low-flow sampling methods using a QED Sample Pro® bladder pump with disposable PFAS-free, HDPE tubing. New tubing was used at each well and the pumps were decontaminated between each well. The wells were purged at a rate determined in the field to reduce 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**). Water levels were measured to the nearest 0.01 inch and recorded. Additionally, a subsample of each groundwater sample was collected in a separate container, and a shaker test was completed to identify if there were any foaming. No foaming was noted in any of the groundwater samples.

Each sample was collected into laboratory-supplied PFAS-free HDPE bottles and labeled using a PFAS-free marker or pen. Samples were packaged on ice and transported via FedEx under standard CoC procedures to the laboratory and analyzed by LC/MS/MS compliant with QSM 5.3 Table B-15 in accordance with the SI QAPP Addendum (AECOM, 2021a).

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. Matrix spike (MS)/MS duplicates (MSDs) were collected at a rate of 5% and analyzed for the same parameters as the accompanying samples. One field reagent blank was collected in accordance with the Programmatic UFP-QAPP (PQAPP) (AECOM, 2018a). 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

A synoptic groundwater gauging event was performed on 15 November 2021. Groundwater elevation measurements were collected from the seven new permanent monitoring wells. Water level measurements were taken from the northern side of the well casing. Groundwater was observed ranging between 26.61 to 60.16 feet bgs, with groundwater elevations ranging between 4,549.19 to 4,597.94 feet North American Vertical Datum 1988 (NAVD88). Based on the groundwater elevations observed during the synoptic groundwater gauging event, the groundwater appears to flow predominantly to the east. A groundwater flow contour map is provided in **Figure 2-4**. Groundwater elevation data is provided in **Table 5-3**.

5.5 Surveying

The northern side of each well casing was surveyed by Utah-licensed land surveyors following guidelines provided in the SOPs provided in the SI QAPP Addendum (AECOM, 2021a). Survey data from the newly installed wells on the facility were collected on 10 November 2021, and ground surface elevation data were collected on 06 December 20221. Survey data was collected in the applicable Universal Transverse Mercator zone projection with World Geodetic System 84 datum (horizontal) and NAVD88 (vertical). The surveyed well data are provided in **Appendix B5**.

5.6 Investigation-Derived Waste

As of the date of this report, the disposal of IDW is not regulated federally. IDW generated during the SI is considered non-hazardous waste and was managed in accordance with the SI QAPP Addendum (AECOM, 2021a) and with the DA Guidance for Addressing Releases of PFAS, Q18 (DA, 2018). Consistent with the SI QAPP, soil cuttings and liquid IDW were distributed or discharged to the ground surface on the immediate downgradient side of the borehole, except where noted otherwise below.

EJG-MW001, EJG-MW002, EJG-MW004, EJG-MW005, and EJG-MW006 were located in paved or high-profile areas, and therefore IDW (i.e., soil cuttings) generated during the SI activities at those locations was containerized in ten 55-gallon drums and placed in the drum staging area as indicated in the Photographic Log (**Appendix C**). The drums were labeled to indicate the type of media (i.e., soil or water) and the source location. Soil cuttings at all other locations were left in place at the point of the source. The soil cuttings were distributed on the ground surface on the downgradient side of the boring. The soil IDW was not sampled and assumes the PFAS characteristics of the associated soil samples collected from that source location. Based on laboratory results, containerized soil cuttings will be managed and disposed by ARNG, either by offsite disposal or, where PFAS concentrations are below the Industrial/Commercial Composite Worker OSD SLs, ARNG will distribute the soil on the downgradient side of the associated borehole.

Due to the surrounding pavement, liquid IDW generated during SI activities (i.e., purge water, development water, and decontamination fluids) at EJG-MW005 and EJG-MW006 was containerized in five 55-gallon drums and placed in the drum staging area as indicated in the Photographic Log (**Appendix C**). The drums were labeled to indicate the type of media (i.e., soil or water) and the source location. Liquid IDW at all other locations was discharged directly to the ground surface slightly downgradient of the source. The liquid IDW was not sampled and assumes the PFAS characteristics of the associated groundwater samples collected from that source location. Based on laboratory results, containerized liquid IDW will be managed and disposed by ARNG under a separate contract for Treating Liquid Investigation-Derived Material (purge water, drilling water, and decontamination fluids) (EA Engineering, Science, and Technology, Inc., 2021).

Geographic coordinates were collected using a global positioning system (GPS) around each location where IDW was placed (i.e., an IDW polygon). The IDW polygons are displayed on the figure in **Appendix B6**.

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 at a licensed solid waste landfill.

5.7 Laboratory Analytical Methods

Samples were analyzed by LC/MS/MS compliant with QSM 5.3 Table B-15 at Pace Analytical Gulf Coast in Baton Rouge, Louisiana, a DoD ELAP and NELAP certified laboratory. Soil samples were also analyzed for TOC using USEPA Method 9060A and pH by USEPA Method 9045D.

5.8 Deviations from SI QAPP Addendum

Two deviations from the SI QAPP Addendum were identified during review of the field documentation. The deviation is noted below and is documented in Field Change Request Forms (**Appendix B3**) and Nonconformance and Corrective Action Reports (**Appendix B4**):

- The QAPP Addendum specified a hollow stem auger drill rig to install the soil borings and monitoring wells. An HSA truck mounted drill rig was used on AOI01-01, EJG-MW006, and EJG-MW001 during the first four days of field work. Heaving sands were encountered in EJG-MW001 and prevented the setting of the monitoring well. A sonic drill rig was mobilized to the site on 1 November 2021 and utilized for the remaining borings. This action was documented in a Field Change Request Form provided in **Appendix B3**.

- Although all preservation techniques were followed by the field staff, a four-day delay by FedEx resulted in one of the coolers arriving at the laboratory above the QAPP-designated temperature of 6 ºC. The affected samples were in Sample Delivery Group (SDG) SDG22110162 and include soil samples EJG-MW006-SB-33-35, EJG-MW001-SB-13-15, EJG-MW001-SB-34-36, and QC sample EJG-PLUG-01. The field samples in SDG22110162 were received at 19.8 degrees ºC; however, the field samples were analyzed within the recommended holding time, so the associated field sample results were qualified as estimate. All technical and analytical holding times were met by the laboratory with minor exceptions. The technical holding time for pH analysis is considered ‘immediate’, so all pH sample results have been qualified as estimate. This action was documented in a nonconformance and corrective action report provided in **Appendix B4**.

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, EJ Garn Aviation Complex, Utah

Sample Identification	Sample Collection Date/Time	Sample Depth (feet bgs)	LC/MS/MS compliant with QSM 5.3 Table B-15	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Grain Size (ASTM D-422)	Comments
Soil Samples							
EJG-MW007-SB-27-29	11/8/2021 13:30	37 -39	x				
AOI01-01-SB-00-02	10/26/2021 8:40	0 - 2	x				
AOI01-01-SB-06-08	10/26/2021 9:50	6 - 8	x				
AOI03-01-SB-00-02	10/25/2021 11:50	0 - 2	x				
AOI03-02-SB-00-02	10/25/2021 12:30	0 - 2	x				
EJG-MW001-SB-00-02	10/26/2021 10:25	0 - 2	x				
EJG-MW001-SB-00-02-D	10/26/2021 10:25	0 - 2	x				FD
EJG-MW001-SB-00-02-MS	10/26/2021 10:25	0 - 2	x				MS/MSD
EJG-MW001-SB-00-02-MSD	10/26/2021 10:25	0 - 2	x				MS/MSD
EJG-MW001-SB-13-15	10/28/2021 8:40	13 - 15	x	x	x		
EJG-MW001-SB-34-36	10/28/2021 10:30	34 - 36	x				
EJG-MW002-SB-00-02	10/26/2021 12:30	0 - 2	x				
EJG-MW002-SB-13-15	11/2/2021 15:15	13 - 15	x				
EJG-MW002-SB-59-61	11/4/2021 10:30	59 - 61	x				
EJG-MW003-SB-00-02	10/26/2021 11:45	0 - 2	x				
EJG-MW003-SB-13-15	11/4/2021 15:20	13 - 15	x				
EJG-MW003-SB-35-37	11/9/2021 10:00	35 - 37	x				
EJG-MW004-SB-00-02	10/25/2021 10:30	0 - 2	x				
EJG-MW004-SB-13-15	11/9/2021 15:00	13 - 15	x	x	x		
EJG-MW004-SB-13-15-D	11/9/2021 15:00	13 - 15	x	x	x		FD
EJG-MW004-SB-13-15-MS	11/9/2021 15:00	13 - 15	x	x	x		MS/MSD
EJG-MW004-SB-13-15-MSD	11/9/2021 15:00	13 - 15	x	x	x		MS/MSD
EJG-MW004-SB-39-41	11/9/2021 16:00	39 - 41	x			x	
EJG-MW005-SB-00-02	11/1/2021 15:30	0 - 2	x				
EJG-MW005-SB-13-15	11/1/2021 16:10	13 - 15	x			x	
EJG-MW005-SB-25-27	11/1/2021 16:30	25 - 27	x				
EJG-MW006-SB-00-02	10/26/2021 14:15	0 - 2	x				
EJG-MW006-SB-00-02-D	10/26/2021 14:15	0 - 2	x				FD
EJG-MW006-SB-13-15	10/26/2021 14:55	13 - 15	x	x	x		
EJG-MW006-SB-33-35	10/26/2021 16:00	33 - 35	x			x	
EJG-MW007-SB-00-02	10/26/2021 9:30	0 - 2	x				
EJG-MW007-SB-13-15	11/9/2021 12:55	13 - 15	x				
Groundwater Samples							
EJG-MW001-110321	11/3/2021 16:15	NA	x				
EJG-MW001-110321-D	11/3/2021 16:20	NA	x				FD
EJG-MW002-110921	11/9/2021 12:40	NA	x				
EJG-MW003-111021	11/10/2021 11:15	NA	x				
EJG-MW003-111021-MS	11/10/2021 11:15	NA	x				MS
EJG-MW003-111021-MSD	11/10/2021 11:15	NA	x				MSD
EJG-MW004-111221	11/12/2021 15:15	NA	x				
EJG-MW005-110421	11/4/2021 16:00	NA	x				
EJG-MW006-110321	11/3/2021 11:35	NA	x				
EJG-MW007-111021	11/10/2021 14:35	NA	x				

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, EJ Garn Aviation Complex, Utah

Sample Identification	Sample Collection Date/Time	Sample Depth (feet bgs)	LC/MS/MS compliant with QSM 5.3 Table B-15	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Grain Size (ASTM D-422)	Comments
Quality Control Samples							
EJG-DECON-01	5/12/2021 9:05	NA	x				Water source
EJG-DECON-02	11/2/2021 12:15	NA	x				Water tank on trailer
EJG-DECON-03	11/3/2021 15:30	NA	x				Portable water tank
EJG-ERB-01	10/26/2021 11:00	NA	x				Hand Auger
EJG-ERB-02	10/26/2021 11:10	NA	x				HSA Drill Bit
EJG-ERB-03	11/2/2021 12:00	NA	x				Sonic Casing (bottom)
EJG-ERB-04	11/2/2021 15:40	NA	x				Tornado Pump
EJG-ERB-05	11/2/2021 15:45	NA	x				Wattera Pump
EJG-ERB-06	11/4/2021 13:00	NA	x				Bladder Pump
EJG-FRB-01	10/26/2021 12:15	NA	x				
EJG-PLUG-01	10/28/2021 14:20	NA	x				Wooden Plug MW-1

Notes:
ASTM = American Society for Testing and Materials
bgs = below ground surface
DECON = decontamination
EJG = EJ Garn
ERB = equipment rinsate blank
FD = field duplicate
FRB = field reagent blank
LC/MS/MS = Liquid Chromatography Mass Spectrometry
MS/MSD = matrix spike/ matrix spike duplicate
MW = monitoring well
NA = not applicable
QSM = Quality Systems Manual
SB = soil boring
TOC = total organic carbon
USEPA = United States Environmental Protection Agency

Table 5-2
Soil Boring Depths
Site Inspection Report, EJ Garn Aviation Complex, Utah

Area of Interest	Boring Location	Soil Boring Depth (feet bgs)	Temporary Well Screen Interval (feet bgs)	Top of Casing Elevation (feet NAVD88)	Ground Surface Elevation (feet NAVD88)	Depth to Water (feet btoc)	Depth to Water (feet bgs)	Groundwater Elevation (feet NAVD88)
1	AOI01-01	8	NA	NA	4627	NA	NA	NA
3	AOI03-01	2	NA	NA	4643	NA	NA	NA
	AOI03-02	2	NA	NA	4637	NA	NA	NA

Notes:

bgs = below ground surface

btoc = below top of casing

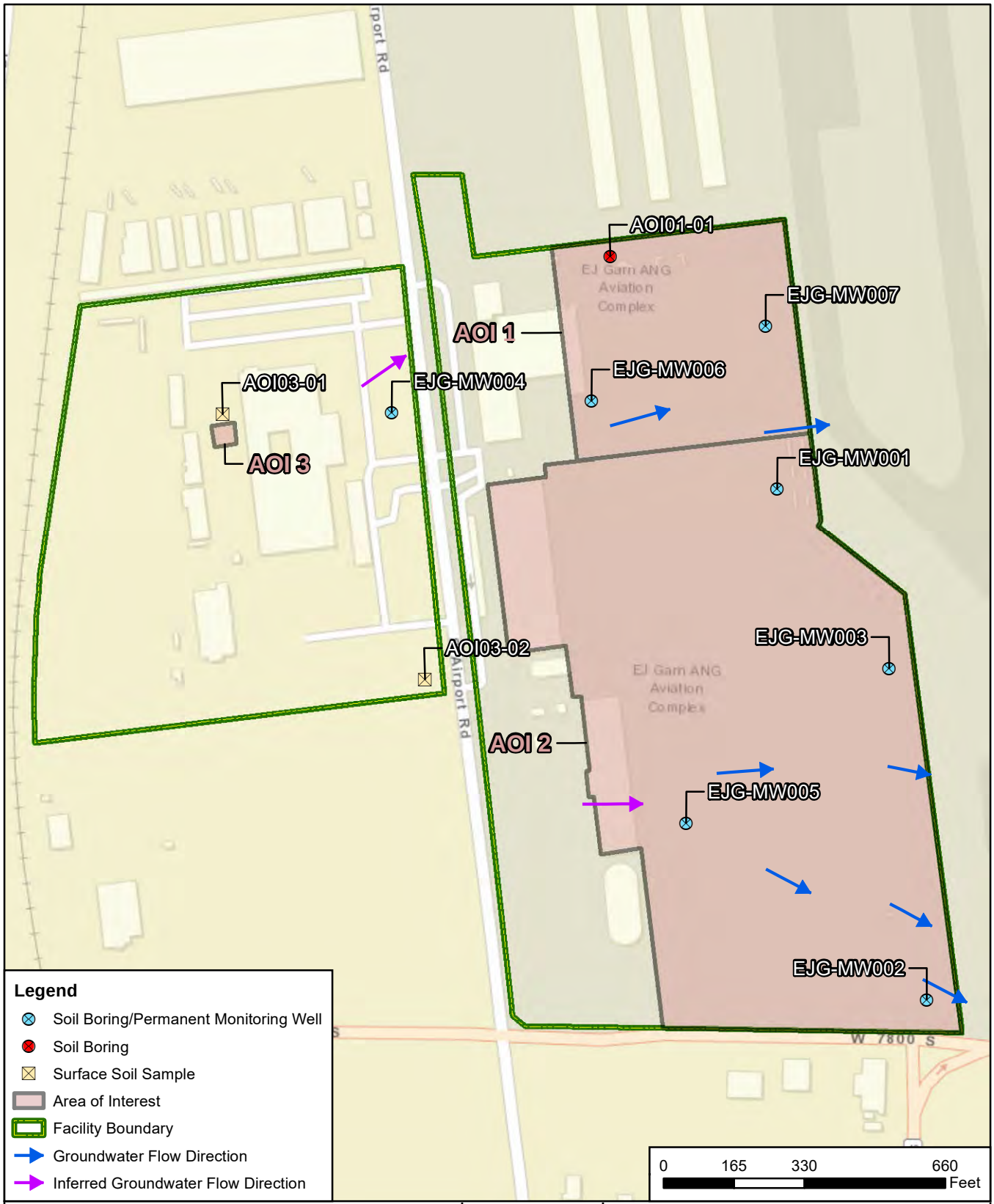
NA = not applicable

NAVD88 = North American Vertical Datum 1988

Table 5-3
Permanent Monitoring Well Screen Intervals and Groundwater Elevations
Site Inspection Report, EJ Garn Aviation Complex, Utah

Area of Interest	Boring Location	Soil Boring Depth (feet bgs)	Permanent Well Screen Interval (feet bgs)	Top of Casing Elevation (feet NAVD88)	Ground Surface Elevation (feet NAVD88)	Depth to Water (feet btoc)	Depth to Water (feet bgs)	Groundwater Elevation (feet NAVD88)
2	EJG-MW001	45	35 - 45	4613.16	4613.29	34.25	34.38	4578.91
	EJG-MW002	70	60 - 70	4609.29	4609.35	60.10	60.16	4549.19
	EJG-MW003	45	35 - 45	4611.79	4612.44	41.55	42.20	4570.24
3	EJG-MW004	51	41 - 51	4630.94	4631.30	33.00	33.36	4597.94
2	EJG-MW005	48	28 - 38	4619.53	4619.95	26.18	26.61	4593.35
1	EJG-MW006	41	31 - 41	4623.98	4624.31	33.82	34.15	4590.16
	EJG-MW007	40	30 - 40	4613.00	4613.16	33.79	33.95	4579.21

bgs = below ground surface
btoc = below top of casing
EJG = EJ Garn
MW = monitoring well
NA = not applicable
NAVD88 = North American Vertical Datum 1988



CLIENT	ARNG			
PROJECT	Site Inspection at E.J. Garn Aviation Complex, UT			
REVISED	8/2/2022	GIS BY	MS	8/2/2022
SCALE	1:3,960	CHK BY	AD	8/2/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	CM	8/2/2022

Site Inspection Sample Locations

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-1

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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 **Section 6.1**. A discussion of the results for each AOI is provided in **Section 6.3** through **Section 6.5**. **Table 6-2** through **Table 6-5** present results in 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 DoD has adopted a policy to retain facilities in the CERCLA process based on risk-based SLs for soil and groundwater, as described in a memorandum from the OSD dated 6 July 2022 (Assistant Secretary of Defense, 2022). The ARNG program under which this SI was performed follows this DoD policy. Should the maximum site concentration for sampled media exceed the SLs established in the OSD memorandum, the AOI will proceed to the next phase under CERCLA. The SLs established in the OSD memorandum apply to the five compounds presented on **Table 6-1** below.

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

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

Notes:
bgs = below ground surface; µg/kg = micrograms per kilogram; ng/L = nanograms per liter

a.) Assistant Secretary of Defense, 2022. Risk Based Screening Levels in Groundwater and Soil using United States Environmental Protection Agency's (USEPA's) Regional Screening Level Calculator. Hazard Quotient (HQ) = 0.1. 6 July 2022.

b.) 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.

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 feet bgs) and the industrial/commercial worker scenario is applied to shallow subsurface soil results (2 to 15 feet bgs). The SLs are not applied to deep subsurface soil results (>15 feet bgs) because 15 feet is the anticipated limit of construction activities.

6.2 Soil Physicochemical Analyses

To provide basic soil parameter information, three soil samples were analyzed for TOC, and pH, which are important for evaluating transport through the soil medium. One sample was selected from each AOI in accordance with the QAPP Addendum (AECOM, 2021a). TOC results for AOI01, AOI02, and AOI03 were 1270, 647, and 1800 mg/kg, respectively; and pH results were 8.52, 8.51, and 8.83, respectively. **Appendix F** contains the results of the TOC, pH, sampling.

The data collected in this investigation will be used in subsequent investigations, where appropriate, to assess fate and transport. According to the Interstate Technology Regulatory Council (ITRC), several important 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: the North Hangar. AOI 1 encompasses the co-located firetruck bay/foam storage area and the wash down area, as well as the dry well that may have received discharge from those areas. The soil and groundwater results are summarized on **Table 6-2** through **Table 6-5**. Soil and groundwater results are presented on **Figure 6-1** through **Figure 6-7**.

6.3.1 AOI 1 Soil Analytical Results

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

At the firetruck bay/foam storage area and the wash down area, soil was sampled from surface soil (0 to 2 feet bgs), shallow subsurface soil (13 to 15 feet bgs), and deep subsurface soil (33 to 35 feet bgs) from boring location EJG-MW006. The depth of the former dry well was estimated to be 6-8 feet bgs; next to (downgradient of) the dry well, soil from boring location AOI01-01 was sampled from surface soil (0 to 2 feet bgs), and shallow subsurface soil (6 to 8 feet bgs), a depth representative of soil conditions at the bottom of the former dry well. Downgradient from the firetruck bay/foam storage area and the wash down area, soil was sampled from the surface soil (0 to 2 feet bgs), shallow subsurface soil (13 to 15 feet bgs), and deep subsurface soil (27 to 29 feet bgs) from boring location EJG-MW007.

At AOI 1, PFOA, PFOS, PFHxS, and PFNA were detected in surface soil at all three locations. The only SL exceeded was for PFOS (13 µg/kg) at EJG-MW006 with a concentration of 53.6 µg/kg. PFOA, PFHxS, and PFNA were detected in all three surface soil samples at concentrations at least an order of magnitude below their respective SLs. PFBS was not detected in surface soil at AOI 1.

PFOA, PFOS, PFHxS, and PFNA were also detected in at least one shallow subsurface soil sample at AOI 1, all at concentrations at least one order of magnitude below their SLs. PFBS was not detected in shallow subsurface soil at AOI 1.

In subsurface soil, PFOS and PFOA were detected only at EJG-MW006, with both concentrations less than 1 µg/kg and below their SLs. PFNA, PFHxS, and PFBS were not detected in subsurface soil at AOI 1.

6.3.2 AOI 1 Groundwater Analytical Results

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

Within and downgradient of the North Hangar potential release area, groundwater was sampled from permanent monitoring wells EJG-MW006 and EJG-MW007. PFOS, PFOA, PFHxS, and PFBS were detected at both locations. The only SL exceedance was for PFOS at EJG-MW006 with a concentration of 5.30 ng/L (SL of 4 ng/L). All other detected concentrations of PFOS, PFOA, PFHxS, and PFBS were below their SLs. There were no PFNA detections in groundwater at AOI 1.

6.3.3 AOI 1 Conclusions

Based on the results of the SI, PFOA , PFOS, PFHxS, and PFNA were detected in soil at AOI 1. PFOS exceeded the SL in surface soil at one location. PFBS was not detected in soil at AOI 1. PFOA, PFBS, and PFHxS were detected in groundwater at concentrations below their SLs. PFOS was detected above the SL in groundwater from one location. Based on the exceedance of the PFOS SL in surface soil and in groundwater in well EJG-MW006, further evaluation at AOI 1 is warranted.

6.4 AOI 2

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 2, which includes the hangar/ramp area east of the south hangar, cold storage building, and Tri-Max training area. The results in soil and groundwater are summarized on **Table 6-2** through **Table 6-5**. Soil and groundwater results are presented on **Figure 6-1** through **Figure 6-7**.

6.4.1 AOI 2 Soil Analytical Results

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

Immediately adjacent to the potential release area, soil was sampled from surface soil (0 to 2 feet bgs), shallow subsurface soil (13 to 15 feet bgs), and deep subsurface soil (25 to 27 feet bgs) from boring location EJG-MW005. Downgradient from the Tri-Max training area, south hangar, cold storage building, soil was sampled from the surface soil (0 to 2 feet bgs), shallow subsurface soil (13 to 15 feet bgs), and deep subsurface soil (34 to 36 feet bgs, 59 to 61 feet bgs, and 35 to 37 feet bgs) from boring locations EJG-MW001, EJG-MW002, and EJG-MW003, respectively.

PFOS, PFOA, PFNA, PFHxS, and PFBS were detected in at least one surface soil sample at AOI 2. PFOS was detected in EJG-MW001, EJG-MW003, and EJG-MW002 at concentrations ranging from 1.11 µg/kg to 77.3 µg/kg, with the maximum concentration in the duplicate sample for EJG-MW001. Concentrations of PFOS in both the regular and duplicate samples for EJG-MW001 exceeded the SL. Positive detections of PFOA (EJG-MW001 and EJG-MW002), PFNA (EJG-MW001, EJG-MW002, and EJG-MW003), and PFHxS (EJG-MW001, EJG-MW002, and EJG-MW003) were below their SLs. PFBS was only detected at EJG-MW001 and was below the SL. There were no detections in surface soil at EJG-MW005.

PFOS, PFHxS, and PFBS were detected in one or more shallow soil samples at concentrations less than 1 µg/kg and below their SLs. PFOA and PFNA were not detected in any shallow subsurface soil at AOI 2.

PFOS and PFHxS were detected at concentrations less than 1 µg/kg and below their SLs in subsurface soil at AOI 2, and only at locations EJG-MW001 and EJG-MW002. PFOA, PFNA, and PFBS were not detected in subsurface soil at AOI 2.

6.4.2 AOI 2 Groundwater Analytical Results

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

East of the Tri-Max Training area, groundwater samples were collected from permanent monitoring well EJG-MW001. PFOS, PFOA, and PFHxS were detected above the SLs, at maximum concentrations of 698 ng/L, 7.31 ng/L, and 124 ng/L, respectively. PFBS was detected below the SL of 600 ng/L, with a maximum concentration of 7.31 ng/L. At EJG-MW001, PFNA was not detected.

East of the south hangar and cold storage building, groundwater samples were collected from permanent monitoring wells EJG-MW002, EJG-MW003, and EJG-MW005. PFOA, PFOS, PFHxS, and PFBS were detected below SLs in groundwater at all locations, with maximum concentrations of 1.52 J ng/L (EJG-MW003), 1.60 J ng/L (EJG-MW002), 28.6 ng/L (EJG-MW003) and 3.55 ng/L (EJG-MW002). PFNA was not detected in groundwater samples.

6.4.3 AOI 2 Conclusions

Based on the results of the SI, PFOA, PFOS, PFBS, PFHxS, and PFNA were detected in soil at AOI 2. PFOS exceeded the SL in surface soil at EJG-MW001. At location EJG-MW001, associated with the Tri-Max Training area and potentially the south hangar, PFOS, PFOA, and PFHxS were detected in groundwater, at concentrations exceeding the SLs. Based on the exceedances of the SL for PFOS in soil and exceedances of the SLs for PFOS, PFOA, and PFHxS in groundwater, further evaluation at AOI 2 is warranted.

6.5 AOI 3

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 3, which includes the armory dumpster fire potential release area. The results in soil and groundwater are presented in **Table 6-2** through **Table 6-5**. Soil and groundwater results are presented on **Figure 6-1** through **Figure 6-7**.

6.5.1 AOI 3 Soil Analytical Results

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

At the dumpster fire area, soil was sampled from surface soil (0 to 2 feet bgs) at AOI03-01, AOI03-02, and EJG-MW004. Soil was also sampled from shallow subsurface soil (13 to 15 feet bgs) and deep subsurface soil (39 to 41 feet bgs) from boring location EJG-MW004.

PFOA, PFOS, and PFNA were detected only in the surface soil samples from at least one location at AOI 3, at concentrations at least two orders of magnitude below the SLs. PFOA, PFOS, and PFNA were not detected in any shallow subsurface or subsurface soil samples. PFBS and PFHxS were not detected in any surface, shallow subsurface, or subsurface soil sample.

6.5.2 AOI 3 Groundwater Analytical Results

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

PFOA, PFOS, and PFBS were detected but did not exceed the SLs in groundwater collected from well EJG-MW004 at AOI 3. PFHxS and PFNA were not detected in groundwater samples collected from EJG-MW004. **Figure 6-4** presents the ranges of detections in groundwater. **Table 6-5** summarizes the detected compounds in groundwater.

Downgradient of the dumpster fire potential release area, groundwater was sampled from permanent monitoring well EJG-MW004. PFOA, PFOS, and PFBS were detected below the SLs at concentrations of 0.968 J ng/L, 0.786 J ng/L, and 0.985 J ng/L, respectively. PFHxS and PFNA were not detected in groundwater at AOI 3.

6.5.3 AOI 3 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFBS were detected only in surface soil at AOI 3 and at concentrations below the soil SLs. PFOA, PFOS, and PFBS were also detected in groundwater and at concentrations below SLs. Thus, further evaluation at AOI 3 is not warranted.

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Table 6-2
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil
Site Inspection Report, E.J. Garn Aviation Complex

Area of Interest		AOI01								AOI02									
Sample ID		AOI01-01-SB-00-02		EJG-MW006-SB-00-02		EJG-MW006-SB-00-02-D		EJG-MW007-SB-00-02		EJG-MW001-SB-00-02		EJG-MW001-SB-00-02-D		EJG-MW002-SB-00-02		EJG-MW003-SB-00-02		EJG-MW005-SB-00-02	
Sample Date		10/26/2021		10/26/2021		10/26/2021		10/26/2021		10/26/2021		10/26/2021		10/26/2021		10/26/2021		11/01/2021	
Depth		0-2 ft		0-2 ft		0-2 ft		0-2 ft		0-2 ft		0-2 ft		0-2 ft		0-2 ft		0-2 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																			
PFBS	1900	ND	U	ND	U	ND	U	ND	U	ND	UJ	0.023	J	ND	U	ND	U	ND	U
PFHxS	130	1.84		0.528	J	0.448	J	0.057	J	2.13	J+	4.20	J+	0.192	J	0.232	J	ND	U
PFNA	19	0.044	J	1.97		1.87		0.103	J	0.069	J	0.135	J	0.038	J	0.032	J	ND	U
PFOA	19	0.205	J	3.80		4.98		0.108	J	0.152	J	0.753	J	0.118	J	ND	U	ND	U
PFOS	13	4.55		53.6		51.2		1.15		23.8	J	77.3	J	1.11		2.23		ND	U

Grey Fill Detected concentration exceeded OSD Screening Levels

ND = Analyte not detected above the LOD. LOD values are presented in Appendix F.

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on residential scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

U = The analyte was not detected at a level greater than or equal to the adjusted DL

UJ = The analyte was not detected at a level greater than or equal to the adjusted DL. However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

PFBS	perfluorobutanesulfonic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
DL	detection limit
EJG	E.J. Garn Aviation Complex
ft	feet
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram

Table 6-2
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil
Site Inspection Report, E.J. Garn Aviation Complex

Area of Interest		AOI03					
Sample ID		AOI03-01-SB-00-02		AOI03-02-SB-00-02		EJG-MW004-SB-00-02	
Sample Date		10/25/2021		10/25/2021		10/25/2021	
Depth		0-2 ft		0-2 ft		0-2 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)							
PFBS	1900	ND	U	ND	U	ND	U
PFHxS	130	ND	U	ND	U	ND	U
PFNA	19	0.072	J	ND	U	0.032	J
PFOA	19	0.136	J	ND	U	ND	U
PFOS	13	0.447	J	0.225	J	0.220	J

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on residential scenario for direct ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

U = The analyte was not detected at a level greater than or equal to the adjusted DL

UJ = The analyte was not detected at a level greater than or equal to the adjusted DL. However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

PFBS	perfluorobutanesulfonic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
DL	detection limit
EJG	E.J. Garn Aviation Complex
ft	feet
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram

Table 6-3
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Shallow Subsurface Soil
Site Inspection Report, E.J. Garn Aviation Complex

Area of Interest		AOI01						AOI02								AOI03			
Sample ID		AOI01-01-SB-06-08		EJG-MW006-SB-13-15		EJG-MW007-SB-13-15		EJG-MW001-SB-13-15		EJG-MW002-SB-13-15		EJG-MW003-SB-13-15		EJG-MW005-SB-13-15		EJG-MW004-SB-13-15		EJG-MW004-SB-13-15-D	
Sample Date		10/26/2021		10/26/2021		11/09/2021		10/28/2021		11/02/2021		11/04/2021		11/01/2021		11/09/2021		11/09/2021	
Depth		6-8 ft		13-15 ft		13-15 ft		13-15 ft		13-15 ft		13-15 ft		13-15 ft		13-15 ft		13-15 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																			
PFBS	25000	ND	U	ND	U	ND	U	ND	UJ	ND	U	0.063	J	ND	U	ND	U	ND	U
PFHxS	1600	0.281	J	0.183	J	0.054	J	0.082	J	ND	U	0.147	J	ND	U	ND	U	ND	U
PFNA	250	ND	U	0.172	J	ND	U	ND	UJ	ND	U	ND	U	ND	U	ND	U	ND	U
PFOA	250	ND	U	1.69		ND	U	ND	UJ	ND	U	ND	U	ND	U	ND	U	ND	U
PFOS	160	0.213	J	7.60		0.130	J	0.226	J	ND	U	0.161	J	0.070	J	ND	U	ND	U

Grey Fill Detected concentration exceeded OSD Screening Levels

ND = Analyte not detected above the LOD. LOD values are presented in Appendix F.

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

UJ = The analyte was not detected at a level greater than or equal to the adjusted DL. However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

PFBS	perfluorobutanesulfonic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
DL	detection limit
EJG	E.J. Garn Aviation Complex
ft	feet
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram

Table 6-4
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Deep Subsurface Soil
Site Inspection Report, E.J. Garn Aviation Complex

Area of Interest	AOI01				AOI02								AOI03	
Sample ID	EJG-MW006-SB-33-35		EJG-MW007-SB-27-29		EJG-MW001-SB-34-36		EJG-MW002-SB-59-61		EJG-MW003-SB-35-37		EJG-MW005-SB-25-27		EJG-MW004-SB-39-41	
Sample Date	10/26/2021		11/09/2021		10/28/2021		11/04/2021		11/09/2021		11/01/2021		11/09/2021	
Depth	33-35 ft		27-29 ft		34-36 ft		59-61 ft		35-37 ft		25-27 ft		39-41 ft	
Analyte	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**	**Result**	**Qual**
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)														
PFBS	ND	UJ	ND	U	ND	UJ	ND	U	ND	U	ND	U	ND	U
PFHxS	ND	UJ	ND	U	0.095	J	0.212	J	ND	U	ND	U	ND	U
PFNA	ND	UJ	ND	U	ND	UJ	ND	U	ND	U	ND	U	ND	U
PFOA	0.139	J	ND	U	ND	UJ	ND	U	ND	U	ND	U	ND	U
PFOS	0.704	J	ND	U	0.093	J	0.256	J	ND	U	ND	U	ND	U

ND = Analyte not detected above the LOD. LOD values are presented in Appendix F.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

UJ = The analyte was not detected at a level greater than or equal to the adjusted DL. However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

PFBS	perfluorobutanesulfonic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid

Acronyms and Abbreviations

AASF	Army Aviation Support Facility
AOI	Area of Interest
DL	detection limit
EJG	E.J. Garn Aviation Complex
ft	feet
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
µg/kg	micrograms per kilogram

Table 6-5
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Groundwater
Site Inspection Report, E.J. Garn Aviation Complex

Area of Interest		AOI01				AOI02										AOI03	
Sample ID		EJG-MW006-110321		EJG-MW007-111021		EJG-MW001-110321		EJG-MW001-110321-D		EJG-MW002-110921		EJG-MW003-111021		EJG-MW005-110421		EJG-MW004-111221	
Sample Date		11/03/2021		11/10/2021		11/03/2021		11/03/2021		11/09/2021		11/10/2021		11/04/2021		11/12/2021	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Water, LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)																	
PFBS	601	4.53		3.86	J	12.8		12.5		3.55	J	3.30	J	2.62	J	0.985	J
PFHxS	39	7.58		7.98		123		124		2.31	J	28.6		5.49		ND	U
PFNA	6	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PFOA	6	2.42	J	1.37	J	7.18		7.31		1.33	J	1.52	J	1.30	J	0.968	J
PFOS	4	5.30		1.54	J	693		698		1.60	J	0.910	J	0.890	J	0.786	J

Grey Fill — Detected concentration exceeded OSD Screening Levels

ND = analyte not detected above the LOD. LOD values are presented in Appendix F.

References

a. Assistant Secretary of Defense, July 2022. Risk Based Screening Levels Calculated for PFOA, PFOS, PFBS, PFHxS, and PFNA in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1, May 2022 Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

Interpreted Qualifiers

J = Estimated concentration

U = The analyte was not detected at a level greater than or equal to the adjusted DL

UJ = The analyte was not detected at a level greater than or equal to the adjusted DL. However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

PFBS	perfluorobutanesulfonic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
DL	detection limit
EJG	E.J. Garn Aviation Complex
GW	groundwater
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
USEPA	United States Environmental Protection Agency
ng/l	nanogram per liter

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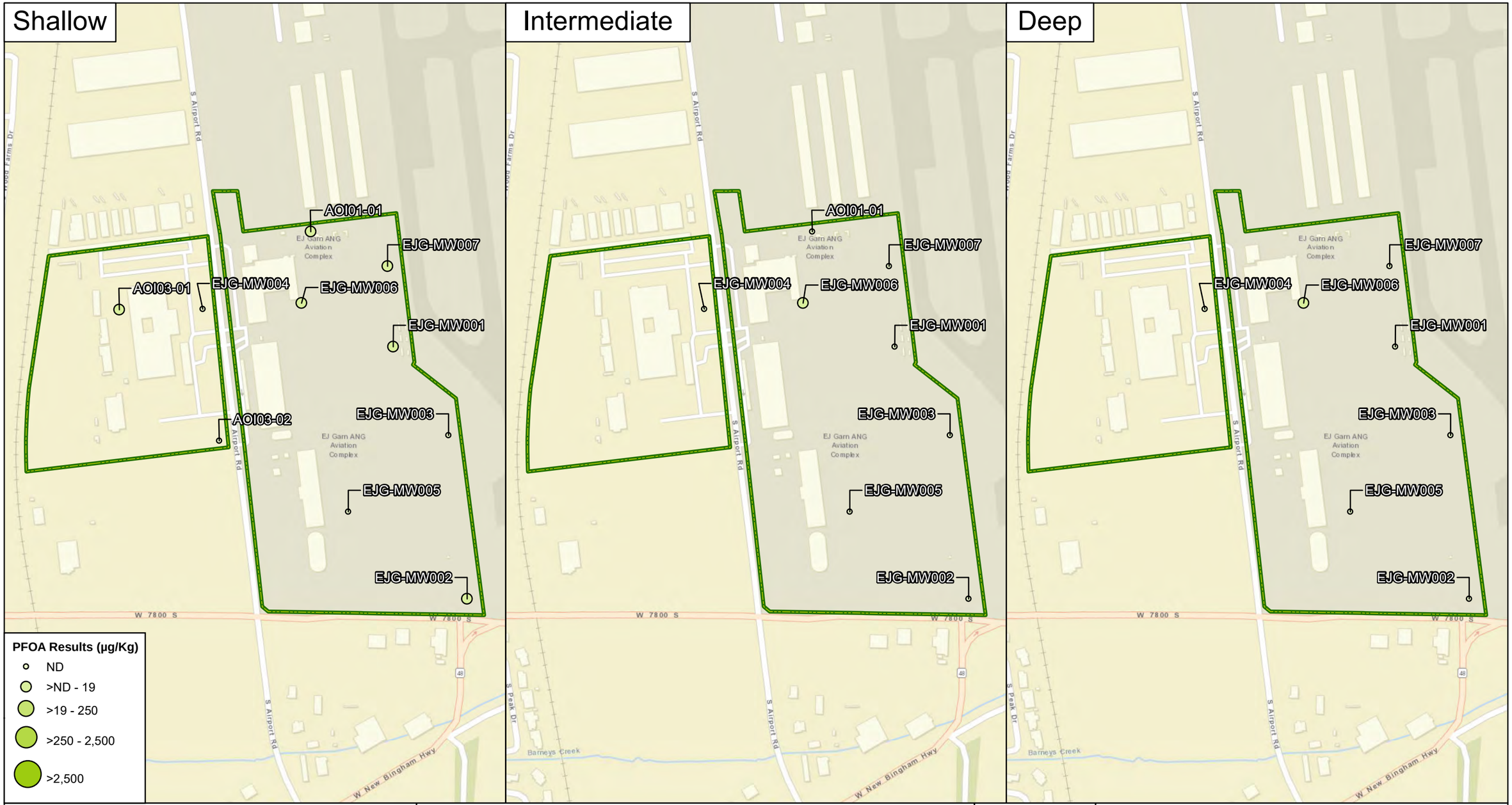

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SCALE		CHK BY	AD	8/11/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	8/11/2022

Legend

Facility Boundary

0 230 460 920 Feet

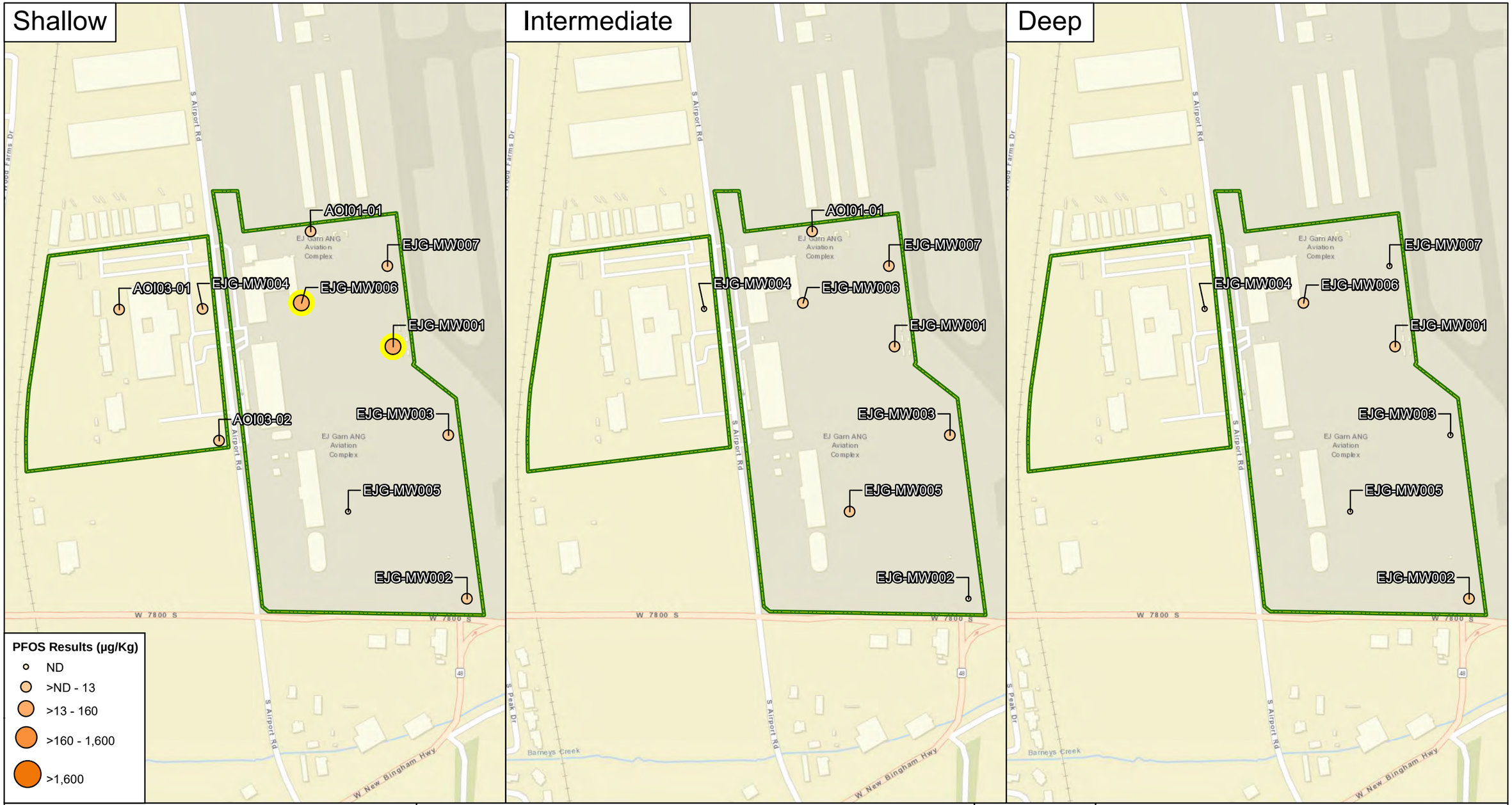
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

PFOA Detections in Soil

AECOM 12420 Milestone Center Drive Germantown, MD 20876

Figure 6-1



CLIENT	ARNG			
PROJECT	Site Inspection at E.J. Garn Aviation Complex, UT			
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SCALE		CHK BY	AD	8/11/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	8/11/2022

Legend

Facility Boundary

0 230 460 920 Feet

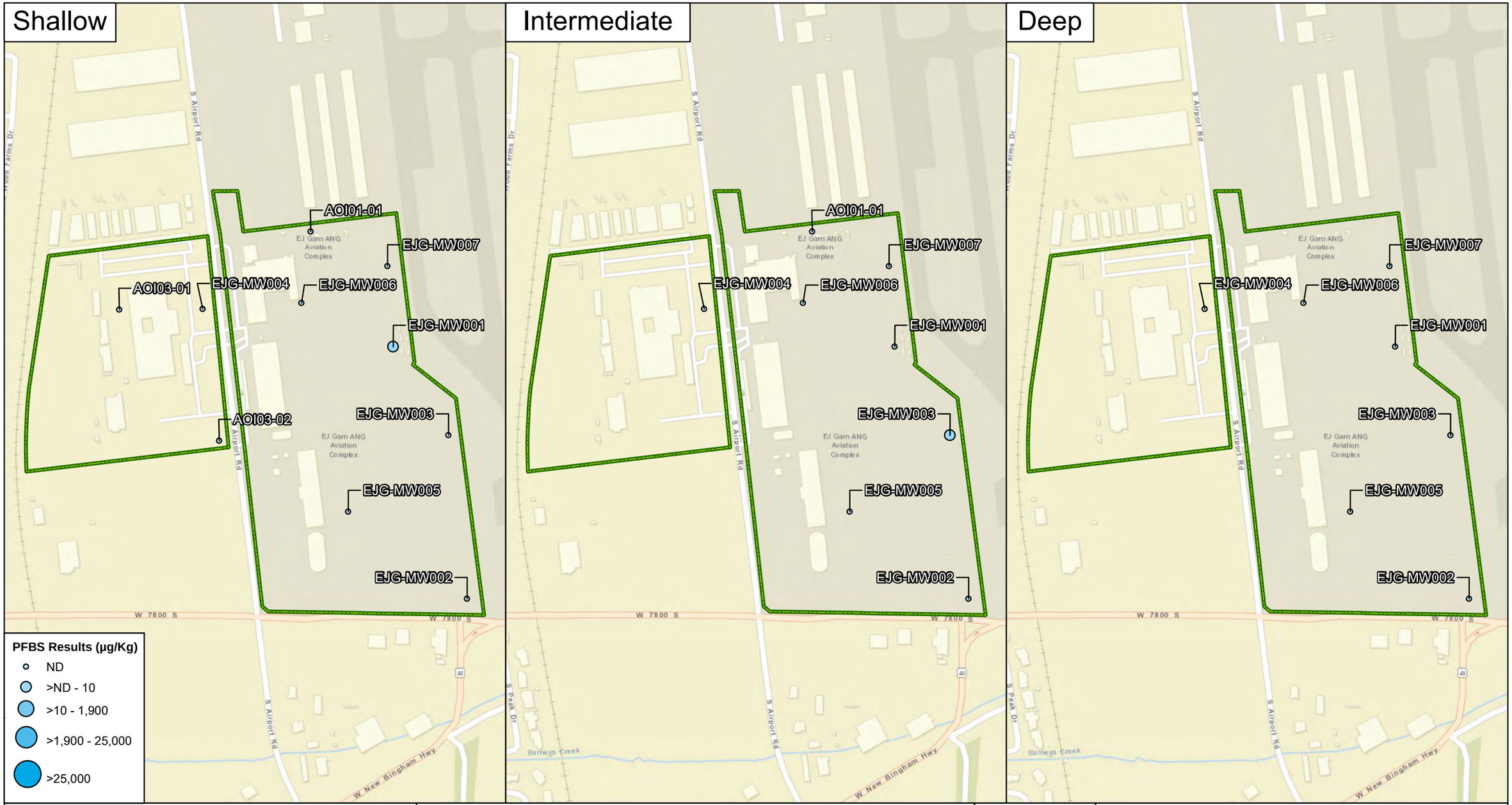
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

PFOS Detections in Soil

AECOM 12420 Milestone Center Drive Germantown, MD 20876

Figure 6-2



CLIENT	ARNG			
PROJECT	Site Inspection at E.J. Garn Aviation Complex, UT			
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SCALE		CHK BY	AD	8/11/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	8/11/2022

Legend

Facility Boundary

0 230 460 920 Feet

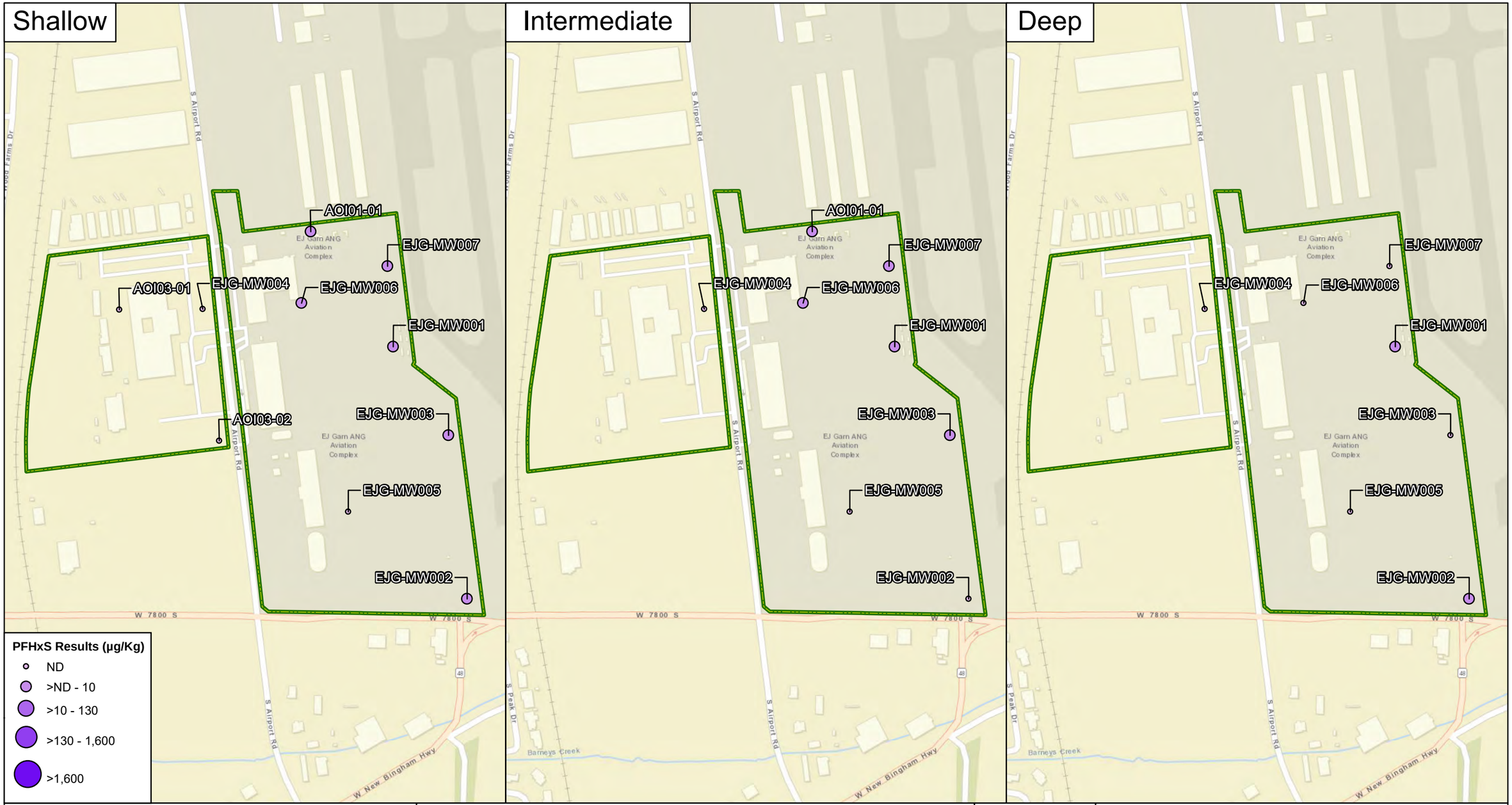
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

PFBS Detections in Soil

AECOM 12420 Milestone Center Drive Germantown, MD 20876

Figure 6-3



CLIENT	ARNG			
PROJECT	Site Inspection at E.J. Garn Aviation Complex, UT			
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Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	8/11/2022

Legend

Facility Boundary

0 230 460 920 Feet

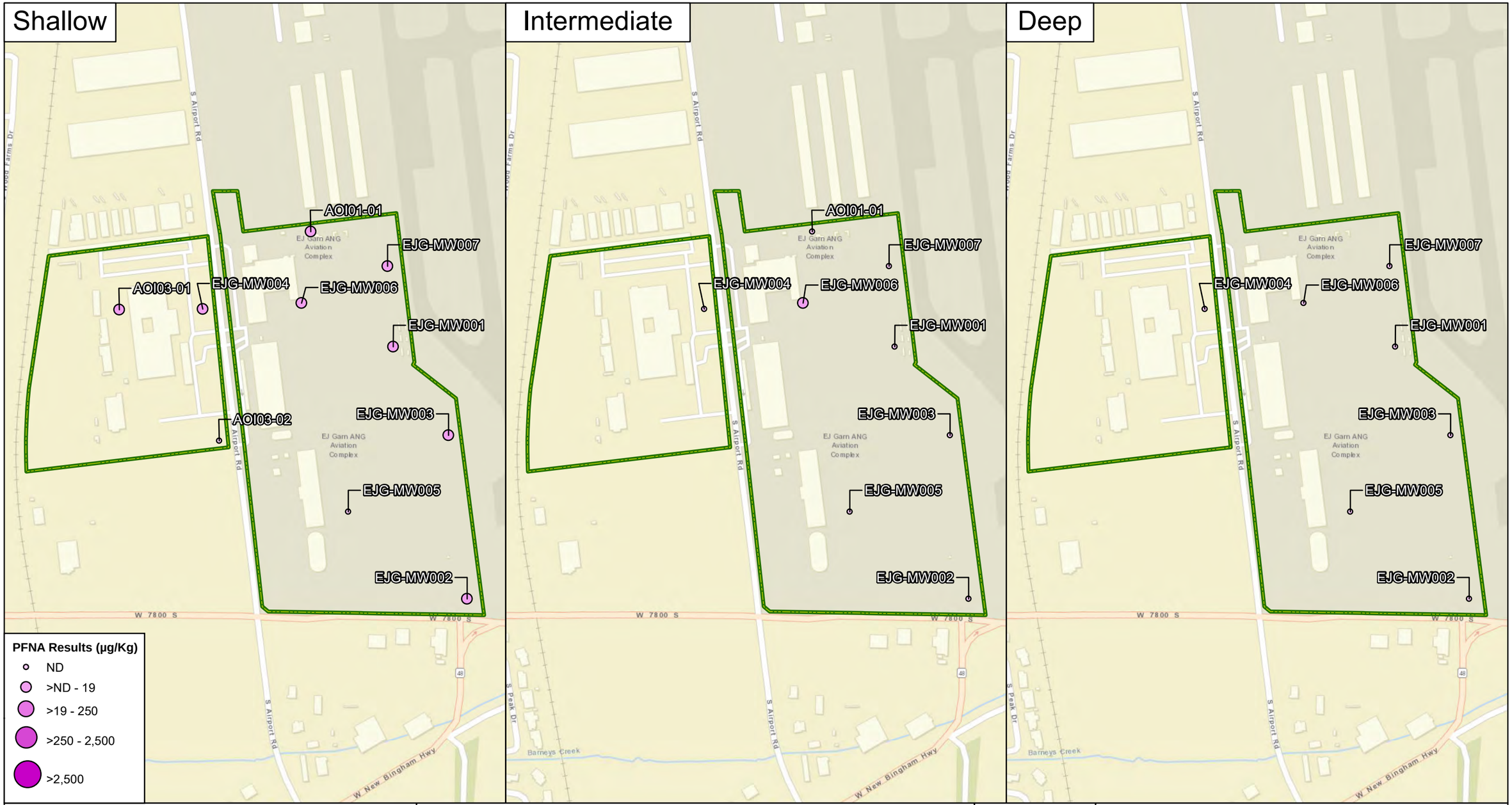
Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

PFHxS Detections in Soil

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-4



CLIENT	ARNG			
PROJECT	Site Inspection at E.J. Garn Aviation Complex, UT			
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Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	8/11/2022

Legend

Facility Boundary

0 230 460 920 Feet

Exceedances of the OSD SL are depicted with a yellow halo.
Depth intervals shown represent respective sampling position within a given soil boring location.

N

PFNA Detections in Soil

AECOM 12420 Milestone Center Drive Germantown, MD 20876

Figure 6-5

PFOA

PFOS

PFBS

EJG-MW007
EJG-MW006
EJG-MW004
EJG-MW001
EJG-MW003
EJG-MW005
EJG-MW002

EJ Garn ANG Aviation Complex
S Airport Rd
Wood Farms Dr
7800 S
W 7800 S
W New Bingham Hwy
48

PFOA Results (ng/L)
- ND
- >ND - 6
- >6 - 40
- >40 - 70
- >70

PFOS Results (ng/L)
- ND
- >ND - 4
- >4 - 40
- >40 - 70
- >70

PFBS Results (ng/L)
- ND
- >ND - 100
- >100 - 601
- >601 - 2,000
- >2,000

CLIENT	ARNG			
PROJECT	Site Inspection at E.J. Garn Aviation Complex, UT			
REVISED	10/5/2022	GIS BY	MS	10/5/2022
SCALE		CHK BY	AD	10/5/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	10/5/2022

Legend
- Facility Boundary
- Groundwater Flow Direction
- Inferred Groundwater Flow Direction

0 230 460 920 Feet

Exceedances of the OSD SL are depicted with a yellow halo.

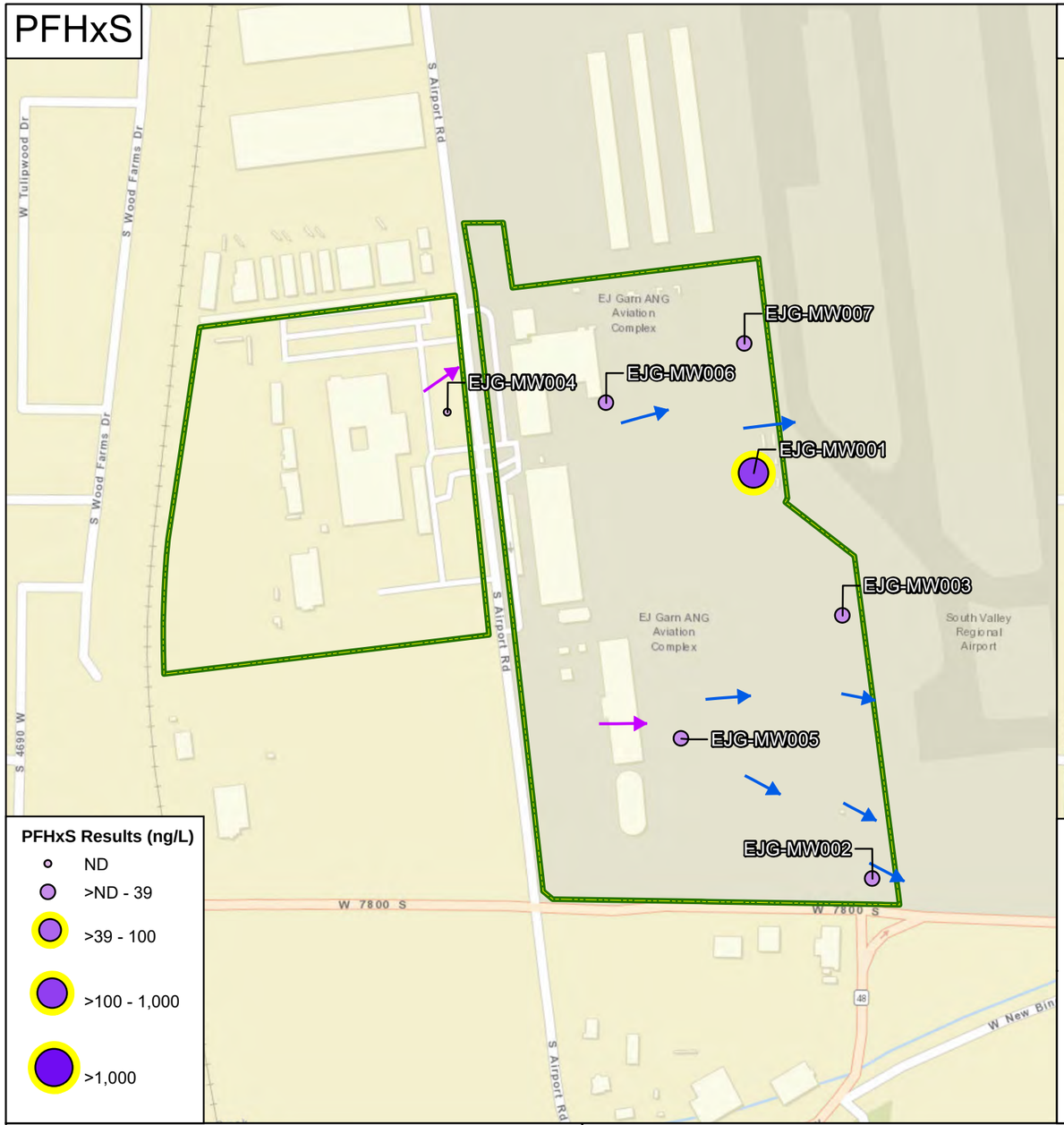
N

PFOA, PFOS, and PFBS Detections in Groundwater

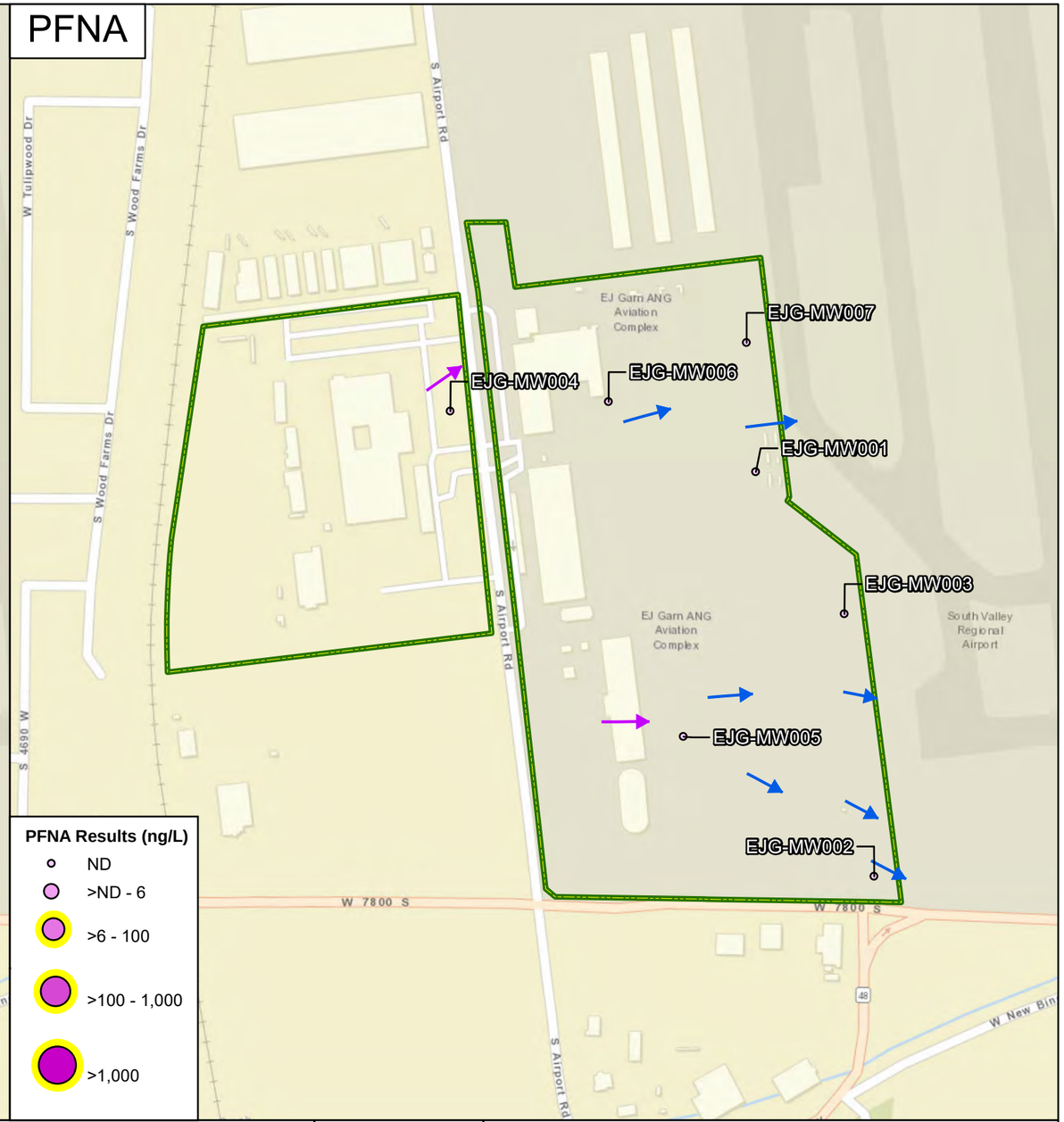
AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-6

PFHxS



PFNA



CLIENT	ARNG			
PROJECT	Site Inspection at E.J. Garn Aviation Complex, UT			
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SCALE		CHK BY	AD	8/11/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	8/11/2022

Legend

- Facility Boundary
- Groundwater Flow Direction
- Inferred Groundwater Flow Direction

0 200 400 800 Feet

N

Exceedances of the OSD SL are depicted with a yellow halo.

PFHxS and PFNA Detections in Groundwater

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-7

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7. Exposure Pathways

The CSMs for each AOI, revised based on the SI findings, are presented on **Figure 7-1** through **Figure 7-3**. Please note that while the CSM discussion assists in determining if a receptor may be impacted, the decision to move from SI to RI or interim action is determined 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:

1. Contaminant source;
2. Environmental fate and transport;
3. Exposure point;
4. Exposure route; and
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 an incomplete 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 CSMs indicate whether potentially complete exposure pathways may exist, the recommendation for future study in a 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 ingestion and inhalation. 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 in soil were used to determine whether a potentially complete pathway exists between the source and potential receptors at AOI 1, AOI 2, and AOI 3 based on the aforementioned criteria.

7.1.1 AOI 1

AFFF may have been released at AOI 1 at the firetruck bay/foam storage area and the wash down area. In addition, potential discharges of AFFF in the firetruck bay could have released AFFF to the dry well for an unknown time period prior to 2009. PFOA, PFOS, PFHxS, and PFNA were detected in surface and subsurface soil at AOI 1, and PFOS exceeded the SL in surface soil.

Based on the results of the SI in AOI 1, ground-disturbing activities could potentially result in site worker, construction worker, or trespasser exposure to constituents via inhalation of dust. Additionally, off-facility recreational users may potentially be exposed to constituents via inhalation of dust caused by on-facility ground disturbing activities. Ground-disturbing activities could also potentially result in site worker, construction worker, or trespasser exposure via ingestion of surface soil. Lastly, the exposure pathway to construction workers via subsurface soil ingestion is considered potentially complete. The CSM for AOI 1 is presented on **Figure 7-1**.

7.1.2 AOI 2

From approximately 1991 to 2016, releases of the AFFF fire suppression systems in the South Hangar and Cold Storage Area resulted in AFFF being pushed onto the Hangar/Ramp Area concrete and left in place to evaporate or disperse with the wind. In addition, fire training activities were conducted around the Hangar/Ramp Area from at least 1995 to 1999, and emergency responses using foam may have occurred on the same area since 1989. PFOA, PFOS, PFBS, PFHxS, and PFNA were detected in soil at AOI 2, and PFOS exceeded its SL in surface soil.

Based on the results of the SI in AOI 2, ground-disturbing activities could potentially result in site worker, construction worker, or trespasser exposure to constituents via inhalation of dust. Additionally, off-facility recreational users may potentially be exposed via inhalation of dust caused by on-facility ground disturbing activities. Ground-disturbing activities could also potentially result in site worker, construction worker, or trespasser exposure via ingestion of surface soil. Lastly, the exposure pathway to construction workers via subsurface soil ingestion is considered potentially complete. The CSM for AOI 2 is presented on **Figure 7-2**.

7.1.3 AOI 3

In 1997 AFFF was released to soil at AOI 3 from a mobile AFFF unit in response to a dumpster fire at the Armory. PFOA, PFOS, and PFNA were detected in surface soil at AOI 3, at concentrations below the SLs. No constituent was detected in shallow subsurface or subsurface soils at AOI 3.

Based on the results of the SI in AOI 3, ground-disturbing activities could potentially result in site worker, construction worker, or trespasser exposure to PFOA and PFOS via inhalation of dust. Additionally, off-facility recreational users may potentially be exposed to PFOA and PFOS via inhalation of dust caused by on-facility ground disturbing activities. Ground-disturbing activities could also potentially result in site worker, construction worker, or trespasser exposure via ingestion of surface soil. The exposure pathway to construction workers via subsurface soil ingestion is considered incomplete due to no detections of relevant constituents in subsurface soil at AOI 3. The CSM for AOI 3 is presented on **Figure 7-3**.

7.2 Groundwater Exposure Pathway

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

7.2.1 AOI 1

PFOS was detected above its SL in groundwater at AOI 1. It is unknown whether offsite potable wells are located downgradient of AOI 1; therefore, the ingestion exposure pathway for off-facility residents and off-facility recreational users is considered potentially complete. E.J. Garn receives its potable water from the Jordan Valley Water Conservancy District. Twenty percent of Jordan Valley Water's supply is groundwater, pumped from wells scattered around the Salt Lake Valley (JVWCD, 2022). Therefore, the ingestion exposure pathway for site workers and trespassers is

considered potentially complete. Depths to water measured in November 2021 during the SI ranged from 26.61 to 60.16 feet bgs, deeper than the maximum depth of 15 feet bgs reasonably considered for construction activities. Therefore, the ingestion exposure pathway for future construction workers is considered incomplete. The CSM for AOI 1 is presented on **Figure 7-1**.

7.2.2 AOI 2

PFOS, PFOA, and PFHxS were detected in groundwater at AOI 2 at concentrations that exceeded the SLs. Records indicate there may be offsite potable wells located downgradient of AOI 2; therefore, the ingestion exposure pathway for off-facility residents and off-facility recreational users is considered potentially complete. E.J. Garn receives its potable water from the Jordan Valley Water Conservancy District. Twenty percent of Jordan Valley Water's supply is groundwater, pumped from wells scattered around the Salt Lake Valley (JVWCD, 2022). Therefore, the ingestion exposure pathway for site workers and trespassers is considered potentially complete. Depths to water measured in November 2021 during the SI ranged from 26.61 to 60.16 feet bgs, deeper than the maximum depth of 15 feet bgs reasonably considered for construction activities. Therefore, the ingestion exposure pathway for future construction workers is considered incomplete. The CSM for AOI 2 is presented on **Figure 7-2**.

7.2.3 AOI 3

PFOA, PFOS, and PFBS were detected, but did not exceed the SLs in groundwater at AOI 3. It is unknown whether offsite potable wells are located downgradient of AOI 3; therefore, the ingestion exposure pathway for off-facility residents and off-facility recreational users is considered potentially complete. E.J. Garn receives its potable water from the Jordan Valley Water Conservancy District. Twenty percent of Jordan Valley Water's supply is groundwater, pumped from wells scattered around the Salt Lake Valley (JVWCD, 2022). Therefore, the ingestion exposure pathway for site workers and trespassers is considered potentially complete. Depths to water measured in November 2021 during the SI ranged from 26.61 to 60.16 feet bgs, deeper than the maximum depth of 15 feet bgs reasonably considered for construction activities. Therefore, the ingestion exposure pathway for future construction workers is considered incomplete. The CSM for AOI 3 is presented on **Figure 7-3**

7.3 Surface Water and Sediment Exposure Pathway

The SI results in soil and groundwater, in combination with knowledge of the fate and transport properties of PFAS, were used to determine whether a potentially complete pathway exists between the source and potential receptors.

7.3.1 AOI 1, AOI 2, and AOI 3

PFAS are water soluble and can migrate readily from soil to surface water via leaching and runoff. Because constituents were detected in soil and groundwater at AOIs 1, 2, and 3, it is possible that those compounds may have migrated from soil and groundwater east to the detention pond/sedimentation basin, as well as the Jordan River, which flows in a north to south direction to the recreational Utah Lake. According to the Industrial Stormwater Pollution Prevention Plan for the facility, stormwater from the facility enters Barney's Creek along the southerly perimeter, although the creek was observed to be dry during the investigation. Due to the potential for seasonal surface water, surface water and sediment ingestion exposure pathway for site workers, construction workers, or trespassers is considered potentially complete. Due to potential use of the Jordan River and Utah Lake, the surface water and sediment ingestion exposure pathway for off-facility residents and recreational users is also considered potentially complete. The CSMs for AOIs 1, 2, and 3 are presented on **Figure 7-1, 7-2, and 7-3**, respectively.

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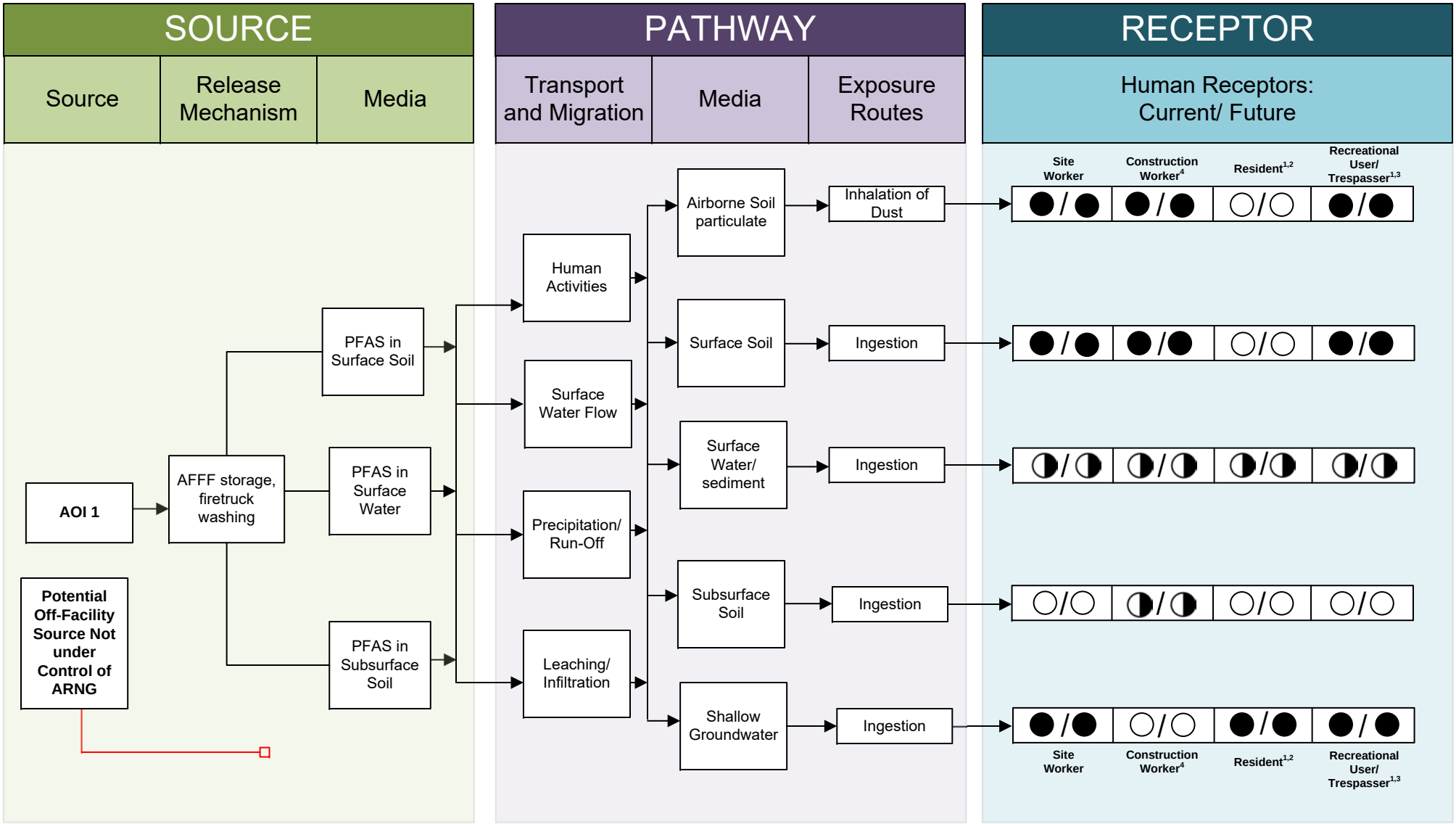


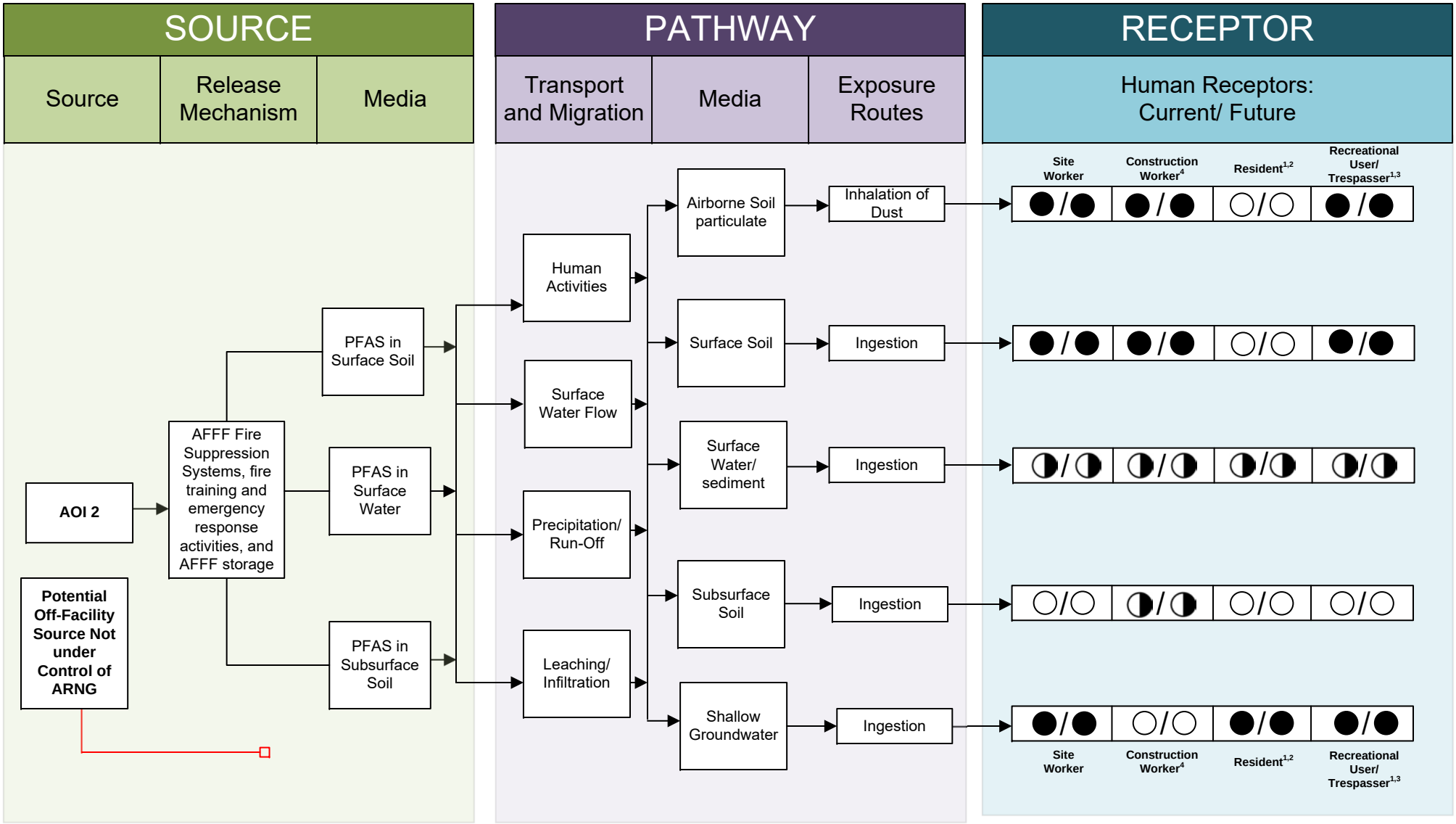
LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.
4. Active construction within AOI 1 was occurring as of the date of SI field work..

Figure 7-1
Conceptual Site Model, AOI 1
EJ Garn Aviation Complex



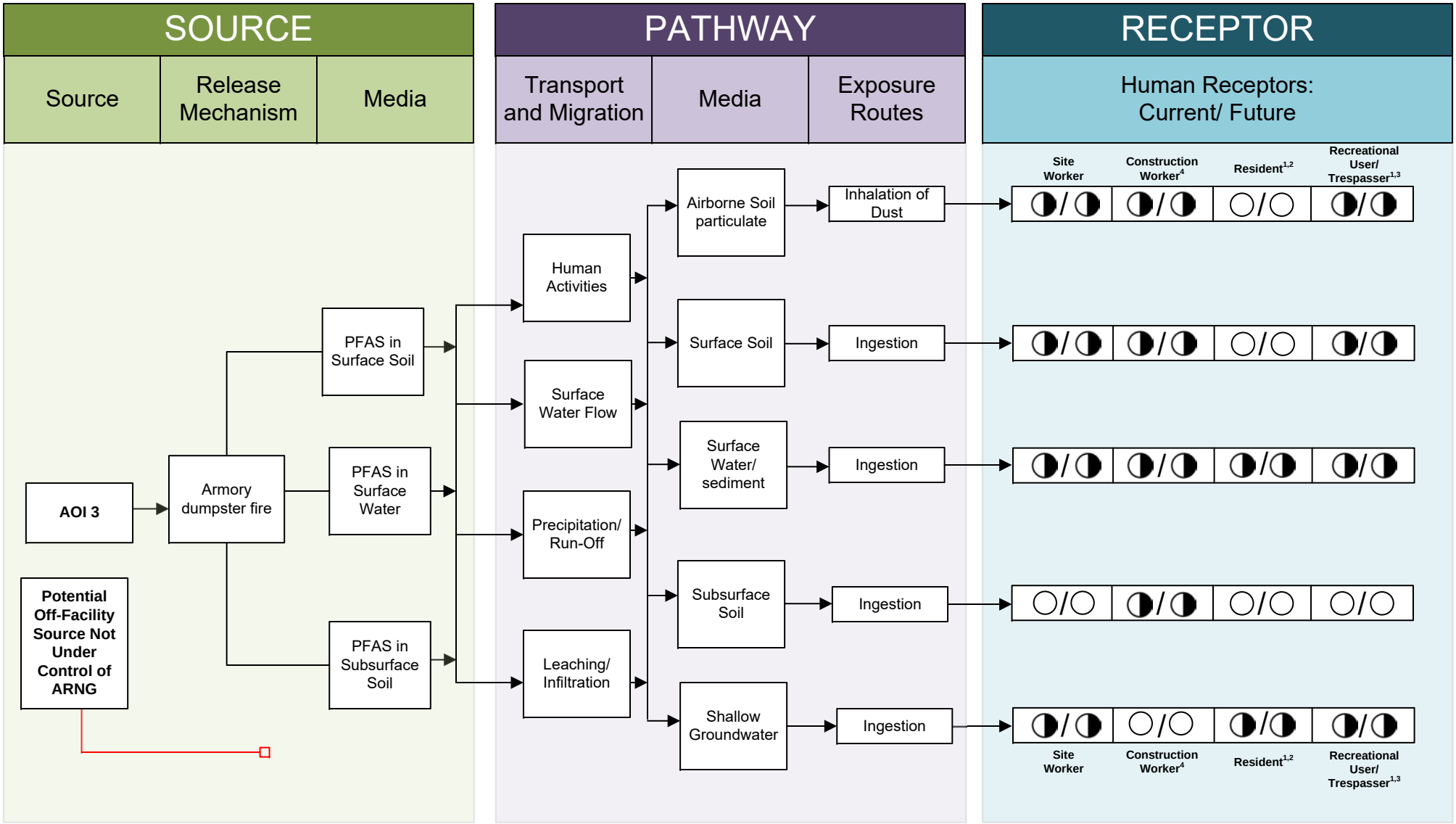
LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.
4. Active construction within AOI 1 was occurring as of the date of SI field work..

Figure 7-2
Conceptual Site Model, AOI 2
EJ Garn Aviation Complex



LEGEND

- Flow-Chart Stops
- Flow-Chart Continues
- Partial / Possible Flow
- Incomplete Pathway
- Potentially Complete Pathway
- Potentially Complete Pathway with Exceedance of SL

NOTES

1. The resident and recreational users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.
3. Human consumption of fish potentially affected by PFAS is possible.
4. Active construction within AOI 1 was occurring as of the date of SI field work..

Figure 7-3
Conceptual Site Model, AOI 3
EJ Garn Aviation Complex

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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 SI Activities

The SI field activities were conducted from 25 October to 10 November 2021 and consisted of utility clearance, hollow stem auger drilling, sonic drilling, soil sample collection, permanent monitoring well installation, grab groundwater sample collection, and land surveying. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2021a), except as previously noted in **Section 5.8**.

To fulfill the project DQOs set forth in the approved SI QAPP Addendum (AECOM, 2021a), samples were collected and analyzed for a subset of 18 compounds by LC/MS/MS compliant with QSM 5.3 Table B-15 as follows.

- Twenty-five (25) soil samples from ten (10) boring locations;
- Seven (7) grab groundwater samples from seven (7) permanent wells; and
- Twenty-one (21) QA 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 CSMs were refined to assess whether a potentially complete pathway exists between the source and potential receptors for potential exposure at the AOIs, which are described in **Section 7**.

8.2 Outcome

Based on the results of this SI, further evaluation under CERCLA is warranted in an RI for AOI 1 and AOI 2; no further evaluation is warranted for AOI 3 at this time (see **Table 8-1**). Based on the CSMs developed and revised in light of the SI findings, there is potential for exposure to drinking water receptors from AOI 1 and AOI 2 from sources on the facility resulting from historical DoD activities. Sample analytical concentrations collected during the SI were compared against the project SLs in soil and groundwater, as described in **Table 6-1**. A summary of the results of the SI data relative to the SLs is as follows:

- At AOI 1:
    - PFOS in surface soil exceeded its SL of 13 µg/kg, with a concentration of 53.6 µg/kg at EJG-MW006. PFOA, PFBS, PFHxS, and PFNA in soil at AOI 1 were below their respective SLs.
    - PFOS in groundwater exceeded its SL of 4 ng/L, with a maximum concentration of 5.3 ng/L at location EJG-MW006. PFOA, PFBS, PFHxS, and PFNA in groundwater at AOI 1 were below their respective SLs. Based on the results of the SI, further evaluation of AOI 1 is warranted in the RI.

- At AOI 2:
    - PFOS in surface soil exceeded its SL of 13 µg/kg, with a maximum concentration of 77.3 µg/kg at EJG-MW001. PFOA, PFBS, PFHxS, and PFNA in surface, shallow subsurface, and subsurface soil at AOI 2 were below their respective SLs. PFOS in shallow subsurface and subsurface soil was below the SL. Based on the results of the SI, further evaluation of AOI 2 is warranted in the RI.
    - PFOS, PFOA, and PFHxS were detected in groundwater at AOI 2 at concentrations that exceeded their respective SLs of 4 ng/L, 6 ng/L, and 39 ng/L, with maximum concentrations of 698 ng/L, 7.31 ng/L, and 124 ng/L, respectively, at EJG-MW001. PFBS and PFNA in groundwater at AOI 2 were below their SLs. Based on the results of the SI, further evaluation of AOI 2 is warranted in the RI.
- At AOI 3:
    - Detected concentrations of PFOA, PFOS, PFHxS, PFNA and PFBS in groundwater were below SLs. Based on the results of the SI, no further evaluation of AOI 3 is warranted.
    - The detected concentrations of PFOA, PFOS, PFHxS, PFNA and PFBS in soil at AOI 3 were below their respective SLs.

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 an 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	North Hangar	●	●	●	Proceed to RI
	Dry Well	●	N/A	N/A	
2	Hangar/Ramp Area	●	●	●	Proceed to RI
	Tent Storage Area	●	●	●	
3	Armory Dumpster Fire	◐	◐	◐	No Further Action

Legend:
N/A = not applicable
● = detected; exceedance of the screening levels
◐ = detected; no exceedance of the screening levels
○ = not detected

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