FINAL
Site Inspection Report
Camp Navajo,
Bellemont, Arizona

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

June 2023

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Acronyms and Abbreviations

%	percent
°C	degrees Celsius
°F	degrees Fahrenheit
µg/kg	micrograms per kilogram
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film-forming foam
AOI	Area of Interest
ARNG	Army National Guard
AZARNG	Arizona Army National Guard
AZDEMA	Arizona Department of Emergency and Military Affairs
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
DESCOM	Army Depot System Command
DoD	Department of Defense
DO	dissolved oxygen
DQO	data quality objective
DUA	data usability assessment
ELAP	Environmental Laboratory Accreditation Program
EM	Engineer Manual
ERB	equipment rinsate blank
FedEx	Federal Express
gpd	gallons per day
gpm	gallons per minute
HDPE	high-density polyethylene
HFPO-DA	hexafluoropropylene oxide dimer acid
HSA	hollow stem auger
IDW	investigation-derived waste
ITRC	Interstate Technology Regulatory Council
LC/MS/MS	liquid chromatography with tandem mass spectrometry
MIL-SPEC	military specification
NADA	Navajo Army Depot
NELAP	National Environmental Laboratory Accreditation Program
ng/L	nanograms per liter
NOD	Navajo Ordnance Depot
ORP	oxidation-reduction potential
OSD	Office of the Secretary of Defense
PA	Preliminary Assessment
PFAS	per- and polyfluoroalkyl substances

PFBS	perfluorobutanesulfonic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PID	photoionization detector
PQAPP	Programmatic UFP-QAPP
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual
RI	Remedial Investigation
SI	Site Inspection
SL	screening level
TOC	total organic carbon
TPP	Technical Project Planning
UFP	Uniform Federal Policy
US	United States
USACE	United States Army Corps of Engineers
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WWTP	wastewater treatment plant

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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 six 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 screening levels (SLs) for relevant compounds. This SI was completed at Camp Navajo in Bellemont Arizona and determined further evaluation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is warranted for AOI 1, AOI 3, AOI 5, and AOI 6; no further evaluation is warranted at AOI 2 and AOI 4 at this time. Camp Navajo will also be referred to as the "facility" throughout this document.

Camp Navajo is located in north-central Arizona, 12 miles west of Flagstaff, 17 miles east of Williams, and adjacent to the industrial community of Bellemont. The facility comprises 28,473 acres along Interstate 40. The installation comprises 28,473 acres and is used to support the installation's munitions storage mission and support of various training missions (Arizona ARNG [AZARNG], 2020).

The PA identified six AOIs for investigation during the SI phase. SI sampling results from the six 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, AOI 3, AOI 5, and AOI 6; no further evaluation is warranted at AOI 2 and AOI 4 at this time.

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

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

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

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

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

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

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

AOI	Potential Release Area	Soil – Source Area	Groundwater – Source Area	Future Action
1	Former Building 209	◐	●	Proceed to RI
2	Former Building LR200	◐	N/A	No further action
3	Building 2	●	●	Proceed to RI
4	WWTP Holding Ponds and Effluent Reuse Site	◐	N/A	No further action
5	NAAD-40	N/A	◐	Proceed to RI
6	North and South Holding Ponds	●	●	Proceed to RI

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

1. Introduction

1.1 Project Authorization

The Army National Guard (ARNG) G-9 is the lead agency in performing Preliminary Assessments (PAs) and Site Inspections (SIs) on the current or potential historical use of per- and polyfluoroalkyl substances (PFAS) with a focus on the six compounds presented in the memorandum from the Office of the Secretary of Defense (OSD) dated 6 July 2022 (Assistant Secretary of Defense, 2022). The six compounds listed in the OSD memorandum will be referred to as "relevant compounds" throughout this document and include perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA), hexafluoropropylene oxide dimer acid (HFPO-DA)[1], and perfluorobutanesulfonic acid (PFBS) at ARNG facilities nationwide. The ARNG performed this SI at Camp Navajo in Bellemont, Arizona. Camp Navajo 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 Camp Navajo (AECOM Technical Services, Inc. [AECOM], 2020) that identified six 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

Camp Navajo is located in north-central Arizona, 12 miles west of Flagstaff, 17 miles east of Williams, and adjacent to the industrial community of Bellemont located along Interstate 40 (**Figure 2-1**). The facility is located in a topographic basin of the San Francisco Plateau within south-central Coconino County, between the Coconino and Kaibab National Forests. The installation comprises 28,473 acres and is used to support the installation's munitions storage mission and support of various training missions (Arizona ARNG [AZARNG], 2020).

Prior to military use, the land currently occupied by Camp Navajo was used for homesteading, ranching, and logging. Lands for the installation were purchased from private landowners and lands that were transferred from the Kaibab and Coconino National Forests. These lands were combined to form the Navajo Ordnance Depot (NOD) in 1942. Initial construction at the facility was completed in 1943 (AZARNG, 2020).

In 1945, NOD's mission was expanded to include a prisoner-of-war camp that continued until the end of World War II. Storage of chemical warfare service ammunition, explosives, and other ammunition continued throughout this time. In 1967, the NOD was designated a Defense Supply Agency Depot; in 1971, it was renamed the Navajo Army Depot Activity (NADA) and placed under the command of the Pueblo Army Depot. In 1982, the AZARNG assumed operational control of NADA and performed the Army Depot System Command's (DESCOM) mission of receipt, storage, shipping, maintenance, and disposal of munitions to enhance the training of AZARNG units. In 1988, NADA was closed as a federally funded and controlled installation under the Base Realignment and Closure Act but continued through 1992 to store ammunition using funding provided by DESCOM, while the AZARNG used the installation as a training facility. In 1993, the installation was renamed Camp Navajo (AZARNG, 2020).

2.2 Facility Environmental Setting

The facility is located near the southern edge of the Colorado Plateau physiographic province, at an elevation of approximately 7,050 feet (**Figure 2-2**). The southern Colorado Plateau is elevated relative to surrounding areas. The plateau surface regionally slopes gently upward to the southwest, reflecting the general dip of the carbonate strata. Twelve (12) miles south of Bellemont, the plateau abruptly ends at the Mogollon Rim, a steep south-facing escarpment with up to 2,500 feet of relief (Wilkinson, 2000).

Bellemont lies within the northernmost extent of the Verde River watershed, which drains a portion of central Arizona. The Verde River lies below the Mogollon Rim in the Verde Valley; it is fed by tributaries whose canyons deeply incise the Rim and whose sub-watersheds extend up on to the plateau. Oak Creek, West Fork, and Sycamore Canyons reach to within a few miles of the southern boundary of Camp Navajo. Perennial springs in the canyon bottoms drain the plateau subsurface, resulting in water levels as deep as 1,500 feet to 1,700 feet in the regional aquifers. The upper portions of the sub-watersheds are ephemeral and only flow in response to significant storm or snowmelt events (Wilkinson, 2000).

The seeps and springs in the town of Bellemont issue from volcanic rocks, and the majority of them occur at the lithologic contact between the Wild Bill Hill basalt flow and the underlying Camp Navajo clay. Most springs are ephemeral, but a few are perennial during most years (Wilkinson, 2000). The springs and karst in the Bellemont area indicate a significant amount of precipitation infiltrates into the subsurface. The majority of terrain consists of permeable cinders, lava, and carbonate rocks, with only a thin residuum of unconsolidated sediments and poorly developed soil. However, only a small portion of the volcanic terrain has associated springs. No springs issue

from the carbonate rocks, which suggests that a significant amount of the infiltrate percolates downward to recharge the regional aquifers.

2.2.1 Geology

Camp Navajo is located along the southern edge of the Colorado Plateau, where volcanic units of the San Francisco volcanic field sit above sedimentary rock units of Paleozoic, Mesozoic, and Tertiary age. The Colorado Plateau is bordered by the Transition Zone to the south and is separated by the physiographic boundary of the Mogollon Rim approximately 6 miles to the south of Camp Navajo. Multiple volcanic features are present in, and around, Camp Navajo. The majority of igneous units at Camp Navajo are basaltic flows that originated from the numerous vents distributed over most of the installation (Weston, 2018a).

A unit consisting of predominantly silt and clay with distinct sand layers has been mapped in the northern and central portions of Camp Navajo and is informally known as the Camp Navajo Clay. Individual sand layers are present to a depth of approximately 20 feet below ground surface (bgs). The sand units are thin and yield limited amounts of water. Variable amounts of gravel or artificial material are present at the surface and shallow depths due to backfill and construction activities during the development of Camp Navajo. The Camp Navajo Clay extends to an approximate depth of 55 feet bgs and is underlain by gravel deposits and basalt flows (Weston, 2018a). In the northwestern side of Camp Navajo, Pleistocene basalt overlays the clay layer, creating natural springs further discussed in Section 2.2.2.

Structurally, the northeasterly-striking Bellemont Fault bisects Camp Navajo (**Figure 2-3**) and has been mapped as a single fault plane in much of this area (Wilkinson, 2000). Various other faults exist in the subsurface at Camp Navajo, including the Dunham Fault Zone, which cuts east to west across the northern portion of Camp Navajo (Thorstenson & Beard, 1998).

During the SI, sandy clay was observed as the dominant lithology of the unconsolidated sediments below Camp Navajo. The borings were completed at depths between 6 and 40 feet bgs. Many of the logs also reported varying percentages of gravel and cobble, with a large percentage consisting of vesicular basalt. These results and facility observations are consistent with the reported depositional environment of the region. Boring logs are presented in **Appendix E**.

2.2.2 Hydrogeology

The regional aquifer, composed of units including the Kaibab Formation, the Coconino Sandstone, and the Schnebly Hill/Supai Formations, has a highly variable water table ranging from 100 feet to over 2,000 feet bgs (Weston, 2018a).

In the Camp Navajo area, the depth to water in the regional aquifer is 1,500 to 1,700 feet bgs (US Army Corps of Engineers [USACE], 2015). Localized, shallow saturated zones of perched groundwater are found within the vicinity of Camp Navajo at typical depths of 10 to 20 feet bgs (Weston, 2018b). Regional groundwater in the vicinity of Camp Navajo flows to the north (Weston, 2018b) as seen in **Figure 2-3**.

According to data obtained directly from the Arizona Department of Emergency and Military Affairs (AZDEMA) and Arizona Department of Water Resources (ADWR), there are monitoring wells and potable water wells on the installation and to the north of Camp Navajo. Additionally, there are approximately 200 wells within one mile of the installation's boundary (**Figure 2-4**) (ADWR, 2019). Well depths outside of the Camp Navajo boundary range from 12 feet bgs to 2,801 feet bgs, and pumping rates range from 3 gallons per minute (gpm) to 250 gpm. The majority of wells outside the Camp Navajo boundary are listed as exempt or non-exempt. The State of Arizona describes

exempt wells as small, non-irrigation wells typically used to provide water for domestic purposes, and non-exempt wells as a well drilled within an Active Management Area pursuant to different groundwater rights. There are 707 wells (domestic, commercial, and industrial) within a 4-mile radius of the facility, 140 of which are downgradient (**Figure 2-4**).

Sources of potable water at Camp Navajo include the CN-2 well, Spring 1, Spring 2, Spring 3/3A, and Reservoir 1, which is fed by the springs (**Figure 2-3**). The springs are fed by shallow perched groundwater from the Wild Bill Hill basalt. This shallow groundwater is generally recharged via precipitation, flows from north to the south, and discharges at the springs. The facility has the ability to pull water from Reservoir 1. Water is stored primarily at the water tower, which has a capacity of 500,000 gallons, in addition to three man-made raw-water resources that can store an additional 20.8 million gallons (Jacobs, 2017). The maximum potable water available to the installation is 246,000 gallons per day (gpd); this includes domestic requirements of 150 gpd per person and enough to supply the fire suppression systems.

2.2.3 Hydrology

Camp Navajo is within the Verde River watershed, which consists of approximately 6,624 square miles of land (Arizona Department of Environmental Quality [ADEQ], 2019). Volunteer Wash is the main surface water drainage channel and has incised Volunteer Canyon in the southern portion of Camp Navajo as it flows to the south and eventually intersects Sycamore Canyon (USACE, 2015). Volunteer Wash and its tributaries are intermittent and only flow following heavy rainstorms or periods of snowmelt. Regional watersheds and surface drainage features within the vicinity of Camp Navajo are presented in **Figure 2-5**.

Surface water on the facility is limited. There are no permanent, naturally occurring streams or lakes at Camp Navajo; however, there are several wetland areas, intermittent streams, natural springs, three perennially spring-fed man-made ponds, and earthen holding ponds. Most surface water does not leave the installation due to interruptions in surface flow, such as water tanks and sinkholes, that detain runoff (AZARNG, 2020).

All surface water runoff west of the Bellemont Fault (**Figure 2-5**) drains toward the ephemeral Atherton Lake, which overflows into two adjacent sinkholes. Sheet runoff from other areas drains towards the southeastern corner of the installation and eventually into the Volunteer Wash channel, which follows the Bellemont Fault (Wilkinson, 2000). All surface drainage paths at Camp Navajo eventually lead to infiltration or exit towards Volunteer Canyon to the south.

2.2.4 Climate

The climate of north-central Arizona is semiarid, and characterized by cold winters, mild summers, and low humidity. The majority of days and nights are clear to partly cloudy. Prevailing wind direction is south-southwest. The mean temperature is 45.6 degrees Fahrenheit (°F), with extreme temperatures up to at least 97 °F and down to at least -30 °F. Average annual precipitation is 22 inches, with the majority occurring from December to March and from July to September. Snowfall typically occurs between October and May, with average annual snowfalls of 102 inches. Some winters have recorded as little as 12 inches of total snow. Due to the dryness of the climate, evaporation causes a loss of 60 inches of water per year from exposed surfaces (AZARNG, 2020).

2.2.5 Current and Future Land Use

The Camp Navajo mission is “To operate a training site and storage facility at Bellemont, Arizona” (AZARNG, 2020). Camp Navajo supports this dual mission of training and storage and provides training to all military branches (training and reserve). Camp Navajo has 2.3 million square feet

of storage and provides capacity to both the Navy and Air Force (Jacobs, 2017). The facility is anticipated to remain used for military training and munitions storage in the future. Camp Navajo can be divided into four areas based on use:

- The Cantonment Area includes headquarters, training sites, the Field Maintenance Shop, and a warehouse area.
- The Limited Area stores various commodities and predominantly munitions.
- The historic Open Burn/Open Detonation Area, used for demilitarization of munitions, is now referred to as the Post-Closure Permit Area.
- The fourth area is the Buffer Area, which was designed to provide safe distances between storage facilities and off-post land and is now used primarily for training.

2.2.6 Sensitive Habitat and Threatened/ Endangered Species

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

- **Amphibians**: Chiricahua Leopard Frog, *Rana chiricahuensis* (threatened)
- **Birds**: California Condor, *Gymnogyps californianus* (endangered); Mexican Spotted Owl, *Strix occidentalis lucida* (threatened); Southwestern Willow Flycatcher, *Empidonax traillii extimus* (endangered); Yellow-billed Cuckoo, *Coccyzus americanus* (threatened)
- **Fishes**: Apache Trout, *Oncorhynchus apache* (threatened); Gila Chub, *Gila intermedia* (endangered); Gila Trout, *Oncorhynchus gilae* (threatened); Humpback Chub, *Gila cypha* (threatened); Little Colorado Spinedace, *Lepidomeda vittata* (threatened); Loach Minnow, *Tiaroga cobitis* (endangered); Razorback Sucker, *Xyrauchen texanus* (endangered); Spikedace, *Meda fulgida* (endangered); Virgin River Chub, *Gila seminuda (robusta)* (endangered)
- **Insects**: Monarch Butterfly, *Danaus plexippus* (candidate)
- **Plants**: Brady Pincushion Cactus, *Pediocactus bradyi* (endangered); Fickeisen Plains Cactus, *Pediocactus peeblesianus fickeiseniae* (endangered); Navajo Sedge, *Carex specuicola* (threatened); Peebles Navajo Cactus, *Pediocactus peeblesianus ssp. peeblesianus* (endangered); San Francisco Peaks Ragwort, *Packera franciscana* (threatened); Sentry Milk-vetch, *Astragalus cremnophylax var. cremnophylax* (endangered); Siler Pincushion Cactus, *Pediocactus (Echinocactus,Utahia) sileri* (threatened); Ute ladies'-tresses, *Spiranthes diluvialis* (threatened); Welsh's Milkweed, *Asclepias welshii* (threatened)
- **Mammals**: Black-footed Ferret, *Mustela nigripes* (endangered); Mexican Wolf, Canis lupus baileyi (endangered)
- **Reptiles:** Narrow-headed Gartersnake, *Thamnophis rufipunctatus* (threatened); Northern Mexican Gartersnake, *Thamnophis eques megalops* (threatened)

2.3 History of PFAS Use

Six potential release areas were identified at Camp Navajo during the PA, where AFFF may have been used or historically released (AECOM, 2020). Between 1994 and 2003, AFFF was used to extinguish intentional burns at two different buildings. Additionally, Camp Navajo operated two fire stations where potential releases occurred from washing firetrucks that carried AFFF, flushing out

lines used for AFFF discharge at other locations, and storage of AFFF. Secondary releases could have occurred via transport of impacted surface water and sediment, discharge of impacted water from Camp Navajo's wastewater treatment plant (WWTP), and disposal of impacted WWTP sludge at the onsite landfill. From these secondary sources, releases could have migrated to groundwater and impacted the regional aquifer. The potential release areas were identified in six AOIs based on preliminary data and assumed groundwater flow directions. A description of each AOI is presented in **Section 3**.

2.4 Other PFAS Investigations

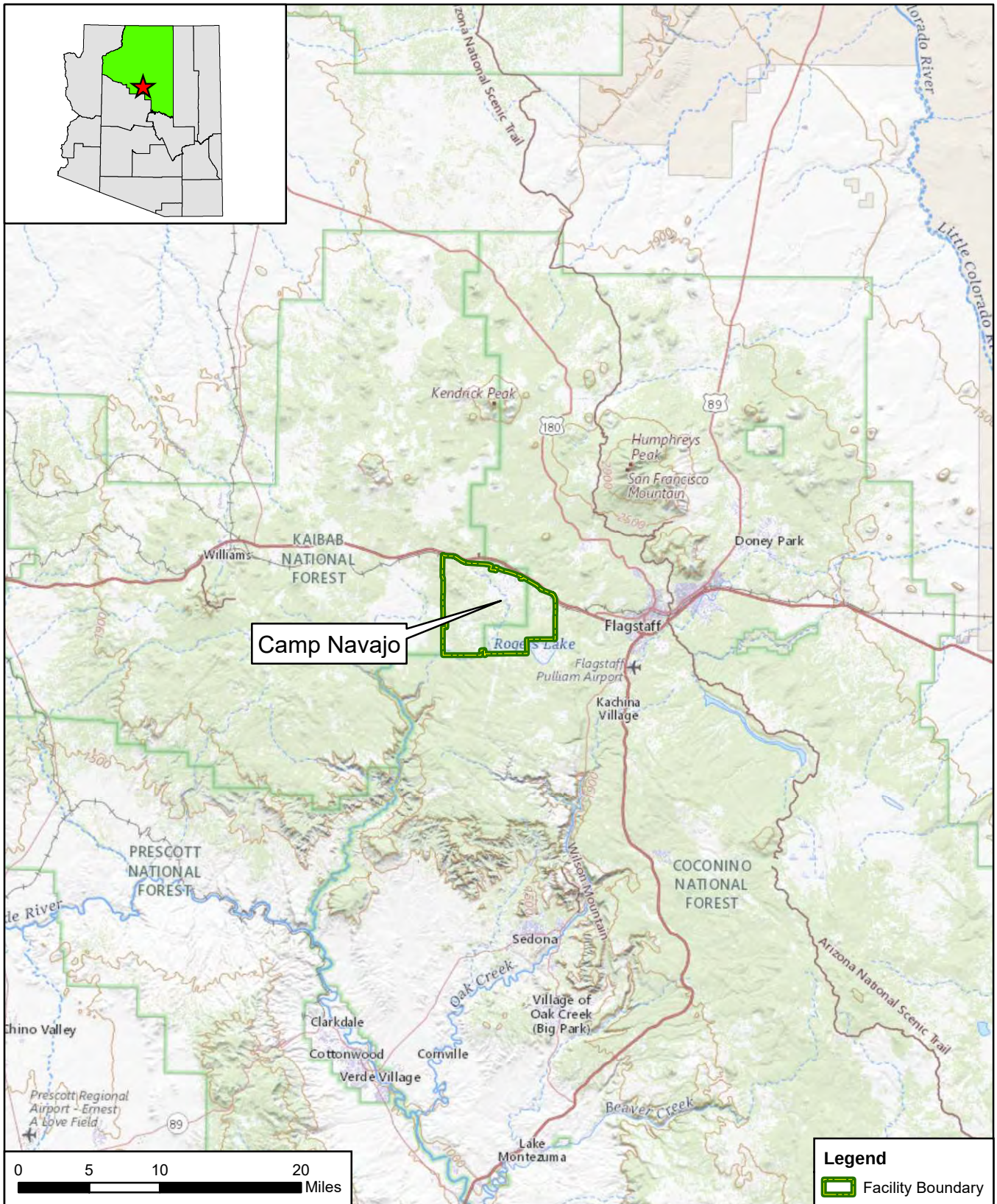
Since 2017 PFAS potable water source sampling has been performed under the direction of the AZARNG at Camp Navajo. Samples have been collected from Spring 1, Spring 2/3,Spring 3, and potable well CN-2 (pre-treatment and post-treatment). The last round of sampling was performed in July 2022, and the results for PFOA, PFOS, PFHxS, PFNA, and PFBS are reported in the **Table 2-1**. Results indicated that detectable concentrations of PFOA, PFOS, PFHxS, and PFBS existed in the drinking water supplies.

Table 2-1: July 2022 PFOA, PFOS, PFHxS, PFNA, and PFBS Sampling Results

Sample ID	Date	PFOA (ng/L)	PFOS (ng/L)	PFHxS (ng/L)	PFNA (ng/L)	PFBS (ng/L)
Spring 1	4/12/2017	3.21 J	13.7	14.3	ND	3.44 J
	3/5/2018	2.7	16	NA	NA	NA
	6/7/2018	2.8	14	NA	NA	NA
	9/17/2018	2.1	19	NA	NA	NA
	12/4/2018	2.3	25	NA	NA	NA
	3/28/2019	7.1	17	NA	NA	NA
	3/31/2020	1.9	10	11	ND (<1.8)	2.4
	3/23/2022	2.09	17.6	15.8	ND (<2.00)	3.52
	6/29/2022	ND (<1.72)	44.6	23.3	ND (<1.72)	16.8
Spring 2/3	4/12/2017	1.64 J	17.1	ND	ND	3.61 J
	3/5/2018	ND (<2.5)	63	NA	NA	NA
	6/7/2018	ND (<2.5)	12	NA	NA	NA
	9/17/2018	ND (<2.0)	16	NA	NA	NA
	12/4/2018	2.5	30	NA	NA	NA
	3/28/2019	3.3	28	NA	NA	NA
	3/31/2020	1.8	56	17	ND (<1.7)	3.4
	3/23/2022	1.75	30.1	26	ND (<1.69)	22.5
	6/29/2022	ND (<1.76)	34.9	25.2	ND (<1.76)	9.62
Spring 3	4/12/2017	0.774 J	11.6	8.13	ND	2.14 J
	3/5/2018	ND (<2.7)	12	NA	NA	NA
	6/7/2018	ND (<2.5)	16	NA	NA	NA
	9/17/2018	ND (<2.0)	16	NA	NA	NA
	12/4/2018	ND (<2.0)	23	NA	NA	NA
	3/28/2019	ND (<2.0)	19	NA	NA	NA
	3/31/2020	1.5 J	16	12	ND (<1.8)	3.4
	3/23/2022	ND (<1.72)	23.3	18.2	ND (<1.72)	37.3

	6/29/2022	ND (<1.77)	28.5	26.1	ND (<1.77)	9.49
Pre-treatment	4/12/2017	ND	ND	ND	ND	ND
	3/28/2019	7	17	NA	NA	NA
	9/25/2019	ND (<2.0)	ND (<2.0)	NA	NA	NA
	12/29/2019	ND (<2.0)	ND (<2.0)	NA	NA	NA
	3/31/2020	ND (<1.9)	ND (<1.9)	ND (<1.9)	ND (<1.9)	ND (<1.9)
	11/9/2021	ND (<1.6)	ND (<1.6)	ND (<1.6)	ND (<1.6)	ND (<1.6)
	3/23/2022	ND (<1.68)	30.2	20.2	ND (<1.68)	24.2
	6/29/2022	1.84	29.6	22	ND (<1.79)	13.9
Post-treatment	4/12/2017	3.80 J	14.1	15.6	ND	4.50 J
	3/28/2019	6.9	18	NA	NA	NA
	9/25/2019	2.4	13	NA	NA	NA
	12/29/2019	3.3	16	NA	NA	NA
	3/31/2020	2.4	11	11	ND (<1.8)	2.6
	3/23/2022	2.26	23.8	22.3	ND (<1.85)	25.5
	6/29/2022	ND (<1.81)	21.9	22.1	ND (<1.81)	10.7

Notes:
NA = not analyzed
ND = not detected above the limit of quantitation
ng/L = nanograms per liter
1. Pre-treatment is a sample taken directly from the CN-2 well head.

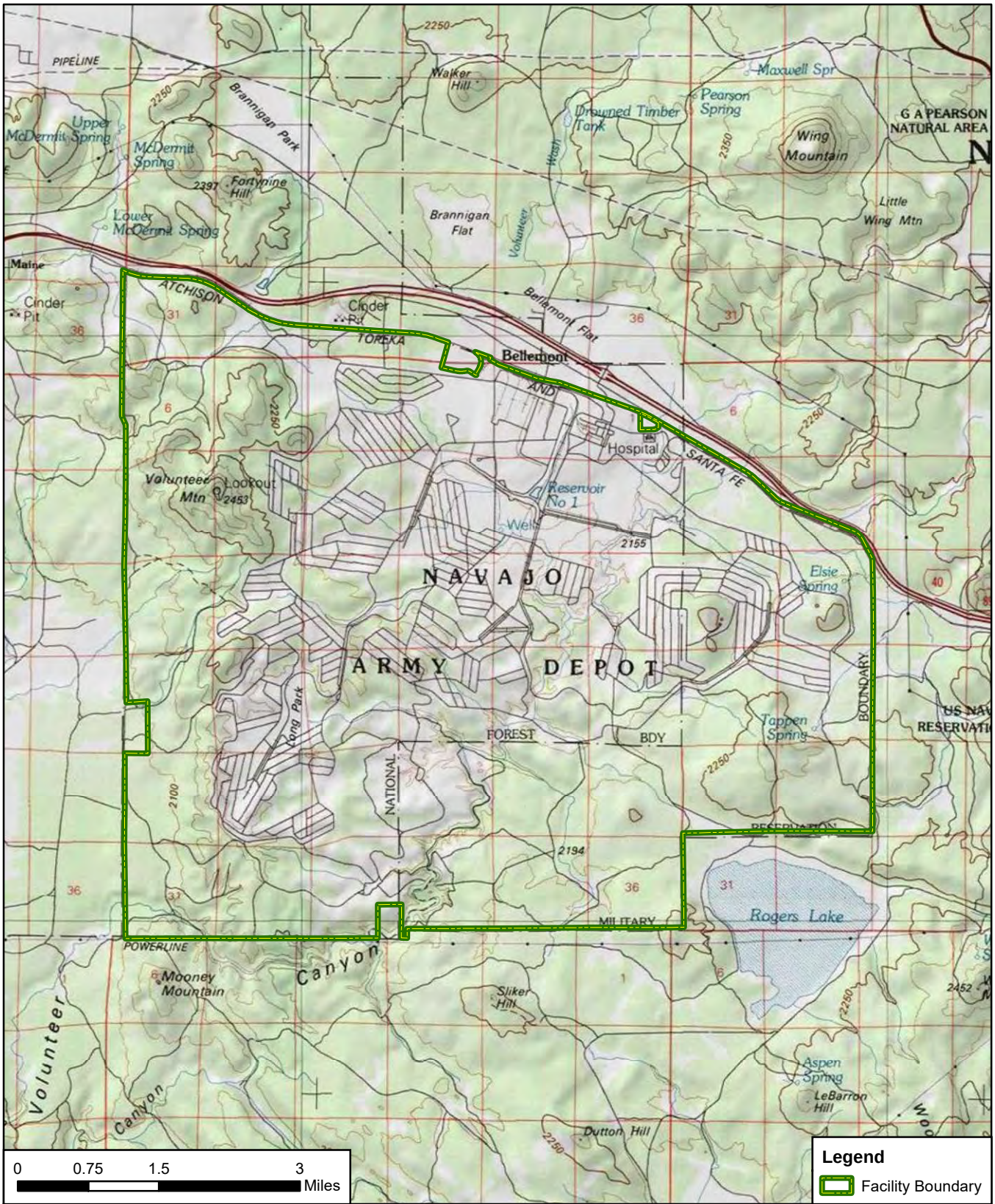


CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	8/16/2022	GIS BY	MS	8/16/2022
SCALE	1:633,600	CHK BY	AB	8/16/2022
Base Map: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program,		PM	CM	8/16/2022

Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-1



CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
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SCALE	1:95,040	CHK BY	AB	8/16/2022
Base Map: Copyright:© 2013 National Geographic Society, i-cubed		PM	CM	8/16/2022

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Site Topography

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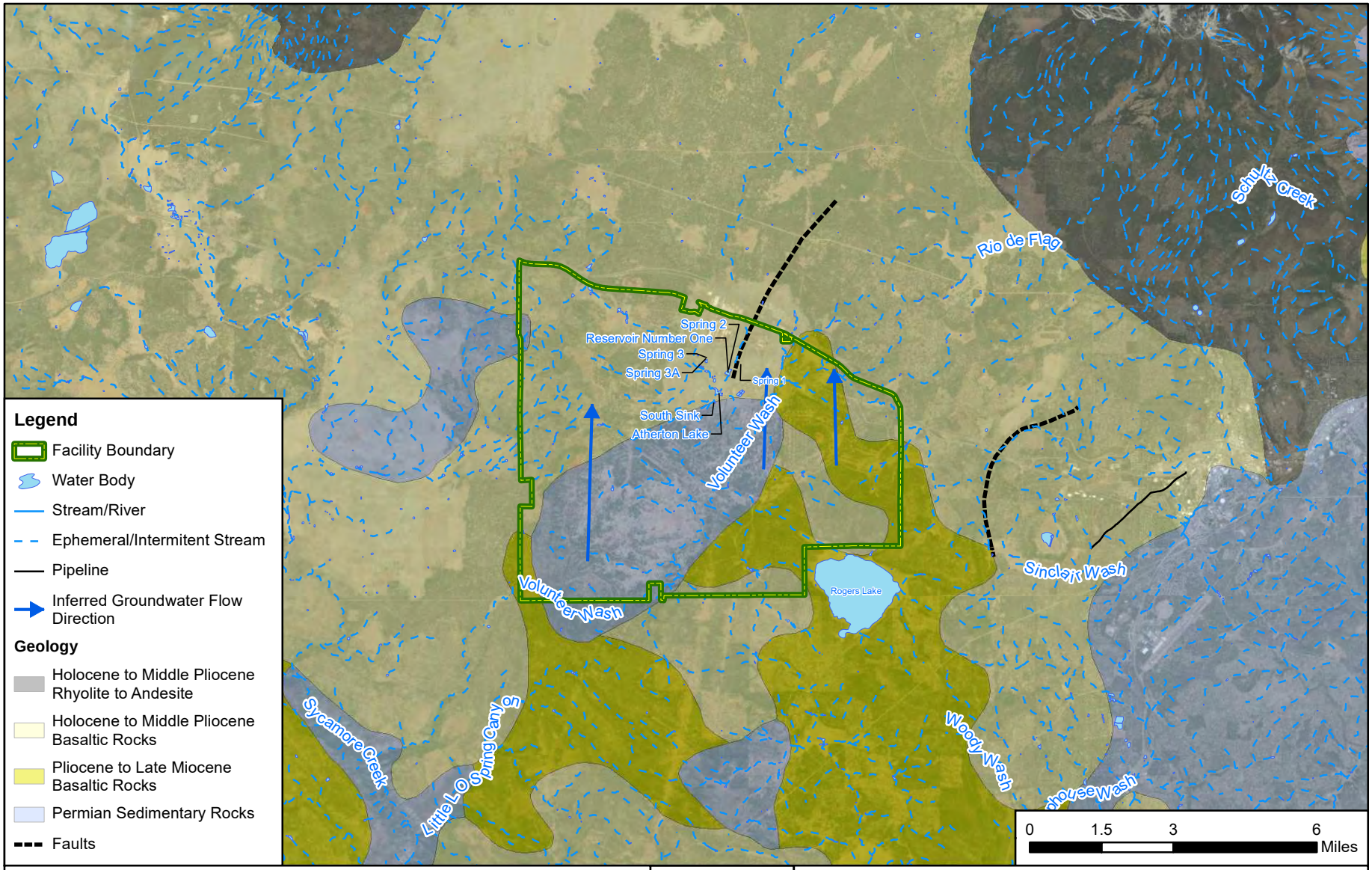
Figure 2-2



CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
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SCALE	1:190,080	CHK BY	AB	9/7/2022
Base Map: National Agricultural Imagery Program, 2017. Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	9/7/2022

Groundwater Features

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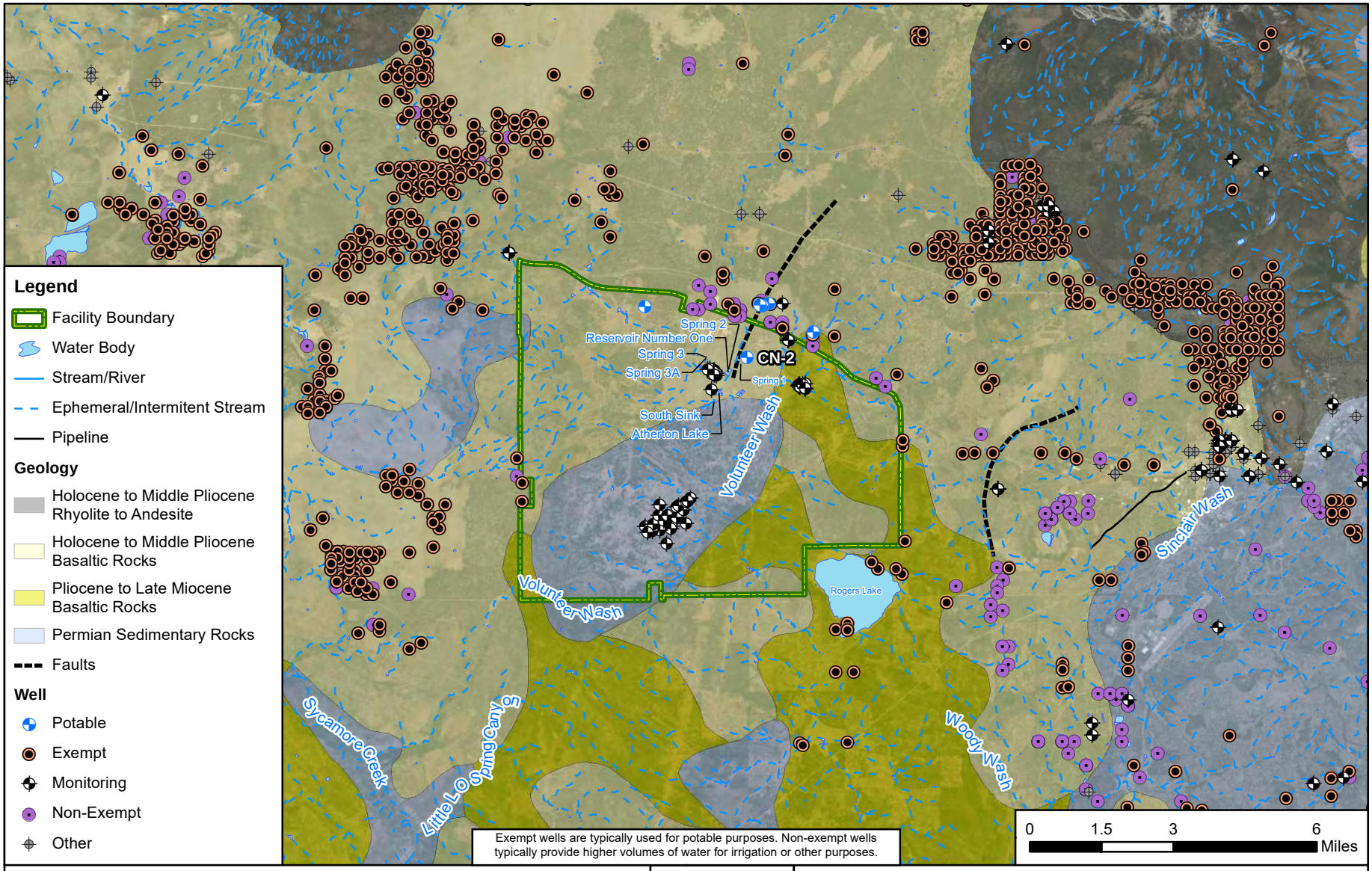
Figure 2-3



CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	8/16/2022	GIS BY	MS	8/16/2022
SCALE	1:190,080	CHK BY	AB	8/16/2022
Base Map: National Agricultural Imagery Program, 2017. Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	8/16/2022

Well Network

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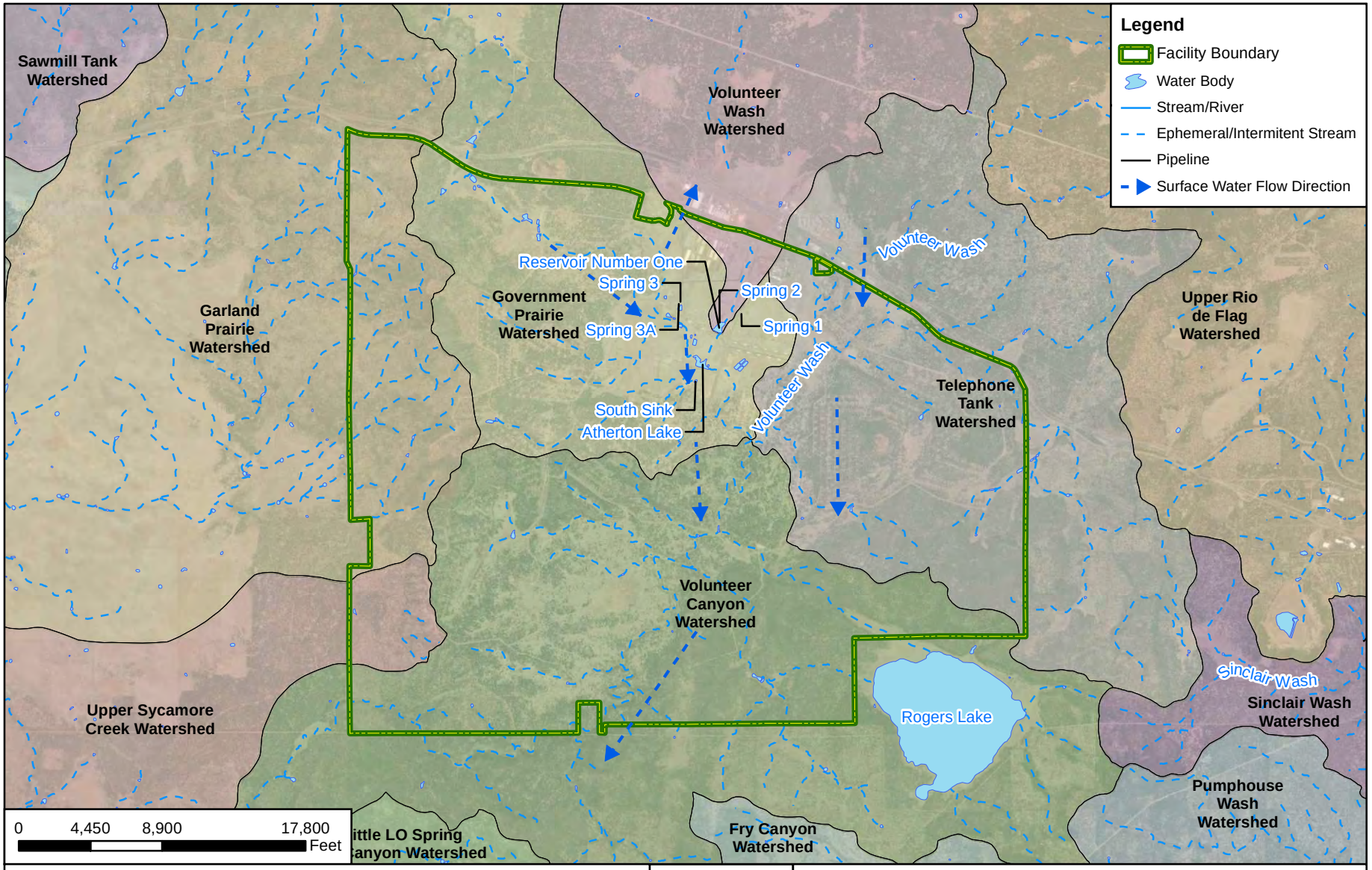
Figure 2-4



CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	10/26/2022	GIS BY	MS	10/26/2022
SCALE	1:106,800	CHK BY	AB	10/26/2022
Base Map: National Agricultural Imagery Program, 2017. Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community		PM	CM	10/26/2022

Surface Water Features

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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, six potential release areas were identified at Camp Navajo and grouped into six AOIs (AECOM, 2020). The potential release areas are shown on **Figure 3-1**.

3.1 AOI 1 Former Building 209

AOI 1 is the Former Building 209, former fire station, which is located in the 200 Area in the northern portion of the facility. According to interviews conducted during the PA site visit and aerial photographs, Building 209 was demolished between 2000 – 2003. No information was obtained about the operation of the fire station at Building 209; however, it is likely that similar operations took place at Building 209 that had taken place at Building 2 during its operation as a fire station. These activities may have included washing firetrucks that carried AFFF, flushing out lines used for AFFF discharge at other locations, and storage of AFFF. It was reported that AFFF was most likely used during the intentional burn of Building 209. The amount of AFFF used during this training exercise is unknown. A Macy Firetruck was used for installation firefighting activities and was likely used to extinguish the Building 209 fire. Camp Navajo's Macy Firetruck had a 600-gallon water tank and a 60-gallon foam tank.

3.2 AOI 2 Former Building LR200

AOI 2 is the Former Building LR200, which is located in the northern portion of the facility in the storage area. Building LR200 was used as a lunchroom prior to being demolished by intentional burn. An unknown quantity of AFFF was likely used to suppress the fire. The exact date of the fire training exercise that demolished the building is not known; however, Camp Navajo personnel recall the training exercise. The Former Building LR200 area is currently used as a storage field for construction materials. To the northeast of LR200 is the South Sink which is a large, but inactive sinkhole. There is an ephemeral stream which flows towards the South Sink and is a flow path from LR200. Most sinks in the area have fractured bedrock and colluvium in the walls and bottom.

3.3 AOI 3 Building 2

AOI 3 is Building 2, former fire station, which is located in the Cantonment Area in the northern portion of the facility. Building 2 was constructed in 1942 and was used as a fire station after Building 209 was destroyed. The use of Building 2 as a fire station continued until approximately 2012, when the new fire station was constructed. Firetrucks and hose lines were flushed, rinsed, and washed outside of Building 2 in the parking lot. No staining or residue were observed within the Building 2 area during the PA site visit. According to interviewees, AFFF was stored inside the fire station and was used in a Macy Firetruck, which was parked at the station.

It is likely that residual AFFF entered two storm drains in the parking lot. According to aerial imagery, in 2007 Building 2 had about 50-foot wide swaths of bare earth along the southern and eastern edges of its footprint. Those areas of bare earth were located directly adjacent to paved roads and the parking lot.

3.4 AOI 4 WWTP Holding Ponds and Effluent Reuse Site

AOI 4 is the WWTP Holding Ponds and Effluent Reuse Area, which are located in the northern portion of the facility to the south of the WWTP. This AOI is a secondary potential release area. It is believed that AFFF released from the 200 Area during fire station maintenance activities entered abandoned storm drains and sewer lines leading to the WWTP. As a result, PFAS-contaminated effluent may have been discharged to the WWTP Holding Ponds. The currently used WWTP Holding Pond Aerial imagery suggests the old ponds were in use through 2007 and that the new pond was constructed between 1992 – 2003. Aerial imagery suggests the new pond began to receive effluent at least as early as 2005. The holding ponds are earthen areas where water is held to infiltrate and evaporate.

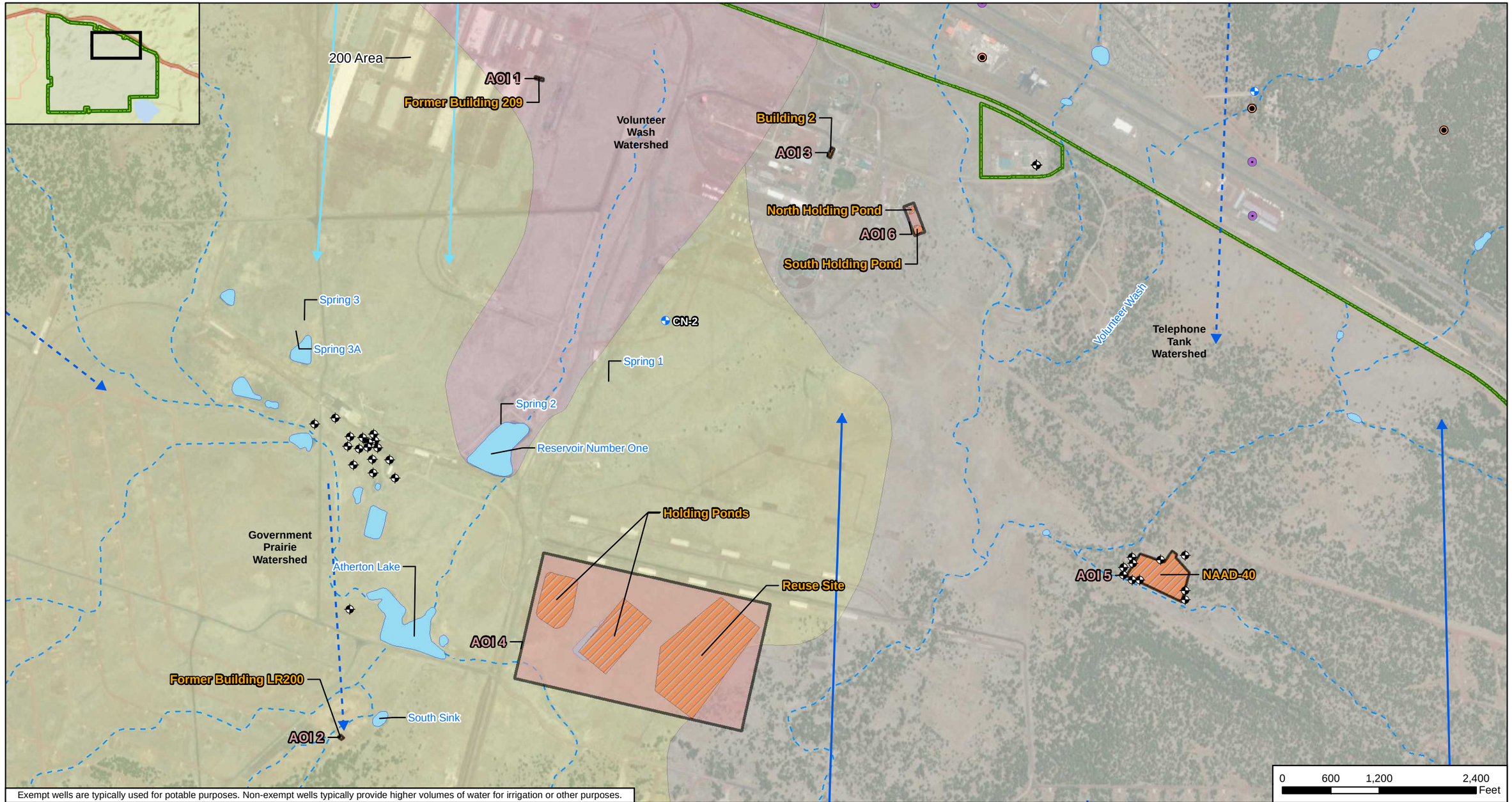
3.5 AOI 5 NAAD-40

AOI 5 is NAAD-40, the former sanitary landfill, which is located in the northern portion of the facility. This AOI is a secondary potential release area. The landfill accepted sludge from the WWTP, which may have been impacted by AFFF releases in the 200 Area and Cantonment Area. The NAAD-40 landfill is unlined; therefore, leaching of PFAS-containing material from WWTP sludge in the landfill to the water table may have occurred. The 2015 Five Year Review identifies a perched water table below AOI 5 (USACE, 2015). This shallow aquifer is potentially hydraulically connected to shallow aquifers off the facility that feed private potable wells. To take a conservative approach, this shallow aquifer may also be in communication with the deep regional aquifer. This shallow aquifer is potentially hydraulically connected to the springs (Springs 1, 2, and 3/3A).

3.6 AOI 6 North and South Holding Ponds

AOI 6 comprises the North and South Holding Ponds located in the Cantonment Area in the northern portion of the facility. Both holding ponds are ephemeral and receive storm water runoff from the Cantonment Area, specifically Building 2, where AFFF discharges have occurred.

The Cantonment Area Holding Ponds are located at a lower elevation than the Cantonment Area, and they drain further east toward a creek and eventually south toward Volunteer Wash. Due to the documented presence and discharge of AFFF at Building 2, there is a possible pathway from the storm drains at Building 2 to the Cantonment Area Holding Ponds, and subsequently off the facility.



Exempt wells are typically used for potable purposes. Non-exempt wells typically provide higher volumes of water for irrigation or other purposes.

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	8/30/2022	GIS BY	MS	8/30/2022
SCALE	1:14,400	CHK BY	AB	8/30/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	8/30/2022

- Area of Interest
- Potential Release Area
- Facility Boundary
- Water Body
- Ephemeral/Intermitent Stream
- Surface Water Flow Direction
- Inferred Shallow Groundwater Flow Direction
- Inferred Groundwater Flow Direction
- Exempt Well
- Monitoring Well
- Non-Exempt Well
- Potable Well

N

Areas of Interest

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Figure 3-1

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4. Project Data Quality Objectives

As identified during the Data Quality Objective (DQO) process and outlined in the SI Quality Assurance Project Plan (QAPP) Addendum (AECOM, 2021a), the objective of the SI is to identify whether there has been a release to the environment at the AOIs identified in the PA. For each AOI, ARNG determines if further investigation is warranted, a removal action is required to address immediate threats, or whether no further action is warranted. This SI evaluated groundwater and soil for presence or absence of relevant compounds at each of the sampled AOIs.

4.1 Problem Statement

ARNG will recommend an AOI for Remedial Investigation (RI) if related soil and groundwater samples have concentrations of the relevant compounds above the OSD risk-based SLs. The SLs are presented in **Section 6.1** of this report.

4.2 Information Inputs

Primary information inputs included:

- The PA for Camp Navajo (AECOM, 2020);
- Analytical data collected under direction of the ARNG from Camp Navajo's drinking water system.
- Analytical data from groundwater, surface water, sediment, and soil samples collected as part of this SI in accordance with the site-specific Uniform Federal Policy (UFP)-QAPP Addendum (AECOM, 2021a); and
    - This includes the compliance sampling performed by the AZARNG of the potable water sources at Camp Navajo. It should be noted that this data has undergone Level 2 data validation by the laboratory, but has not undergone any additional external validation.
- 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 spring season, which was the earliest available time field resources were available to complete the study.

4.4 Analytical Approach

Samples were analyzed by Pace Analytical Gulf Coast, accredited under the Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP; Accreditation Number 74960) and the National Environmental Laboratory Accreditation Program (NELAP; Certificate Number 01955). Data were compared to applicable SLs within this document and decision rules as defined in the SI QAPP Addendum (AECOM, 2021a).

4.5 Data Usability Assessment

The Data Usability Assessment (DUA), which is provided in **Appendix A**, is an evaluation at the conclusion of data collection activities that uses the results of both data verification and validation in the context of the overall project decisions or objectives. Using both quantitative and qualitative methods, the assessment determines whether project execution and the resulting data have met installation-specific DQOs. Both sampling and analytical activities are considered to assess whether the collected data are of the right type, quality, and quantity to support the decision-making (DoD, 2019a; DoD, 2019b; USEPA, 2017).

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

It should be noted that the water collected from these the AOI 5 existing monitoring wells was collected below the well screen (stagnant water) and are not low-flow samples representative of formation water. Under normal circumstances, these samples would not used for decision making purposes; however, in lieu of not collecting samples and having no data, the samples were collected and consider acceptable (for screening purposes only) to determine presence or absence of PFAS

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, Camp Navajo, Arizona* dated September 2020 (AECOM, 2020);
- *Final Site Inspection Uniform Federal Policy-Quality Assurance Project Plan Addendum, Camp Navajo* dated April 2021 (AECOM, 2021a); and
- *Final Site Safety and Health Plan, Camp Navajo* dated May 2021 (AECOM, 2021b).

The SI field activities were conducted from 24 May to 3 June 2021 and consisted of utility clearance, soil boring installation and sampling via hollow stem auger (HSA), grab groundwater sample collection, and sediment and surface water sample collection. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2021a), except as noted in **Section 5.9**.

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-six (36) soil samples from 23 boring locations;
- Four grab groundwater samples from four permanent monitoring wells;
- One sediment and one surface water sample from one location;
- Five spring samples from five natural spring locations; and
- Twenty-seven (27) quality assurance (QA)/quality control (QC) samples.

Figure 5-1 through **Figure 5-4** provide 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**, a Nonconformance and Corrective Action Report is 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 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 11 January 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, AZARNG, USACE, ADEQ, and representatives familiar with the facility, the regulations, and the community. Stakeholders were provided the opportunity to make comments on the technical sampling approach and methods at the combined TPP Meeting 1 and 2. The outcome of the combined TPP Meeting 1 and 2 was memorialized in the SI QAPP Addendum (AECOM, 2021a).

A TPP Meeting 3 was held 14 April 2022 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

Utility clearance was conducted by Camp Navajo personnel, with input from the AECOM field team. AECOM's drilling subcontractor, Cascade Technical Services, LLC. placed a ticket with the Arizona 811 utility clearance provider to notify them of intrusive work on 19 May 2021. Additionally, the first 5 feet of each boring were pre-cleared using a hand auger to verify utility clearance in shallow subsurface where utilities would typically be encountered.

5.1.3 Source Water and Sampling Equipment Acceptability

A potable water source at Camp Navajo was sampled on 18 February 2021 to assess usability for decontamination of drilling equipment. Results of the sample (CN-PW-01) collected from the sample tap at the onsite potable production well, CN-2, pumphouse 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 potable production well 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 appendix to the SI QAPP Addendum (AECOM, 2021a). Prior to the start of field work each day, a Sampling Checklist was completed as an additional layer of control. The checklist served as a daily reminder to each field team member regarding the allowable materials within the sampling environment.

5.2 Soil Borings and Soil Sampling

Borings were installed in grass or dirt areas, where applicable, to avoid disturbing concrete or asphalt surfaces. Soil samples were collected via hand auger and HSA, in accordance with the SI QAPP Addendum (AECOM, 2021a). Hand augers were used at locations designated for collection of surface soil samples (0 to 2 feet bgs). Borings were advanced using HSA at locations designated for subsurface soil sample collection; however, hand augers were used to collect soil from the top 5 feet of the boring, in accordance with AECOM utility clearance procedures. At subsurface soil boring locations, a track-mounted CME-85 was used to collect soil (via split spoon) every five feet to the target depth, or until refusal was encountered. The soil boring locations are shown on **Figure 5-1** through **Figure 5-4**, and depths are provided **Table 5-1**.

Three discrete soil samples were collected for chemical analysis per boring, except where refusal was encountered at 6 feet bgs, only allowing two soil samples to be collected. This situation occurred at several sample locations and these deviations are described in **Section 5.9**. One shallow soil sample at approximately 5 feet bgs, one mid-point soil sample between the surface and total boring depth, and one sample at target depth (or approximately 1-foot above refusal) were collected at each boring via split spoon. The soil cores were 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 sampling forms (**Appendix B2**) and in a non-treated field logbook (i.e., composition notebook). Depth interval, recovery thickness, PID concentrations, moisture, relative density, color (using a Munsell soil color chart), and texture (using the USCS) were recorded. The boring logs are provided in **Appendix E**.

Soil borings completed during the SI encountered sandy clay as the dominant lithology of the unconsolidated soil below Camp Navajo. The borings were completed at depths between 6 and 40 feet bgs. Many of the logs also reported varying percentages of gravel and cobble, consisting of vesicular basalt. These observations are consistent with the understood depositional environment of the region.

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

Field duplicate samples were collected at a rate of 10 percent (%) and analyzed for the same parameters as the accompanying samples. Matrix spike (MS)/MS duplicates (MSDs) were collected at a rate of 5% and analyzed for the same parameters as the accompanying samples. In instances when non-dedicated sampling equipment was used, such as a hand auger for the shallow soil samples, equipment rinsate blanks (ERBs) 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.

Upon completion of soil sample collection, borings were abandoned by backfilling with bentonite chips and dressed at the surface with soil cuttings. At locations where asphalt was disturbed, the borehole was patched with cold patch asphalt to match existing grade.

5.3 Groundwater Grab Sampling

Temporary and permanent monitoring installation were attempted at eight locations across the facility. However, no monitoring wells were installed due to bedrock refusal and lack of water-bearing lenses in the unconsolidated soil.

Four existing monitoring wells (PMW-1, PMW-2, PMW-4, and FSL-5) were sampled at AOI 5 on 1 June and 2 June 2021. The well locations are shown on **Figure 5-1** and **Figure 5-4**. Sampling was completed in accordance with the SI QAPP Addendum (AECOM, 2021a). Samples were collected using a QED Sample Pro® bladder pump with disposable PFAS-free, HDPE tubing at all wells except PMW-4. The water level was insufficient to use a bladder pump at PMW-4; therefore, a peristaltic pump with disposable PFAS-free silicon and HDPE tubing was used to collect a sample. New tubing was used at each well and the pump was decontaminated between each well. Water quality parameters (e.g., temperature, specific conductance, pH, dissolved oxygen [DO], oxidation-reduction potential [ORP], and turbidity) 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.

5.4 Spring Sampling

Five natural springs which are fed by the perched aquifer underlying AOI 1, AOI 3, and potentially AOI 6 were sampled on 2 June 2021. The locations of these springs are shown on **Figure 5-1**.

Spring samples were collected using a peristaltic pump with PFAS-free HDPE tubing. Water quality parameters (e.g., temperature, specific conductance, pH, DO, ORP, and turbidity) were measured using a water quality meter and recorded on the field sampling form (**Appendix B2**) after each grab sample was collected. Additionally, a subsample of each spring 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 spring 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 for analysis by LC/MS/MS compliant with QSM 5.3 Table B-15 in accordance with the SI QAPP Addendum (AECOM, 2021a).

Groundwater 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. In instances when non-dedicated sampling equipment was used, equipment rinsate blank samples 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 °C during shipment.

5.5 Surface Water and Sediment Sampling

One surface water sample and one sediment sample were collected from Atherton Lake. The sample location is shown on **Figure 5-1**.

The sediment sample was co-located with the surface water sample and collected in accordance with the SI QAPP Addendum (AECOM, 2021a). The surface water sample was collected from a single point in the waterbody by dipping a Ziploc bag into the water, approximately two-thirds up from the bottom of the water body, and subsequently transferring the water into laboratory-supplied bottles. For the co-located surface water and sediment samples, the surface water sample was collected before the co-located sediment sample. Sampling was performed deliberately and methodically to minimize disturbance of bottom sediments and as quickly as possible to ensure a representative sample was collected. Additionally, a subsample of the surface water sample was collected in a separate container, and a shaker test was completed to identify if there were any foaming. No foaming was noted on the surface water sample.

After collection of the surface water sample, a sediment coring device (hand auger) was used to collect the sediment sample from the first foot of sediment. The sediment was transferred to a Ziploc bag, where the sample was homogenized and stones in excess of 1 centimeter were removed. After collection of the surface water and sediment samples from each location, general water quality parameters (e.g., temperature, specific conductance, pH, DO, ORP, and turbidity) were collected with a water quality meter and recorded on the field sampling form (**Appendix B2**). The surface water and sediment sample locations are shown on **Figure 5-1**, and sample depths are provided in **Table 5-1**.

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 for analysis by LC/MS/MS compliant with QSM 5.1 Table B-15. Sediment samples were also analyzed for TOC (USEPA Method 9060A) and pH (USEPA Method 9045D), in accordance with the SI QAPP Addendum (AECOM, 2021a).

Field duplicate samples were collected at a rate of 10% and analyzed for the same parameters as the accompanying samples. 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, ERB samples 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°C during shipment.

5.6 Water Level Measurements

A groundwater gauging event was performed at AOI 5 on 1 June and 2 June 2021. Groundwater elevation measurements were collected from the five existing monitoring wells. Water level measurements were taken from the northern side of the well casing. Groundwater elevation data are provided in **Table 5-2**.

5.7 Investigation-Derived Waste

As of the date of this report, the disposal of IDW is not regulated federally. IDW generated during the SI is considered non-hazardous waste and was managed in accordance with the SI QAPP Addendum (AECOM, 2021a) and with the DA Guidance for Addressing Releases of PFAS, Q18 (DA, 2018).

Soil IDW (i.e., soil cuttings) generated during the SI activities were left in place at the point of the source. The soil cuttings were returned to the borehole as backfill or distributed on the ground surface on the downgradient side of the boring. The soil IDW was not sampled and assumes the 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) were containerized in two 55-gallon drums and stored onsite in the drum storage area next to the Environmental Office at Building 15. The liquid IDW was not sampled and assumes the characteristics of the associated groundwater samples collected from that source location.

Geographic coordinates were collected using a global positioning system 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.

5.8 Laboratory Analytical Methods

Samples were analyzed for PFAS 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.

5.9 Deviations from SI QAPP Addendum

Deviations from the SI QAPP Addendum occurred based on field conditions and discussion between AECOM, ARNG, and USACE. Deviations from the SI QAPP Addendum are noted below and are documented in the Field Change Requests and Nonconformance and Corrective Action Report (**Appendix B3** and **B4**):

As a result of the site walk on 24 May 2021, the following changes were proposed via Field Change Request Forms submitted to and later approved by ARNG and USACE.

- During the site walk, the team walked along the drainage ditch immediately behind and downhill of the AOI 1 release area and determine AOI01-05 would be better located in a low spot adjacent to an outfall rather than the proposed location along the northern boundary of the 200 Area. This action was documented in a Field Change Request form and is provided in **Appendix B3**.

- The surface water/sediment location in Atherton Lake was shifted approximately 75 feet west of the original location to avoid areas of cultural significance (move approved by AZARNG cultural resources personnel). The new location was positioned at a point of safe entry to access the water's edge. This action was documented in a Field Change Request form and is provided in **Appendix B3**.

- Due to ongoing construction in the area of AOI 2, it is likely any permanent well installed in the AOI 2 area would be buried or destroyed. Therefore, the team decided that if AOI02-01 was installed, it should be a temporary well and a grab groundwater sample collected. Additionally, the team agreed to relocate AOI02-02 and AOI02-03 along a drainage ditch where surface water flows from the release area to the South Sink. The original location of AOI02-04 was found to be duplicative and was removed from the list of samples. This action was documented in a Field Change Request form and is provided in **Appendix B3**. Additionally, proposed surface water/sediment sampling location AOI02-05 was found to be dry. As a result, AOI02-05 was converted to a soil sample location and relabeled as AOI02-04.

- AOI04-01 is located in a retention basin much lower in elevation than the surrounding ground surface. The drill rig would not be able to traverse the slope into the basin. Additionally, Camp Navajo personnel indicated that bedrock was expected to be close to the surface (< 5 feet bgs) inside the retention basin and a boring/monitoring well was not likely to be installed due to shallow refusal. The team agreed to convert AOI04-01 from a boring/monitoring well into a hand auger surface soil location (0-2 feet bgs). Additionally, AOI04-08 was moved approximately 200-300 feet east of the originally proposed location to be in the low spot near the reclaimed water discharge pipe. This action was documented in a Field Change Request form and is provided in **Appendix B3**.

- The team agreed to move AOI06-01 to a low spot between the North and South Holding Ponds downgradient of both holding pond outfalls. This action was documented in a Field Change Request form and is provided in **Appendix B3**.

- After gauging the wells at AOI 5, the AECOM field team found that PMW-3 and PMW-5 were dry. Additionally, wells PMW-1, PMW-2, and PMW-4 had limited water (saturated thickness between 0.4 - 2 feet), and it was not possible to low-flow sample since the water was below the screen interval. As a result, grab groundwater samples were collected at two proposed wells, and a third was collected at PMW-4, which was not originally proposed for sampling. This action was documented in a Field Change Request form and is provided in **Appendix B3**.

- The SI QAPP Addendum stated that three soil samples were to be collected from each HSA boring locations. However, refusal was encountered at 17 feet bgs at boring location AOI01-01. Soil from the 3-5 feet bgs and 8-10 feet bgs intervals were inadvertently not saved; therefore, only soil samples could only be collected from two intervals (0-2 feet bgs and 13-15 feet bgs) instead of three intervals. This action was documented in a Nonconformance and Corrective Action Report and is provided in **Appendix B4**.

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Table 5-1
Samples by Medium
Site Inspection Report
Camp Navajo, Bellemont, Arizona

Sample Identification	Sample Collection Date/Time	Sample Depth (ft bgs)	LC/MS/MS compliant with QSM 5.3 Table B-15	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Comments
Soil Samples						
AOI01-01-SB-0-2	5/25/2021 11:20	0-2	x			
AOI01-01-SB-13-15	5/25/2021 12:50	13-15	x			
AOI01-01-SB-13-15-D	5/25/2021 12:50	13-15	x			FD
AOI01-02-SB-0-2	5/26/2021 7:30	0-2	x			
AOI01-02-SB-8-10	5/26/2021 8:35	8-10	x			
AOI01-02-SB-8-10-D	5/26/2021 8:35	8-10	x			FD
AOI01-02-SB-13-15	5/26/2021 8:45	13-15	x			
AOI01-03-SB-0-2	5/25/2021 14:00	0-2	x			
AOI01-03-SB-3-5	5/25/2021 14:45	3-5	x			
AOI01-03-SB-8-10	5/25/2021 14:53	8-10	x			
AOI01-04-SB-0-1.7	5/26/2021 9:15	0-1.7	x	x	x	
AOI01-05-SB-0-1.7	5/26/2021 10:05	0-1.7	x			
AOI02-01-SB-0-2	5/27/2021 10:20	0-2	x	x	x	
AOI02-01-SB-0-2-MS	5/27/2021 10:20	0-2	x			MS
AOI02-01-SB-0-2-MSD	5/27/2021 10:20	0-2	x			MSD
AOI02-01-SB-18-20	5/27/2021 10:50	18-20	x			
AOI02-01-SB-33-35	5/27/2021 11:30	33-35	x			
AOI02-02-SB-0-2	5/28/2021 9:38	0-2	x			
AOI02-03-SB-0-2	5/28/2021 9:58	0-2	x			
AOI02-04-SB-0-1	5/28/2021 10:16	0-1	x			
AOI03-01-SB-0-2.5	5/26/2021 13:56	0-2.5	x			
AOI03-01-SB-3-5	5/26/2021 14:05	3-5	x			
AOI03-02-SB-0-2	5/26/2021 10:45	0-2	x			
AOI03-02-SB-8-10	5/26/2021 11:15	8-10	x			
AOI03-02-SB-20-22	5/26/2021 11:45	20-22	x			
AOI03-03-SB-0-2	5/26/2021 15:07	0-2	x	x	x	
AOI03-03-SB-0-2-MS	5/26/2021 15:07	0-2	x			MS
AOI03-03-SB-0-2-MSD	5/26/2021 15:07	0-2	x			MSD
AOI03-03-SB-8-10	5/26/2021 15:24	8-10	x			
AOI03-03-SB-23-25	5/26/2021 15:46	23-35	x			
AOI04-01-SB-0-0.5	6/1/2021 9:15	0-0.5	x			
AOI04-02-SB-0-2	6/1/2021 8:52	0-2	x			
AOI04-03-SB-0-0.75	6/1/2021 8:38	0-0.75	x			
AOI04-04-SB-0-0.75	6/1/2021 10:36	0-0.75	x			
AOI04-05-SB-0-0.75	6/1/2021 10:00	0-0.75	x			
AOI04-06-SB-0-2	6/1/2021 10:20	0-2	x			
AOI04-07-SB-0-1	6/1/2021 9:45	0-1	x			
AOI04-08-SB-0-2	5/28/2021 10:55	0-2	x	x	x	
AOI04-08-SB-0-2-D	5/28/2021 10:55	0-2	x			FD
AOI06-01-SB-0-2	5/27/2021 7:47	0-2	x			
AOI06-01-SB-3-5	5/27/2021 7:55	3-5	x			
AOI06-02-SB-0-0.75	5/27/2021 8:15	0-0.75	x			
AOI06-02-SB-0-0.75-D	5/27/2021 8:15	0-0.75	x			FD
AOI06-03-SB-0-1.25	5/27/2021 8:30	0-1.25	x	x	x	
AOI06-03-SB-0-1.25-D	5/27/2021 8:30	0-1.25		x	x	FD
AOI06-03-SB-0-1.25-MS	5/27/2021 8:30	0-1.25		x	x	MS
AOI06-03-SB-0-1.25-MSD	5/27/2021 8:30	0-1.25		x	x	MSD

Table 5-1
Samples by Medium
Site Inspection Report
Camp Navajo, Bellemont, Arizona

Sample Identification	Sample Collection Date/Time	Sample Depth (ft bgs)	LC/MS/MS compliant with QSM 5.3 Table B-15	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Comments
Sediment Samples						
AL-01-SD-0-0.2	6/1/2021 8:10	NA	x			
AL-01-SD-0-0.2-D	6/1/2021 8:10	NA	x			FD
AL-01-SD-0-0.2-MS	6/1/2021 8:10	NA	x			MS
AL-01-SD-0-0.2-MSD	6/1/2021 8:10	NA	x			MSD
Surface Water Samples						
AL-01-SW	6/1/2021 7:45	NA	x			
AL-01-SW-D	6/1/2021 7:45	NA	x			FD
AL-01-SW-MS	6/1/2021 7:45	NA	x			MS
AL-01-SW-MSD	6/1/2021 7:45	NA	x			MSD
Groundwater Samples						
FSL-5-060121	6/1/2021 13:00	56.6-121.6	x			
FSL-5-060121-D	6/1/2021 13:00	56.6-121.6	x			FD
PMW-1-060221	6/2/2021 8:50	11.5-31.5	x			
PMW-2-060221	6/2/2021 9:20	4.75-24.75	x			
PMW-4-060221	6/2/2021 8:30	4.75-24.75	x			
Spring Samples						
SPG-01-GW	6/2/2021 13:20	NA	x			
SPG-02-GW	6/2/2021 13:40	NA	x			
SPG-03-GW	6/2/2021 14:20	NA	x			
SPG-03-GW-MS	6/2/2021 14:20	NA	x			MS
SPG-03-GW-MSD	6/2/2021 14:20	NA	x			MSD
SPG-04-GW	6/2/2021 14:30	NA	x			
SPG-05-GW	6/2/2021 14:55	NA	x			
Quality Control Samples						
CN-PW-01	2/18/2021 12:37	NA	x			Decon water source
CN-ERB-01	5/26/2021 14:30	NA	x			ERB on hand auger (Driller)
CN-ERB-02	5/26/2021 14:32	NA	x			ERB on HSA
CN-ERB-03	5/26/2021 14:34	NA	x			ERB on HSA split spoon
CN-ERB-04	6/1/2021 10:42	NA	x			ERB on hand auger (AECOM)
CN-ERB-05	6/2/2021 9:54	NA	x			ERB on bladder pump
CN-FRB-01	6/1/2021 13:20	NA	x			FRB

Notes:

AL = Atherton Lake
AOI = area of interest
bgs = below ground surface
CN = Camp Navajo
ERB = equipment rinsate blank
FD = field duplicate
FRB = field reagent blank
ft = feet
GW = groundwater
HSA = hollow stem auger
LC/MS/MS = Liquid Chromatography Mass Spectrometry
MS/MSD = matrix spike/ matrix spike duplicate
NA = not applicable
QSM = Quality Systems Manual
SB = soil boring
SD = sediment
SPG = spring
SW = surface water
TOC = total organic carbon
USEPA = United States Environmental Protection Agency

Table 5-2
Soil Boring Depths, Well Screen Intervals, and Groundwater Elevations
Site Inspection Report
Camp Navajo, Bellemont, Arizona

Area of Interest	Boring Location	Soil Boring Depth (feet bgs)	Well Screen Interval (feet bgs)	Top of Casing Elevation (feet NAVD88)	Depth to Water (feet btoc)	Groundwater Elevation (feet NAVD88)
1	AOI01-01	17	NA	NA	NA	NA
	AOI01-02	17	NA	NA	NA	NA
	AOI01-03	16	NA	NA	NA	NA
	AOI01-04	1.7	NA	NA	NA	NA
	AOI01-05	1.7	NA	NA	NA	NA
2	AOI02-01	40	NA	NA	NA	NA
	AOI02-02	2	NA	NA	NA	NA
	AOI02-03	2	NA	NA	NA	NA
	AOI02-04	1	NA	NA	NA	NA
3	AOI03-01	6	NA	NA	NA	NA
	AOI03-02	22	NA	NA	NA	NA
	AOI03-03	25	NA	NA	NA	NA
4	AOI04-01	0.5	NA	NA	NA	NA
	AOI04-02	2	NA	NA	NA	NA
	AOI04-03	0.75	NA	NA	NA	NA
	AOI04-04	0.75	NA	NA	NA	NA
	AOI04-05	0.75	NA	NA	NA	NA
	AOI04-06	2	NA	NA	NA	NA
	AOI04-07	1	NA	NA	NA	NA
	AOI04-08	2	NA	NA	NA	NA
5	FLS-5	143	56.6-121.6	7108.85	90.53	7018.32
	PMW-1	31.5	11.5-31.5	7068.05	30.29	7037.76
	PMW-2	27.35	4.75-24.75	7068.71	25.41	7043.30
	PMW-3	27.35	4.75-24.75	7067.09	DRY[1]	NA[2]
	PMW-4	14.7	8.7-14.7	7067.71	14.41	7053.30
	PMW-5	16.8	11.8-16.8	7069.64	DRY[1]	NA[2]
6	AOI06-01	6	NA	NA	NA	NA
	AOI06-02	0.75	NA	NA	NA	NA
	AOI06-03	1.25	NA	NA	NA	NA
Sitewide	SPG-01	NA	NA	NA	NA	NA
	SPG-02	NA	NA	NA	NA	NA
	SPG-03	NA	NA	NA	NA	NA
	SPG-04	NA	NA	NA	NA	NA
	SPG-05	NA	NA	NA	NA	NA
	AL-01	0.2	NA	NA	NA	NA

Notes:

[1] During synoptic groundwater level measurements, well was found to be dry.

[2] Could not calculate groundwater measurement due to the well being dry

AOI = area of interes

AL = Atherton Lake

bgs = below ground surface

btoc = below top of casing

NA = not applicable

NAVD88 = North American Vertical Datum 1988

SPG = spring

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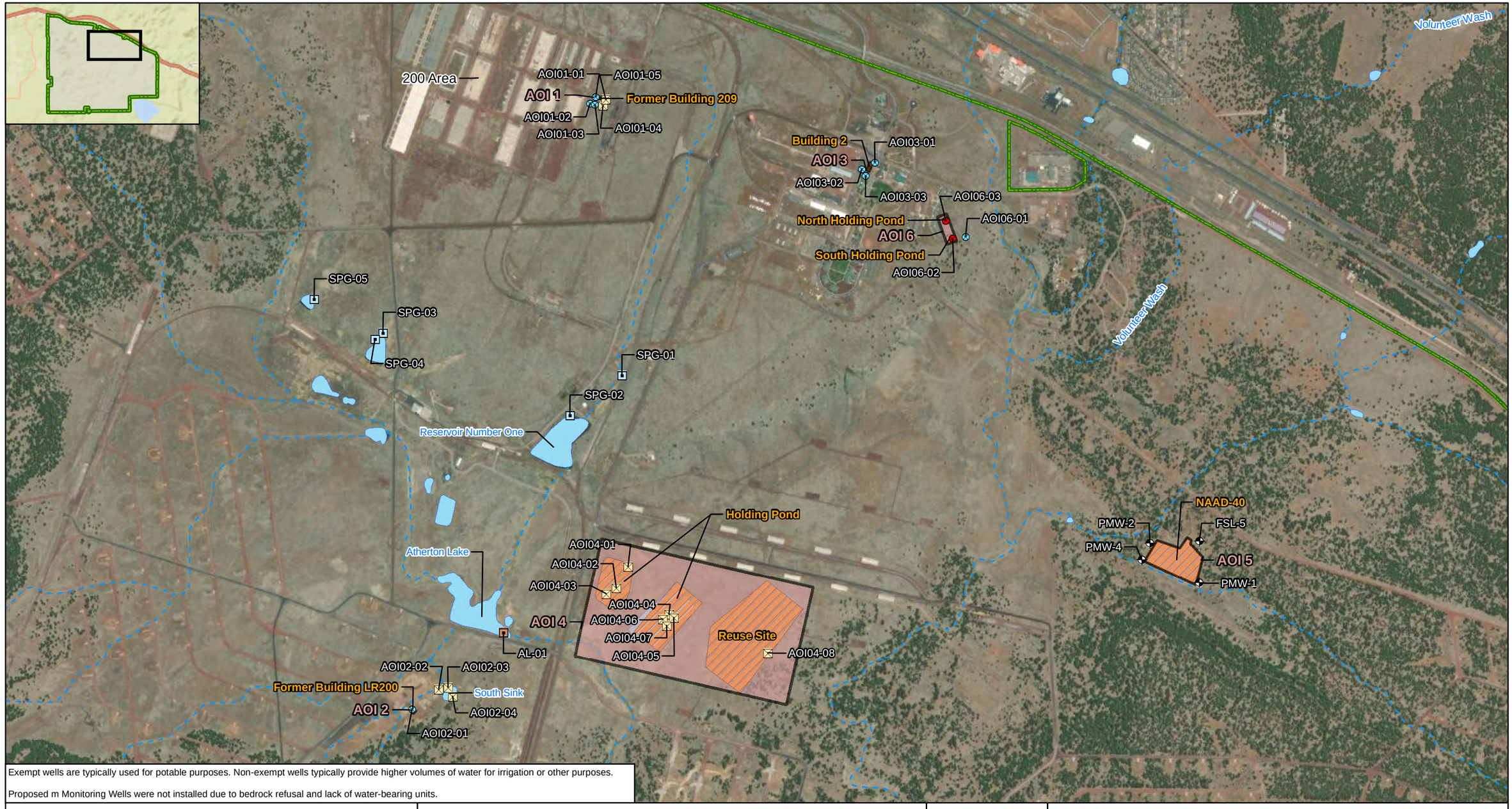


Exempt wells are typically used for potable purposes. Non-exempt wells typically provide higher volumes of water for irrigation or other purposes.

Proposed m Monitoring Wells were not installed due to bedrock refusal and lack of water-bearing units.

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	6/6/2023	GIS BY	MS	6/6/2023
SCALE	1:15,480	CHK BY	AB	6/6/2023
Base Map: National Agricultural Imagery Program, 2017. Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong),		PM	CM	6/6/2023

- Natural Spring
- Soil Boring
- Soil Boring/Monitoring Well
- Existing Monitoring Well
- Surface Water/Sediment
- Surface Soil
- Area of Interest
- Potential Release Area
- Facility Boundary
- Water Body
- Ephemeral/Intermitent Stream

0 645 1,290 2,580 Feet

N

Site Inspection Sample Locations

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-1

Proposed Monitoring Wells were not installed due to bedrock refusal and lack of water-bearing units.

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	10/26/2022	GIS BY	MS	10/26/2022
SCALE	1:5,400	CHK BY	AB	10/26/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	10/26/2022

- Soil Boring
- Soil Boring/Monitoring Well
- Surface Soil
- Area of Interest
- Potential Release Area
- Facility Boundary
- Ephemeral/Intermitent Stream

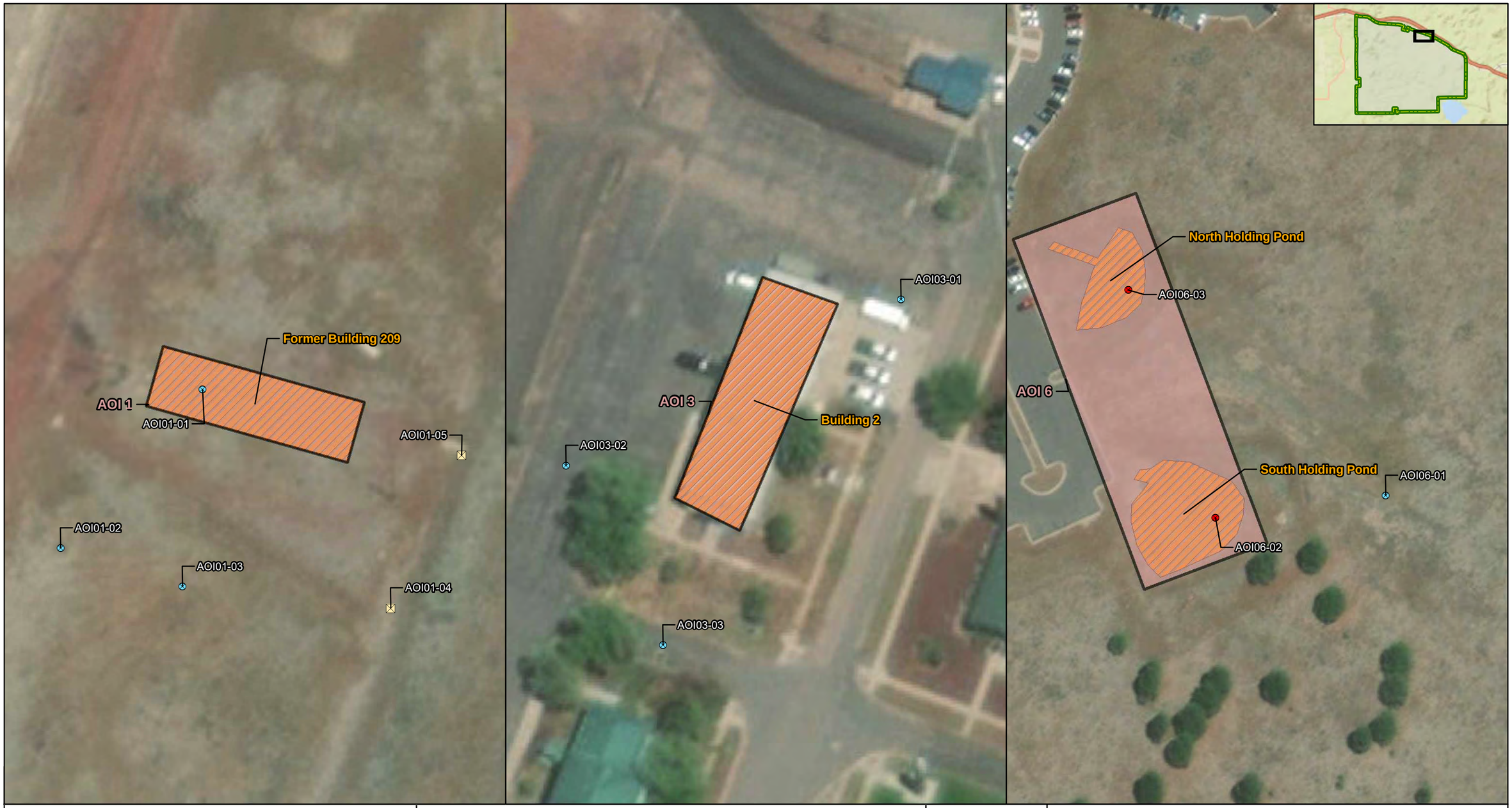
0 225 450 900 Feet

N

Site Inspection Sample Locations – AOI 1, AOI 3, AOI 6

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-2



CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	9/7/2022	GIS BY	MS	9/7/2022
SCALE	1:5,400	CHK BY	AB	9/7/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c)		PM	CM	9/7/2022

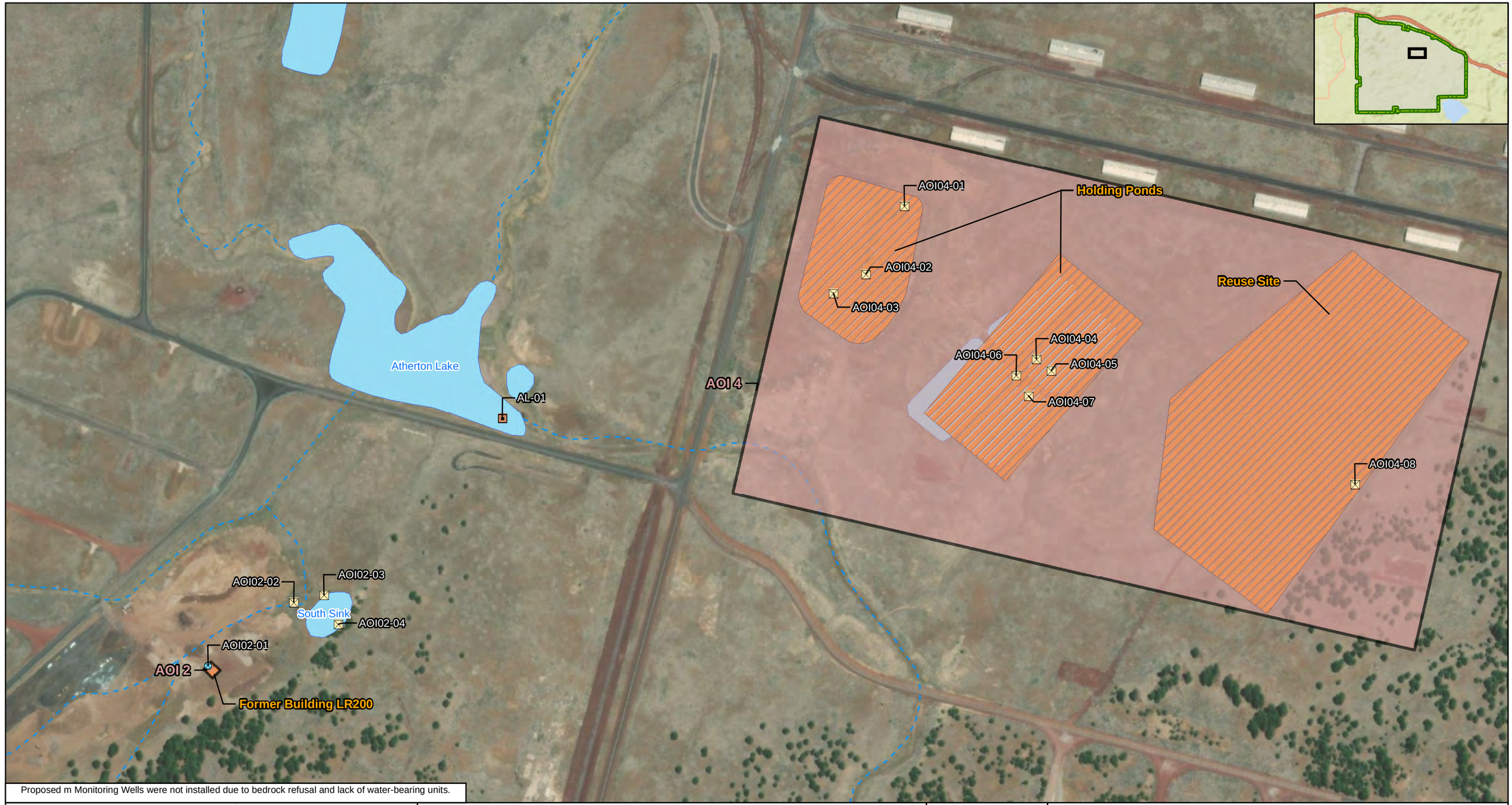
- Soil Boring
- Soil Boring/Monitoring Well
- Surface Soil
- Area of Interest
- Potential Release Area
- Facility Boundary

N

Site Inspection Sample Locations - AOI 1, AOI 3, and AOI 6 Zoom

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-2A



Proposed m Monitoring Wells were not installed due to bedrock refusal and lack of water-bearing units.

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	6/6/2023	GIS BY	MS	6/6/2023
SCALE	1:4,800	CHK BY	AB	6/6/2023
Base Map: National Agricultural Imagery Program, 2017. Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong),		PM	CM	6/6/2023

Soil Boring/Monitoring Well
Surface Water/Sediment
Surface Soil
Area of Interest
Potential Release Area
Facility Boundary
Water Body
Ephemeral/Intermitent Stream

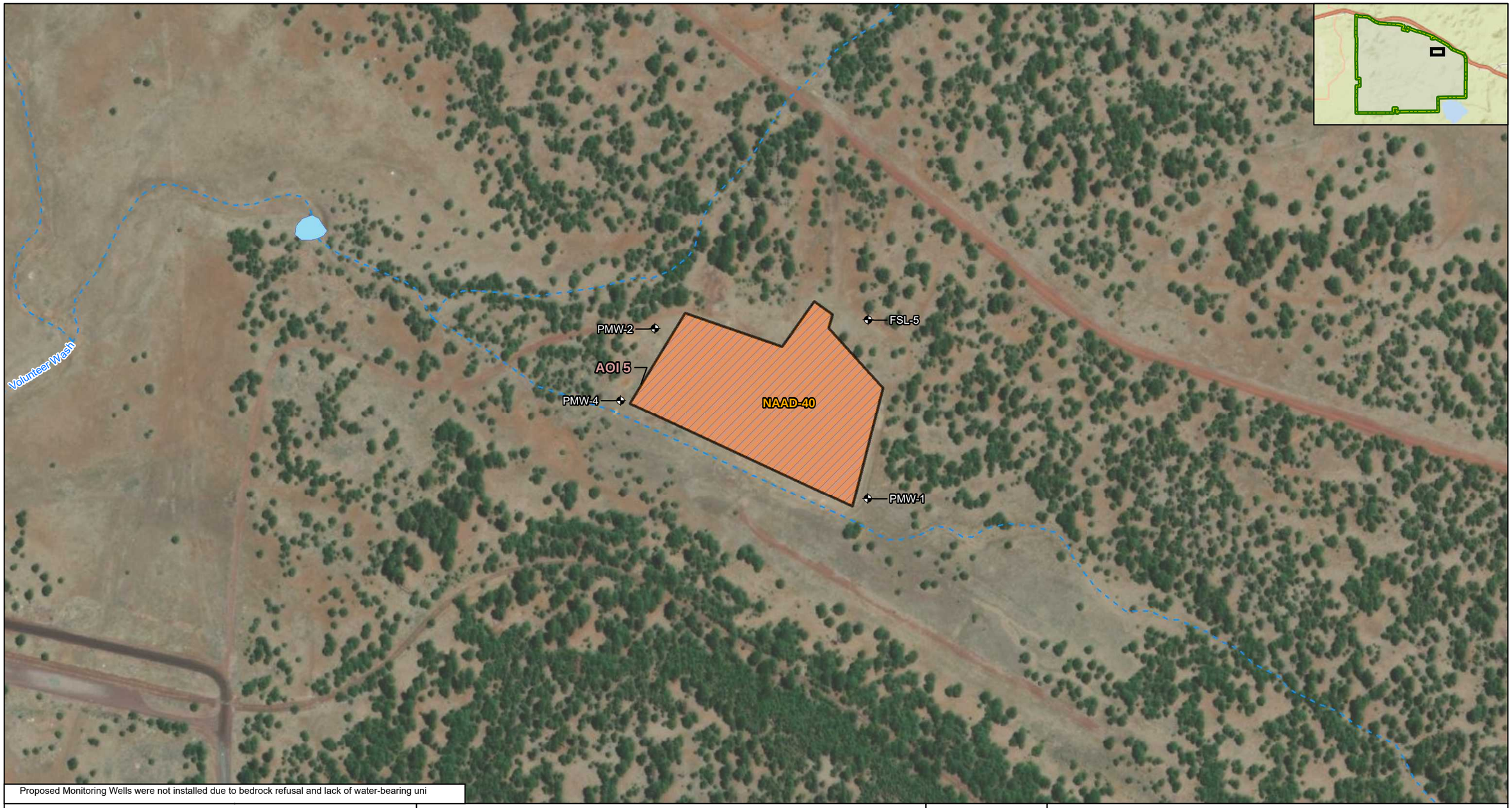
0 200 400 800 Feet

N

Site Inspection Sample Locations - AOI 2, AOI 4

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-3



Proposed Monitoring Wells were not installed due to bedrock refusal and lack of water-bearing uni

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	10/26/2022	GIS BY	MS	10/26/2022
SCALE	1:3,600	CHK BY	AB	10/26/2022
Base Map: National Agricultural Imagery Program, 2017. Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong),		PM	CM	10/26/2022

Existing Monitoring Well
Ephemeral/Intermitent Stream
Area of Interest
Potential Release Area
Facility Boundary
Water Body

0 150 300 600 Feet

N

Site Inspection Sample Locations - AOI 5

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-4

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6. Site Inspection Results

This section presents the analytical results of the SI. The SLs used in this evaluation are presented in **Section 6.1**. A discussion of the results for each AOI is provided in **Section 6.3** through **Section 6.9**. **Table 6-2** through **Table 6-7** present results in soil, groundwater, surface water, or sediment 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: Former Building 209. The soil and groundwater results are summarized on **Table 6-2** through **Table 6-5**. Soil results are presented on **Figure 6-1, Figure 6-3, Figure 6-5, Figure 6-7,** and **Figure 6-9** and groundwater results are presented on **Figure 6-11** through **Figure 6-16**.

6.3.1 AOI 1 Soil Analytical Results

Figure 6-1, Figure 6-3, Figure 6-5, Figure 6-7, and **Figure 6-9** present the ranges of detections in soil. **Table 6-2** through **Table 6-4** summarize the soil results.

Surface soil was sampled from (0 to 1.7 feet bgs or 0 to 2 feet bgs at boring locations AOI01-01 through AOI01-05. Soil was also sampled from one or more shallow subsurface intervals at AOI01-01 (13 to 15 feet bgs), AOI01-02 (8 to 10 feet bgs; 13 to 15 feet bgs), and AOI01-03 (3 to 5 feet bgs; 8 to 10 feet bgs). PFOA, PFOS, PFHxS, PFNA, and PFBS were detected at concentrations below their SLs in surface soil. PFOA, PFOS, and PFNA were detected in three of the five locations with maximum concentrations of 0.413 J µg/kg, 6.35 µg/kg, and 0.070 J µg/kg, respectively. PFHxS and PFBS were detected at two of the five locations with maximum concentrations of 1.78 µg/kg and 0.061 J µg/kg, respectively.

PFOA was detected below the SL in shallow subsurface soil (8 to 10 feet bgs) at location AOI01-02, with a concentration of 0.114 J µg/kg in the field duplicate sample (AOI01-02-8-10-D). PFOS, PFHxS, PFNA, and PFBS were not detected in shallow subsurface soil.

6.3.2 AOI 1 Groundwater Analytical Results

Figure 6-11 and **Figure 6-12** present the ranges of detections in groundwater. **Table 6-5** summarizes the groundwater results.

Groundwater was sampled from natural spring locations SPG-01 through SPG-05, which are fed by the perched aquifer underlying AOI 1. PFOS was detected above the SL of 4 nanograms per liter (ng/L) in four of the five spring locations, with concentrations ranging from 13.6 ng/L to 25.9 ng/L. PFOA, PFHxS, and PFBS were detected at concentrations below their SLs in groundwater. PFOA was detected at four of the five spring locations, with a maximum concentration of 1.70 J+ ng/L. PFHxS and PFBS were detected at all five spring locations with maximum concentrations

of 22.9 ng/L and 26.4 ng/L, respectively. PFNA was not detected in groundwater collected from any of the five springs.

6.3.3 AOI 1 Conclusions

Based on the results of the SI, PFOA, PFOS, PFHxS, PFNA, and PFBS were detected in soil below their SLs. PFOA was detected at concentrations above the SL in groundwater at spring locations fed by the perched aquifer underlying AOI 1. Based on the exceedances of the SL in groundwater within the perched aquifer, further evaluation at AOI 1 is warranted.

6.4 AOI 2

This section presents the analytical results for soil in comparison to SLs for AOI 2: Former Building LR200. Groundwater was not encountered in any of the borings drilled at AOI 2. The results in soil are presented in **Table 6-2** through **Table 6-4**. Soil results are presented on **Figure 6-2**, **Figure 6-4**, **Figure 6-6**, **Figure 6-8**, and **Figure 6-10**.

6.4.1 AOI 2 Soil Analytical Results

Surface soil was sampled from 0 to 1 feet bgs or 0 to 2 feet bgs at boring locations AOI02-01 through AOI02-04. Soil was also sampled from two deep subsurface soil intervals (18 to 20 feet bgs; 33-35 feet bgs) at AOI02-01. PFOS, PFHxS, PFNA, and PFBS were each detected in at least one surface soil location at concentrations below their SLs with the following maximum concentrations: PFOS at 0.071 J µg/kg; PFHxS at 0.099 J µg/kg; PFNA at 0.037 J µg/kg; PFBS at 0.033 J µg/kg. PFOA was not detected in surface soil. PFOA, PFOS, PFHxS, PFNA, and PFBS were not detected in deep subsurface soil.

6.4.2 AOI 2 Conclusions

Based on the results of the SI, PFOS, PFHxS, PFNA, and PFBS were detected at concentrations below their SLs in surface soil. Therefore, further evaluation at AOI 2 is not warranted.

6.5 AOI 3

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 3: Building 2. The soil and groundwater results are summarized on **Table 6-2** through **Table 6-5**. Soil results are presented on **Figure 6-1**, **Figure 6-3**, **Figure 6-5**, **Figure 6-7**, and **Figure 6-9** and groundwater results are presented on **Figure 6-11** through **Figure 6-12**.

6.5.1 AOI 3 Soil Analytical Results

Figure 6-1, **Figure 6-3**, **Figure 6-5**, **Figure 6-7**, and **Figure 6-9** present the ranges of detections in soil. **Table 6-2** through **Table 6-4** summarize the soil results.

Surface soil was sampled from 0 to 2.5 feet bgs and shallow subsurface soil collected from 3 to 5 feet bgs at boring location AOI03-01. Soil was also sampled from surface soil (0 to 2 feet bgs), shallow subsurface soil (8 to 10 feet bgs), and deep subsurface soil (20 to 22 feet bgs and 23 to 25 feet bgs, respectively) at AOI03-02 and AOI03-03. PFOS was detected above the SL of 13 µg/kg in surface soil at AOI03-01, with a concentration of 41.6 µg/kg. The remaining four compounds were detected below their SLs in surface soil at AOI03-01, with concentrations as follows: PFOA at 4.56 µg/kg; PFHxS at 2.80 µg/kg; PFNA at 0.577 J µg/kg; and PFBS at 0.159 J µg/kg.

PFOA, PFOS, PFHxS, PFNA, and PFBS were detected at concentrations below their SLs in shallow subsurface soil. PFOS was detected at two of the three locations with a maximum concentration of 28.5 µg/kg. The remaining four compounds were detected at AOI03-01 with concentrations as follows: PFOA at 1.34 µg/kg; PFHxS at 1.77 µg/kg; PFNA at 0.240 J µg/kg; and PFBS at 0.133 J µg/kg.

PFOA, PFOS, PFHxS, PFNA, and PFBS were not detected in deep subsurface soil.

6.5.2 AOI 3 Groundwater Analytical Results

Figure 6-11 and **Figure 6-12** present the ranges of detections in groundwater. **Table 6-5** summarizes the groundwater results.

AOI 3 is underlain by the same perched aquifer as AOI 1 which feeds natural spring locations SPG-01 through SPG-05. The groundwater results from the spring samples are presented in **Section 6.3.2**.

6.5.3 AOI 3 Conclusions

Based on the results of the SI, PFOS was detected at a concentration above the SL in surface soil. PFOA was detected at concentrations above the respective SL in groundwater at spring locations fed by the perched aquifer underlying AOI 3. Based on the exceedances of the SLs in surface soil and groundwater within the perched aquifer, further evaluation at AOI 3 is warranted.

6.6 AOI 4

This section presents the analytical results for soil in comparison to SLs for AOI 4: WWTP Holding Ponds and Effluent Reuse Site. Groundwater was not encountered in any of the borings drilled at AOI 4. The results in soil are presented in **Table 6-2** through **Table 6-4**. Soil results are presented on **Figure 6-2, Figure 6-4, Figure 6-6, Figure 6-8, and Figure 6-10**.

6.6.1 AOI 4 Soil Analytical Results

Surface soil was sampled from 0 to 2 feet bgs at boring locations AOI04-01 through AOI04-08. PFOA, PFOS, PFHxS, PFNA, and PFBS were detected at concentrations below their SLs in surface soil. PFOA, PFOS, and PFNA were detected in six of the eight locations, with maximum concentrations of 0.773 J µg/kg, 8.86 µg/kg, and 0.297 J µg/kg, respectively. PFHxS was detected at seven of the eight locations with a maximum concentration of 0.394 J µg/kg. PFBS was detected at four of the six locations with a maximum concentration of 0.079 J µg/kg.

6.6.2 AOI 4 Conclusions

Based on the results of the SI, PFOA, PFOS, PFHxS, PFNA, and PFBS were detected at concentrations below their respective SLs in surface soil. Therefore, further evaluation at AOI 4 is not warranted.

6.7 AOI 5

This section presents the analytical results for groundwater in comparison to SLs for AOI 5: NAAD-40. The results in groundwater are presented in **Table 6-5**. Groundwater results are presented on **Figure 6-11** and **Figure 6-12**.

No soil was sampled at AOI 5, as NAAD-40 is a capped former sanitary landfill with land use restrictions preventing ground-disturbing activities to surface and subsurface soil. Furthermore, soil sampling would compromise the integrity of the landfill cap.

6.7.1 AOI 5 Groundwater Analytical Results

Groundwater was sampled from existing permanent monitoring wells FSL-5, PMW-1, and PMW-2. PFOS and PFBS were detected at concentrations below their SLs in groundwater. PFOS was detected at well location PMW-1, with a concentration of 2.60 J ng/L. PFBS was detected at well locations PMW-1 and PMW-2, with concentrations of 5.06 ng/L and 1.27 J ng/L, respectively. PFOA, PFHxS, and PFNA were not detected in groundwater.

It should be noted that the water collected from these monitoring wells was collected below the well screen (stagnant water) and are not low-flow samples representative of formation water. Under normal circumstances, these samples would not be used for decision making purposes; however, the samples were considered acceptable, for screening purposes only, to determine presence or absence of PFAS.

6.7.2 AOI 5 Conclusions

Based on the results of the SI, PFOS and PFBS were detected in groundwater at concentrations below their respective SLs. However, there are concerns regarding the quality of the samples and representativeness of the results with respect to groundwater underlying the AOI. As a result, further evaluation of AOI 5 is warranted as a conservative measure.

6.8 AOI 6

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 6: North and South Holding Ponds. The soil and groundwater results are summarized on **Table 6-2** through **Table 6-5**. Soil results are presented on and groundwater results are presented on **Figure 6-1**, **Figure 6-3**, **Figure 6-5**, **Figure 6-7**, and **Figure 6-9. Figure 6-1** through **Figure 6-12**.

6.8.1 AOI 6 Soil Analytical Results

Figure 6-1, **Figure 6-3**, **Figure 6-5**, **Figure 6-7**, and **Figure 6-9** present the ranges of detections in soil. **Table 6-2** through **Table 6-4** summarize the soil results.

Surface soil was sampled from 0 to 2 feet bgs at boring locations AOI06-01 through AOI06-03. Soil was also sampled from the shallow subsurface (3 to 5 feet bgs) at AOI06-01. PFOS was detected above the SL of 13 µg/kg in surface soil at locations AOI06-01 and AOI06-03, with concentrations of 51.1 µg/kg and 15.9 µg/kg, respectively. The remaining four compounds were detected below their SLs in surface soil in at least one sample, with maximum concentrations as follows: PFOA at 14.4 µg/kg; PFHxS at 4.95 µg/kg; PFNA at 0.563 J µg/kg; and PFBS at 0.058 J µg/kg.

PFOA, PFOS, PFHxS, and PFNA were detected at concentrations below their SLs in shallow subsurface soil at location AOI06-01, with concentrations as follows: PFOA at 3.06 µg/kg; PFOS at 37.5 µg/kg; PFHxS at 2.34 µg/kg; and PFNA at 0.458 J µg/kg. PFBS was not detected in shallow subsurface soil.

6.8.2 AOI 6 Groundwater Analytical Results

Figure 6-11 and **Figure 6-12** present the ranges of detections in groundwater. **Table 6-5** summarizes the groundwater results.

AOI 6 is potentially underlain by the same perched aquifer as AOI 1 and AOI 3 that feeds natural spring locations SPG-01 through SPG-05. Groundwater results from the spring samples are presented in **Section 6.3.2**.

6.8.3 AOI 6 Conclusions

Based on the results of the SI, PFOS was detected in surface soil above the SL. PFOA was detected at concentrations above the SL in groundwater at spring locations fed by the perched aquifer potentially underlying AOI 6. Based on the exceedances of the SLs in soil and groundwater within the perched aquifer, further evaluation at AOI 6 is warranted.

6.9 Atherton Lake

This section presents the analytical results for sediment and surface water for Atherton Lake. There are no established SLs for sediment and surface water; therefore, these results are presented for informational purposes only. The results in sediment and surface water are presented in **Table 6-6** and **Table 6-7**, respectively. Sediment and surface water results are presented on **Figure 6-13** through **Figure 6-16**.

6.9.1 Atherton Lake Surface Water Analytical Results

Surface water was sampled from one location (AL-01) along the shoreline of Atherton Lake. PFOA, PFOS, PFHxS, and PFBS were detected in surface water, with maximum concentrations in the field duplicate sample (AL-01-SW-D) as follows: PFOA at 7.22 ng/L; PFOS at 27.9 ng/L; PFHxS at 39 ng/L; and PFBS at 10.3 ng/L. PFNA was not detected in either the primary or duplicate surface water samples. **Figure 6-13** and **Figure 6-14** present the ranges of detections in surface water. **Table 6-7** summarizes the surface water results.

6.9.2 Atherton Lake Sediment Analytical Results

Sediment was sampled from one location (AL-01) along the shoreline of Atherton Lake. PFOS, PFHxS, and PFBS were detected in the sediment sample with concentrations of 0.518 J µg/kg, 0.251 J µg/kg, and 0.044 J µg/kg, respectively. PFOA and PFNA were not detected. **Figure 6-15** and **Figure 6-16** present the ranges of detections in sediment. **Table 6-6** summarizes the sediment results.

6.9.3 Atherton Lake Conclusions

Based on the results of the SI, PFOS, PFHxS, and PFBS were detected in sediment at Atherton Lake. PFOA, PFOS, PFHxS, and PFBS were detected in surface water. There are no established SLs for sediment and surface water; therefore, these results are presented for informational purposes only.

Table 6-2
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil
Site Inspection Report, Camp Navajo

Area of Interest		AOI01										AOI02								AOI03	
Sample ID		AOI01-01-SB-0-2		AOI01-02-SB-0-2		AOI01-03-SB-0-2		AOI01-04-SB-0-1.7		AOI01-05-SB-0-1.7		AOI02-01-SB-0-2		AOI02-02-SB-0-2		AOI02-03-SB-0-2		AOI02-04-SB-0-1		AOI03-01-SB-0-2.5	
Sample Date		05/25/2021		05/26/2021		05/25/2021		05/26/2021		05/26/2021		05/27/2021		05/28/2021		05/28/2021		05/28/2021		05/26/2021	
Depth		0-2 ft		0-2 ft		0-2 ft		0-1.7 ft		0-1.7 ft		0-2 ft		0-2 ft		0-2 ft		0-1 ft		0-2.5 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																					
PFBS	1900	0.061	J	ND	U	ND	U	0.029	J	ND	U	ND	U	ND	U	0.032	J	0.033	J	0.159	J
PFHxS	130	1.78		ND	U	ND	U	ND	U	0.106	J	ND	U	ND	U	0.056	J	0.099	J	2.80	
PFNA	19	0.043	J	ND	U	ND	U	0.069	J	0.070	J	ND	U	ND	U	ND	U	0.037	J	0.577	J
PFOA	19	0.413	J	ND	U	ND	U	0.133	J	0.170	J	ND	U	ND	U	ND	U	ND	U	4.56	
PFOS	13	2.88		ND	U	ND	U	0.970	J	6.35		ND	U	0.071	J	ND	U	ND	U	41.6	

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

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

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

Chemical Abbreviations

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

Acronyms and Abbreviations

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

Table 6-2
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil
Site Inspection Report, Camp Navajo

Area of Interest		AOI03				AOI04															
Sample ID		AOI03-02-SB-0-2		AOI03-03-SB-0-2		AOI04-01-SB-0-0.5		AOI04-02-SB-0-2		AOI04-03-SB-0-0.75		AOI04-04-SB-0-0.75		AOI04-05-SB-0-0.75		AOI04-06-SB-0-2		AOI04-07-SB-0-1		AOI04-08-SB-0-2	
Sample Date		05/26/2021		05/26/2021		06/01/2021		06/01/2021		06/01/2021		06/01/2021		06/01/2021		06/01/2021		06/01/2021		05/28/2021	
Depth		0-2 ft		0-2 ft		0-0.5 ft		0-2 ft		0-0.75 ft		0-0.75 ft		0-0.75 ft		0-2 ft		0-1 ft		0-2 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	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	0.079	J	ND	U	ND	U	0.032	J	ND	U	ND	UJ
PFHxS	130	ND	U	ND	U	0.087	J	ND	U	0.394	J	0.051	J	0.088	J	0.147	J	0.050	J	0.062	J
PFNA	19	ND	U	ND	U	0.114	J	ND	U	ND	U	0.162	J	0.297	J	0.025	J	0.128	J	0.052	J
PFOA	19	ND	U	ND	U	0.220	J	ND	U	ND	U	0.269	J	0.773	J	0.224	J	0.280	J	ND	UJ
PFOS	13	ND	U	ND	U	1.71		0.199	J	ND	U	2.87		8.86		ND	U	4.43		2.37	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

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

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

Chemical Abbreviations

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

Acronyms and Abbreviations

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

Table 6-2
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Soil
Site Inspection Report, Camp Navajo

Area of Interest		AOI04		AOI06							
Sample ID		AOI04-08-SB-0-2-D		AOI06-01-SB-0-2		AOI06-02-SB-0-0.75		AOI06-02-SB-0-0.75-D		AOI06-03-SB-0-1.25	
Sample Date		05/28/2021		05/27/2021		05/27/2021		05/27/2021		05/27/2021	
Depth		0-2 ft		0-2 ft		0-0.75 ft		0-0.75 ft		0-1.25 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	1900	0.046	J	ND	U	ND	U	ND	U	0.058	J
PFHxS	130	0.358	J	4.95		ND	U	0.038	J	1.60	
PFNA	19	0.035	J	0.432	J	0.041	J	0.034	J	0.563	J
PFOA	19	0.103	J	14.4		ND	U	ND	U	2.30	
PFOS	13	1.44	J	51.1		ND	U	ND	U	15.9	

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

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

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

Chemical Abbreviations

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

Acronyms and Abbreviations

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

Table 6-3
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Shallow Subsurface Soil
Site Inspection Report, Camp Navajo

Area of Interest		AOI01														AOI03					
Sample ID		AOI01-01-SB-13-15		AOI01-01-SB-13-15-D		AOI01-02-SB-8-10		AOI01-02-SB-8-10-D		AOI01-02-SB-13-15		AOI01-03-SB-3-5		AOI01-03-SB-8-10		AOI03-01-SB-3-5		AOI03-02-SB-8-10		AOI03-03-SB-8-10	
Sample Date		05/25/2021		05/25/2021		05/26/2021		05/26/2021		05/26/2021		05/25/2021		05/25/2021		05/26/2021		05/26/2021		05/26/2021	
Depth		13-15 ft		13-15 ft		8-10 ft		8-10 ft		13-15 ft		3-5 ft		8-10 ft		3-5 ft		8-10 ft		8-10 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)																					
PFBS	25000	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	0.133	J	ND	U	ND	U
PFHxS	1600	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	1.77		ND	U	ND	U
PFNA	250	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	0.240	J	ND	U	ND	U
PFOA	250	ND	U	ND	U	ND	UJ	0.114	J	ND	U	ND	U	ND	U	1.34		ND	U	ND	U
PFOS	160	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	28.5		ND	U	0.195	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.

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
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram

Table 6-3
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Shallow Subsurface Soil
Site Inspection Report, Camp Navajo

	Area of Interest	AOI06	
	Sample ID	AOI06-01-SB-3-5	
	Sample Date	05/27/2021	
	Depth	3-5 ft	
Analyte	**OSD Screening Level [a]**	**Result**	**Qual**
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)			
PFBS	25000	ND	U
PFHxS	1600	2.34	
PFNA	250	0.458	J
PFOA	250	3.06	
PFOS	160	37.5	

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.

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
HQ	hazard quotient
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
OSD	Office of the Secretary of Defense
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram

Table 6-4
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Deep Subsurface Soil
Site Inspection Report, Camp Navajo

Area of Interest	AOI02				AOI03			
Sample ID	AOI02-01-SB-18-20		AOI02-01-SB-33-35		AOI03-02-SB-20-22		AOI03-03-SB-23-25	
Sample Date	05/27/2021		05/27/2021		05/26/2021		05/26/2021	
Depth	18-20 ft		33-35 ft		20-22 ft		23-25 ft	
Analyte	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)								
PFBS	ND	U	ND	U	ND	U	ND	U
PFHxS	ND	U	ND	U	ND	U	ND	U
PFNA	ND	U	ND	U	ND	U	ND	U
PFOA	ND	U	ND	U	ND	U	ND	U
PFOS	ND	U	ND	U	ND	U	ND	U

Interpreted Qualifiers

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

Chemical Abbreviations

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

Acronyms and Abbreviations

AOI	Area of Interest
DL	detection limit
ft	feet
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
QSM	Quality Systems Manual
Qual	interpreted qualifier
SB	soil boring
µg/kg	micrograms per kilogram

Table 6-5
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Groundwater
Site Inspection Report, Camp Navajo

Area of Interest		AOI01										AOI05							
Sample ID		SPG-01-GW		SPG-02-GW		SPG-03-GW		SPG-04-GW		SPG-05-GW		FSL-5-060121		FSL-5-060121-D		PMW-1-060221		PMW-2-060221	
Sample Date		06/02/2021		06/02/2021		06/02/2021		06/02/2021		06/02/2021		06/01/2021		06/01/2021		06/02/2021		06/02/2021	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Water, LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)																			
PFBS	601	4.24		13.1		24.5	J+	26.4		12.8		ND	U	ND	U	5.06		1.27	J
PFHxS	39	16.7		22.9		17.2	J+	21.5		1.48	J	ND	U	ND	U	ND	U	ND	U
PFNA	6	ND	U	ND	U	ND	UJ	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
PFOA	6	1.16	J	1.69	J	1.70	J+	1.48	J	ND	U	ND	U	ND	U	ND	U	ND	U
PFOS	4	13.6		24.3		19.4	J+	25.9		1.19	J	ND	U	ND	U	2.60	J	ND	U

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

J+ = Estimated concentration, biased high

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

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

Chemical Abbreviations

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

Acronyms and Abbreviations

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

Table 6-5
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Groundwater
Site Inspection Report, Camp Navajo

	Area of Interest	AOI05	
	Sample ID	PMW-4-060221	
	Sample Date	06/02/2021	
Analyte	OSD Screening Level [a]	Result	Qual
Water, LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)			
PFBS	601	ND	U
PFHxS	39	ND	U
PFNA	6	ND	U
PFOA	6	ND	U
PFOS	4	ND	U

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

J+ = Estimated concentration, biased high

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

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

Chemical Abbreviations

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

Acronyms and Abbreviations

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

Table 6-6
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Sediment
Site Inspection Report, Camp Navajo

Area of Interest	AL-01			
Sample ID	AL-01-SD-0-0.2		AL-01-SD-0-0.2-D	
Sample Date	06/01/2021		06/01/2021	
Depth	0-0.2 ft		0-0.2 ft	
Analyte	Result	Qual	Result	Qual
Sediment, LCMSMS compliant with QSM 5.3 Table B-15 (µg/kg)				
PFBS	0.044	J	ND	UJ
PFHxS	0.251	J	0.063	J
PFNA	ND	U	ND	UJ
PFOA	ND	U	ND	UJ
PFOS	0.518	J	0.163	J

Interpreted Qualifiers

J = Estimated concentration

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

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

Chemical Abbreviations

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

Acronyms and Abbreviations

AOI	Area of Interest
D	duplicate
DL	detection limit
ft	feet
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
QSM	Quality Systems Manual
Qual	interpreted qualifier
SD	sediment
µg/kg	micrograms per kilogram

Table 6-7
PFOA, PFOS, PFBS, PFNA, and PFHxS Results in Surface Water
Site Inspection Report, Camp Navajo

Area of Interest	AL-01			
Sample ID	AL-01-SW		AL-01-SW-D	
Sample Date	06/01/2021		06/01/2021	
Analyte	Result	Qual	Result	Qual
Water, LCMSMS compliant with QSM 5.3 Table B-15 (ng/l)				
PFBS	9.49		10.3	
PFHxS	36.2		39.0	
PFNA	ND	U	ND	U
PFOA	7.04		7.22	
PFOS	21.2		27.9	

Interpreted Qualifiers

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

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
ID	identification
LCMSMS	liquid chromatography with tandem mass spectrometry
LOD	limit of detection
ND	analyte not detected above the LOD
QSM	Quality Systems Manual
Qual	interpreted qualifier
ng/l	nanogram per liter
SW	surface water

Facility Boundary

Ephemeral/Intermitent Stream

PFOA Results (µg/Kg)

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

N

0 335 670 1,340 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 - AOI 1, AOI 3, AOI 6

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	9/12/2022	GIS BY	MS	9/12/2022
SCALE	1:8,040	CHK BY	AB	9/12/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	9/12/2022

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Figure 6-1

Shallow

AOI04-01
AOI04-02
AOI04-03
AOI04-04
AOI04-05
AOI04-06
AOI04-07
AOI04-08
Atherton Lake
AOI02-02
AOI02-03
South Sink
AOI02-04
AOI02-01

Intermediate

Atherton Lake
South Sink
AOI02-01

Deep

Atherton Lake
South Sink
AOI02-01

Facility Boundary
Water Body
Ephemeral/Intermitent Stream

PFOA Results (µg/Kg)

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

N

0 275 550 1,100
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 - AOI 2 and AOI 4

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	9/12/2022	GIS BY	MS	9/12/2022
SCALE	1:6,600	CHK BY	AB	9/12/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	9/12/2022

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Figure 6-2

Facility Boundary

Ephemeral/Intermitent Stream

PFOS Results (µg/Kg)

- ND
- >ND - 13
- >13 - 160
- >160 - 1,600
- >1,600

N

0 335 670 1,340 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.

PFOS Detections in Soil - AOI 1, AOI 3, AOI 6

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	9/12/2022	GIS BY	MS	9/12/2022
SCALE	1:8,040	CHK BY	AB	9/12/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	9/12/2022

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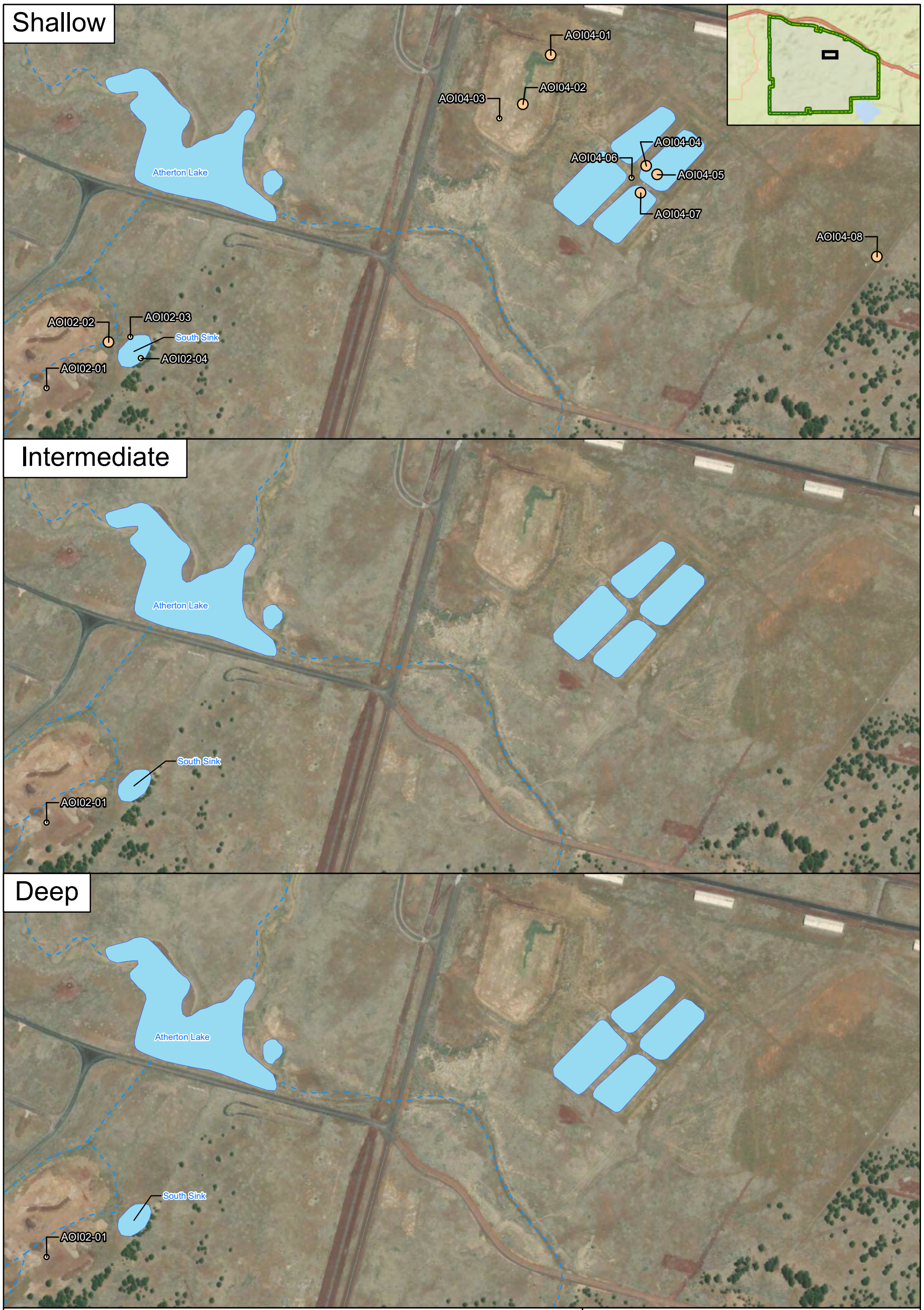
Figure 6-3



Facility Boundary
Water Body
Ephemeral/Intermitent Stream

PFOS Results (µg/Kg)

- ND
- >ND - 13
- >13 - 160
- >160 - 1,600
- >1,600

N

0 275 550 1,100 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.

PFOS Detections in Soil - AOI 2 and AOI 4

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	9/12/2022	GIS BY	MS	9/12/2022
SCALE	1:6,600	CHK BY	AB	9/12/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	9/12/2022

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Figure 6-4

Facility Boundary

Ephemeral/Intermitent Stream

PFBS Results (µg/Kg)

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

N

0 335 670 1,340 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 - AOI 1, AOI 3, AOI 6

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	9/12/2022	GIS BY	MS	9/12/2022
SCALE	1:8,040	CHK BY	AB	9/12/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	9/12/2022

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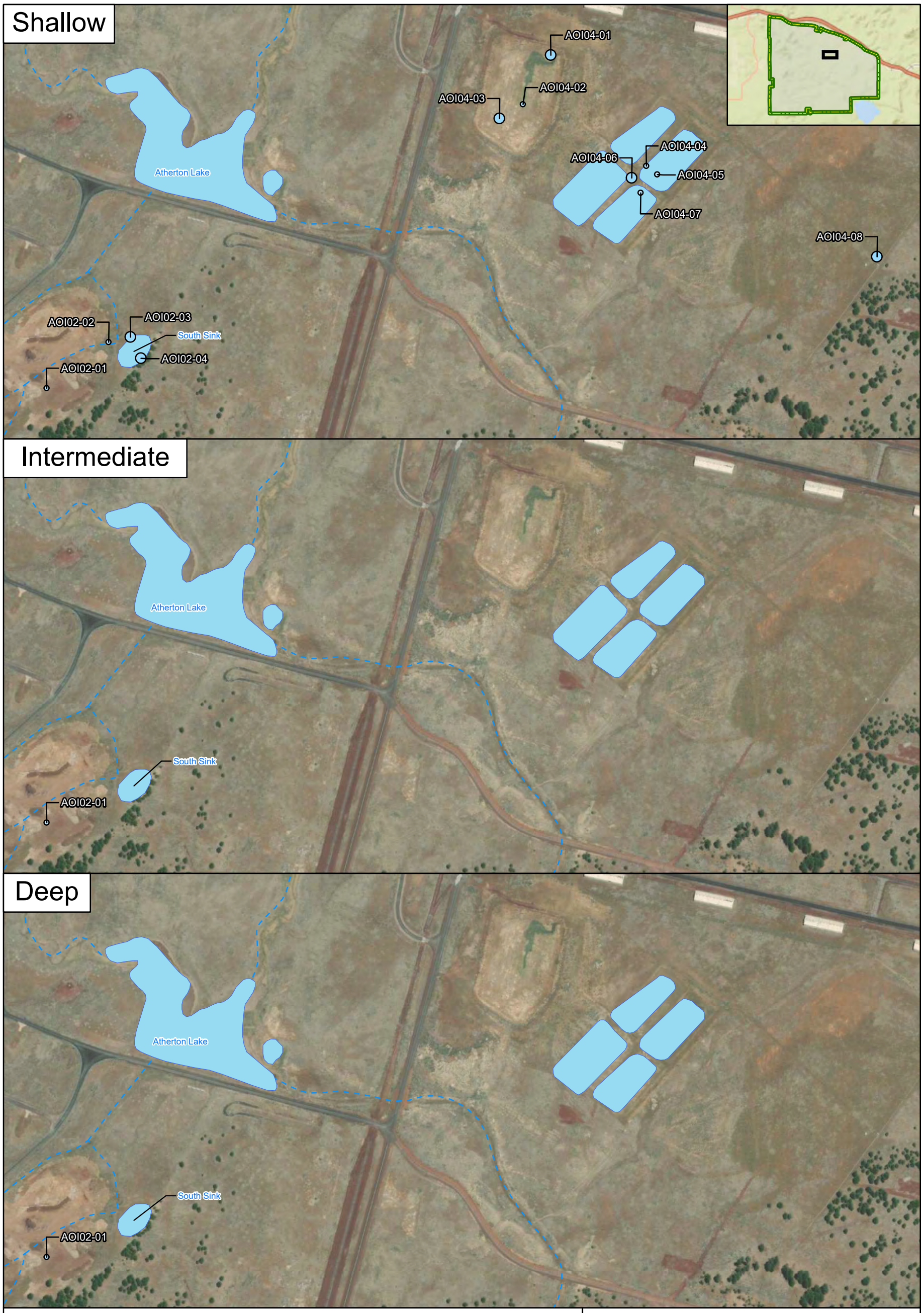
Figure 6-5



Facility Boundary
Water Body
Ephemeral/Intermitent Stream

PFBS Results (µg/Kg)

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

N

0 275 550 1,100 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 - AOI 2 and AOI 4

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	9/12/2022	GIS BY	MS	9/12/2022
SCALE	1:6,600	CHK BY	AB	9/12/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	9/12/2022

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Figure 6-6

Facility Boundary

Ephemeral/Intermitent Stream

PFHxS Results (µg/Kg)

- ND
- >ND - 10
- >10 - 130
- >130 - 1,600
- >1,600

N

0 335 670 1,340 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 - AOI 1, AOI 3, AOI 6

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	9/12/2022	GIS BY	MS	9/12/2022
SCALE	1:8,040	CHK BY	AB	9/12/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	9/12/2022

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Figure 6-7

Shallow

AOI04-01
AOI04-02
AOI04-03
AOI04-04
AOI04-05
AOI04-06
AOI04-07
AOI04-08
Atherton Lake
AOI02-02
AOI02-03
South Sink
AOI02-04
AOI02-01

Intermediate

Atherton Lake
South Sink
AOI02-01

Deep

Atherton Lake
South Sink
AOI02-01

Facility Boundary
Water Body
Ephemeral/Intermitent Stream

PFHxS Results (µg/Kg)

ND
>ND - 10
>10 - 130
>130 - 1,600
>1,600

N

0 275 550 1,100 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 - AOI 2 and AOI 4

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	9/12/2022	GIS BY	MS	9/12/2022
SCALE	1:6,600	CHK BY	AB	9/12/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	9/12/2022

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Figure 6-8

Facility Boundary

Ephemeral/Intermitent Stream

PFNA Results (µg/Kg)

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

N

0 335 670 1,340 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.

PFNA Detections in Soil - AOI 1, AOI 3, AOI 6

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	9/12/2022	GIS BY	MS	9/12/2022
SCALE	1:8,040	CHK BY	AB	9/12/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	9/12/2022

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Figure 6-9

Shallow

Intermediate

Deep

Atherton Lake

South Sink

AOI04-01
AOI04-02
AOI04-03
AOI04-04
AOI04-05
AOI04-06
AOI04-07
AOI04-08
AOI02-01
AOI02-02
AOI02-03
AOI02-04

Facility Boundary
Water Body
Ephemeral/Intermitent Stream

PFNA Results (µg/Kg)

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

N

0 275 550 1,100 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.

PFNA Detections in Soil - AOI 2 and AOI 4

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	9/12/2022	GIS BY	MS	9/12/2022
SCALE	1:6,600	CHK BY	AB	9/12/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	9/12/2022

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Figure 6-10

PFOA

SPG-05
SPG-03
SPG-04
SPG-01
SPG-02
Reservoir Number One
Atherton Lake
Volunteer Wash
FSL-5
PMW-4
PMW-2
PMW-1

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

PFOS

SPG-05
SPG-03
SPG-04
SPG-01
SPG-02
Reservoir Number One
Atherton Lake
Volunteer Wash
FSL-5
PMW-4
PMW-2
PMW-1

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

PFBS

SPG-05
SPG-03
SPG-04
SPG-01
SPG-02
Reservoir Number One
Atherton Lake
Volunteer Wash
FSL-5
PMW-2
PMW-4
PMW-1

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

Legend
- Facility Boundary
- Water Body
- Ephemeral/Intermitent Stream
- Inferred Shallow Groundwater Flow Direction
- Inferred Groundwater Flow Direction

N

0 675 1,350 2,700 Feet

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

PFOA, PFOS, and PFBS Detections in Groundwater

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	10/26/2022	GIS BY	MS	10/26/2022
SCALE	1:16,200	CHK BY	AB	10/26/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	10/26/2022

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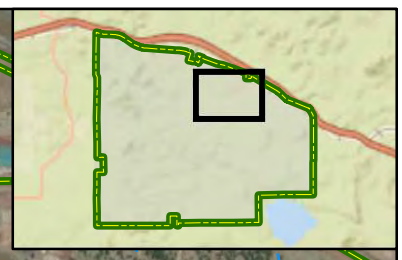
Figure 6-11

PFHxS



SPG-05
SPG-03
SPG-04
SPG-01
SPG-02
Reservoir Number One
Volunteer Wash
Volunteer Wash
FSL-5
PMW-4
PMW-2
PMW-1
Atherton Lake
South Sink

PFHxS Resutls (ng/L)
- ND
- >ND - 39
- >39 - 100
- >100 - 1,000
- >1,000

PFNA

SPG-05
SPG-03
SPG-04
SPG-01
SPG-02
Reservoir Number One
Volunteer Wash
Volunteer Wash
FSL-5
PMW-4
PMW-2
PMW-1
Atherton Lake
South Sink

PFNA Results (ng/L)
- ND
- >ND - 6
- >6 - 100
- >100 - 1,000
- >1,000

Legend
- Facility Boundary
- Water Body
- Ephemeral/Intermitent Stream
- Inferred Shallow Groundwater Flow Direction
- Inferred Groundwater Flow Direction

N

0 675 1,350 2,700 Feet

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

PFHxS and PFNA Detections in Groundwater

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	10/26/2022	GIS BY	MS	10/26/2022
SCALE	1:16,200	CHK BY	AB	10/26/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	10/26/2022

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 6-12

PFOA

Atherton Lake

AL-01

South Sink

PFOA Results (ng/L)

- ND
- >ND - 6
- >6 - 40
- >40 - 70
- >70

PFOS

Atherton Lake

AL-01

South Sink

PFOS Results (ng/L)

- ND
- >ND - 4
- >4 - 40
- >40 - 70
- >70

PFBS

Atherton Lake

AL-01

South Sink

PFBS Results (ng/L)

- ND
- >ND - 100
- >100 - 601
- >601 - 2,000
- >2,000

Legend

- Facility Boundary
- Water Body
- Ephemeral/Intermitent Stream
- Surface Water Flow Direction

N

0 275 550 1,100 Feet

PFOA, PFOS, and PFBS Detections in Surface Water

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	10/5/2022	GIS BY	MS	10/5/2022
SCALE	1:6,600	CHK BY	AB	10/5/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	10/5/2022

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Figure 6-13

PFHxS

Atherton Lake

AL-01

South Sink

PFHxS Results (ng/L)

- ND
- >ND - 39
- >39 - 100
- >100 - 1,000
- >1,000

PFNA

Atherton Lake

AL-01

South Sink

PFNA Results (ng/L)

- ND
- >ND - 6
- >6 - 100
- >100 - 1,000
- >1,000

Legend

- Facility Boundary
- Water Body
- Ephemeral/Intermitent Stream
- Surface Water Flow Direction

N

0 275 550 1,100 Feet

PFHxS and PFNA Detections in Surface Water

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	9/7/2022	GIS BY	MS	9/7/2022
SCALE	1:6,600	CHK BY	AB	9/7/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	9/7/2022

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Figure 6-14

PFOA

Atherton Lake

AL-01

South Sink

PFOA Results (µg/Kg)

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

PFOS

Atherton Lake

AL-01

South Sink

PFOS Results (µg/Kg)

- ND
- >ND - 13
- >13 - 160
- >160 - 1,600
- >1,600

PFBS

Atherton Lake

AL-01

South Sink

PFBS Results (µg/Kg)

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

Legend

- Facility Boundary
- Water Body
- Ephemeral/Intermitent Stream

N

0 275 550 1,100 Feet

PFOA, PFOS, and PFBS Detections in Sediment

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	9/7/2022	GIS BY	MS	9/7/2022
SCALE	1:6,600	CHK BY	AB	9/7/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	9/7/2022

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Figure 6-15

PFHxS

Atherton Lake

AL-01

South Sink

PFHxS Resultsg (µg/Kg)

- ND
- >ND - 10
- >10 - 130
- >130 - 1,600
- >1,600

PFNA

Atherton Lake

AL-01

South Sink

PFNA Results (µg/Kg)

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

Legend

- Facility Boundary
- Water Body
- Ephemeral/Intermitent Stream

N

0 275 550 1,100 Feet

PFHxS and PFNA Detections in Sediment

CLIENT	ARNG			
PROJECT	Site Investigation at Camp Navajo, AZ			
REVISED	9/7/2022	GIS BY	MS	9/7/2022
SCALE	1:6,600	CHK BY	AB	9/7/2022
Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong		PM	CM	9/7/2022

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Figure 6-16

7. Exposure Pathways

The CSMs for each AOI, revised based on the SI findings, are presented on **Figure 7-1** through **Figure 7-6**. 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, residents outside the facility boundary, and recreational users outside of the facility boundary.

7.1 Soil Exposure Pathway

The SI results in soil were used to determine whether a potentially complete pathway exists between the source and potential receptors at AOI 1 through AOI 6 based on the aforementioned criteria.

7.1.1 AOI 1

AOI 1 is the Former Building 209, AFFF may have been released through washing and flushing firetrucks as well as extinguishing the intentional burn of Building 209.

PFOA, PFOS, PFHxS, PFNA, and PFBS were detected in surface soil at AOI 1. Site workers, construction workers, and trespassers could contact constituents in surface soil via incidental

ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for site workers, construction workers, and trespassers are potentially complete. PFOA was detected in subsurface soil at AOI 1. Construction workers could contact constituents in subsurface soil via incidental ingestion; therefore, the subsurface soil exposure pathway for construction workers is potentially complete. The CSM for AOI 1 is presented on **Figure 7-1**.

7.1.2 AOI 2

AOI 2 is the Former Building LR200, where AFFF may have been released during a fire training exercise that involved the intentional burn of Building LR200.

PFOS, PFHxS, PFNA, and PFBS were detected in surface soil at AOI 2. Site workers, construction workers, and trespassers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for site workers, construction workers, and trespassers are potentially complete. PFOA, PFOS, PFHxS, PFNA, and PFBS were not detected in subsurface soil at AOI 2; therefore, all exposure pathways are considered incomplete. The CSM for AOI 2 is presented on **Figure 7-2**.

7.1.3 AOI 3

AOI 3 is Building 2, which was previously used as a fire station from approximately 2000 to 2012. Firetrucks were flushed, rinsed, and washed in the parking lot outside of Building 2. AFFF was stored inside the building and used in the firetruck parked outside.

PFOA, PFOS, PFHxS, PFNA, and PFBS were detected in surface soil at AOI 3. Of these, PFOS exceeded the residential SL. Site workers, construction workers, and trespassers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for site workers, construction workers, and trespassers are potentially complete. PFOA, PFOS, PFHxS, PFNA, and PFBS were detected in shallow subsurface soil at AOI 3. Construction workers could contact constituents in subsurface soil via incidental ingestion; therefore, the subsurface soil exposure pathway for construction workers is potentially complete. The CSM for AOI 3 is presented on **Figure 7-3**.

7.1.4 AOI 4

AOI 4 is a secondary potential release area that consists of the WWTP Holding Ponds and Effluent Reuse Area. It is believed that AFFF released in the 200 Area during fire station maintenance activities ultimately made its way to the WWTP, and impacted effluent may have been discharged to the WWTP Holding Ponds.

PFOA, PFOS, PFHxS, PFNA, and PFBS were detected in surface soil at AOI 4. Site workers, construction workers, and trespassers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for site workers, construction workers, and trespassers are potentially complete. The CSM for AOI 4 is presented on **Figure 7-4**.

7.1.5 AOI 5

Ground-disturbing activities to surface soil and subsurface soil at AOI 5 will not occur given current land use restrictions at the AOI (USACE, 2015). Therefore, there are no complete exposure pathways in surface soil and subsurface soil.

7.1.6 AOI 6

AOI 6 is comprised of the North and South Holding Ponds, which receive stormwater from the Cantonment Area, specifically Building 2, where AFFF discharges have occurred.

PFOA, PFOS, PFHxS, PFNA, and PFBS was detected in surface soil at AOI 6. PFOS additionally exceeded the residential SL. Site workers, construction workers, and trespassers could contact constituents in surface soil via incidental ingestion and inhalation of dust. Therefore, the surface soil exposure pathway for site workers, construction workers, and trespassers are potentially complete. PFOA, PFOS, PFHxS, and PFNA were detected in subsurface soil at AOI 6. Construction workers could contact constituents in subsurface soil via incidental ingestion; therefore, the subsurface soil exposure pathway for construction workers is potentially complete. The CSM for AOI 6 is presented on **Figure 7-6**.

7.2 Groundwater Exposure Pathway

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

7.2.1 AOI 1, AOI 3, and AOI 6

PFOS was detected above its respective SL in groundwater samples collected from natural springs which are fed by the perched aquifer underlying AOI 1, AOI 3, and AOI 6. PFOA, PFHxS, and PFBS were detected below their SLs in groundwater. The springs are used for potable water at Camp Navajo. There are also domestic drinking water/public supply wells screened in the same perched aquifer. Therefore, the ingestion exposure pathway for site workers and off-facility residents is potentially complete. The CSMs for AOI 1, AOI 3, and AOI 6 are presented on **Figure 7-1**, **Figure 7-3**, and **Figure 7-6**, respectively.

7.2.2 AOI 2 and 4

Groundwater samples were not collected from AOI 2 and 4 because the perched aquifer does not exist at AOI 2 or AOI 4. As described in Section 2.2.2, the Wild Bill Hill Basalt aquifer pinches out at the springs north of AOI 2 and AOI 4. The geologic layers immediately underlying AOI 2 and 4 are the Kaibab Formation, the Coconino Sandstone, and the Schnebly Hill/Supai Formations and are the primary units associated with the regional aquifer. The exact depth to water from these units in the area of AOI 2 and 4 is unknown; however, measurements taken from the regional aquifer in the area of Camp Navajo have ranged from several hundred feet to 1,700 feet bgs (USACE, 2015; Weston, 2018a).

With the current understanding of the CSM, the ingestion exposure pathway is incomplete for all receptors even without AOI-specific groundwater results. Analytical results from AOI 2 and AOI 4 did shown detections within the surface soil (0 to 2 feet bgs), but not within the shallow subsurface or deep soil samples collected indicating potential releases did not migrate into the subsurface. Additionally, given the depth to water underlying AOI 2 and AOI 4, it would be difficult for potential releases to migrate to the depths necessary to reach the regional aquifer. This is supported by the decontamination water sample (collected from CN-2 screened within the regional aquifer) result which was non-detect for all PFAS compounds.

7.2.3 AOI 5

AOI 5 is a secondary potential release area consisting of NAAD-40, the former sanitary landfill. The landfill accepted sludge from the WWTP; the sludge may have been impacted by AFFF releases in the 200 Area and cantonment.

PFOS and PFBS were detected below their respective SLs in groundwater samples collected at AOI 5. There is potential for multiple residential wells off the facility that are screening in shallow and regional aquifers to be hydraulically connected to the aquifer at NAAD-40. Therefore, the ingestion exposure pathway for off-facility residents is potentially complete. The CSM for AOI 5 is presented on **Figure 7-5**.

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 source and potential receptors at each AOI based on the aforementioned criteria. Additionally, the SI results in soil and groundwater, in combination with knowledge of the fate and transport properties of PFAS, were used to determine whether a potentially complete pathway exists between the source and potential receptors.

7.3.1 AOI 1

It is likely that some surface water runoff at AOI 1 enters the stormwater system and discharges to the WWTP holding pond. PFAS are water soluble and can migrate readily from soil to surface water via leaching and run-off. Because PFOA, PFOS, PFHxS, PFNA, and PFBS were detected in soil at AOI 1 and proxy groundwater via the natural springs, it is possible that those compounds may have migrated from soil and groundwater to the stormwater system via groundwater discharge or the surface water runoff. Additionally, PFOS, PFHxS, and PFBS were detected in the sediment sample collected from Atherton Lake. PFOA, PFOS, PFHxS, and PFBS were detected in the surface water sample. Atherton Lake is known to capture overflow water from the springs which are considered a proxy for groundwater at AOI 1. Therefore, the surface water and sediment ingestion exposure pathway for site workers, construction workers, or trespassers is considered potentially complete. The CSM for AOI 1 is presented on **Figure 7-1**.

7.3.2 AOI 2

Because PFOS, PFHxS, PFNA, and PFBS were detected in soil at AOI 2, it is possible that those compounds may have migrated from soil to ephemeral drainage ditch adjacent to AOI 2. Therefore, the surface water and sediment ingestion exposure pathway for site workers, construction workers, or trespassers is considered potentially complete. The CSM for AOI 2 is presented on **Figure 7-2**.

7.3.3 AOI 3

PFOA, PFOS, PFHxS, PFNA, and PFBS were detected in soil at AOI 3 and proxy groundwater at the natural springs. Based on the stormwater pathway from the Cantonment Area to the Cantonment Area Holding Ponds, which occasionally overflow to Volunteer Wash, it is possible that those compounds may have migrated from soil and groundwater to the Cantonment Area Holding ponds or Volunteer Wash via groundwater discharge or the surface water runoff. The Cantonment Area Holding Ponds may overflow into Volunteer Wash and eventually off-site during periods of abnormally high surface water discharge. Additionally, PFOS, PFHxS, and PFBS were detected in the sediment sample collected from Atherton Lake. PFOA, PFOS, PFHxS, and PFBS were detected in the surface water sample. Atherton Lake is known to capture overflow water from the springs which are considered a proxy for groundwater at AOI 3. Therefore, there is a potentially complete exposure pathway for surface water and sediment to all receptors. The CSM for AOI 3 is presented on **Figure 7-3**.

7.3.4 AOI 4

PFOA, PFOS, PFHxS, PFNA, and PFBS were detected in soil at AOI 4. Based on the potential for PFAS compounds to be present in the holding pond water, and for the holding pond water to be discharged to the effluent reuse area, there is a potentially complete exposure pathway for surface water and sediment to site workers, construction workers, and trespassers. The CSM for AOI 4 is shown on **Figure 7-4**.

7.3.5 AOI 5

PFOS and PFBS were detected in groundwater at AOI 5. The landfill soil cap keeps surface water from coming into contact with potential PFAS-containing materials; therefore, there is no complete exposure pathway from surface water and sediment to any receptor. The CSM for AOI 5 is shown on **Figure 7-5**.

7.3.6 AOI 6

PFOA, PFOS, PFHxS, PFNA, and PFBS were detected in soil at AOI 6 and proxy groundwater at the natural springs. Based on the stormwater pathway to the Cantonment Area Holding Ponds, which occasionally overflow to Volunteer Wash, it is possible that those compounds may have migrated from soil and groundwater to the Cantonment Area Holding ponds or Volunteer Wash via groundwater discharge or the surface water runoff. The Cantonment Area Holding Ponds may overflow into Volunteer Wash and eventually off-site during periods of abnormally high surface water discharge. Additionally, PFOS, PFHxS, and PFBS were detected in the sediment sample collected from Atherton Lake. PFOA, PFOS, PFHxS, and PFBS were detected in the surface water sample. Atherton Lake is known to capture overflow water from the springs, which are considered a proxy for groundwater at AOI 6. Therefore, there is a potentially complete exposure pathway for surface water and sediment to all receptors. The CSM for AOI 6 is shown on **Figure 7-6**.

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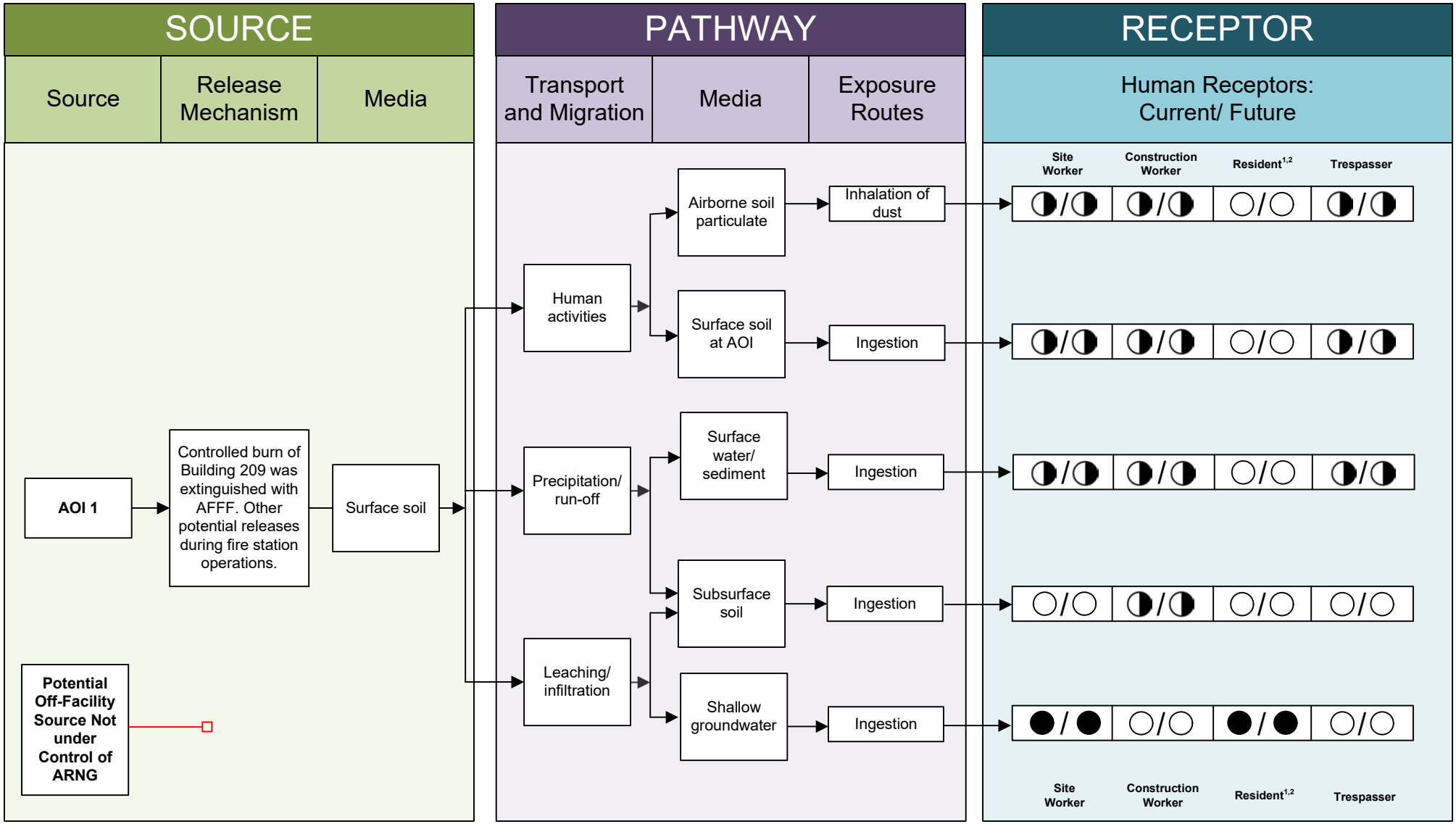


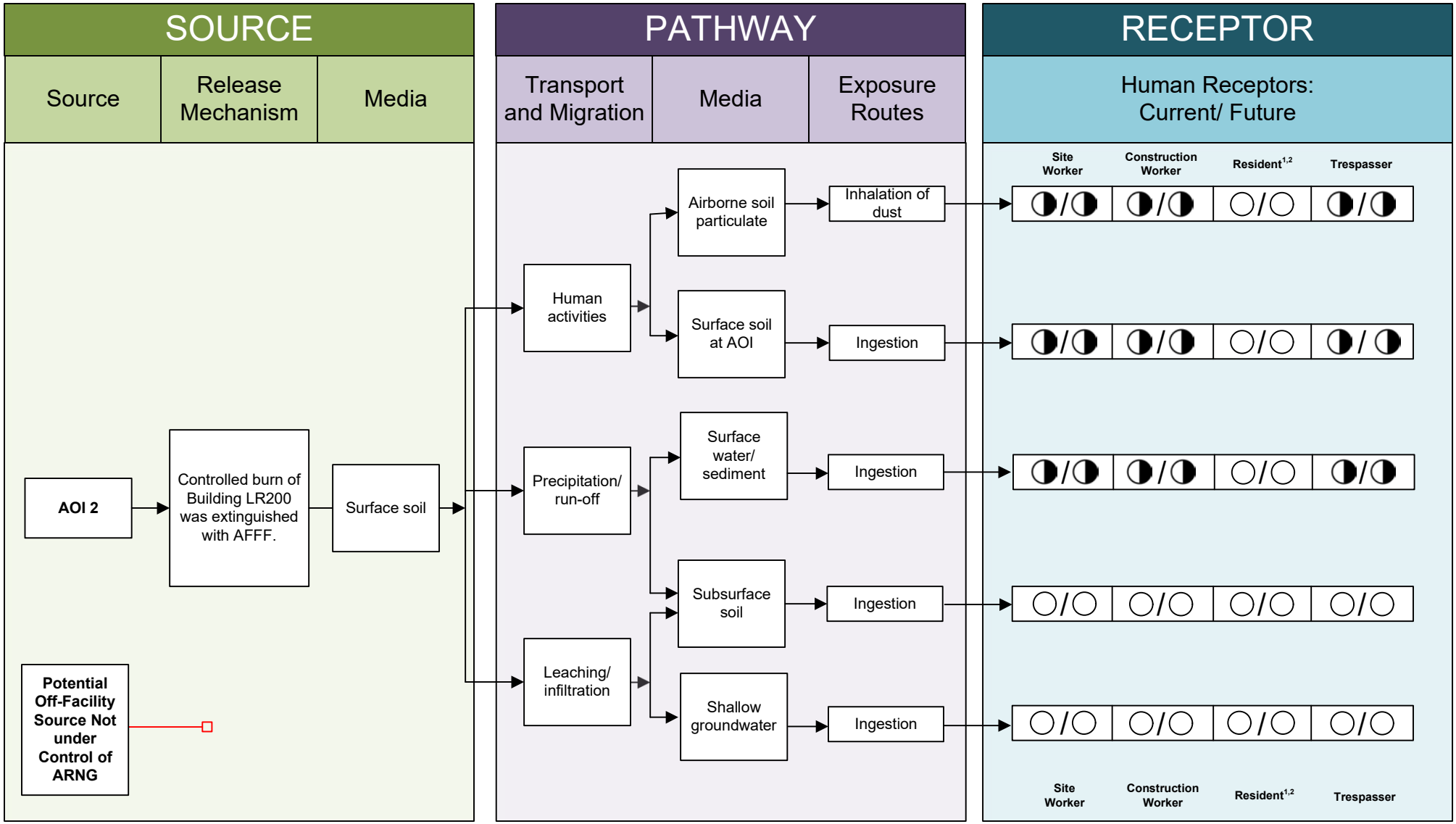
LEGEND

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

Notes:

1. The residential users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.

Figure 7-1
Conceptual Site Model, AOI 1
Camp Navajo



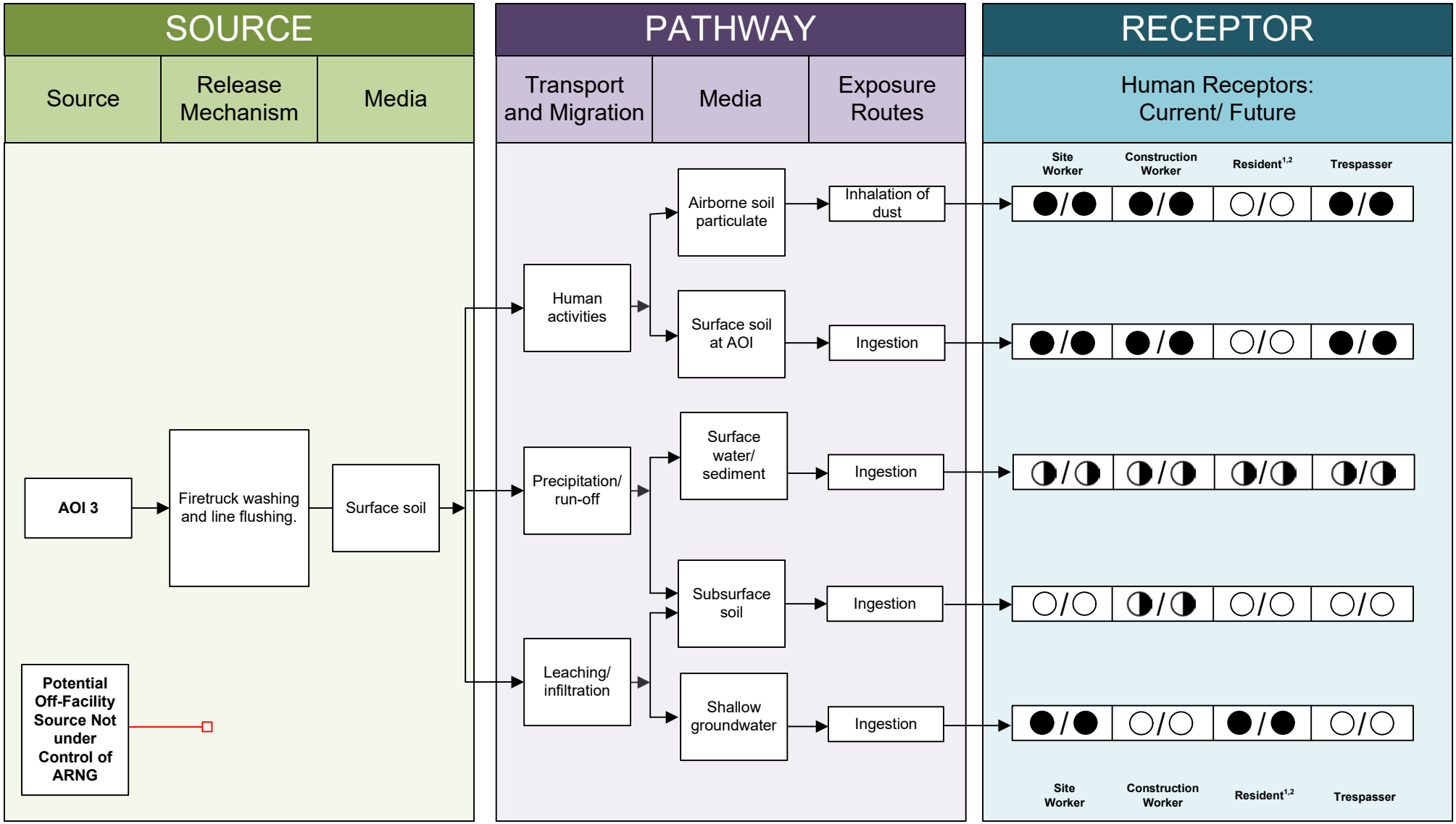
LEGEND

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

Notes:

1. The residential users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.

Figure 7-2
Conceptual Site Model, AOI 2
Camp Navajo



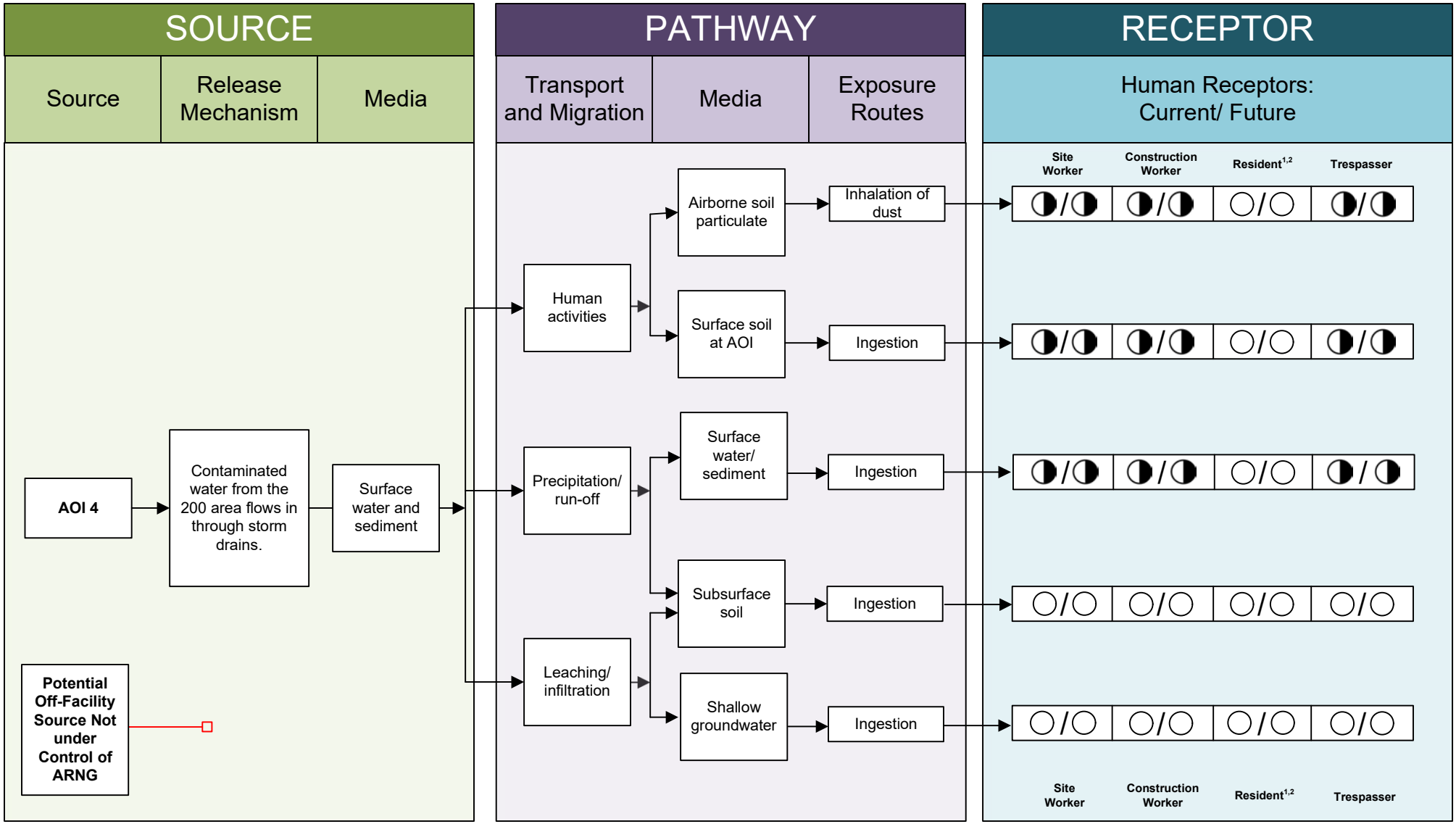
LEGEND

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

Notes:

1. The residential users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.

Figure 7-3
Conceptual Site Model, AOI 3
Camp Navajo



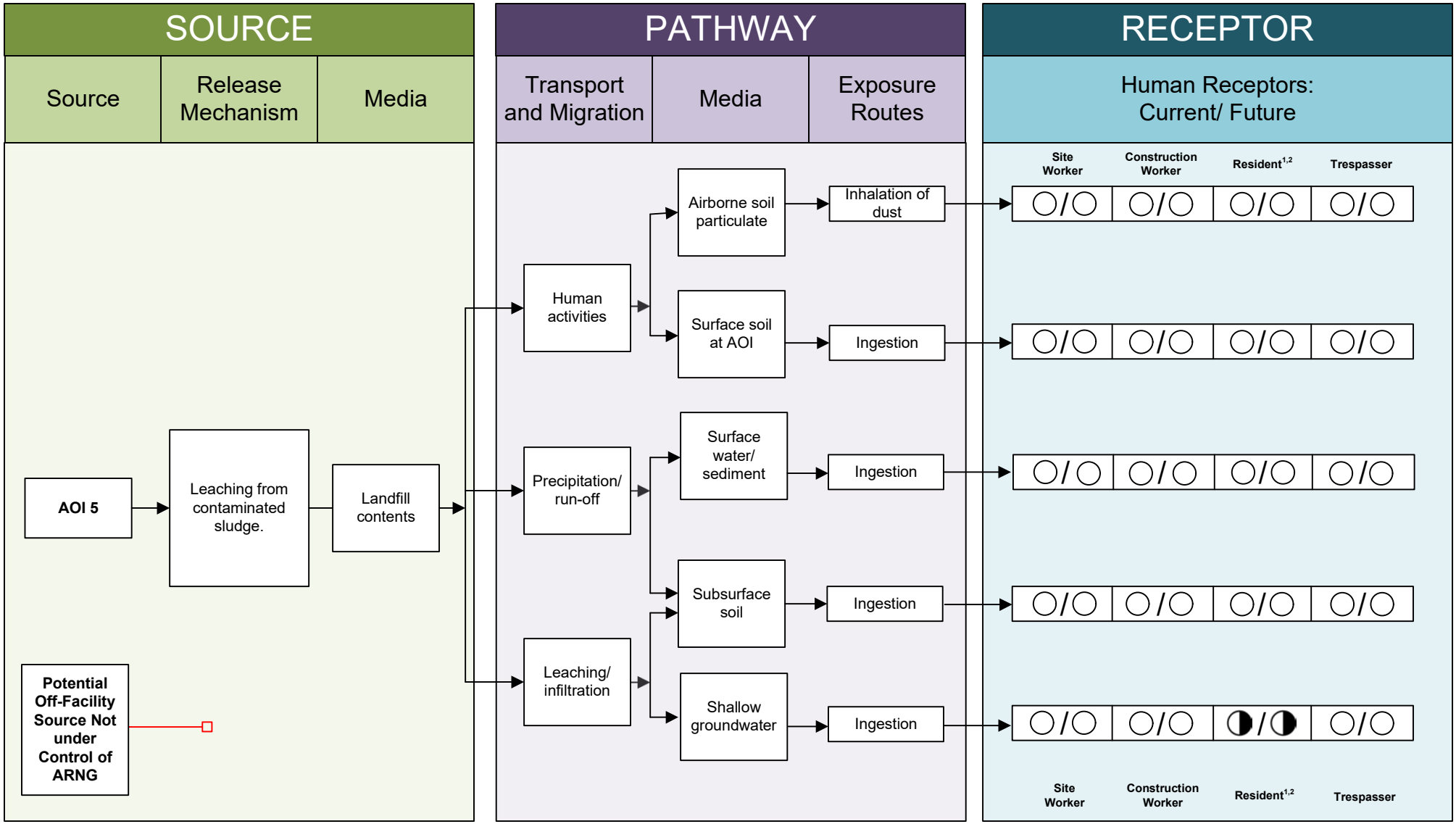
LEGEND

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

Notes:

1. The residential users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.

Figure 7-4
Conceptual Site Model, AOI 4
Camp Navajo



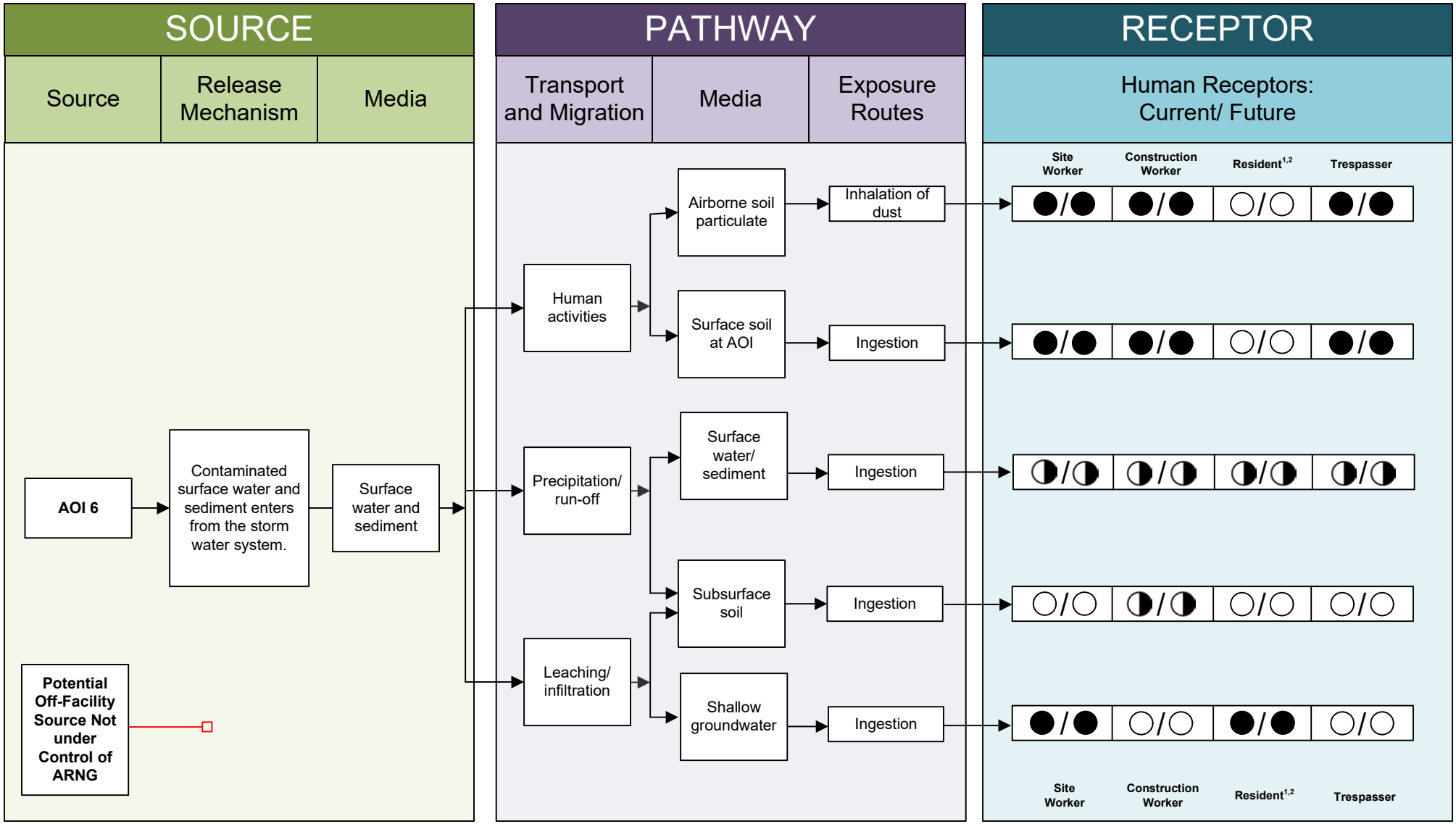
LEGEND

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

Notes:

1. The residential users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.

Figure 7-5
Conceptual Site Model, AOI 5
Camp Navajo



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 residential users refer to off-site receptors.
2. Inhalation of dust for off-site receptors is likely insignificant.

Figure 7-6
Conceptual Site Model, AOI 6
Camp Navajo

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 24 May to 3 June 2021 and consisted of utility clearance, soil boring installation and sampling via HSA, grab groundwater sample collection, and sediment, and surface water sample collection. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2021a), except as previously noted in **Section 5.9**.

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

- Thirty-six (36) soil samples from 23 boring locations;
- Four grab groundwater samples from four permanent monitoring wells;
- One sediment and one surface water sample from one location;
- Five spring samples from five natural spring locations; and
- Twenty-seven (27) 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 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, AOI 3, AOI 5, and AOI 6; no further evaluation is warranted for AOI 2 and AOI 4 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, AOI 3, AOI 5, and AOI 6 from 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, Former Building 209:
    - The detected concentrations of PFOA, PFOS, PFHxS, PFNA and PFBS in soil at AOI 1 were below their SLs.
    - PFOS in groundwater exceeded the SL of 4 ng/L with a maximum concentration of 25.9 ng/L at natural spring location SPG-04, which is fed by the perched aquifer underlying AOI 1. Detected concentrations of PFOA, PFHxS, and PFBS in groundwater were below their SLs. PFNA was not detected in groundwater. Based on the results of the SI, further evaluation of AOI 1 is warranted in an RI.

- At AOI 2, Former Building LR200:
    - The detected concentrations of PFOS, PFHxS, PFNA, and PFBS in surface soil at AOI 2 were below their SLs. PFOA was not detected in surface soil. PFOA, PFOS, PFHxS, PFNA, and PFBS were not detected in deep subsurface soil. Based on the results and the depth to groundwater, no further action at AOI 2 is warranted.
- At AOI 3, Building 2:
    - PFOS in surface soil exceeded the SL of 13 µg/kg, with a maximum concentration of 41.6 µg/kg at location AOI03-01. The detected concentrations of PFOA, PFHxS, PFNA, and PFBS in surface soil at AOI 3 were below their SLs. Detected concentrations of PFOA, PFOS, PFHxS, PFNA, and PFBS in shallow subsurface soil at AOI 3 were below their SLs. PFOA, PFOS, PFHxS, PFNA, and PFBS were not detected in deep subsurface soil. Based on the results of the SI, further evaluation of AOI 3 is warranted in an RI.
    - Like AOI 1, PFOS in groundwater exceeded the SL of 4 ng/L at a spring location that is fed by the perched aquifer underlying AOI 3. PFOA, PFHxS, and PFBS were detected in groundwater below their respective SLs.
- At AOI 4, WWTP Holding Ponds and Effluent Reuse Site:
    - The detected concentrations of PFOA, PFOS, PFHxS, PFNA, and PFBS in surface soil at AOI 4 were below their SLs. Based on the results, limited evidence of subsurface migration, and the depth to groundwater, no further action at AOI 4 is warranted.
- At AOI 5, NAAD-40:
    - Detected concentrations of PFOS and PFBS in groundwater were below their SLs. PFOA, PFHxS, and PFNA were not detected in groundwater. However, there are concerns regarding the quality of the samples and representativeness of the results with respect to groundwater underlying the AOI. As a result, further evaluation of AOI 5 is warranted as a conservative measure..
- At AOI 6, North and South Holding Ponds:
    - PFOS in surface soil exceeded the SL of 13 µg/kg, with a maximum concentration of 51.1 µg/kg at location AOI06-01. The detected concentrations of PFOA, PFHxS, PFNA, and PFBS in surface soil at AOI 6 were below their SLs. Detected concentrations of PFOA, PFOS, PFHxS, and PFNA in shallow subsurface soil were below their SLs. PFBS was not detected in shallow subsurface soil. Based on the results of the SI, further evaluation of AOI 6 is warranted in an RI.
    - Like AOI 1, PFOS in groundwater exceeded the SL of 4 ng/L at a spring location that is fed by the perched aquifer potentially underlying AOI 6. PFOA, PFHxS, and PFBS were detected in groundwater below their SLs.
- Atherton Lake:
    - PFOS, PFHxS, and PFBS were detected in sediment. PFOA and PFNA were not detected in sediment. PFOA, PFOS, PFHxS, and PFBS were detected in surface water. PFNA was not detected in surface water. There are no established SLs for sediment and surface water; therefore, these results are presented for informational purposes only.

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	Former Building 209	◐	●	Proceed to RI
2	Former Building LR200	◐	N/A	No further action
3	Building 2	●	●	Proceed to RI
4	WWTP Holding Ponds and Effluent Reuse Site	◐	N/A	No further action
5	NAAD-40	N/A	◐	Proceed to RI
6	North and South Holding Ponds	●	●	Proceed to RI

Legend:

● = detected; exceedance of the screening levels

◐ = detected; no exceedance of the screening levels

○ = not detected

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