FINAL
Site Inspection Report
Johnstown Army Aviation Support Facility #2
Johnstown, Pennsylvania

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

August 2023

Prepared for:

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

UNCLASSIFIED

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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
AMEC	AMEC Earth & Environmental, Inc.
amsl	above mean sea level
AOI	Area of Interest
ARFF	Aircraft Rescue and Fire Fighting
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
DoD	Department of Defense
DQO	data quality objective
DUA	data usability assessment
EDR™	Environmental Data Resources, Inc.™
EIS	extraction internal standards
ELAP	Environmental Laboratory Accreditation Program
EM	Engineer Manual
FAA	Federal Aviation Administration
FedEx	Federal Express
GIS	Geographic Information System
GPS	Global positioning system
GPRS	Ground Penetrating Radar Systems
HDPE	high-density polyethylene
HFPO-DA	hexafluoropropylene oxide dimer acid
IDW	investigation-derived waste
ITRC	Interstate Technology Regulatory Council
JCC	Johnstown-Cambria County
JCCA	Johnstown-Cambria County Airport
LC/MS/MS	liquid chromatography with tandem mass spectrometry
MIL-SPEC	military specification
MS/MSD	matrix spike/ matrix spike duplicate
NAVD88	North American Vertical Datum 1988
NELAP	National Environmental Laboratory Accreditation Program
ng/L	nanograms per liter
OSD	Office of the Secretary of Defense
PA	Preliminary Assessment

PAANG	Pennsylvania Air National Guard
PAARNG	Pennsylvania Army National Guard
PADEP	Pennsylvania Department of Environmental Protection
PaGWIS	Pennsylvania Groundwater Information System
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
SI	Site Inspection
SL	screening level
SOP	standard operating procedure
TOC	total organic carbon
TPP	Technical Project Planning
UFP	Uniform Federal Policy
US	United States
USACE	United States Army Corps of Engineers
USACHPPM	United States Army Center for Health Promotion and Preventive Medicine
USAEC	United States Army Environmental Command
USAR	United States Army Reserves
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USMCR	United States Marine Corps Reserve

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 Johnstown Army Aviation Support Facility (AASF) #2 in Johnstown, Pennsylvania 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. Johnstown AASF #2 will also be referred to as the "facility" throughout this document.

Johnstown AASF #2 is located in the northwestern portion of a parcel of land owned by the Johnstown-Cambria County Airport Authority, within the Richland and Conemaugh Townships in Cambria County, Pennsylvania. The facility is situated on property shared between United States (US) Army Reserves, Pennsylvania ARNG (PAARNG), and US Marine Corps Reserve and is used for administrative, training, mechanical/maintenance, and storage purposes. Johnstown AASF #2 serves as a PAARNG aviation maintenance and storage facility for rotary wing aircraft.

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. Given the level of uncertainty at AOI 3, additional sampling may be considered at this AOI during a future CERCLA phase.

[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	Future Action
1	Hangar Apron Areas	◐	●	Proceed to RI
2	Drainage Areas	●	○	Proceed to RI
3	Former Burn Area	◐	◐	No further action at this time

Legend:
● = 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 Johnstown Army Aviation Support Facility (AASF) #2 in Johnstown, Pennsylvania. The Johnstown AASF #2 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 Johnstown AASF #2 (AECOM Technical Services, Inc. [AECOM], 2020) 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

Johnstown AASF #2 is located in the northwestern portion of a parcel of land owned by the Johnstown-Cambria County Airport (JCCA) Authority, within the Richland and Conemaugh Townships in Cambria County, Pennsylvania. The facility is approximately 5 miles east of the City of Johnstown and 2 miles north of the intersection of Highway 219 and Highway 56. **Figure 2-1** illustrates the location of Johnstown AASF #2; however, property boundaries are approximate, based on Geographic Information System (GIS) database information provided by PAARNG, and may not reflect all informal property agreements.

The JCCA is a joint civil and military airport, with the military comprising approximately 37 percent (%) of all operations (US Army Center for Health Promotion and Preventive Medicine [USACHPPM], 2006). Military occupants include PAARNG, Pennsylvania Air National Guard (PAANG), the US Army Reserves (USAR), the US Marine Corps, and the US Marine Corps Reserve (USMCR) (Army Public Health Center, 2018). In 1991, the US Government entered into a long-term lease agreement with the JCCA Authority for the acquirement of approximately 70 acres at the JCC; the lease has since been amended by several supplemental lease agreements. The USAR began construction of an Army Reserve Center Building on the facility property in 1997. The PAARNG AASF #2 was located in Washington, Pennsylvania at the time but then relocated to the USAR ASF in 1997 (USACHPPM, 2006). Operational usage of the property was shared between three military divisions: USAR, PAARNG, and USMCR. The PAANG is located on separate property across the airport runway. In 2010, the PAARNG occupation was formalized in a land lease agreement between the Secretary of the Army and the Commonwealth of Pennsylvania that designated three buildings, a 3,247-square yard parking apron, and a 50,000-square yard hangar apron for use by PAARNG. The land occupied by PAARNG is on a portion of the land leased under the aforementioned lease with the Johnstown-Cambria County (JCC) Authority. Both agreements are active and expire in 2051, although they may be extended every 10 years until 2081. The total acreage currently being leased and used by these three military organizations is 106.502 acres.

2.2 Facility Environmental Setting

The JCCA is situated on a plateau that is a regional topographic high in the Allegheny Mountains; therefore, surface water and presumably unconfined groundwater generally move radially from this position. The surrounding topography is characterized by steep slopes and gently rolling hills (**Figure 2-2**). Locally, elevations range from 1,880 feet above mean sea level (amsl) to 2,278 feet amsl. The facility sits at an elevation of 2,253 feet amsl and generally slopes to the northwest.

The facility is northwest of the JCCA Runway 15/33. The area surrounding the JCCA is predominantly undeveloped, wooded land, but the area has been zoned for office commercial, light industrial, manufacturing, and single-family residential use (USACHPPM, 2006). Scattered residential homes are located to the west and northwest. Agricultural lands are located beyond the JCCA property to the east.

2.2.1 Geology

Johnstown AASF #2 is located within the Allegheny Mountain Section of the Appalachian Plateau physiographic province, which is characterized by wide ridges separated by broad valleys and increasing ridge elevations to the south (Commonwealth of Pennsylvania, 2018). The Ebensburg anticline runs north to south and approximately bisects the JCCA (National Park Service, 2018).

The surface soils at the facility are primarily disturbed and composed of fill material from airport construction activities. Within the area, the majority of the original soils are from the Cookport-Hazelton-Laidig Association. These soils are formed in residual and colluvial materials and have moderately well- to well-drained, deep to moderately deep, and channery loam characteristics (AMEC Earth & Environmental, Inc. [AMEC], 2003).

According to a 1994 geotechnical survey of the Johnstown AASF #2 property, the overburden consists of a mixture of organic soil with sands, clay, and silty clay and has a thickness ranging from 0.5 to 14 feet below ground surface (bgs); however, much of the overburden has since been disturbed by construction activities (AMEC, 2003). The underlying bedrock belongs to the Pennsylvanian-age Conemaugh Group, which is subdivided into the sedimentary bedrock units of the Casselman and Glenshaw Formations. The facility sits squarely on the Glenshaw Formation according to a geologic map of Cambria County (McElroy, 1993). The Saltsburg member is the primary sandstone unit within the Glenshaw Formation and is prevalent in the hills and ridges east of Johnstown. The Conemaugh Group is nearly 1,000 feet thick and consists mainly of shales and sandstones and some beds of limestone. The Allegheny Formation underlies the Conemaugh Group and includes the top of the Upper Freeport coal bed to the base of the Brooksville coal bed. The thickness of the Allegheny Formation is between 220 and 290 feet (Phalen and Martin, 1911). The youngest-age deposits are the Quaternary alluvium deposits along the Conemaugh River and its tributaries (National Park Service, 2018) (**Figure 2-3**).

Starting with the eastern most boring locations (JTN-AOI01-03, JTN-AOI01-02, and JTN-AOI01-01 – from east to west), bedrock was observed (based on pulverized rock due to the sonic drilling) between 1 and 2 feet bgs. No limestone was observed in any of these three borings, and weathered shale was documented in the western most location (JTN-AOI01-01) in the bottom 8 feet, corresponding to an elevation of 2,207 to 2,199 feet North American Vertical Datum 1988 (NAVD88). Moving westward, bedrock was encountered in boring location JTN-AOI02-02 at 15 feet bgs (elevation 2,203 feet NAVD88). Sandstone red beds (13 feet thick) were observed in this boring starting at 55 feet bgs (elevation 2,163 feet NAVD88), followed by 5 feet of gray to black claystone and shale and ending with 2 feet of red beds (sandstone) at an elevation of 2,143 feet NAVD88. The most westerly location (JTN-AOI03-02) encountered bedrock at the deepest elevation (elevation of 2,132 feet NAVD88 or 57 feet bgs) of all the borings conducted. The bedrock encountered was not sandstone but appeared to be calcitic and was interpreted to be more likely limestone lithology.

Varying quantities of clay, silt, sand, and gravel were noted across all five borings. Specifically noted material included lean clay, silt, sandy silt (with/without gravel), clayey sand (with/without gravel), silty sand (with/without gravel), poorly graded sand, and weathered shale. These layers ranged in thicknesses from a few inches to 38.5 feet. Boring logs are presented in **Appendix E** and a bedrock surface map is presented in **Figure 2-4**.

2.2.2 Hydrogeology

The regional source for groundwater is the Pennsylvanian aquifer, which is part of the Appalachian Plateau aquifer system. The Appalachian Plateau aquifer system consists of alternating sequences of sandstone, shale, clay, coal, and limestone (US Geological Survey, 1997). Groundwater yields average about 50 gallons per minute from the Pennsylvanian aquifer, in which the Conemaugh Group is considered a productive water bearing unit due to the presence of sandstone (Skelly and Loy, Inc., 2010; AMEC, 2003). The coal beds and limestones that comprise the Appalachian Plateau aquifer system are also water bearing units but are not as productive as the sandstones (US Geological Survey, 1997).

An Environmental Data Resources, Inc.™ (EDR™) report conducted a well search for a 1-mile radius surrounding the facility. Using additional online resources, such as state and local GIS

databases, wells and water providers were researched to a 4-mile radius of the facility. Potable water at the facility is supplied by the Southwestern Cambria County Water Authority and the Greater Johnstown Water Authority. The Southwestern Cambria County Water Authority is a distribution system that purchases water from Highland Sewer and Water Authority (Southwestern Cambria County Water Authority, 2018). The Highland Sewer and Water Authority and the Greater Johnstown Water Authority have surface water intakes at the North Fork, Dalton Run, Beaverdam Run, Quemahoning, and Lloydell Reservoirs (AMEC, 2003; Highland Sewer and Water Authority, 2019). The closest reservoir to the facility (Dalton Run) is located approximately 8 miles to the southwest.

Several domestic wells were identified, from the Pennsylvania Groundwater Information System (PaGWIS) northeast and southeast of the facility, within 4 miles of the facility. Domestic wells are typically screened within the Conemaugh Group and have static water levels ranging from 28 to 70 feet bgs. Several monitoring wells at the JCC are located approximately 0.5 miles to the east and have static water level measurements ranging from 9 to 14 feet bgs, where bedrock was encountered at 3 to 5 feet bgs and the monitoring wells were screened below the bedrock (Pennsylvania Department of Conservation & Natural Resources, n.d.). The groundwater flow direction in the overburden likely follows the topographic gradient (generally trending west), but groundwater flow direction in the bedrock is unknown (AMEC, 2003). During the SI, an existing well (designated JTN-AOI03-MW001) was discovered within AOI 3. No known well installation records were found for this well, but USAR personnel stated that this was a water supply well that was used for the concrete batch plant during airport tarmac construction. Groundwater features are presented on **Figure 2-3**.

Depths to water measured in August 2022 during the SI ranged from 27.92 to 119.96 feet bgs. Groundwater elevation contours from the SI are presented on **Figure 2-4** and indicate the groundwater flow direction at the facility is primarily to the southwest. Groundwater availability varied between wells installed during the SI due to differences in the lithology based on the vertical section drilled. A permanent well was installed at location JTN-AOI03-02, but the well was purged dry and could not be sampled for groundwater. At JTN-AOI01-01, located at a higher elevation than JTN-AOI03-02, groundwater production was higher because the porous sandstone, underlain by shale at this location, acts as a reservoir for water infiltrating from directly above. In contrast, while JTN-AOI03-02 also consisted of sandstone in the upper section of the boring, the lithology is interpreted as transitioning to cemented limestone at approximately 50 to 55 feet bgs (**Appendix E**). Because these units are nearly flat-lying, and based on relative elevations between AOI 1 and AOI 3, the productive section present at JTN-AOI01-01 is considered missing (above) JTN-AOI03-02. The well at JTN-AOI03-02 was installed within the interpreted limestone lithology where groundwater may have been initially present in possible fracture zones; however, it is likely due to the cementing observed, that groundwater recharge is limited.

2.2.3 Hydrology

Stormwater drainage from the hangar buildings (Buildings 292 and 288) and the apron areas are captured by two stormwater detention ponds that lead into an intermittent, unnamed branch of Solomon Run, which is a tributary of the Conemaugh River. The stormwater detention pond that is located directly west of Building 292 is referred to as the “AFFF Pond”. According to the GIS database information provided by PAARNG, the AFFF Pond and a portion of a drainage ditch that leads into the second stormwater detention pond are located on facility property. The second stormwater detention pond is located outside the facility property, to the north. Another intermittent branch of Solomon Run is located southeast of the facility. Both branches flow southwest into Solomon Run and then connect with the Conemaugh River, located approximately 3.5 miles west of the facility. The general surface water flow direction from the facility is to the west and northwest (Skelly and Loy, Inc., 2010). Surface water features are presented on **Figure 2-5**.

2.2.4 Climate

Johnstown is in a humid subtropical climate zone that is generally characterized by cold and temperate weather. The average high temperature for the summer is 78 degrees Fahrenheit (°F), and the average winter low temperature is 20°F. The mean annual temperature is 47°F. The area receives an average of 41 inches of precipitation throughout the year. Generally, the heaviest rains occur from May to July, although the region experiences year-round rainfall (National Weather Service, 2019).

2.2.5 Current and Future Land Use

Johnstown AASF #2 serves as a PAARNG aviation maintenance and storage facility for rotary wing aircraft. The facility is situated on property shared between USAR, PAARNG, and USMCR and is used for administrative, training, mechanical/maintenance, and storage purposes. Related infrastructure includes 12 buildings, tarmacs, hangar aprons, parking lots, storage lockers, two large retention ponds, and one smaller detention pond designed to capture AFFF (Skelly and Loy, Inc., 2010). Future property agreements between USAR and PAARNG over the occupation of shared buildings and resources are currently planned. Otherwise, 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

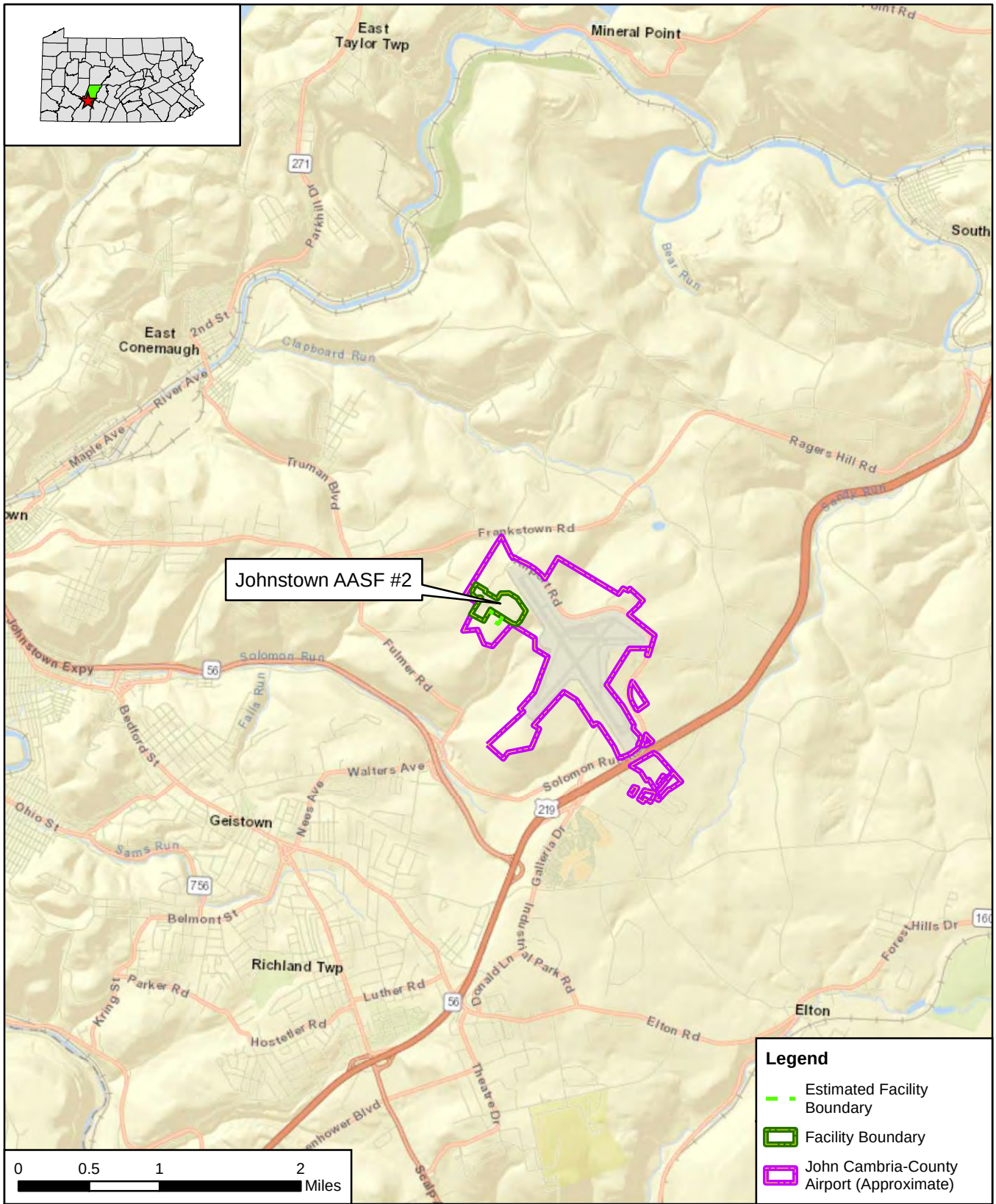
A wildlife survey has not occurred at the facility, and the facility does not have any significant areas of habitat. The following species have not been identified at the facility but may be present in the surrounding area.

The following birds, plants, insects, and mammals are federally endangered, threatened, proposed, and/ or are listed as candidate species in Cambria County, Pennsylvania (US Fish and Wildlife Service [USFWS], 2022).

- **Birds:** Bald eagle, *Haliaeetus leucocephalus* (recovery)
- **Flowering Plants:** Northeastern bulrush, *Scirpus ancistrochaetus* (endangered)
- **Insects:** Monarch butterfly, *Danaus plexippus* (candidate)
- **Mammals**: Tricolored bat, *Perimyotis subflavus* (proposed endangered); Little brown bat, *Myotis lucifugus* (under review); Indiana bat, *Myotis sodalis* (endangered); Northern Long-Eared Bat, *Myotis septentrionalis* (endangered)

2.3 History of PFAS Use

Three AOIs were identified in the PA where AFFF may have been used, stored, disposed, or released historically at the Johnstown AASF #2 (AECOM, 2020). AFFF may have historically been released at the facility during fire training exercises, fire suppression system releases, and other release mechanisms. The potential release areas were grouped into three AOIs based on preliminary data and presumed groundwater flow directions. A description of each AOI is presented in **Section 3**.



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PROJECT	Site Inspection at Johnstown AASF #2, PA			
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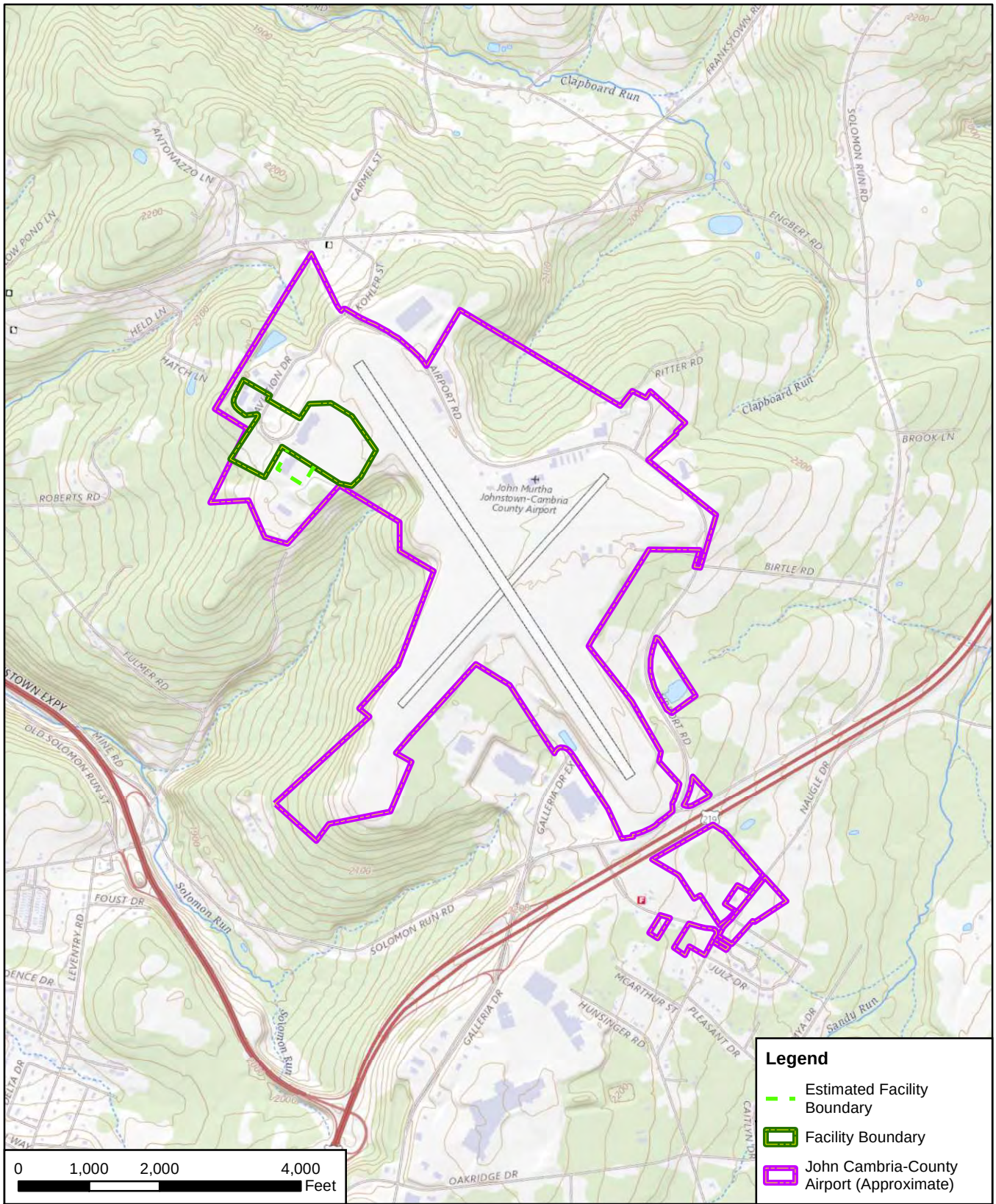
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	CM	12/19/2022

Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-1



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PROJECT	Site Inspection at Johnstown AASF #2, PA			
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SCALE	1:24,000	CHK BY	ST	12/19/2022
Base Map: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program,		PM	CM	12/19/2022

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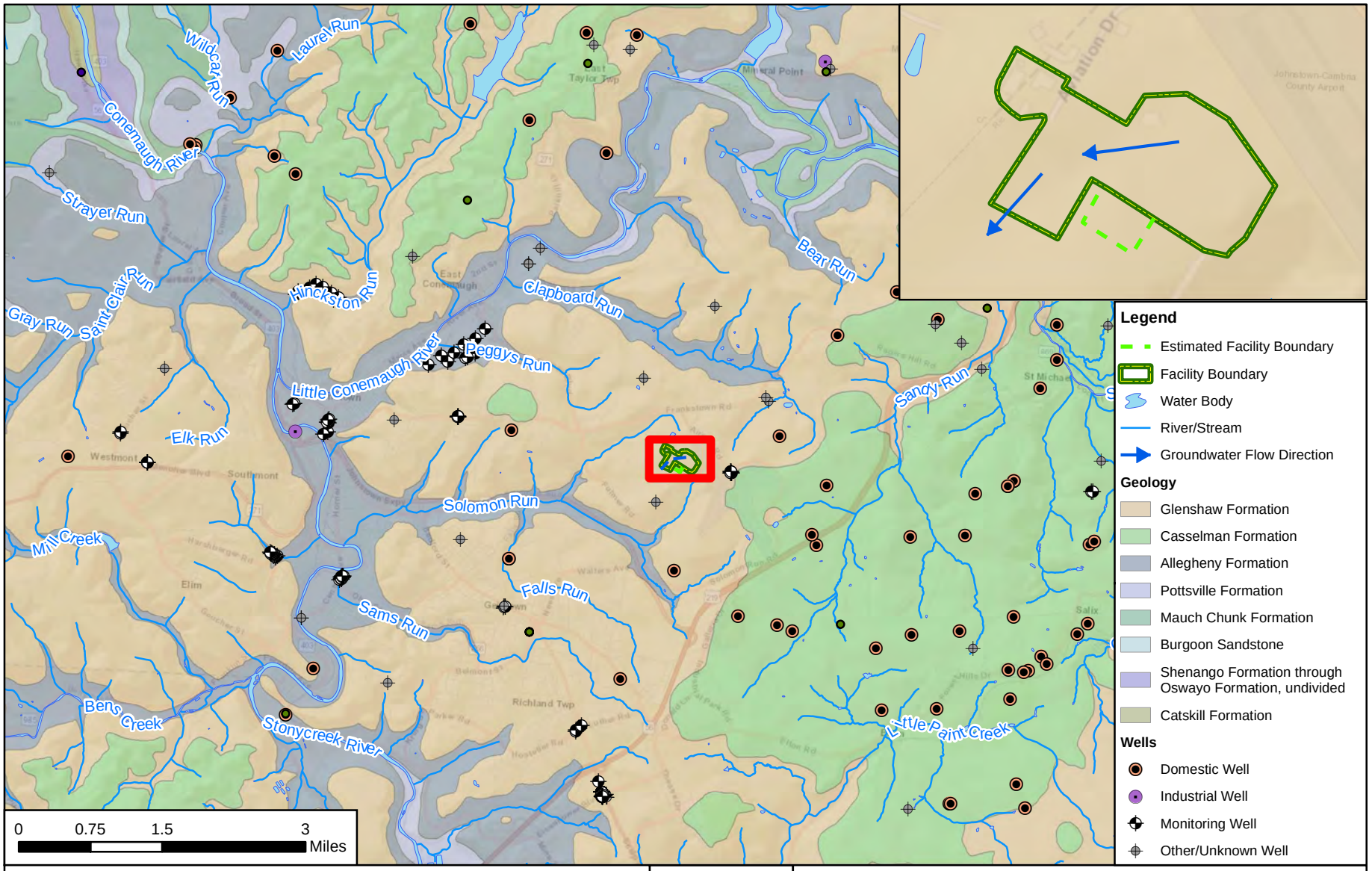
Facility Topography

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-2



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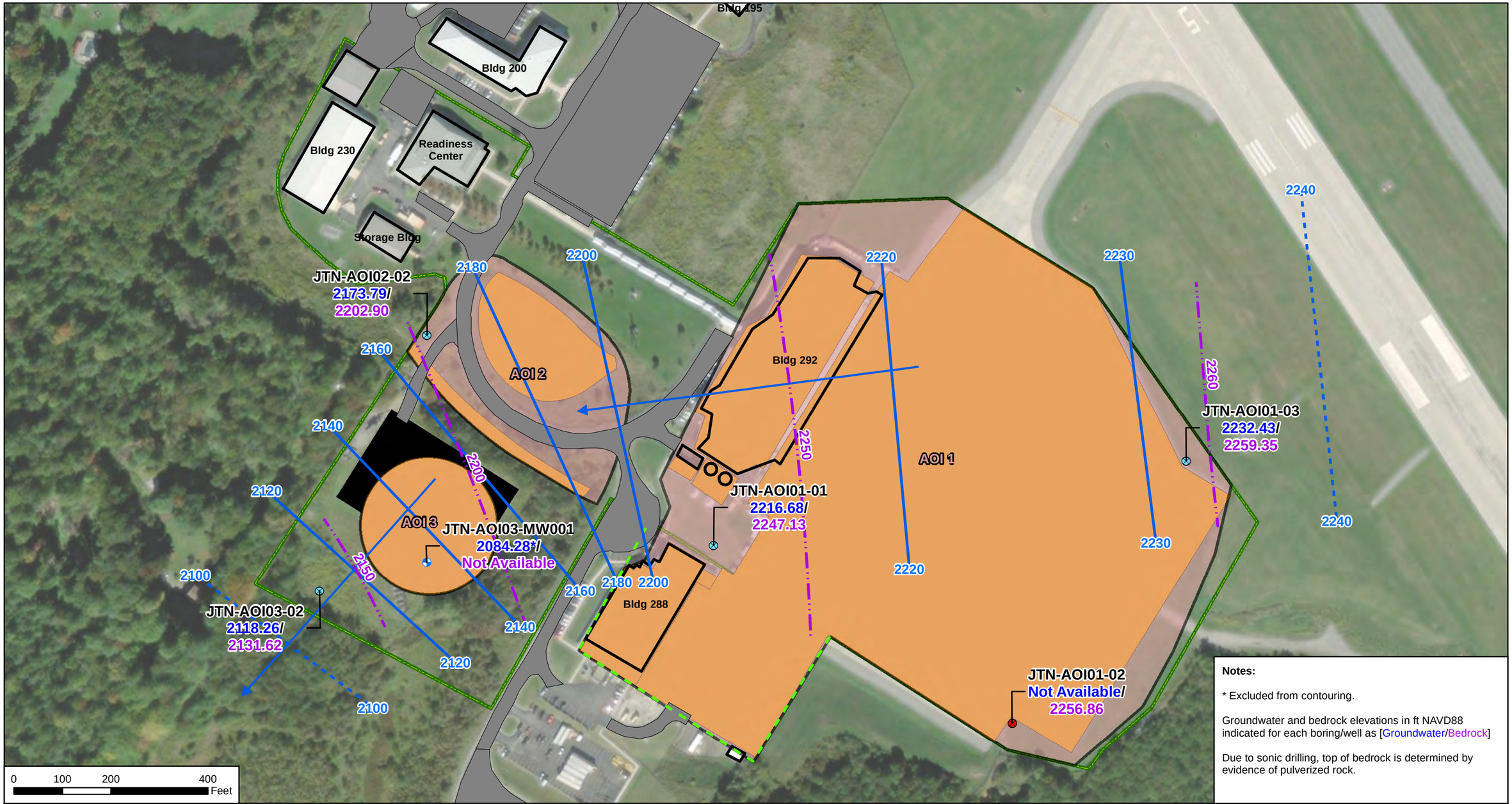
Groundwater Features

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-3



Notes:

* Excluded from contouring.

Groundwater and bedrock elevations in ft NAVD88 indicated for each boring/well as [Groundwater/Bedrock]

Due to sonic drilling, top of bedrock is determined by evidence of pulverized rock.

CLIENT	ARNG			
PROJECT	Site Inspection at Johnstown AASF #2, PA			
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SCALE	1:2,400	CHK BY	ST	3/17/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	3/17/2023

- Boring/Permanent Monitoring Well
- Boring
- Existing Water Supply Well
- Area of Interest
- Potential Release Area
- Estimated Facility Boundary
- Facility Boundary
- Roadway/Parking
- Groundwater Elevation Contour
- Inferred Groundwater Elevation Contour
- Groundwater Flow Direction
- Bedrock Elevation Contour

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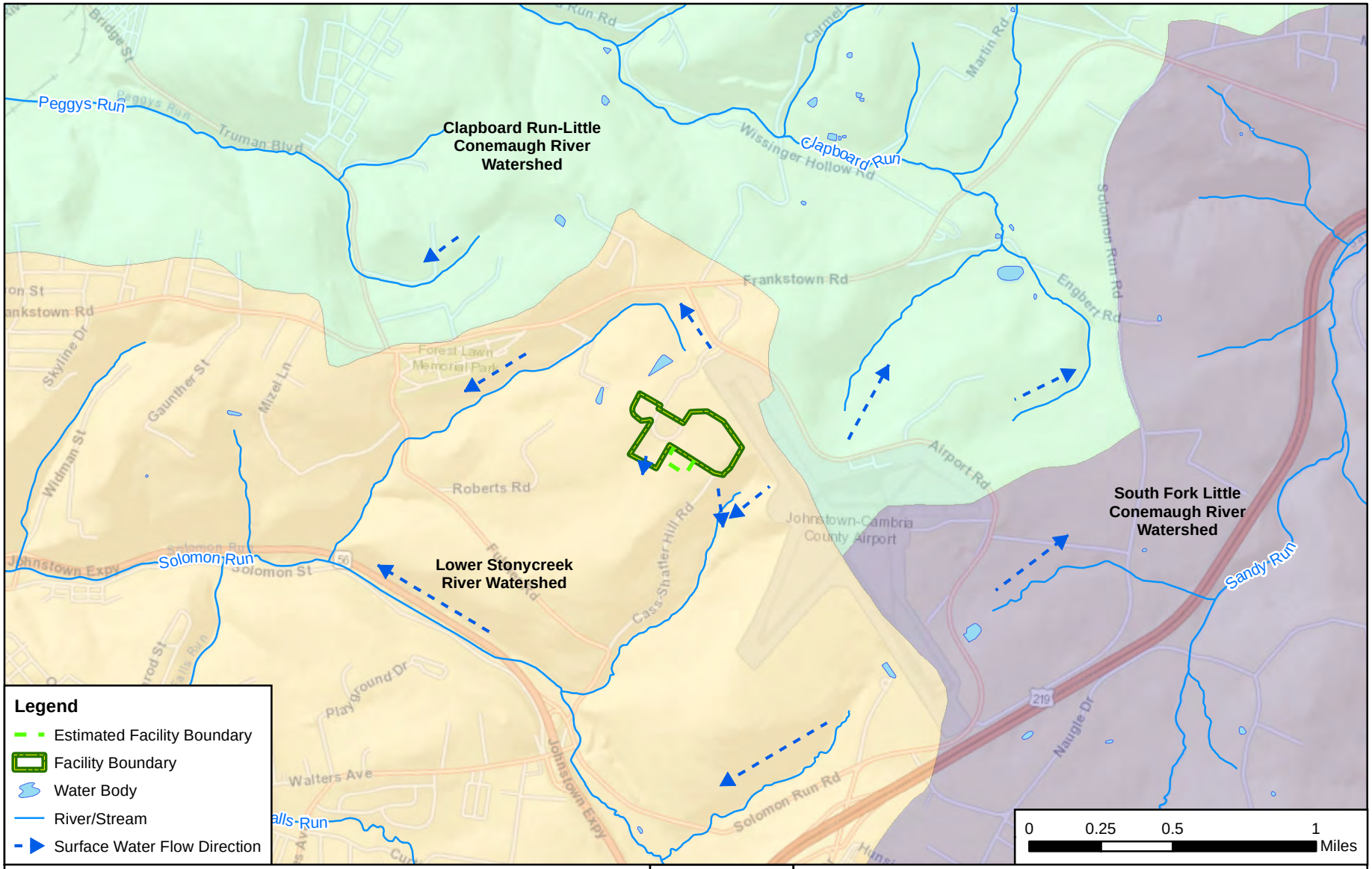
Groundwater and Bedrock Elevations, August 2022

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-4



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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, eight potential release areas were identified at Johnstown AASF #2 and grouped into three AOIs (AECOM, 2020). The potential release areas, and AOIs, are shown on **Figure 3-1**.

3.1 AOI 1 Hangar Apron Areas

AOI 1 includes Building 292, Building 288, Tri-Max™ Service Area, hangar apron, and Pump House #1. Buildings 292 and 288 are aircraft hangars equipped with AFFF fire suppression systems that have a history of releases due to trips, leaks, and testing. Tri-Max™ fire extinguishers were refilled with AFFF at the Tri-Max™ Service Area, and four 55-gallon AFFF drums were observed in storage at Pump House #1. The hangar apron was the site of familiarization training and nozzle testing activities that utilized AFFF. Excess AFFF from fire crash trucks and Tri-Max™ fire extinguishers were also purged into the hangar apron drains prior to the disposal of the equipment in 2017 or 2018.

3.2 AOI 2 Drainage Areas

AOI 2 includes the AFFF Pond and a portion of the drainage ditch that leads into a second off-facility stormwater detention pond. Both drainage areas lead to Solomon Run, which is a tributary of the Conemaugh River. AFFF releases from AOI 1 are captured in surface water and sediment in AOI 2. Throughout the years of facility operation, the water runoff in both drainage areas occasionally has been observed to be foamy as a result of suspected AFFF releases in AOI 1.

3.3 AOI 3 Former Burn Area

AOI 3 includes the Former Burn Area where AFFF releases may have occurred from fire training activities. PAARNG personnel reported that only Tri-Max™ fire extinguishers containing water were used to extinguish the fires. The burn area was also used by USMCR and USAR, but their activities at the site are unknown. The Former Burn Area was regraded and paved over around 2010, and the current area is a fenced motor pool. At the time of the fire training activities (approximately 2004 to 2010), AOI 3 was located on unpaved surfaces.

3.4 Adjacent Sources

Four off-facility, potential source areas were identified adjacent to the Johnstown AASF #2 during the PA and are not associated with ARNG activities, except for the drainage ditch to detention pond adjacent source (**Section 3.4.1**). The adjacent potential source areas are shown on **Figure 3-1** and described in the following sections for informational purposes only and were not investigated as part of this SI.

3.4.1 Drainage Ditch to Detention Pond

The drainage ditch to detention pond source is the off-facility, downgradient portion of the drainage ditch described in **Section 3.2**. The drainage ditch is a 0.5-mile riprap channel that leads into a second stormwater detention pond and then connects with an intermittent, unnamed stream of Solomon Run. The second stormwater detention pond also receives drainage from paved lots and buildings designated for USMCR or USAR usage (AECOM, 2020). The drainage ditch to detention pond is downgradient from the facility, and PFAS contamination from this potential source is not anticipated to migrate towards the facility.

3.4.2 Runway 15/33

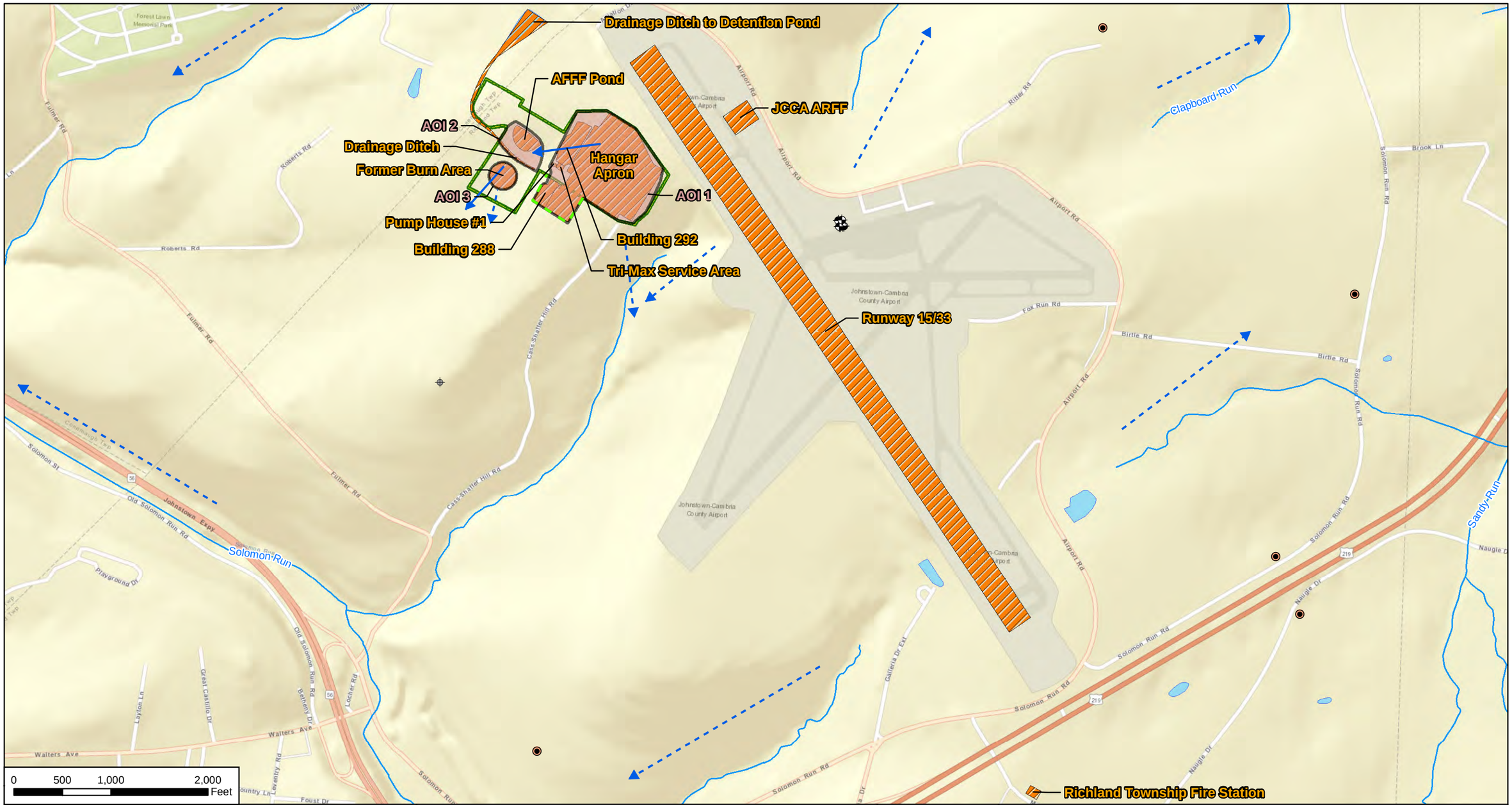
Runway 15/33 trends northwest to southeast and is one of the two primary runways at JCCA. Three aircraft accidents at Runway 15/33 occurred between 2006 and 2012, and an unspecified amount of AFFF was used in the emergency response for each incident. Emergency responses were conducted jointly by PAARNG, JCCA Aircraft Rescue and Fire Fighting (ARFF), and Richland Township Fire Department per a mutual aid agreement between entities. Runway 15/33 is upgradient of the facility, and it is possible that the potential PFAS contamination from the emergency responses are migrating towards the facility.

3.4.3 JCCA ARFF

The JCCA ARFF maintains a maintenance facility on the northeast portion of JCCA along Airport Road. There are two 60-gallon foam tank capacity ARFF firetrucks, 200-gallon barrels, and 5-gallon buckets of 6% AFFF stored within the maintenance facility. Additionally, in accordance with Federal Aviation Administration (FAA) regulations, the JCCA ARFF performed biannual AFFF testing outside the maintenance facility. It was estimated that less than 5 gallons of 6% AFFF concentrate were released during each testing event. After the AFFF was discharged, the area was hosed down with water, and the runoff was captured in an adjacent retention pond. The JCCA ARFF had FAA testing records available that date back to 2005. The JCCA ARFF is upgradient of the facility, and it is possible the that potential PFAS contamination from the testing events are migrating towards the facility.

3.4.4 Richland Township Fire Station

The Richland Township Fire Department has a fire station due south of the JCCA border. The Richland Township Fire Station was identified as a potential adjacent source due to the potential storage of AFFF and involvement in emergency responses with AFFF at JCCA. The Richland Township Fire Station is cross-gradient of the facility, and it is possible that potential PFAS contamination from the fire station is migrating towards the facility.



CLIENT	ARNG			
PROJECT	Site Inspection at Johnstown AASF #2, PA			
REVISED	4/12/2023	GIS BY	MS	4/12/2023
SCALE	1:12,000	CHK BY	ST	4/12/2023
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	4/12/2023

- Area of Interest
- Potential Release Area
- Estimated Facility Boundary
- Facility Boundary
- Water Body
- River/Stream
- Surface Water Flow Direction
- Groundwater Flow Direction
- Domestic Well
- Monitoring Well
- Other/Unknown Well

N

Areas 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, 2021), 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 Johnstown AASF #2 (AECOM, 2020);
- 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, 2021); 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). Temporal boundaries were limited to the summer season, which was the earliest available time field resources were available to complete the study. Vertical boundaries were established by the depth to encountered groundwater and sonic drilling refusal.

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, 2021).

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. Multiple field and quality control (QC) samples displayed extraction internal standards (EIS) area counts outside the QC limits of 50%-150%. The field sample results that displayed EIS area counts less than 10% were initially flagged “X” while positive results were changed to estimate with a positive bias. These samples were re-extracted and reanalyzed outside technical holding time and displayed EIS area counts within QC limits in the reanalysis. The reanalyzed results were qualified appropriately and recommended to be retained in place of the “X” flagged data in the data set. These data are of sufficient quality to meet the objectives and requirements of the SI QAPP Addendum (AECOM, 2021).

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, Johnstown Army Aviation Support Facility #2, Johnstown, Pennsylvania* dated July 2020 (AECOM, 2020);
- *Final Site Inspection Uniform Federal Policy-Quality Assurance Project Plan Addendum, Johnstown Army Aviation Support Facility #2, Johnstown, Pennsylvania* dated December 2021 (AECOM, 2021); and
- *Final Site Safety and Health Plan, Johnstown Army Aviation Support Facility #2, Johnstown, Pennsylvania* dated July 2022 (AECOM, 2022).

The SI field activities were conducted from 21 July to 10 August 2022 and consisted of utility clearance, borings, soil sample collection, permanent monitoring well installations and development, groundwater sample collection, and land surveying. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2021), except as noted in **Section 5.8**.

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:

- Thirty (30) soil samples from five (5) borings and sixteen (16) hand auger locations;
- Four (4) groundwater samples from three (3) permanent well locations and one (1) existing well (JTN-AOI03-MW001);
- Fifteen (15) quality assurance (QA)/ QC 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**, land survey data are provided in **Appendix B4**, and investigation-derived waste (IDW) polygons are provided in **Appendix B5**. 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 14 September 2021, prior to SI field activities. The combined TPP Meeting 1 and 2 was conducted in general accordance with EM 200-1-2. The stakeholders for this SI include the ARNG, PAARNG, USACE, USAR, US Army Environmental Command (USAEC), and Pennsylvania Department of Environmental Protection (PADEP). 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, 2021).

A TPP Meeting 3 was held 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 Pennsylvania 811 utility clearance provider to notify them of intrusive work on 19 July 2022. Additionally, AECOM contracted Ground Penetrating Radar Systems (GPRS), a private utility location service, to perform utility clearance. GPRS performed utility clearance of the proposed boring locations on 21 July 2022 with input from the AECOM field team and USAR facility staff. General locating services and ground-penetrating radar were used to complete the clearance. To verify utility clearance in the shallow subsurface where utilities would typically be encountered, all proposed boring locations were precleared, using a hand auger. Three of the five borings encountered shallow bedrock refusal prior to reaching the target depth of 5 feet bgs. The remaining two borings were able to be cleared, via hand auger, to 5 feet bgs.

5.1.3 Source Water and Sampling Equipment Acceptability

The potable water source at Johnstown AASF #2 was sampled on 12 October 2021 to assess usability for decontamination of drilling equipment. Results of the sample collected at the Building 292 spigot (JTN-DECON-01) confirmed this source to be acceptable for use in this investigation; therefore, it was used throughout the field activities. Specifically, the samples were analyzed by LC/MS/MS compliant with QSM 5.3 Table B-15. The results of the decontamination water sample associated with the wash rack spigot source used during the SI 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, 2021). 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 Borings and Soil Sampling

Borings were installed in grass areas to avoid disturbing concrete or asphalt surfaces. Soil samples were collected via sonic drilling technology, in accordance with the SI QAPP Addendum (AECOM, 2021). A sonic drill rig was used to collect continuous soil cores to the target depth. A hand auger was used to collect soil from within the top five feet of the boring, in accordance with AECOM utility clearance procedures. The boring locations are shown on **Figure 5-1**, and depths are provided **Table 5-2**. Several boring locations were adjusted within a 100-feet offset for reasons

including drill rig access, utility avoidance and bias toward sampling within observed drainage features. Additional details regarding these adjustments are described in **Section 5.8**.

In general, three discrete soil samples were collected from the vadose zone for chemical analysis from each boring: one surface soil sample (0 to 2 feet bgs), one subsurface soil sample approximately 1 foot above the groundwater table or 1 foot above the bedrock, whichever was encountered first, and one subsurface soil sample at the mid-point between the surface and the groundwater table. Only two soil samples could be collected from boring location AOI02-02 due to the presence of bedrock and lack of available soil below 15 feet bgs.

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**.

Starting with the eastern most boring locations (JTN-AOI01-03, JTN-AOI01-02, and JTN-AOI01-01 – from east to west), bedrock was observed (based on pulverized rock due to the sonic drilling) between 1 and 2 feet bgs. No limestone was observed in any of these three borings, and weathered shale was documented in the western most location (JTN-AOI01-01) in the bottom 8 feet, corresponding to an elevation of 2,207 to 2,199 feet NAVD88. Moving westward, bedrock was encountered in boring location JTN-AOI02-02 at 15 feet bgs (elevation 2,203 feet NAVD88). Sandstone red beds (13 feet thick) were observed in this boring starting at 55 feet bgs (elevation 2,163 feet NAVD88), followed by 5 feet of gray to black claystone and shale and ending with 2 feet of red beds (sandstone) at an elevation of 2,143 feet NAVD88. The most westerly location (JTN-AOI03-02) encountered bedrock at the deepest elevation (elevation of 2,132 feet NAVD88 or 57 feet bgs) of all the borings conducted. The bedrock encountered was not sandstone but appeared to be calcitic and was interpreted to be more likely limestone lithology.

Varying quantities of clay, silt, sand, and gravel were noted across all five borings. Specifically noted material included lean clay, silt, sandy silt (with/without gravel), clayey sand (with/without gravel), silty sand (with/without gravel), poorly graded sand, and weathered shale. These layers ranged in thicknesses from a few inches to 38.5 feet. Boring logs are presented in **Appendix E**.

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, 2021).

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

Sonic borings were converted into permanent wells, except for location JTN-AOI01-02 that was dry after boring installation. JTN-AOI01-02 was abandoned using bentonite chips at the completion of sampling activities, in accordance with the SI QAPP Addendum (AECOM, 2021).

5.3 Permanent Well Installation and Groundwater Sampling

During the SI, four permanent monitoring wells were installed within or downgradient of potential source areas. Of the four newly-installed permanent wells, one well could not be sampled due to a lack of available groundwater. Additionally, an existing well (JTN-AOI03-MW001) was discovered at AOI 3 during SI field activities. No known well installation records were found for this well, but USAR personnel stated that the concrete batch plant, in place during airport tarmac construction, used this well as a water supply well. The bottom of the well was tagged around 292 feet bgs, and other measured well construction details are provided in **Table 5-3**. This well was sampled for groundwater, as described further in **Section 5.8**. The locations of the wells are shown on **Figure 5-1**.

A sonic drill rig was used to install four 2-inch diameter monitoring wells. The monitoring wells were constructed with Schedule 40 polyvinyl chloride (PVC), flush threaded 10-foot sections of riser, 0.010-inch slotted 10-foot well screens, 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-feet above the well screen. A 2-foot-thick bentonite seal was placed above the filter sand and hydrated with distilled 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, 2021). All monitoring wells were completed with flush mount well vaults. The screen intervals of the groundwater monitoring wells are provided in **Table 5-3**.

Development and sampling of wells were completed in accordance with the SI QAPP Addendum (AECOM, 2021). 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. Due to the sampling depth limitations of the bladder pump, a Geotech Geosub submersible pump with a drop tube assembly was used to sample the existing well, JTN-AOI03-MW001. 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, 2021).

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. MS/MSDs were collected at a rate of 5% and analyzed for the same parameters as the accompanying samples. 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 10 August 2022. Groundwater elevation measurements were collected from four new permanent monitoring wells and one existing well, JTN-AOI03-MW001. Water level measurements were taken from the northern side of the well

casing. A groundwater flow contour map is provided in **Figure 2-4**. Groundwater elevation data are provided in **Table 5-3**.

5.5 Surveying

The northern side of each well casing was surveyed by Pennsylvania-licensed land surveyors following guidelines provided in the SOPs provided in the SI QAPP Addendum (AECOM, 2021). Survey data from the newly installed wells and the existing well, on the facility were collected on 4 August 2022 in the applicable Universal Transverse Mercator zone projection with Pennsylvania State Plane South Coordinate System Datum (horizontal) and North American Vertical Datum 1988 (vertical). The surveyed well data are provided in **Appendix B4**.

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, 2021) and with the DA Guidance for Addressing Releases of PFAS, Q18 (DA, 2018).

Solid IDW (i.e., soil cuttings) generated during the SI activities were either left in place at the point of the source or distributed in a designated IDW discharge location downgradient of AOI 3, as described further in **Section 5.8**. This IDW was not sampled and assumes the PFAS characteristics of the associated soil samples collected from that source location.

Liquid IDW generated during SI activities (i.e. purge water, development water, and decontamination fluids) was discharged directly to the ground surface slightly downgradient of the source. This IDW was not sampled and assumes the PFAS characteristics of the associated groundwater samples collected from that source location.

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 B5**.

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

Three deviations from the SI QAPP Addendum were identified during review of the field documentation. The deviations are noted below and are documented in Field Change Request Forms (**Appendix B3**):

- Prior to the SI field activities, one alternate boring location for JTN-AOI01-01 was proposed for utility avoidance, and three alternate boring locations for AOI 3 were proposed to avoid a potential construction area. Both the proposed and original locations were marked and cleared for utilities during the utility clearance event on 21 July 2022. The final placement of the borings was determined during subsequent field activities. These proposed boring

locations were documented in a field change request form dated 28 March 2022 and provided in **Appendix B3**.

- During the SI field activities, the AOI 2 well construction was changed to flush mount completion instead of stick-up completion with bollards. Since AOI 2 was in the mowing path area, this change was made to help avoid potential obstructions for landscaping equipment. Additionally, an alternate IDW discharge location was identified downgradient of AOI 3 for soil IDW generated from AOI 1. The alternate IDW discharge location was proposed by PAARNG and approved by the USAR facilities manager to assist with foreign object debris management at AOI 1. These actions were documented in a field change request form dated 26 July 2022 and provided in **Appendix B3**.
- During the SI field activities, shallow bedrock was encountered above 5 feet bgs at all attempted boring locations, except for one location (JTN-AOI03-02). Additionally, the sonic rig was seizing and experiencing mechanical failures due to the pressure exerted when encountering the various bedrock lithologies. The permanent wells that were able to be successfully installed had generally low groundwater recharge rates. Therefore, in concurrence with the project delivery team, the following deviations were implemented and documented in a field change request form dated 3 August 2022 (**Appendix B3**):
    - Seven surface soil samples were added to the sampling plan and collected at the facility drainage features (see **Figure 5-1**). The additional surface soil samples were identified as JTN-AOI01-04, JTN-AOI01-05, JTN-AOI01-06, JTN-AOI02-09, JTN-AOI03-04, JTN-AOI03-05, and JTN-AOI03-06.
    - The drilling for the permanent well at JTN-AOI02-02 was limited to 75 feet bgs.
    - The proposed permanent wells for JTN-AOI02-01, JTN-AOI02-03, JTN-AOI03-01, and JTN-AOI03-03 were converted to surface soil sample locations.
    - An existing well (designated JTN-AOI03-MW001) was discovered within AOI 3 and, with USAR's approval, the groundwater was sampled.

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, Johnstown AASF #2, Pennsylvania

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)	Comments
Soil Samples						
JTN-AOI01-01-SB-00-02	7/28/2022 7:45	0 - 2	x			
JTN-AOI01-01-SB-00-02-D	7/28/2022 7:45	0 - 2	x			Field Duplicate
JTN-AOI01-01-SB-00-02-MS	7/28/2022 7:45	0 - 2	x			MS
JTN-AOI01-01-SB-00-02-MSD	7/28/2022 7:45	0 - 2	x			MSD
JTN-AOI01-01-SB-23-25	7/28/2022 15:45	23 - 25	x			
JTN-AOI01-01-SB-30-32	7/29/2022 8:00	30 - 32	x			
JTN-AOI01-02-SB-00-01	7/26/2022 11:15	0 - 1	x	x	x	
JTN-AOI01-02-SB-12-14	7/26/2022 14:30	12 - 14	x			
JTN-AOI01-02-SB-25-27	7/26/2022 9:00	25 - 27	x			
JTN-AOI01-03-SB-00-01	7/25/2022 14:15	0 - 1	x			
JTN-AOI01-03-SB-10-12	7/25/2022 18:15	10 - 12	x			
JTN-AOI01-03-SB-15-17	7/25/2022 18:00	15 - 17	x			
JTN-AOI01-04-HA-00-02	8/2/2022 16:30	0 - 2	x			
JTN-AOI01-05-HA-00-01	8/2/2022 17:00	0 - 2	x			
JTN-AOI01-06-HA-00-02	8/2/2022 16:00	0 - 2	x			
JTN-AOI02-01-HA-00-02	8/5/2022 10:10	0 - 2	x			
JTN-AOI02-02-SB-00-02	8/3/2022 14:15	0 - 2	x			
JTN-AOI02-02-SB-13-15	8/3/2022 17:00	13 - 15	x	x	x	
JTN-AOI02-02-SB-13-15-D	8/3/2022 17:00	13 - 15	x			Field Duplicate
JTN-AOI02-02-SB-13-15-MS	8/3/2022 17:00	13 - 15		x	x	MS for TOC/pH
JTN-AOI02-02-SB-13-15-MSD	8/3/2022 17:00	13 - 15		x	x	MSD for TOC/pH
JTN-AOI02-03-HA-00-02	8/5/2022 8:35	0 - 2	x			
JTN-AOI02-04-HA-00-02	7/28/2022 13:40	0 - 2	x			
JTN-AOI02-04-HA-00-02-D	7/28/2022 13:40	0 - 2	x			Field Duplicate
JTN-AOI02-05-HA-00-02	8/5/2022 8:50	0 - 2	x			
JTN-AOI02-06-HA-00-02	8/5/2022 9:05	0 - 2	x			
JTN-AOI02-07-HA-00-02	8/5/2022 9:20	0 - 2	x			
JTN-AOI02-08-HA-00-02	8/5/2022 9:50	0 - 2	x			
JTN-AOI02-09-HA-00-01	8/5/2022 10:30	0 - 1	x			
JTN-AOI03-01-HA-00-02	7/28/2022 14:00	0 - 2	x			
JTN-AOI03-02-SB-00-02	7/28/2022 12:00	0 - 2	x			
JTN-AOI03-02-SB-13-15	8/1/2022 10:45	13 - 15	x			
JTN-AOI03-02-SB-46-48	8/1/2022 17:00	46 - 48	x			
JTN-AOI03-02-SB-46-48-D	8/1/2022 17:00	46 - 48	x	x	x	Field Duplicate
JTN-AOI03-03-HA-00-02	8/4/2022 14:15	0 - 2	x			
JTN-AOI03-04-HA-00-02	8/4/2022 12:30	0 - 2	x			
JTN-AOI03-05-HA-00-02	8/4/2022 13:30	0 - 2	x			
JTN-AOI03-06-HA-00-02	8/4/2022 13:00	0 - 2	x			
Groundwater Samples						
JTN-AOI01-01-GW	8/5/2022 15:30	NA	x			
JTN-AOI01-01-GW-D	8/5/2022 15:30	NA	x			Field Duplicate
JTN-AOI01-03-GW	8/5/2022 13:00	NA	x			
JTN-AOI01-03-GW-MS	8/5/2022 13:00	NA	x			MS
JTN-AOI01-03-GW-MSD	8/5/2022 13:00	NA	x			MSD
JTN-AOI02-02-GW	8/10/2022 12:30	NA	x			
JTN-AOI03-MW001-GW	8/9/2022 18:00	NA	x			
Equipment Blank Samples						

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, Johnstown AASF #2, Pennsylvania

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)	Comments
JTN-DECON-01	10/12/2021 14:45	NA	x			Decontamination Water Sample
JTN-DECON-02	7/25/2022 19:00	NA	x			Decontamination Water Sample
JTN-ERB-01	7/26/2022 10:45	NA	x			Equipment Blank from Hand Auger
JTN-ERB-02	8/2/2022 14:45	NA	x			Equipment Blank from Drill Shoe
JTN-ERB-03	8/10/2022 13:00	NA	x			Equipment Blank from Bladder Pump
JTN-ERB-04	8/10/2022 13:30	NA	x			Equipment Blank from Development Pump

Notes:
AASF = Army Aviation Support Facility
bgs = below ground surface
ERB = equipment rinsate blank
FD = field duplicate
LC/MS/MS = Liquid Chromatography Mass Spectrometry
MS/MSD = matrix spike/ matrix spike duplicate
QSM = Quality Systems Manual
TOC = total organic carbon
USEPA = United States Environmental Protection Agency

Table 5-2
Borings Depths and Bedrock Elevations
Site Inspection Report, Johnstown AASF #2, Pennsylvania

Area of Interest	Boring ID	Boring Depth (feet bgs)	Ground Surface Elevation (feet NAVD88)	Depth to Top of Bedrock[1] (feet bgs)	Top of Bedrock Elevation (feet NAVD88)
1	JTN-AOI01-01	50	2249.13	2	2247.13
	JTN-AOI01-02	60	2257.86	1	2256.86
	JTN-AOI01-03	36	2260.35	1	2259.35
2	JTN-AOI02-02	75	2217.90	15	2202.90
3	JTN-AOI03-02	75	2188.62	57	2131.62

Notes:

[1] Due to sonic drilling, top of bedrock is determined by evidence of pulverized rock.

AASF = Army Aviation Support Facility

bgs = below ground surface

NAVD88 = North American Vertical Datum 1988

Table 5-3
Permanent Monitoring Well Screen Intervals and Groundwater Elevations
Site Inspection Report, Johnstown AASF #2, Pennsylvania

Area of Interest	Monitoring Well ID	Screen Interval (feet bgs)	Top of Casing Elevation (feet NAVD88)	Ground Surface Elevation (feet NAVD88)	Depth to Water[2] (feet btoc)	Depth to Water[2] (feet bgs)	Groundwater Elevation (feet NAVD88)
1	JTN-AOI01-01	38 - 48	2248.83	2249.13	32.15	32.45	2216.68
	JTN-AOI01-03	26 - 36	2260.04	2260.35	27.61	27.92	2232.43
2	JTN-AOI02-02	65 - 75	2217.59	2217.90	43.80	44.11	2173.79
3	JTN-AOI03-MW001	Unknown[1]	2205.68	2204.24	121.40	119.96	2084.28
	JTN-AOI03-02	60 - 70	2188.36	2188.62	70.10	70.35	2118.26

Notes:

[1] Screen interval of existing water supply well JTN-AOI03-MW001 is unknown.

[2] Synoptic gauging event occurred on 10 August 2022.

AASF = Army Aviation Support Facility

bgs = below ground surface

btoc = below top of casing

NAVD88 = North American Vertical Datum 1988

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CLIENT	ARNG			
PROJECT	Site Inspection at Johnstown AASF #2, PA			
REVISED	3/15/2023	GIS BY	MS	3/15/2023
SCALE	1:2,400	CHK BY	ST	3/15/2023
Base Map: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	3/15/2023

- Boring/Permanent Monitoring Well
- Boring
- Existing Water Supply Well
- Surface Soil Sample
- Area of Interest
- Potential Release Area
- Estimated Facility Boundary
- Facility Boundary
- Roadway/Parking
- Groundwater Flow Direction

N

Site Inspection Sample Locations

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-1

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

The data collected in this investigation will be used in subsequent investigations, where appropriate, to assess fate and transport. 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: Hangar Apron 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 of the relevant compounds in soil. **Table 6-2** through **Table 6-4** summarize the soil results.

Soil was sampled from surface soil (between 0 and 2 feet bgs) from JTN-AOI01-01 through JTN-AOI01-06. Soil was also sampled from shallow subsurface soil (between 10 and 14 feet bgs) from JTN-AOI01-02 and JTN-AOI01-03 and deep subsurface soil (between 15 and 32 feet bgs) from borings JTN-AOI01-01 through JTN-AOI01-03.

All detected concentrations of the relevant compounds were below the residential SLs in surface soil. The following ranges of concentrations were measured:

- PFOA was detected ranging from 0.119 J micrograms per kilogram (µg/kg) in JTN-AOI01-01 to 2.92 µg/kg in JTN-AOI01-05.
- PFOS was detected ranging from 0.063 J µg/kg in JTN-AOI01-03 to 7.56 µg/kg in JTN-AOI01-05.
- PFHxS was detected ranging from 0.083 J µg/kg in JTN-AOI01-01 to 0.887 J µg/kg in JTN-AOI01-05.
- PFNA was detected ranging from 0.133 J µg/kg in JTN-AOI01-01 to 2.71 µg/kg in JTN-AOI01-05.
- PFBS was detected ranging from 0.036 J µg/kg in JTN-AOI01-02 to 0.040 J+ µg/kg in JTN-AOI01-06.

PFOS was the most frequently detected compound (measured in all seven surface soil samples) and highest detected compound at 7.56 µg/kg in surface soil. No relevant compounds were detected in the shallow subsurface soil samples. Only PFOS was detected, at 0.068 J+ µg/kg and 0.105 J µg/kg, in the deep subsurface soil samples from JTN-AOI01-01 and JTN-AOI01-02, respectively.

6.3.2 AOI 1 Groundwater Analytical Results

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

Groundwater was sampled from permanent monitoring wells JTN-AOI01-01 and JTN-AOI01-03. PFOA and PFOS exceeded their SLs in groundwater at JTN-AOI01-01. PFOA exceeded the SL of 6 nanograms per liter (ng/L) with a maximum concentration of 9.46 ng/L. PFOS exceeded the SL of 4 ng/L with a maximum concentration of 68.4 ng/L. PFHxS, PFNA, and PFBS were detected in groundwater, at concentrations below their SLs. The maximum concentrations and SLs of PFHxS, PFNA, and PFBS were 22.9 ng/L (SL of 39 ng/L), 3.06 J ng/L (SL of 6 ng/L), and 2.63 J ng/L (SL of 601 ng/L), respectively.

6.3.3 AOI 1 Conclusions

Based on the results of the SI, PFOA, PFOS, PFHxS, PFNA, and PFBS were detected in surface soil below their residential SLs. No relevant compounds were detected in shallow subsurface soil. PFOA and PFOS were detected in groundwater, at concentrations above their SLs. Based on the exceedances of the SLs in groundwater, 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: Drainage Areas. The results in soil and groundwater are summarized on **Table 6-2**, **Table 6-3**, and **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 of the relevant compounds in soil. **Table 6-2** and **Table 6-3** summarize the soil analytical results.

Soil was sampled from surface soil (between 0 and 2 feet bgs) from JTN-AOI02-01 through JTN-AOI02-09. Shallow subsurface soil samples (between 13 and 15 feet bgs) were also collected from JTN-AOI02-02.

PFOA, PFOS, and PFNA were detected in surface soil, at concentrations above their residential SLs. PFOA exceeded the residential SL of 19 µg/kg, with a concentration of 36.2 µg/kg in JTN-AOI02-06. PFOS exceeded the residential SL of 13 µg/kg, with concentrations of 439 µg/kg and 19.4 µg/kg in JTN-AOI02-06 and JTN-AOI02-07, respectively. PFNA exceeded the residential SL of 19 µg/kg, with a concentration of 34.9 µg/kg in JTN-AOI02-06. PFHxS and PFBS were detected at concentrations below their SLs, with reported concentrations less than 0.622 J µg/kg. No relevant compounds were detected in subsurface soil.

6.4.2 AOI 2 Groundwater Analytical Results

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

Groundwater was sampled from permanent monitoring well JTN-AOI02-02. No relevant compounds were detected in the groundwater sample collected from this well.

6.4.3 AOI 2 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFNA were detected in soil above their SLs. No relevant compounds were detected in groundwater. Based on the exceedances of the SLs in soil, 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: Former Burn 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 of the relevant compounds in soil. **Table 6-2** through **Table 6-4** summarize the soil results.

Soil was sampled from surface soil (between 0 and 2 feet bgs) from JTN-AOI03-01 through JTN-AOI03-06. Soil was also sampled from shallow subsurface soil (between 13 and 15 feet bgs) and deep subsurface soil (between 46 and 48 feet bgs) from JTN-AOI03-02.

All detected concentrations of the relevant compounds were below their residential SLs in surface soil. The following ranges of concentrations were measured:

- PFOA was detected ranging from 0.224 J+ µg/kg in JTN-AOI03-05 to 0.621 J µg/kg in JTN-AOI03-02.
- PFOS was detected ranging from 0.218 J+ µg/kg in JTN-AOI03-06 to 11.5 µg/kg in JTN-AOI03-02.
- PFHxS was detected ranging from 0.033 J µg/kg in JTN-AOI03-01 to 0.590 J µg/kg in JTN-AOI03-02.
- PFNA was detected ranging from 0.044 J µg/kg in JTN-AOI03-01 to 0.499 J µg/kg in JTN-AOI03-02.
- PFBS was detected ranging from 0.039 J+ µg/kg in JTN-AOI03-03 to 0.086 J+ µg/kg in JTN-AOI03-05.

PFOS was the most frequently detected compound (measured in all six surface soil samples) and highest detected compound at 11.5 µg/kg in surface soil. PFOS and PFNA were also detected below their industrial/commercial worker SLs in shallow subsurface soil, at concentrations of 0.309 J and 0.026 J µg/kg, respectively. No relevant compounds were detected in the deep subsurface soil samples.

6.5.2 AOI 3 Groundwater Analytical Results

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

Groundwater was sampled from the existing well JTN-AOI03-MW001. PFOS was detected in groundwater at a concentration of 1.51 J ng/L below the SL of 4 ng/L. No other relevant compounds were detected.

6.5.3 AOI 3 Conclusions

Based on the results of the SI, PFOA, PFOS, PFHxS, PFNA, and PFBS were detected in soil, below their SLs, and PFOS was detected in groundwater at a concentration below its SL; therefore, no further evaluation at AOI 3 is warranted.

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Table 6-2
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil
Site Inspection Report, Johnstown Army Aviation Support Facility #2

Area of Interest		AOI01														AOI02	
Sample ID		JTN-AOI01-01-SB-00-02		JTN-AOI01-01-SB-00-02-D		JTN-AOI01-02-SB-00-01		JTN-AOI01-03-SB-00-01		JTN-AOI01-04-HA-00-02		JTN-AOI01-05-HA-00-01		JTN-AOI01-06-HA-00-02		JTN-AOI02-01-HA-00-02	
Sample Date		07/28/2022		07/28/2022		07/26/2022		07/25/2022		08/02/2022		08/02/2022		08/02/2022		08/05/2022	
Depth		0-2 ft		0-2 ft		0-1 ft		0-1 ft		0-2 ft		0-1 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**
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																	
PFBS	1900	ND	U	ND	U	0.036	J	ND	U	ND	U	ND	U	0.040	J+	ND	U
PFHxS	130	0.142	J	0.083	J	0.215	J	ND	U	0.264	J	0.887	J	0.254	J+	0.086	J
PFNA	19	0.149	J	0.133	J	0.175	J	ND	U	0.203	J	2.71		0.439	J+	0.351	J
PFOA	19	0.162	J	0.119	J	0.155	J	ND	U	0.324	J	2.92		0.590	J+	0.529	J
PFOS	13	2.04		1.78		4.06		0.063	J	6.24		7.56		1.29	J+	0.782	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 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.

Notes

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

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
ft	feet
HA	hand auger
HQ	hazard quotient
ID	identification
JTN	Johnstown
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, Johnstown Army Aviation Support Facility #2

Area of Interest		AOI02															
Sample ID		JTN-AOI02-02-SB-00-02		JTN-AOI02-03-HA-00-02		JTN-AOI02-04-HA-00-02		JTN-AOI02-04-HA-00-02-D		JTN-AOI02-05-HA-00-02		JTN-AOI02-06-HA-00-02		JTN-AOI02-07-HA-00-02		JTN-AOI02-08-HA-00-02	
Sample Date		08/03/2022		08/05/2022		07/28/2022		07/28/2022		08/05/2022		08/05/2022		08/05/2022		08/05/2022	
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	
Analyte	OSD Screening Level [a]	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	UJ	0.050	J	ND	UJ	0.041	J	ND	U	ND	U	ND	U	ND	U
PFHxS	130	0.049	J	0.463	J	0.112	J	0.166	J	0.095	J	0.622	J	0.296	J	ND	U
PFNA	19	0.043	J	0.370	J	0.066	J	0.057	J	0.575	J	34.9		9.36		0.070	J
PFOA	19	0.105	J	0.663	J	0.145	J	0.137	J	0.570	J	36.2		5.81		ND	U
PFOS	13	0.127	J	1.95		1.15		0.977	J	1.05	J	439		19.4		0.666	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 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.

Notes

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

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
ft	feet
HA	hand auger
HQ	hazard quotient
ID	identification
JTN	Johnstown
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, Johnstown Army Aviation Support Facility #2

Area of Interest		AOI02		AOI03											
Sample ID		JTN-AOI02-09-HA-00-01		JTN-AOI03-01-HA-00-02		JTN-AOI03-02-SB-00-02		JTN-AOI03-03-HA-00-02		JTN-AOI03-04-HA-00-02		JTN-AOI03-05-HA-00-02		JTN-AOI03-06-HA-00-02	
Sample Date		08/05/2022		07/28/2022		07/28/2022		08/01/2022		08/04/2022		08/04/2022		08/04/2022	
Depth		0-1 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
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)															
PFBS	1900	ND	U	ND	U	ND	U	0.039	J+	ND	UJ	0.086	J+	ND	UJ
PFHxS	130	0.254	J	0.033	J	0.590	J	ND	U	ND	UJ	0.194	J+	ND	UJ
PFNA	19	0.331	J	0.044	J	0.499	J	0.135	J+	0.116	J+	0.132	J+	0.051	J+
PFOA	19	0.575	J	ND	U	0.621	J	0.297	J+	0.293	J+	0.224	J+	ND	U
PFOS	13	2.55		0.313	J	11.5		1.28	J+	0.534	J+	1.85	J+	0.218	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 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.

Notes

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

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
ft	feet
HA	hand auger
HQ	hazard quotient
ID	identification
JTN	Johnstown
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, Johnstown Army Aviation Support Facility #2

Area of Interest		AOI01				AOI02				AOI03	
Sample ID		JTN-AOI01-02-SB-12-14		JTN-AOI01-03-SB-10-12		JTN-AOI02-02-SB-13-15		JTN-AOI02-02-SB-13-15-D		JTN-AOI03-02-SB-13-15	
Sample Date		07/26/2022		07/25/2022		08/03/2022		08/03/2022		08/01/2022	
Depth		12-14 ft		10-12 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
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)											
PFBS	25000	ND	U	ND	U	ND	UJ	ND	U	ND	UJ
PFHxS	1600	ND	U	ND	U	ND	UJ	ND	U	ND	U
PFNA	250	ND	U	ND	U	ND	UJ	ND	U	0.026	J
PFOA	250	ND	U	ND	U	ND	UJ	ND	U	ND	UJ
PFOS	160	ND	U	ND	U	ND	UJ	ND	U	0.309	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 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.

Notes

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

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
D	duplicate
DL	detection limit
ft	feet
HQ	hazard quotient
ID	identification
JTN	Johnstown
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, Johnstown Army Aviation Support Facility #2

Area of Interest	AOI01								AOI03			
Sample ID	JTN-AOI01-01-SB-23-25		JTN-AOI01-01-SB-30-32		JTN-AOI01-02-SB-25-27		JTN-AOI01-03-SB-15-17		JTN-AOI03-02-SB-46-48		JTN-AOI03-02-SB-46-48-D	
Sample Date	07/28/2022		07/29/2022		07/27/2022		07/25/2022		08/01/2022		08/01/2022	
Depth	23-25 ft		30-32 ft		25-27 ft		15-17 ft		46-48 ft		46-48 ft	
Analyte	**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	U	ND	UJ	ND	U	ND	U	ND	UJ	ND	UJ
PFHxS	ND	U	ND	UJ	ND	U	ND	U	ND	UJ	ND	UJ
PFNA	ND	U	ND	UJ	ND	U	ND	U	ND	UJ	ND	UJ
PFOA	ND	U	ND	UJ	ND	U	ND	U	ND	UJ	ND	UJ
PFOS	ND	U	0.068	J+	0.105	J	ND	U	ND	UJ	ND	UJ

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.

Notes

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

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
ft	feet
ID	identification
JTN	Johnstown
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, Johnstown Army Aviation Support Facility #2

Area of Interest		AOI01						AOI02		AOI03	
Sample ID		JTN-AOI01-01-GW		JTN-AOI01-01-GW-D		JTN-AOI01-03-GW		JTN-AOI02-02-GW		JTN-AOI03-MW001-GW	
Sample Date		08/05/2022		08/05/2022		08/05/2022		08/10/2022		08/09/2022	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Water, LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)											
PFBS	601	2.63	J	2.51	J	2.00	J	ND	U	ND	U
PFHxS	39	22.9		21.6		ND	U	ND	U	ND	U
PFNA	6	3.06	J	2.80	J	ND	U	ND	U	ND	U
PFOA	6	9.46		8.69		1.39	J	ND	U	ND	U
PFOS	4	68.4		64.2		0.745	J	ND	U	1.51	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 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

Notes

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

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
GW	groundwater
HQ	hazard quotient
ID	identification
JTN	Johnstown
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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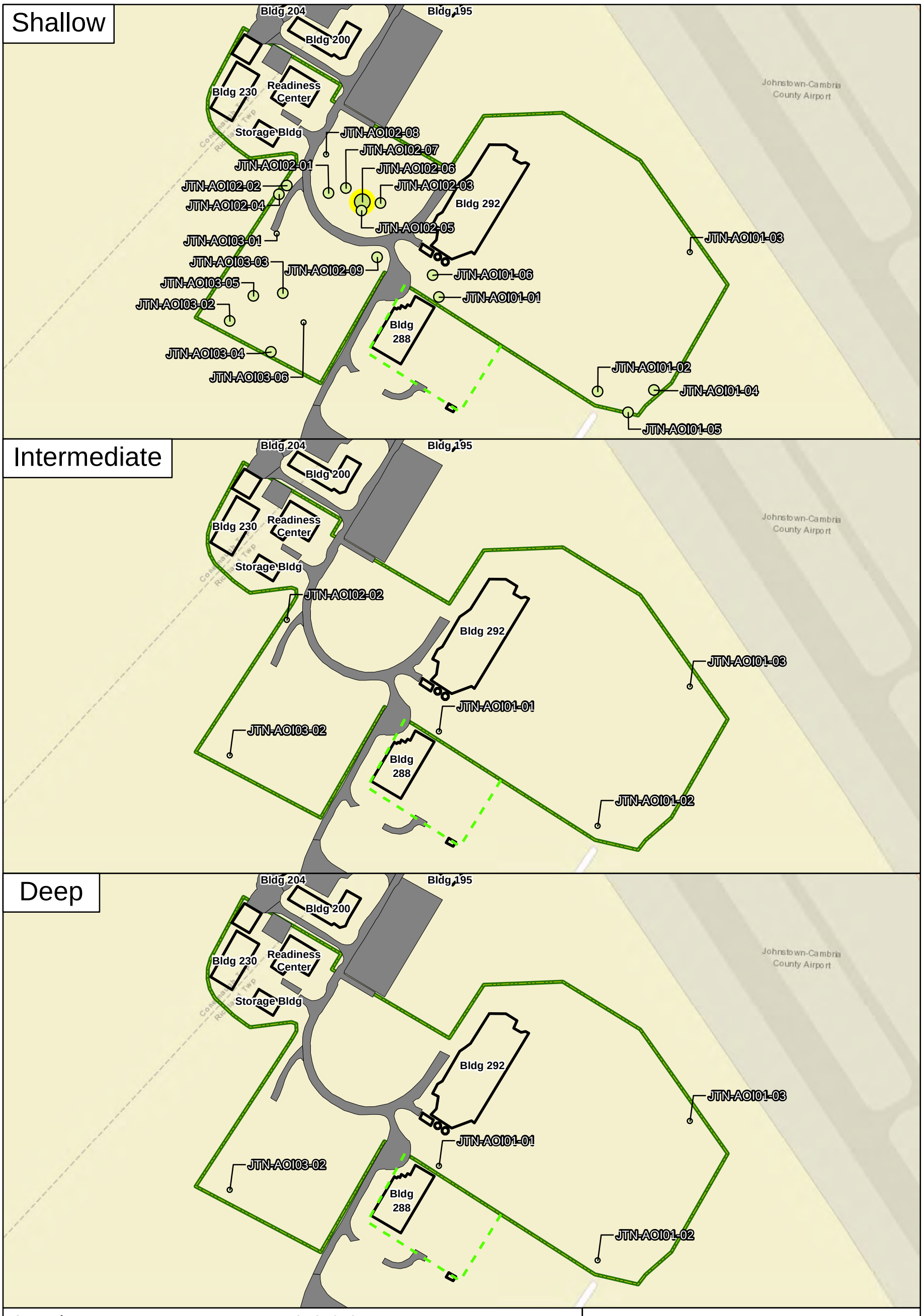

Legend

- Estimated Facility Boundary
- Facility Boundary
- Roadway/Parking

PFOA Results (µg/Kg)

- ND
- >ND - 19
- >19 - 250
- >250 - 2,500
- >2,500

N

0 187.5 375 750 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.

PFOA Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection at Johnstown AASF #2, PA			
REVISED	12/19/2022	GIS BY	MS	12/19/2022
SCALE	1:4,500	CHK BY	ST	12/19/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	12/19/2022

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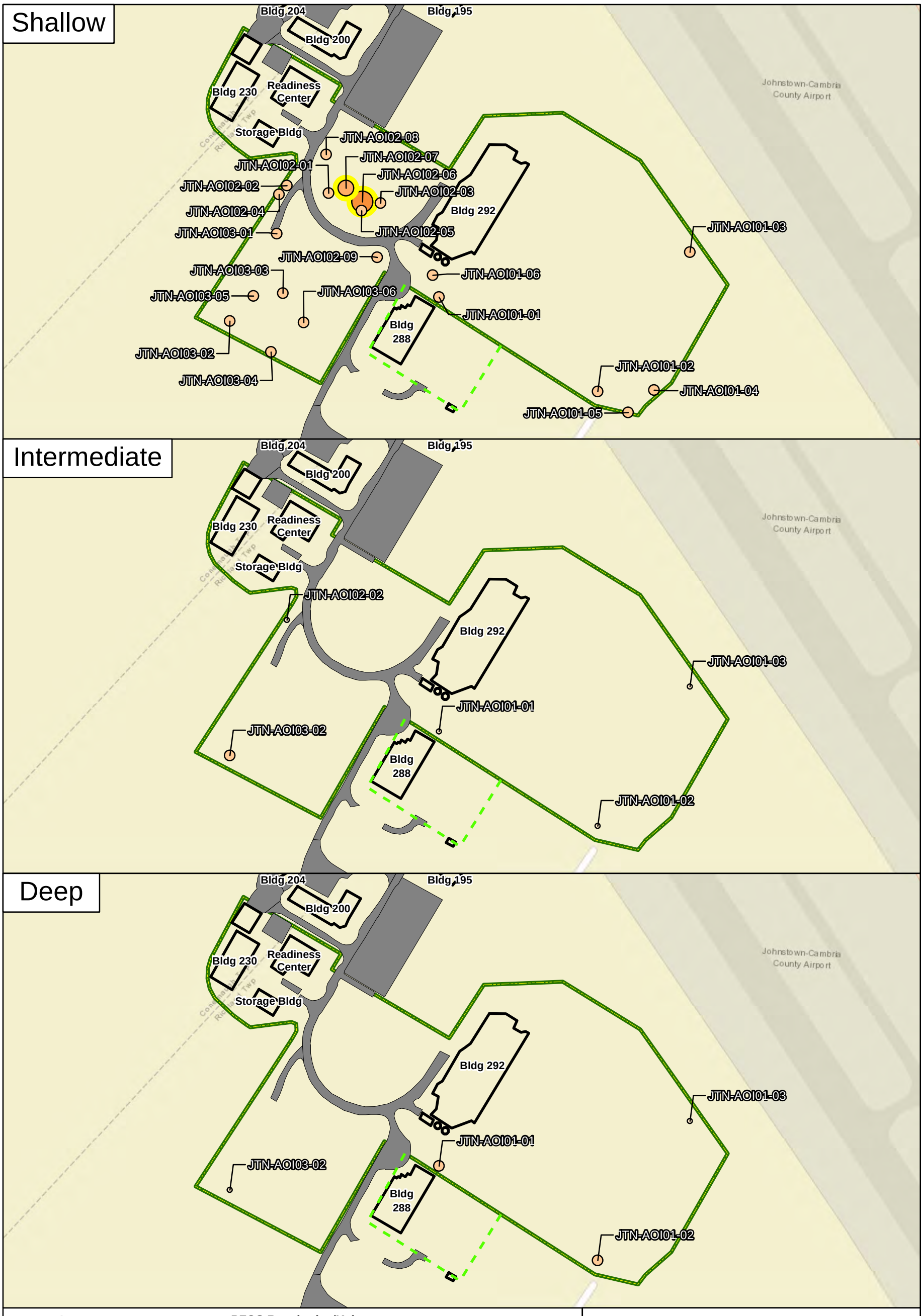
Figure 6-1



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

PFOS Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection at Johnstown AASF #2, PA			
REVISED	12/19/2022	GIS BY	MS	12/19/2022
SCALE	1:4,500	CHK BY	ST	12/19/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	12/19/2022

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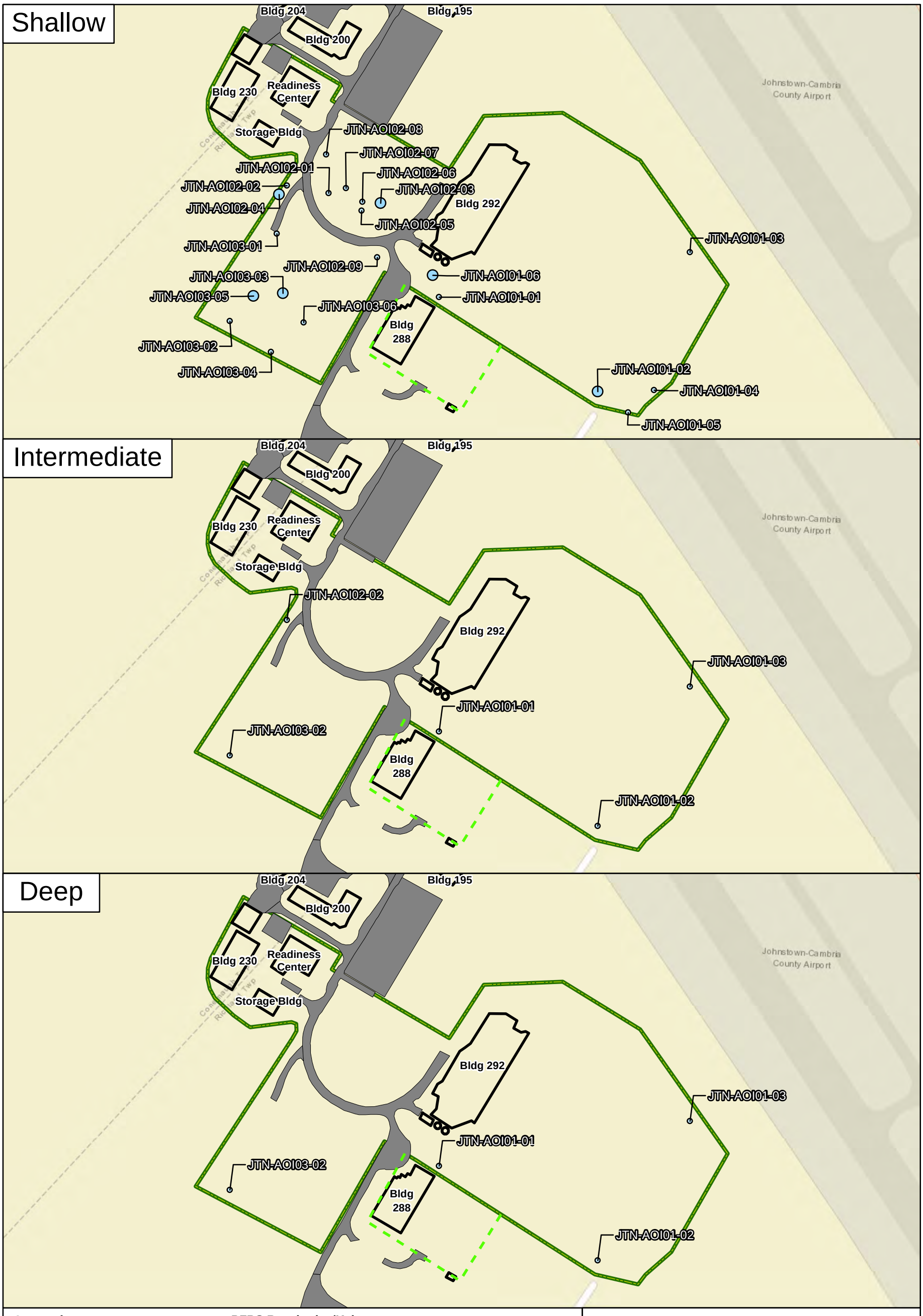
Figure 6-2



Legend

- Estimated Facility Boundary
- Facility Boundary
- Roadway/Parking

PFBS Results (µg/Kg)

- ND
- >ND - 10
- >10 - 1,900
- >1,900 - 25,000
- >25,000

N

0 187.5 375 750 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.

PFBS Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection at Johnstown AASF #2, PA			
REVISED	12/19/2022	GIS BY	MS	12/19/2022
SCALE	1:4,500	CHK BY	ST	12/19/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	12/19/2022

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Figure 6-3

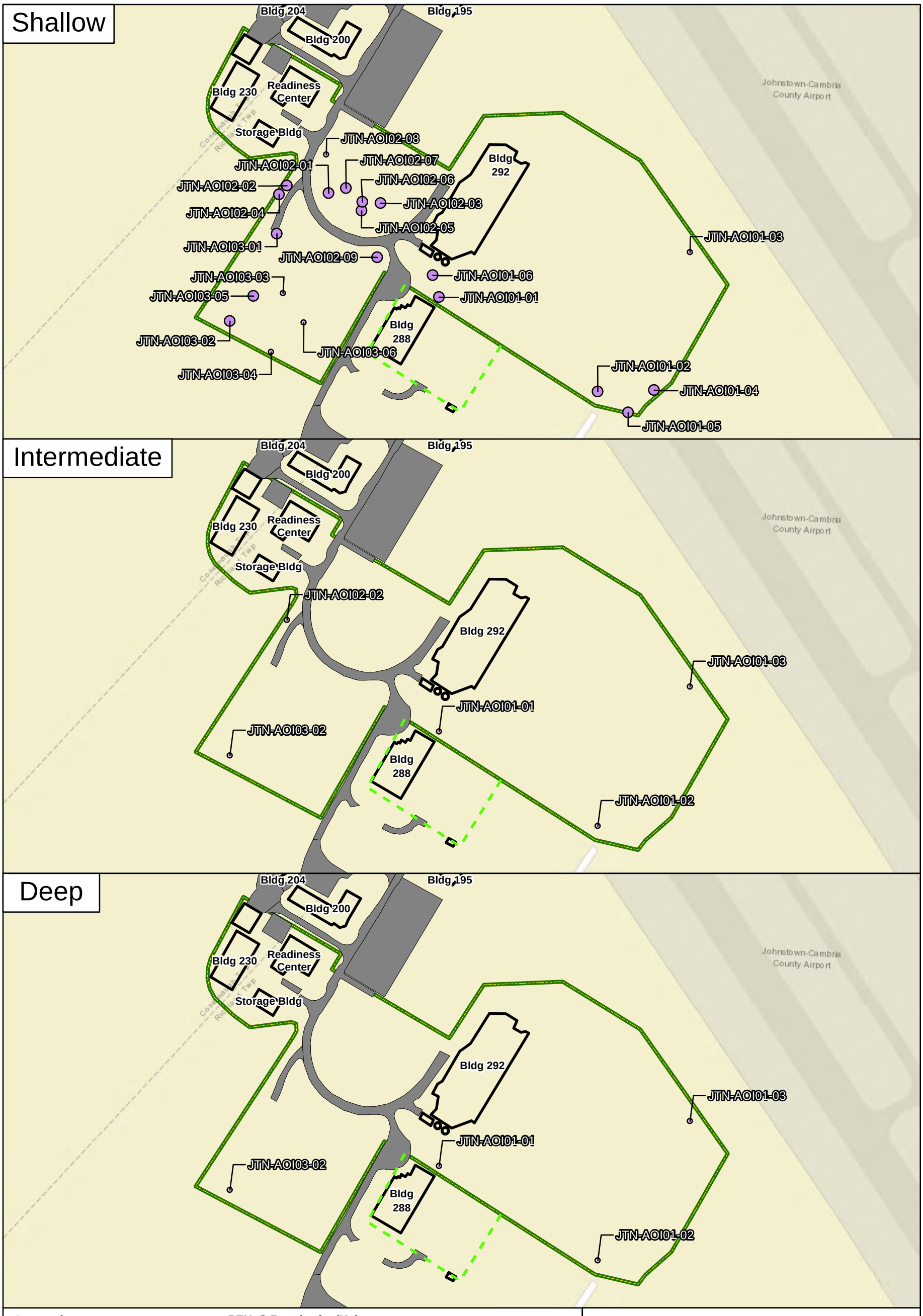
Shallow
Bldg 204
Bldg 195
Bldg 200
Bldg 230
Readiness Center
Storage Bldg
Johnstown-Cambria County Airport
JTN-AOI02-08
JTN-AOI02-01
JTN-AOI02-07
JTN-AOI02-06
JTN-AOI02-02
JTN-AOI02-03
JTN-AOI02-04
JTN-AOI02-05
JTN-AOI03-01
JTN-AOI02-09
JTN-AOI01-03
JTN-AOI03-03
JTN-AOI01-06
JTN-AOI03-05
JTN-AOI01-01
Bldg 292
Bldg 288
JTN-AOI03-02
JTN-AOI03-06
JTN-AOI01-02
JTN-AOI03-04
JTN-AOI01-04
JTN-AOI01-05
Intermediate
Bldg 204
Bldg 195
Bldg 200
Bldg 230
Readiness Center
Storage Bldg
Johnstown-Cambria County Airport
JTN-AOI02-02
Bldg 292
JTN-AOI01-03
JTN-AOI01-01
JTN-AOI03-02
Bldg 288
JTN-AOI01-02
Deep
Bldg 204
Bldg 195
Bldg 200
Bldg 230
Readiness Center
Storage Bldg
Johnstown-Cambria County Airport
Bldg 292
JTN-AOI01-03
JTN-AOI01-01
JTN-AOI03-02
Bldg 288
JTN-AOI01-02
Legend
Estimated Facility Boundary
Facility Boundary
Roadway/Parking
PFHxS Results (µg/Kg)
ND
>ND - 10
>10 - 130
>130 - 1,600
>1,600
N
0
187.5
375
750
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.
PFHxS Detections in Soil
CLIENT ARNG
PROJECT Site Inspection at Johnstown AASF #2, PA
REVISED 12/19/2022 GIS BY MS 12/19/2022
SCALE 1:4,500 CHK BY ST 12/19/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong
PM CM 12/19/2022
AECOM
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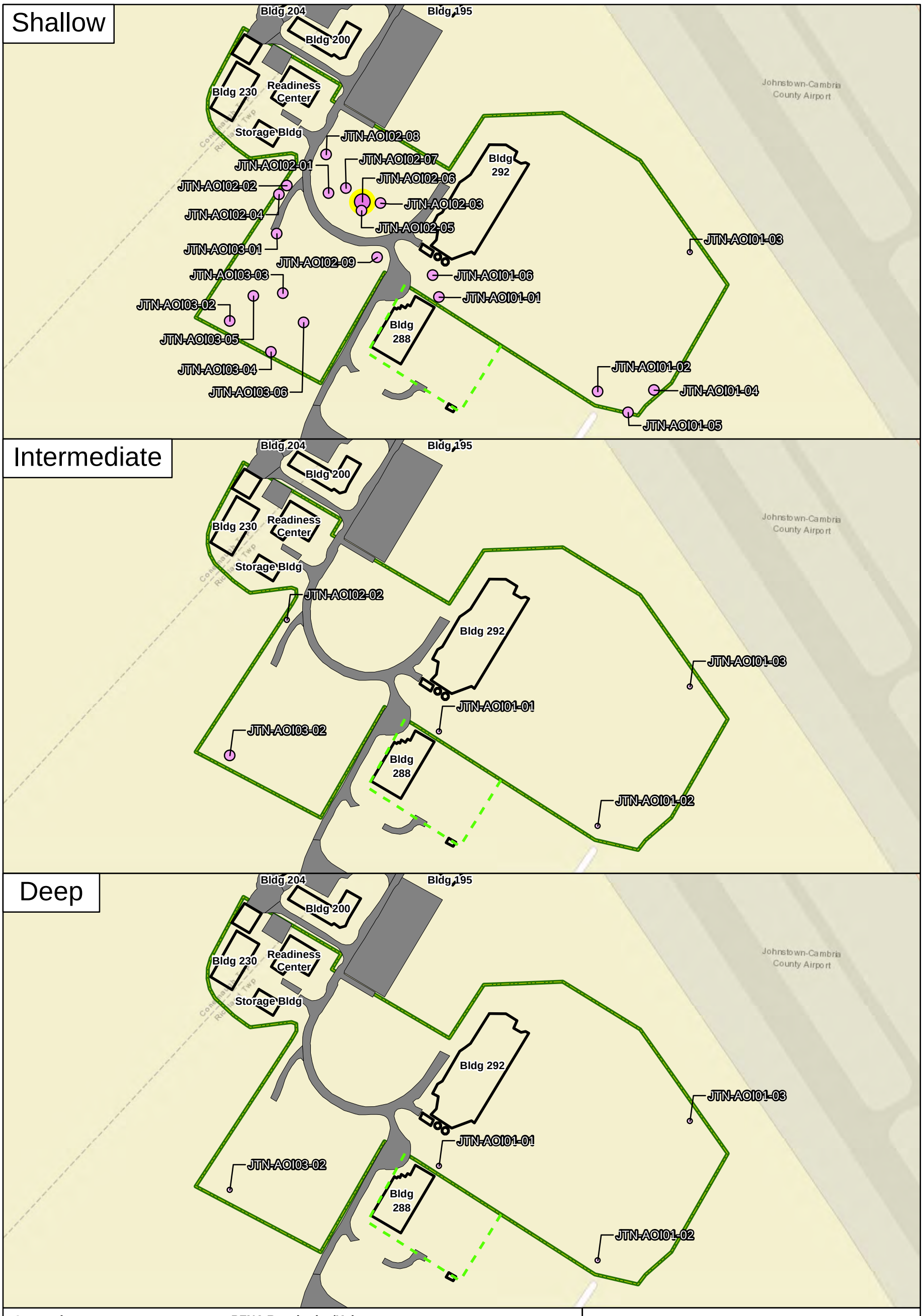
Figure 6-4



PFNA Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection at Johnstown AASF #2, PA			
REVISED	12/19/2022	GIS BY	MS	12/19/2022
SCALE	1:4,500	CHK BY	ST	12/19/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	12/19/2022

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Figure 6-5

PFOA

Bldg 204
Bldg 195
Bldg 200
Bldg 230
Readiness Center
Storage Bldg
JTN-AOI02-02
Bldg 292
JTN-AOI01-03
JTN-AOI03-MW001
JTN-AOI01-01
Bldg 288
Johnstown-Cambria County Airport

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

PFOS

Bldg 204
Bldg 195
Bldg 200
Bldg 230
Readiness Center
Storage Bldg
JTN-AOI02-02
Bldg 292
JTN-AOI01-03
JTN-AOI03-MW001
JTN-AOI01-01
Bldg 288
Johnstown-Cambria County Airport

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

PFBS

Bldg 204
Bldg 195
Bldg 200
Bldg 230
Readiness Center
Storage Bldg
JTN-AOI02-02
Bldg 292
JTN-AOI01-03
JTN-AOI03-MW001
JTN-AOI01-01
Bldg 288
Johnstown-Cambria County Airport

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

Legend
- Estimated Facility Boundary
- Facility Boundary
- Roadway/Parking
- Groundwater Flow Direction

N

0 187.5 375 750 Feet

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

PFOA, PFOS, and PFBS Detections in Groundwater

CLIENT	ARNG			
PROJECT	Site Inspection at Johnstown AASF #2, PA			
REVISED	1/31/2023	GIS BY	MS	1/31/2023
SCALE	1:4,500	CHK BY	ST	1/31/2023
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	1/31/2023

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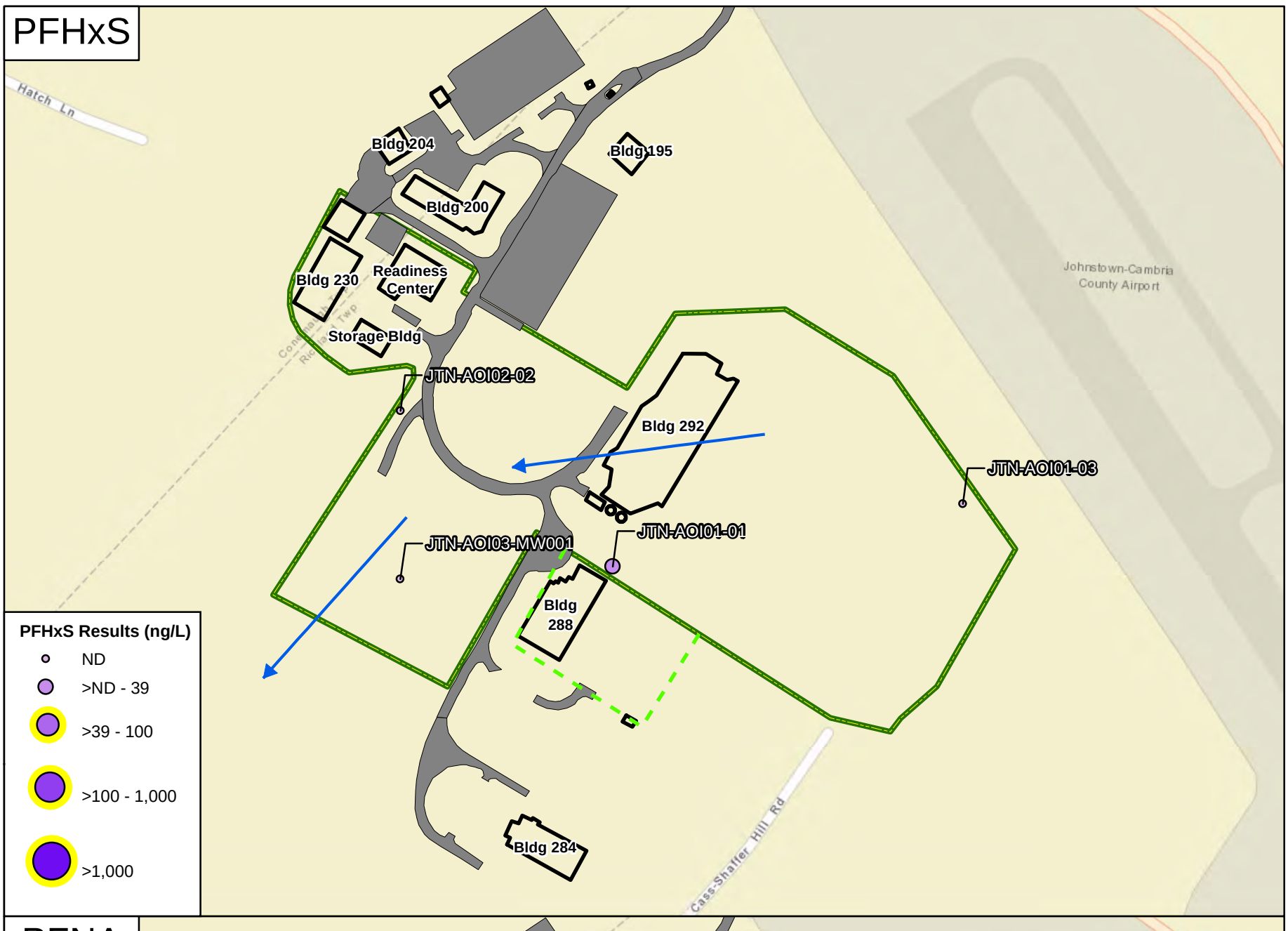
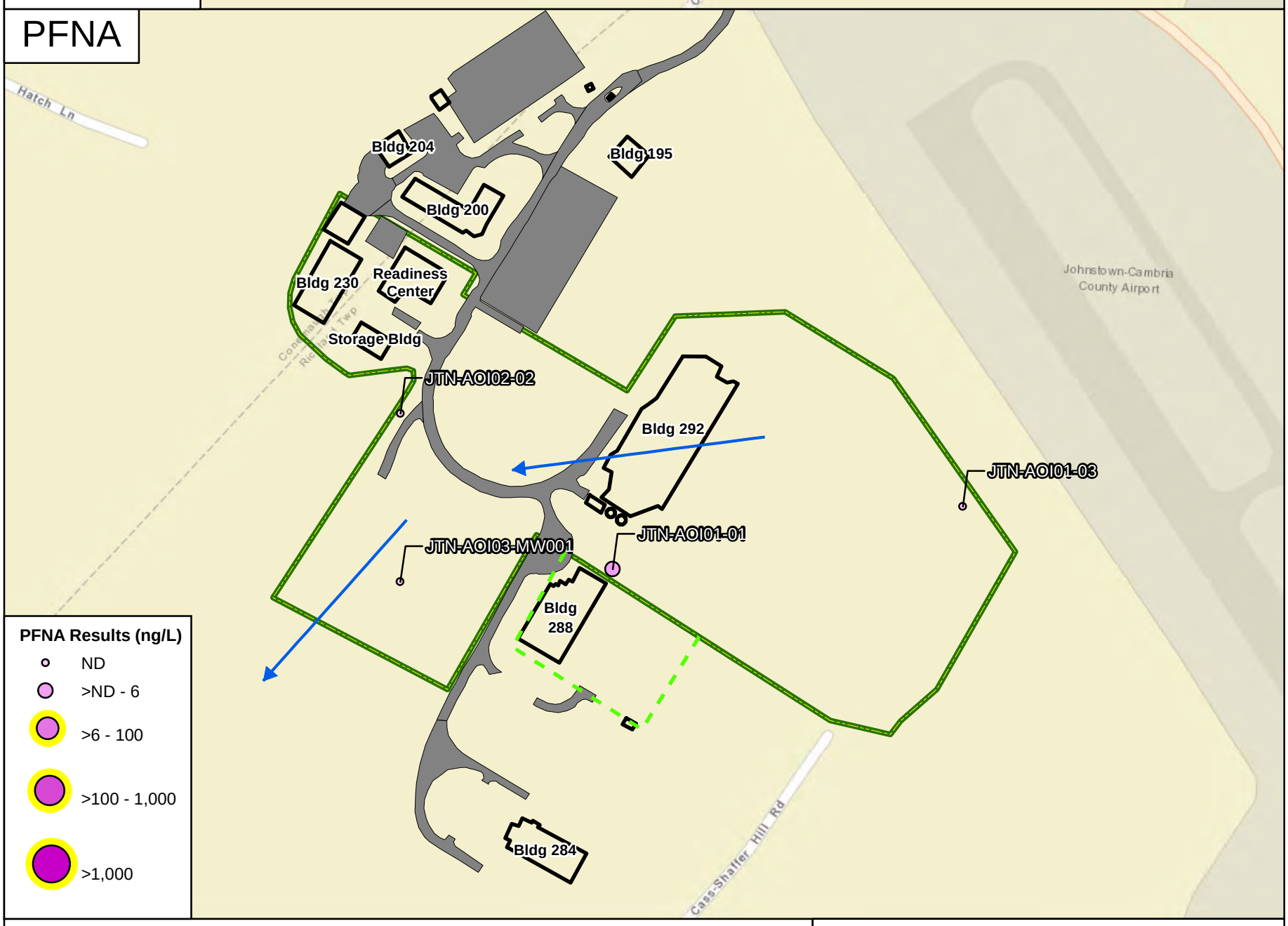
Figure 6-6

PFHxS



PFNA



Legend

- Estimated Facility Boundary
- Facility Boundary
- Roadway/Parking
- Groundwater Flow Direction

N

0 187.5 375 750 Feet

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

PFHxS and PFNA Detections in Groundwater

CLIENT	ARNG			
PROJECT	Site Inspection at Johnstown AASF #2, PA			
REVISED	12/19/2022	GIS BY	MS	12/19/2022
SCALE	1:4,500	CHK BY	ST	12/19/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	12/19/2022

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Figure 6-7

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 an 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 (though unlikely due to restricted access), 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 suspected source and potential receptors at AOI 1, AOI 2, and AOI 3 based on the aforementioned criteria.

7.1.1 AOI 1

AOI 1 includes Building 292, Building 288, Tri-Max™ Service Area, and hangar apron. AFFF releases have occurred due to fire suppression system trips and testing from Building 292 and nozzle testing, familiarization training, Tri-Max™ servicing, and excess AFFF disposal in the apron areas. The AFFF releases occurred on both paved areas and directly on grassy surfaces.

Relevant compounds were detected in surface soil and subsurface soil at AOI 1. No active construction was ongoing during site activities, but site workers and future construction workers could encounter relevant compounds in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for site workers and future construction workers are potentially complete. The incidental ingestion and inhalation of dust exposure pathways for the off-facility residents and recreational users are considered incomplete due to the unlikelihood of those receptors encountering on-facility media. Future construction workers could encounter relevant compounds in subsurface soil via incidental ingestion. Therefore, the subsurface soil exposure pathway for future construction workers is potentially complete but incomplete for site workers who are unlikely to partake in subsurface activities. The CSM for AOI 1 is presented on **Figure 7-1**.

7.1.2 AOI 2

AOI 2 includes the AFFF Pond and a portion of the drainage ditch that leads into a second off-facility stormwater detention pond. Surface soil samples were collected near the inlets and outlets of these drainage features.

PFOA, PFOS, and PFNA were detected above the residential SLs in surface soil samples collected at AOI 2. No active construction was ongoing during site activities, but site workers and future construction workers could encounter relevant compounds in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for site workers and future construction workers are potentially complete. The incidental ingestion and inhalation of dust exposure pathways for the off-facility residents and recreational users are considered incomplete due to the unlikelihood of those receptors encountering on-facility media. Relevant compounds were not detected in subsurface soil at AOI 2; therefore, all exposure pathways for subsurface soil are considered incomplete. The CSM for AOI 2 is presented on **Figure 7-2**.

7.1.3 AOI 3

AOI 3 includes the Former Burn Area, where AFFF releases may have occurred from fire training activities. The Former Burn Area was regraded and paved over in approximately 2010, and the current area is a fenced motor pool. At the time of the fire training activities (approximately 2004 to 2010), AOI 3 was located on unpaved surfaces. Thus, expended AFFF may have been released directly onto surface soil and then infiltrated the subsurface soil.

Relevant compounds were detected in surface soil and subsurface soil at AOI 3. No active construction was ongoing during site activities, but site workers and future construction workers could come in contact with relevant compounds in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for site workers and future construction workers are potentially complete. The incidental ingestion and inhalation of dust exposure pathways for the off-facility residents and recreational users are considered incomplete due to the unlikelihood of those receptors encountering on-facility media. Future construction workers could come in contact with relevant compounds in subsurface soil via incidental ingestion; therefore, the subsurface soil exposure pathway for future construction workers is potentially complete but incomplete for site workers who are unlikely to partake in subsurface activities. 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 suspected source and potential receptors based on the aforementioned criteria.

7.2.1 AOI 1

PFOA and PFOS were detected above their SLs in groundwater samples collected at AOI 1. Domestic wells are present within a 4-mile radius of the facility. Although none of the domestic wells are immediately downgradient from AOI 1, the pathway for exposure to off-facility residents via ingestion of groundwater is conservatively considered potentially complete. Depths to water measured at AOI 1 in August 2022 during the SI ranged from 27.92 to 32.45 feet bgs. Based on the measured depths to water, future construction workers and recreational users are unlikely to encounter shallow groundwater. Therefore, the ingestion exposure pathway for future construction workers and recreational users are considered incomplete. The ingestion exposure pathway for site workers is also considered incomplete since the facility is serviced by municipal water derived from surface water intakes. The CSM for AOI 1 is presented on **Figure 7-1**.

7.2.2 AOI 2

Relevant compounds were not detected in groundwater samples collected at AOI 2. Therefore, the groundwater ingestion pathway is considered incomplete for all receptors. The CSM for AOI 2 is presented on **Figure 7-2**.

7.2.3 AOI 3

PFOS was detected below its SL at AOI 3, in the groundwater sample collected from the existing well (JTN-AOI03-MW001). Domestic wells are present within a 4-mile radius of the facility. Although none of the domestic wells are immediately downgradient from AOI 3, the pathway for exposure to off-facility residents via ingestion of groundwater is conservatively considered potentially complete. Site workers and future construction workers may also be potentially exposed to groundwater through access to the existing well that was sampled during the SI. Depths to water measured at AOI 3 in August 2022 during the SI ranged from 70.35 to 119.96 feet bgs. Based on the measured depths to water, recreational users are unlikely to encounter shallow groundwater. Therefore, the ingestion exposure pathway for recreational users 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 surface water and sediment were used to determine whether a potentially complete pathway exists between the suspected source and potential receptors at each AOI based on the aforementioned criteria. At AOIs where surface water and sediment samples were not collected, data from downgradient AOIs or 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 suspected source and potential receptors.

7.3.1 AOI 1

AFFF releases from the fire suppression systems in Building 288 and Building 292 would have been captured by trench drains within the buildings. AFFF releases on the hangar apron would have been captured by drains on the hangar apron. All drainage is controlled by diverter valves, which either release the drainage as stormwater or as wastewater through connection to the sanitary sewer. In the event that the drainage is released as stormwater, the drainage ditch and AFFF Pond (both AOI 2) are the receiving water bodies. The surface water and sediment pathway for AOI 1 is evaluated as part of AOI 2. The CSM for AOI 1 is presented on **Figure 7-1**.

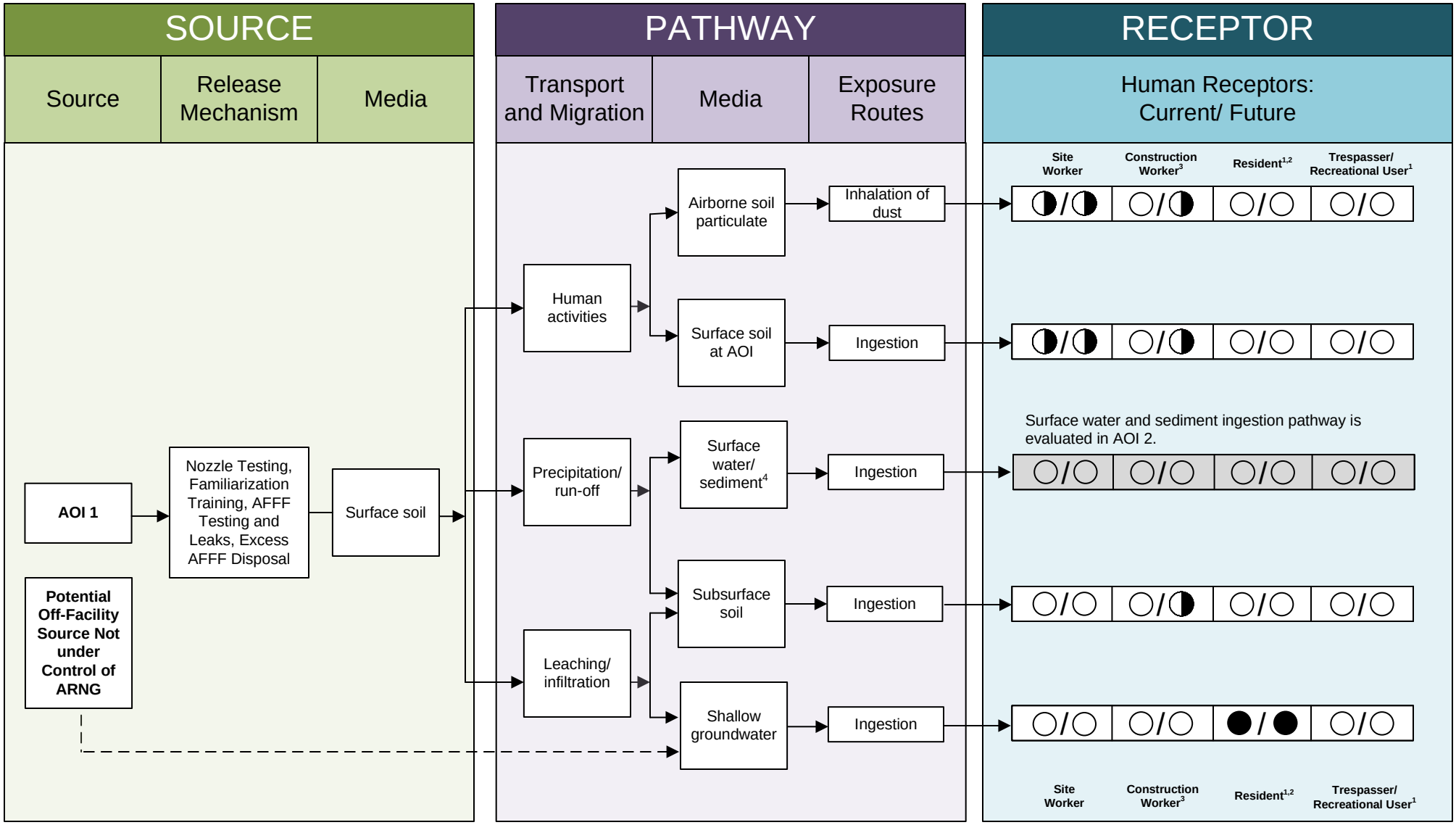
7.3.2 AOI 2

Both drainage areas that comprise AOI 2, AFFF Pond and the drainage ditch, lead to Solomon Run, which is a tributary of the Conemaugh River. Surface soil samples were collected near the inlets and outlets of the AFFF Pond and drainage ditch.

AFFF releases from AOI 1 have a history of migrating downgradient to AOI 2, as the drainage areas have been occasionally observed to contain residual foam after AFFF releases at AOI 1. PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. Because relevant compounds were detected in soil at AOI 2, it is possible that those compounds may have migrated from soil to surface water and sediment before ultimately discharging as surface water off-facility. The surface water and sediment ingestion exposure pathways for site workers, future construction workers, and recreational users are considered potentially complete. Surface water from the Conemaugh River is not directly used as drinking water in the vicinity, so the surface water ingestion exposure pathway for residents is considered incomplete. The CSM for AOI 2 is presented on **Figure 7-2**.

7.3.3 AOI 3

Surface water runoff at AOI 3 generally flows south-southwest towards Solomon Run, which is a tributary of the Conemaugh River. A surface soil sample (JTN-AOI03-04) was collected near an observed stream running south of AOI 3 and had detections of the relevant compounds. PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. Because relevant compounds were detected in soil at AOI 3, it is possible that those compounds may have migrated from soil to surface water and sediment before ultimately discharging as surface water off-facility. The surface water and sediment ingestion exposure pathways for site workers, future construction workers, and recreational users are considered potentially complete. Surface water from the Conemaugh River is not directly used as drinking water in the vicinity, so the surface water ingestion exposure pathway for residents is considered incomplete. The CSM for AOI 3 is presented on **Figure 7-3**.



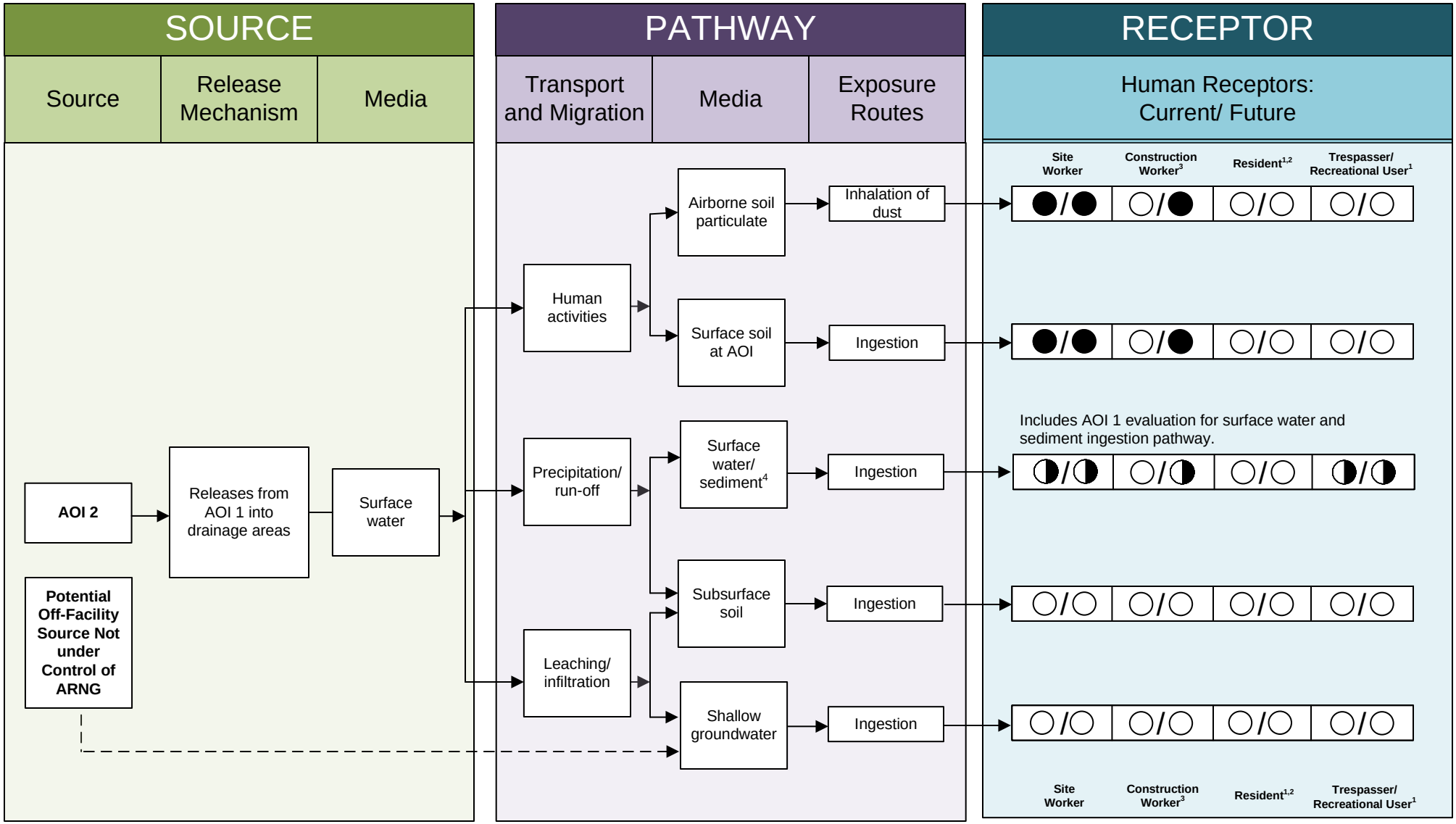
LEGEND

- 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. No current active construction at the facility.
4. Surface water and sediment ingestion pathway is evaluated in AOI 2.

Figure 7-1
Conceptual Site Model, AOI 1
Johnstown AASF #2



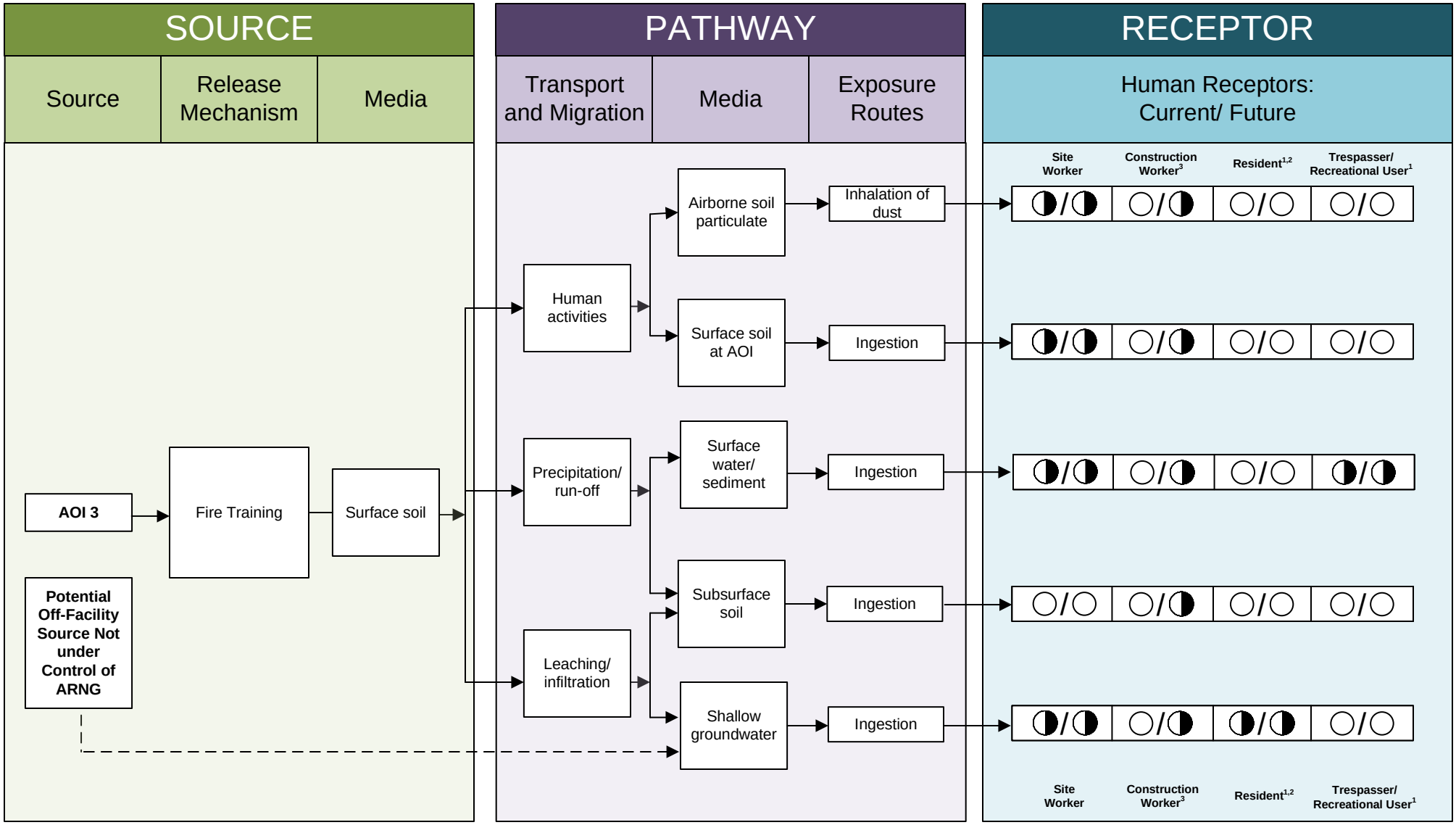
LEGEND

- 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. No current active construction at the facility.
4. Includes AOI 1 evaluation for surface water and sediment ingestion pathway.

Figure 7-2
Conceptual Site Model, AOI 2
Johnstown AASF #2



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. No current active construction at the facility.

Figure 7-3
Conceptual Site Model, AOI 3
Johnstown AASF #2

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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 21 July to 10 August 2022 and consisted of utility clearance, borings, soil sample collection, permanent monitoring well installation and development, groundwater sample collection, and land surveying. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2021), except as noted in **Section 5.8**.

To fulfill the project DQOs set forth in the approved SI QAPP Addendum (AECOM, 2021), 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.

- Thirty (30) soil samples from five (5) borings and sixteen (16) hand auger locations;
- Four (4) groundwater samples from three (3) permanent well locations and one (1) existing well (JTN-AOI03-MW001);
- Fifteen (15) QA/QC samples.

An SI is conducted when the PA determines an AOI exists based on probable use, storage, and/or disposal of PFAS-containing materials. The SI includes multi-media sampling at AOIs to determine whether or not a release has occurred. The SI may conclude further investigation is warranted, a removal action is required to address immediate threats, or no further action is required. Additionally, the CSMs were refined to assess whether a potentially complete pathway exists between the suspected 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 from suspected sources on the facility resulting from historical DoD activities. Sample analytical concentrations collected during the SI were compared to 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:
    - The detected concentrations of relevant compounds in surface and subsurface soil at AOI 1 were below their respective SLs.
    - PFOA and PFOS in groundwater exceeded their SLs. PFOA exceeded the SL of 6 ng/L with a maximum concentration of 9.46 ng/L. PFOS exceeded the SL of 4 ng/L with a maximum concentration of 68.4 ng/L.
    - Based on the results of the SI, further evaluation of AOI 1 is warranted in an RI.

- At AOI 2:
    - PFOA, PFOS, and PFNA were detected in surface soil, at concentrations above their residential SLs. PFOA exceeded the SL of 19 µg/kg, with a concentration of 36.2 µg/kg in JTN-AOI02-06. PFOS exceeded the SL of 13 µg/kg, with concentrations 439 µg/kg and 19.4 µg/kg in JTN-AOI02-06 and JTN-AOI02-07, respectively. PFNA exceeded the SL of 19 µg/kg, with a concentration of 34.9 µg/kg in JTN-AOI02-06.
    - No relevant compounds were detected in groundwater at AOI 2.
    - Based on the results of the SI, further evaluation of AOI 2 is warranted in an RI.
- At AOI 3:
    - The detected concentrations of relevant compounds in surface and subsurface soil at AOI 3 were below their respective SLs.
    - PFOS was detected in groundwater below the SL. No other relevant compounds were detected in groundwater at AOI 3.
    - Based on the results of the SI, no further evaluation of AOI 3 is warranted.

This report resulted in one location (existing well JTN-AOI03-MW001) with groundwater data associated with the Former Burn Area at AOI 3. Another permanent well (JTN-AOI03-02) was installed at AOI 3, but the well was purged dry and could not be sampled for groundwater. All sample concentration data at AOI 3 were measured below the respective SLs. One surface soil sample collected from JTN-AOI03-02 had a PFOS concentration of 11.5 µg/kg close to the residential SL of 13 µg/kg. Based on the lack of groundwater data and AOI 3's downgradient position with respect to AOI 1 and AOI 2, additional sampling at AOI 3 may be considered during future phases of CERCLA. For that reason, AOI 3 is recommended for no further action at this time, with consideration for additional sampling during a future CERCLA phase.

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	Future Action
1	Hangar Apron Areas	◐	●	Proceed to RI
2	Drainage Areas	●	○	Proceed to RI
3	Former Burn Area	◐	◐	No further action at this time

Legend:

● = detected; exceedance of the screening levels

◐ = detected; no exceedance of the screening levels

○ = not detected

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