FINAL
Site Inspection Report
Camp Dodge,
Johnston, Iowa

Perfluorooctanesulfonic Acid (PFOS) and
Perfluorooctanoic Acid (PFOA) Impacted Sites
ARNG Installations, Nationwide

May 2021

Prepared for:

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

UNCLASSIFIED

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Acronyms and Abbreviations

6:2 FTS	6:2 Fluorotelomer sulfonate
8:2 FTS	8:2 Fluorotelomer sulfonate
µg/Kg	micrograms per Kilogram
°C	degrees Celsius
°F	degrees Fahrenheit
AECOM	AECOM Technical Services, Inc.
AFFF	aqueous film forming foam
amsl	above mean sea level
AOI	Area of Interest
AR	alcohol resistant
ARNG	Army National Guard
bgs	below ground surface
CCV	calibration verifications
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CoC	chain of custody
CSM	conceptual site model
DA	Department of the Army
DoD	Department of Defense
DPT	direct-push technology
DQI	data quality indicator
DQO	data quality objective
DUA	data usability assessment
DVR	data validation report
EIS	extraction internal standard
ELAP	Environmental Laboratory Accreditation Program
EM	Engineers Manual
ERB	equipment rinsate blank
FedEx	Federal Express
FTA	fire training area
HDPE	high-density polyethylene
IAARNG	Iowa Army National Guard
IDNR	Iowa Department of Natural Resources
IDW	investigation-derived waste
ITRC	Interstate Technology Regulatory Council
LC/MS/MS	liquid chromatography tandem mass spectrometry
LCS	laboratory control spike
LCSD	laboratory control spike duplicate
LOD	limit of detection
LOQ	limit of quantitation
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
NELAP	National Environmental Laboratory Accreditation Program

NEtFOSAA	N-ethyl perfluorooctanesulfonamidoacetic acid
NFG	National Functional Guidelines
ng/L	nanograms per liter
NMeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid
NOAA	National Oceanic and Atmospheric Administration
ORP	oxidation-reduction potential
OSD	Office of the Secretary of Defense
PA	Preliminary Assessment
PFAS	per- and polyfluoroalkyl substances
PFBA	perfluorobutyrate
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUdA	perfluoroundecanoic acid
PID	photoionization detector
PVC	poly-vinyl chloride
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual
RI	Remedial Investigation
RPD	relative percent differences
SDZ	surface danger zone
SI	Site Inspection
SL	screening level
SOP	standard operating procedure
TOC	total organic carbon
TPP	Technical Project Planning
UFP	Uniform Federal Policy
URS	URS Group Inc.
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) is performing Preliminary Assessments (PAs) and Site Inspections (SIs) at per- and polyfluoroalkyl substances (PFAS)-impacted sites at ARNG facilities nationwide. The objective of the SI at each facility is to identify whether there has been a release to the environment from the Areas of Interest (AOIs) identified in the PA and determine the presence or absence of perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), and perfluorobutanesulfonic acid (PFBS) at or above screening levels (SLs). An SI was completed at Camp Dodge in Johnston, Iowa. Camp Dodge will be referred to as the "facility" throughout this document.

Camp Dodge is located in Polk County, central Iowa. Portions of the post lie within the city limits of Johnston. The City of Des Moines lies approximately five miles to the south (URS Group Inc., 2013). The facility is the Major Training Area for the Iowa ARNG (IAARNG) and serves as a training area for the ARNG, Air National Guard, Army Reserve, Marine Corps Reserve, Reserve Officer's Training Corps, and state law enforcement agencies.

During the PA for PFAS, 11 potential PFAS release areas in the facility were grouped into eleven AOIs (AOI 1 through 11). Each of the AOIs were investigated during the SI. SI field activities included soil, sediment, surface water, and groundwater grab sampling from temporary monitoring wells from 12 November to 26 November 2019.

To fulfill the project Data Quality Objectives (DQOs) set forth in the approved SI Quality Assurance Project Plan (QAPP) Addendum (AECOM, 2019b), samples were collected and analyzed for a subset of 18 PFAS by liquid chromatography tandem mass spectrometry (LC/MS/MS) compliant with Quality Systems Manual (QSM) 5.1 Table B-15. The 18 PFAS analyzed as part of the ARNG SI program are specified in **Section 5.8** of this Report.

The Department of Defense (DoD) has adopted a policy to retain facilities in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process based on risk-based SLs for soil and groundwater, as described in a memorandum from the Office of the Secretary of Defense (OSD) dated 15 October 2019 (Assistant Secretary of Defense, 2019). The ARNG PFAS SIs follow this DoD policy and, when the maximum site concentration for sampled media exceeds the SLs, the AOI will proceed to a Remedial Investigation (RI), the next phase under CERCLA. The SLs apply to three compounds, PFOA, PFOS, and PFBS, for both soil and groundwater, as presented in **Table ES-1**. All other results presented in this report are considered informational in nature and serve as an indication as to whether soil, groundwater, sediment, and surface water contain or do not contain the 18 PFAS analyzed within the boundaries of the facility.

Sample chemical analytical concentrations were compared against the project SLs as described in **Table ES-1**. A summary of the results of the SI data relative to the SLs is as follows:

- PFOS in shallow soil and groundwater at AOI 1: PFOS in groundwater at the Conex Fire Training Area (FTA) exceeded the individual SL of 40 nanograms per liter (ng/L), with detected concentrations of 347 ng/L and 285 ng/L at locations AOI1-GW01 and AOI1-GW02, respectively. PFOS in soil exceeded the individual residential SL of 130 micrograms per kilogram (µg/Kg), with a concentration of 410 µg/Kg. Based on the results of the SI, further evaluation of AOI 1 is warranted in the RI.
- PFOS in groundwater at AOI 3: PFOS in groundwater at the Fuel Point Training Area exceeded the individual SL of 40 ng/L, with detected concentrations of 42.4 ng/L and 61.4 ng/L at locations AOI3-GW05 and AOI3-GW24, respectively. Based on the results of the SI, further evaluation of AOI 3 is warranted in the RI.
- PFOS in groundwater at AOI 7: PFOS in groundwater at the Camp Dodge Fire Station exceeded the SL of 40 ng/L, with a detected concentration of 90.2 J+ ng/L at AOI7-

GW14. Based on the results of the SI, further evaluation of AOI 7 is warranted in the RI.

- The detected concentrations of PFOA, PFOS, and PFBS in soil and groundwater samples from the remaining AOIs were below the individual SLs or not detected.

Table ES-2 summarizes the SI results for soil and groundwater. Based on the conceptual site models (CSMs) developed and revised following the SI and potable water sampling results for PFOA, PFOS, and PFBS at Camp Dodge (TetraTech, 2017 and GHD, 2020), there is no potential for exposure to residential drinking water receptors caused by DoD activities at or adjacent to the facility.

Table ES-3 summarizes the rationale used to determine if an AOI should be considered for further investigation under CERCLA and undergo an RI. Based on the results of this SI, further evaluation is warranted in the RI for AOI 1: Conex FTA, AOI 3: Fuel Point FTA, and AOI 7: Camp Dodge Fire Station.

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

Analyte	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	130	1,600	40
PFOS	130	1,600	40
PFBS	130,000	1,600,000	40,000

Notes:

a.) Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater and Soil using United States Environmental Protection Agency's (USEPA's) Regional Screening Level Calculator. HQ=0.1. 15 October 2019.

Table ES-2: Summary of Site Inspection Findings

AOI	Potential PFAS Release Area	Soil – Source Area	Groundwater – Source Area	Groundwater – Facility Boundary
1	Conex FTA	●	●	N/A
2	Rail Load FTA	◐	◐	N/A
3	Fuel Point FTA	○	●	○
4	Gravel FTA	◐	◐	N/A
5	Chapel FTA	◐	○	N/A
6	Structure Fire	◐	◐	○
7	Camp Dodge Fire Station (Building B-59)	◐	●	N/A
8	Trash Dumpster Fire	◐	◐	N/A
9	Car FTA	○	◐	N/A
10	Aggregate Collection Point FTA	○	◐	N/A
11	Live-Fire Shoot House Fire	○	○	N/A

Legend:
FTA = Fire Training Area
N/A = Not applicable.
● = PFOS, PFOA, and/or PFBS detected; exceedance of the screening levels
◐ = PFOS, PFOA, and/or PFBS detected; no exceedance of the screening levels
○ = PFOS, PFOA, and/or PFBS not detected

Table ES-3: Site Inspection Recommendations

AOI	Description	Rationale	Future Action
1	Conex FTA	Exceedances of the SLs in groundwater and soil at source area.	Proceed to RI
2	Rail Load FTA	Detections in groundwater but no exceedances of SLs. No exceedances of SLs in soil.	No further action
3	Fuel Point FTA	Exceedances of the SLs in groundwater at source area. No detections in soil.	Proceed to RI
4	Gravel FTA	Detections in groundwater but no exceedances of SLs. No exceedances of SLs in soil.	No further action
5	Chapel FTA	No detections in groundwater. No exceedances of SLs in soil.	No further action
6	Structure Fire	Detections in groundwater but no exceedances of SLs. No exceedances of SLs in soil.	No further action
7	Camp Dodge Fire Station (Building B-59)	Exceedances of the SLs in groundwater at source area. No exceedances of SLs in soil.	Proceed to RI
8	Trash Dumpster Fire	Detections in groundwater but no exceedances of SLs. No exceedances of SLs in soil.	No further action
9	Car FTA	Detections in groundwater but no exceedances of SLs. No exceedances of SLs in soil.	No further action
10	Aggregate Collection Point FTA	Detections in groundwater but no exceedances of SLs. No detections in soil.	No further action
11	Live-Fire Shoot House Fire	No detections in groundwater or in soil.	No further action

1. Introduction

1.1 Project Authorization

The Army National Guard (ARNG) G9 is the lead agency in performing Preliminary Assessments (PAs) and Site Inspections (SIs) for Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic acid (PFOA) at Impacted Sites, ARNG Installations, Nationwide. This work is supported by the United States (US) Army Corps of Engineers (USACE) Baltimore District and their contractor, AECOM Technical Services, Inc. (AECOM), under Contract Number W912DR-12-D-0014, Task Order W912DR17F0192, issued 11 August 2017. The ARNG performed this SI at Camp Dodge in Johnston, Iowa. Camp Dodge is 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; 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 Army requirements and guidance for field investigations including specific requirements for sampling for PFOA, PFOS, and perfluorobutanesulfonic acid (PFBS), and the group of related compounds known in the industry as per- and poly-fluoroalkyl substances (PFAS). The term PFAS is used throughout this report to encompass all PFAS chemicals being evaluated, including PFOA, PFOS, and PFBS, which are the key components of the suspected releases being evaluated, and the other 15 related compounds listed in the task order.

1.2 SI Purpose

A PA was performed at Camp Dodge (AECOM, 2019a) that identified 11 potential PFAS release areas, which were grouped into 11 Areas of Interest (AOIs). The objective of the SI is to identify whether there has been a release to the environment from the AOIs and determine the presence or absence of PFOA, PFOS, and PFBS at or above screening levels (SLs).

As stated in the *Federal Facilities Remedial Site Inspection Summary Guide* (USEPA, 2005), an SI has five goals:

1. Develop information to potentially eliminate a release from further consideration because it is determined that it poses no significant threat to human health or the environment;
2. Determine the potential need for a removal action;
3. Collect or develop data to evaluate potential release;
4. Collect data to better characterize the release for more effective and rapid initiation of a Remedial Investigation (RI), if determined necessary; and
5. Collect data to determine whether the release is more than likely the result of activities associated with the Department of Defense (DoD).

In addition to the USEPA-identified goals of an SI, the ARNG SI also identifies whether there are potential off-facility PFAS sources.

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2. Site Background

2.1 Site Location and Description

Camp Dodge is in Polk County, central Iowa (**Figure 2-1**). Portions of the post lie within the city limits of Johnston. The City of Des Moines is approximately five miles to the south (URS Group Inc. [URS], 2013). The facility is the Major Training Area for the Iowa ARNG (IAARNG) and also serves as a training area for the ARNG, Air National Guard, Army Reserve, Marine Corps Reserve, Reserve Officer's Training Corps, and state and federal law enforcement agencies.

Between 1909 and 1917, the State of Iowa purchased land to supplement an existing federal rifle range, formally establishing Camp Dodge (IAARNG, 2013). The area was expanded by the Federal government during World War I and World War II, and federal land acquired during this time was conveyed to the State of Iowa in 1954. The State of Iowa recently purchased additional land on the northern boundary of Camp Dodge to provide additional military maneuver training area. At present, Camp Dodge has a total land area of approximately 4,830 acres. Of the 4,830 acres, 2,000 acres are federally owned and licensed to the State of Iowa for Iowa National Guard training. The remaining acreage is owned by the State of Iowa, with portions under a federal reversionary clause (IAARNG, 2013).

2.2 Facility Environmental Setting

Camp Dodge is within the Cary drift region of the Des Moines lobe (**Figure 2-2**). Elevations on Camp Dodge range from 820 to 950 feet above mean sea level (amsl). The western and central portions of the facility are level at an elevation of approximately 850 feet amsl. The upland ridge along the eastern boundary of Camp Dodge is approximately 1,000 feet amsl. This ridge acts as a drainage divide for both surface water and groundwater flow; water east of the ridge flows toward Saylorville Lake and the Des Moines River, and water west of the ridge flows west towards Beaver Creek. The area surrounding Camp Dodge is primarily terrace plain and used for agricultural purposes. Beaver Creek ranges in elevation from about 820 to 850 feet amsl and runs north to south through the western and middle areas of Camp Dodge. Beaver Creek converges with the Des Moines River approximately 3 miles southeast of Camp Dodge.

2.2.1 Geology

Unconsolidated material in the northern portion of Polk County, including Camp Dodge, is characterized by Quaternary glacial and alluvial stratigraphy ranging in depth from approximately 100 to 150 feet (URS, 2013). The facility is underlain by alluvial sand and silt of various thicknesses associated with the modern Beaver Creek channel and overbank sedimentation. Approximately 15 feet of supraglacial sand, silt, and clay from the Morgan Member of the Dows Formation lies below the surficial alluvial sediments deposited from Beaver Creek. The Morgan Member can also be found at the surface in upland regions above the Beaver Creek Vally Floodplain. Underlying the Morgan Member is the subglacial Alden Member of the Dows Formation, which is composed of dense and relatively impermeable loam diamicton of variable thickness. The glacial sediments lie upon pre-glacial Quaternary alluvium that was deposited in a buried bedrock channel known as Beaver Channel (URS, 2013).

Underlying the Quaternary unconsolidated deposits are approximately 200 to 250 feet of Pennsylvanian-age bedrock. The top of bedrock is approximately 100 to 150 feet below ground surface (bgs). The Pennsylvanian Cherokee Group underlies the site and is comprised of shales/siltstones (light to dark gray, part silty to sandy) and sandstones (very fine to medium grained). The Cherokee Group directly overlies Mississippian bedrock found at depths from approximately 300 to 400 feet bgs. Within the Des Moines area, Mississippian-aged bedrock is about 350 feet

thick and is primarily comprised of limestones and dolomites (URS, 2013). The surficial geology of the leased area that lies north of the main installation cantonment area in Boone County is mainly comprised of Des Moines River Valley low, intermediate, and high terrace alluvial sediments from the Hudson Episode. These loam-rich units range in thickness from 3 to 21 feet and overlie approximately 15 feet of glacial outwash that rest on the Pennsylvanian bedrock.

2.2.2 Hydrogeology

Underlying Polk County and Camp Dodge are two primary aquifer systems: an unconsolidated aquifer system and a bedrock aquifer. The unconsolidated aquifer system is composed of three aquifer groups. These groups include an uppermost aquifer found in the surficial alluvial deposits of the Beaver Creek Valley floodplain, a glacial drift aquifer found in the deposits of the Dows Formations, and a lower aquifer found in the buried bedrock channel deposits of Beaver Channel.

The alluvial aquifer is located within the stream valley areas of Camp Dodge. Depth to water in this aquifer is approximately 5 feet bgs. The alluvial aquifer consists of highly permeable sand and gravel. Groundwater flow generally mimics surface topography, discharging to Beaver Creek (**Figure 2-3**). The glacial drift aquifer (the Morgan Member of the Dows Formation) is found at the surface in upland areas and below the alluvial aquifer in the stream valley. Water within this aquifer is contained within localized lenses of sand and gravel, which are surrounded by low permeability till. The lenses are discontinuous and have the potential to be easily impacted, making them an unsuitable potable water source. Recharge for both the surficial alluvial and the glacial drift aquifers occurs through infiltration. Observed groundwater elevations from the November 2019 synoptic gauging event and corresponding contours are displayed on **Figure 2-4**.

The Alden Member of the Dows Formation acts as a semi-confining layer between the alluvial and glacial drift aquifers and the underlying Beaver Channel aquifer. The dense, clay-rich till of the Alden Member limits the hydraulic interaction between the upper aquifers and the Beaver Channel aquifer (URS, 2013).

Drinking water for Camp Dodge is drawn from two wells on the post: Well 7 (primary), constructed in 1965, and Well 8 (backup), constructed in 1971, with the exception of two Camp Dodge residences located east of the cantonment area adjacent to NW Beaver Drive that are provided city water. The Beaver Channel aquifer, located within the buried bedrock channel, is the primary source of the drinking water for Well 7 and Well 8 (**Figure 2-3**). Well 7 and Well 8 were sampled and analyzed for PFAS in 2017 and 2020, and the results were reported as non-detect for PFOS, PFOA, and PFBS (TetraTech, 2017; GHD, 2020). Based on information from the facility Wellhead Protection Plan, the aquifer is described as being covered by approximately 30 feet of confining materials; however, other references suggest this confining unit is leaky or discontinuous (IAARNG, 2013). Recharge to the Beaver Channel Aquifer is from up-gradient infiltration and possible percolation from the overlying aquifers (IAARNG, 2013). Water movement within the Beaver Channel aquifer is predominantly horizontal, to the south-southeast, as the channel sits on low permeability Pennsylvanian bedrock. The Beaver Channel Aquifer discharges into the Des Moines River approximately 3 miles south-southeast of Camp Dodge (URS, 2013).

The shales of the Pennsylvanian Cherokee Group beneath Camp Dodge are considered a regional confining unit, hydraulically separating the unconsolidated aquifers from the deeper bedrock aquifers (IAARNG, 2013). The Mississippian Aquifer directly underlies the Cherokee Group and is most heavily utilized by rural residents. The Mississippian Aquifer is comprised of limestones and dolomites and supplies a moderate amount of water. Groundwater flow in the Mississippian Aquifer is to the south, where it eventually discharges into the Des Moines River (URS, 2013).

2.2.3 Hydrology

Camp Dodge lies within the Beaver Creek watershed (**Figure 2-5**). The primary surface water features found on Camp Dodge include Beaver Creek and Little Beaver Creek, multiple ponds, intermittent streams, and wetlands. Hillside wetlands exist within the slopes of the upland area on the eastern border and in the southern portion of the facility, with smaller wetlands in the northeast corner of the facility. Wetlands also border Camp Dodge on the west and south sides. Camp Dodge is situated within a 100-year floodplain along Beaver Creek and its tributaries, which cover approximately 750 acres (IAARNG, 2013).

Beaver Creek enters the facility on the northwest corner and flows southeast, turns west, and exits the facility on the southwest corner. While on Camp Dodge, Beaver Creek flows through the western and middle areas of the facility (**Figure 2-5**). Beaver Creek is 13 miles long and converges with the Des Moines River about 3 miles south of Camp Dodge. Shallow groundwater flows towards the southwest and discharges into Beaver Creek. Little Beaver Creek also enters the facility on the southwestern boundary and joins Beaver Creek. The intermittent water features on the facility flow into an unnamed pond in the northwest cantonment area and then to both Beaver Creek and Little Beaver Creek.

The largest regional surface water feature is found east of Camp Dodge, at Saylorville Lake (**Figure 2-5**). Saylorville Lake was created when the Des Moines River was dammed for flood control by the USACE in the 1960s and 1970s. The Des Moines River flows south through the northern 30 miles of a leased training area before it reaches Saylorville Lake. Within these 30 miles, many small tributaries flow into the Des Moines River. The Des Moines River then exits the dammed area and continues to flow south. The upland ridge on the eastern boundary of Camp Dodge creates a surface water divide, and no surface water flows from Camp Dodge to the leased land. Surface water on the west side of the upland ridge flows through Camp Dodge to Beaver Creek. Surface water on the east side of the leased land flows southwest into Big Creek. Big Creek converges with the Des Moines River within Saylorville Lake. The Des Moines public water supply intake is approximately 10 miles downstream from the facility's southern boundary on the Des Moines River. Water is supplied from both surface water and groundwater sources.

2.2.4 Climate

Camp Dodge has a continental climate with hot, humid summers and cold winters including possible heavy snowfall. Average monthly temperatures range from 14 to 86 degrees Fahrenheit (˚F), with a mean annual temperature of 50.85 ˚F (National Oceanic and Atmospheric Administration [NOAA], 2020). January is usually the coldest month, and thereafter, temperatures gradually increase, peaking in July. December, January, and February have mean monthly temperatures below freezing. The growing period occurs approximately from April to September, when temperatures rise above 50 ˚F (IAARNG, 2013).

The mean annual precipitation is 36.01 inches, with the largest amounts of rainfall occur in May through June, and average annual snowfall is 35 inches (NOAA, 2020).

2.2.5 Current and Future Land Use

At present, Camp Dodge has a total land area of approximately 4,830 acres. The cantonment area is approximately 400 acres and contains the majority of facility buildings and support facilities. The weapons firing ranges occupy approximately 500 acres, and portions of the range surface danger zone (SDZ) are leased for corn and bean production. Another 200 acres are restricted lands and include archeological or historical sites, wetlands, native prairie, and areas under special management (IAARNG, 2013). The remaining land is used for training and maneuver exercises. Access to the facility is controlled, and within the facility boundaries, access

to the ranges is controlled. Land use surrounding the facility is a mixture of residential and agricultural.

Portions of Camp Dodge are located within the City of Johnston, Iowa. According to the 2016 City of Johnston special census, the estimated population of the City of Johnston is 20,460 (US Census Bureau, 2016). The City of Johnston has experienced significant population growth over the last decade, and agricultural lands have been converted to residential subdivisions to accommodate growth. The IAARNG continues to acquire lands to the north of Camp Dodge for additional military maneuver training area.

Reasonably anticipated future land use is not expected to change from the current land use described above.

2.2.6 Critical Habitat and Threatened/ Endangered Species

The following species are listed as federally endangered, threatened, proposed, and/or candidate species in Polk County, Iowa (US Fish and Wildlife Service [USFWS], 2020):

- **Mammal**: Indiana bat, *Myotis sodalis* (endangered)
- **Mammal**: Northern long-eared bat, *Myotis septentrionalis* (threatened)
- **Bird**: Least tern, *Sterna antillarum* (endangered)
- **Plant**: Prairie bush-clover, *Lespedeza leptostachya* (threatened)
- **Plant**: Western prairie fringed orchid (*threatened*)

No federally designated threatened or endangered plant species have been found during vegetation surveys at Camp Dodge. Results from an acoustic bat species survey indicate the presence of the threatened northern long-eared bat and the possible presence of the endangered Indiana bat along the Beaver Creek corridor (Kalina, 2015).

Two plant species listed as State of Iowa species of special concern have been identified during vegetation surveys at Camp Dodge: black haw (*Viburnum prunifolium*) and tube penstemon (*Penstemon tubiflorus*) (IAARNG, 2013).

Two State of Iowa endangered species have been documented at Camp Dodge. There were four confirmed sightings of the Eastern spotted skunk (*Spilogale putorius*) between 2001 and 2005, and it has been sighted on a nearly annual basis in the center of Camp Dodge (IAARNG, 2013). During the same time frame from 2001 to 2005, the plains pocket mouse (*Perognathus flavescens*) was live-trapped and released during scientific surveys conducted in 2003 and 2004.

There are currently no critical habitats within the Camp Dodge facility boundary (USFWS, 2020).

2.3 History of PFAS Use

During the time period from the 1980s to the 1990s, PFAS were potentially released to soil at several locations within the boundary of Camp Dodge. According to interviewees and facility records, training activities at Camp Dodge that used aqueous film forming foam (AFFF) were conducted at multiple fire training areas (FTAs) on-Post during this time period. A fire station located in the cantonment area currently stores AFFF. Historically, nozzle testing was conducted outside the Fire Station, and the discharge was released into the stormwater drainage ditch that flows north, parallel to Main Avenue. Additionally, on-Post fire response actions may have utilized AFFF or Class A foam. **Section 3** describes the AOIs that were investigated during the SI.

2.4 Other PFAS Investigations – Drinking Water Sampling

Drinking water wells (Well 7 and Well 8) at Camp Dodge were sampled in accordance with the Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP) Sampling and Analysis Plan for PFOS and PFOA (USACE, 2017) for ARNG Owned/Operated Drinking Water Systems Nationwide. Well 7 and Well 8 are located in the cantonment area (**Figure 2-3**) and were sampled in March 2017 and March 2020. In March 2017, PFAS were not detected above the analyte limit of detection (LOD) in Well 7 or Well 8 (TetraTech, 2017). In March 2020, PFAS were not detected in Well 7 or Well 8; however, PFOA was detected at an estimated concentration of 0.646 J nanograms per liter (ng/L) (below the limit of quantitation [LOQ] for the analytical method used) in a sample collected from the Building W-7 Utility Sink (GHD, 2020).

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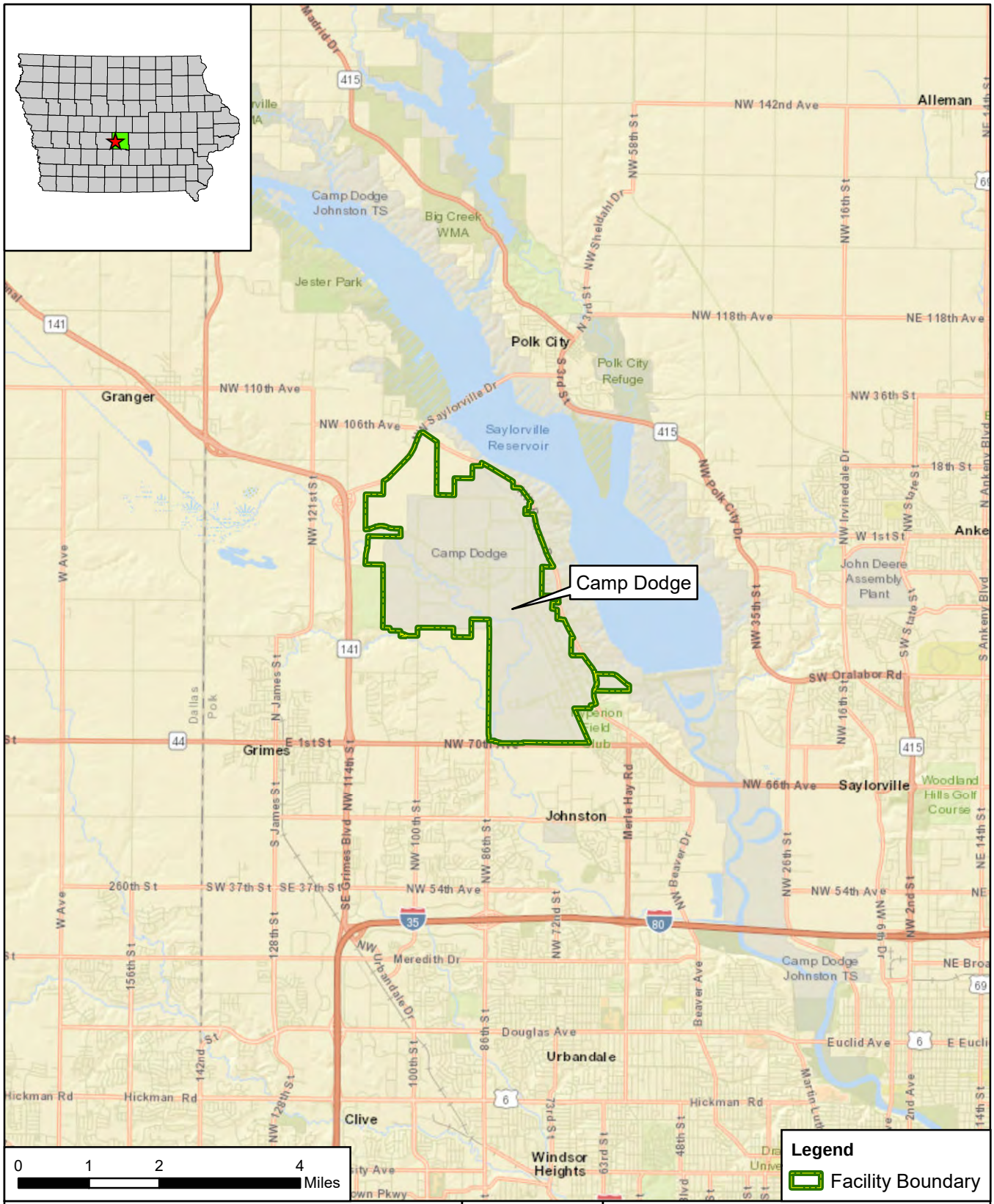

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Base Map: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI,		PM	RG	7/22/2020

Facility Location

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-1

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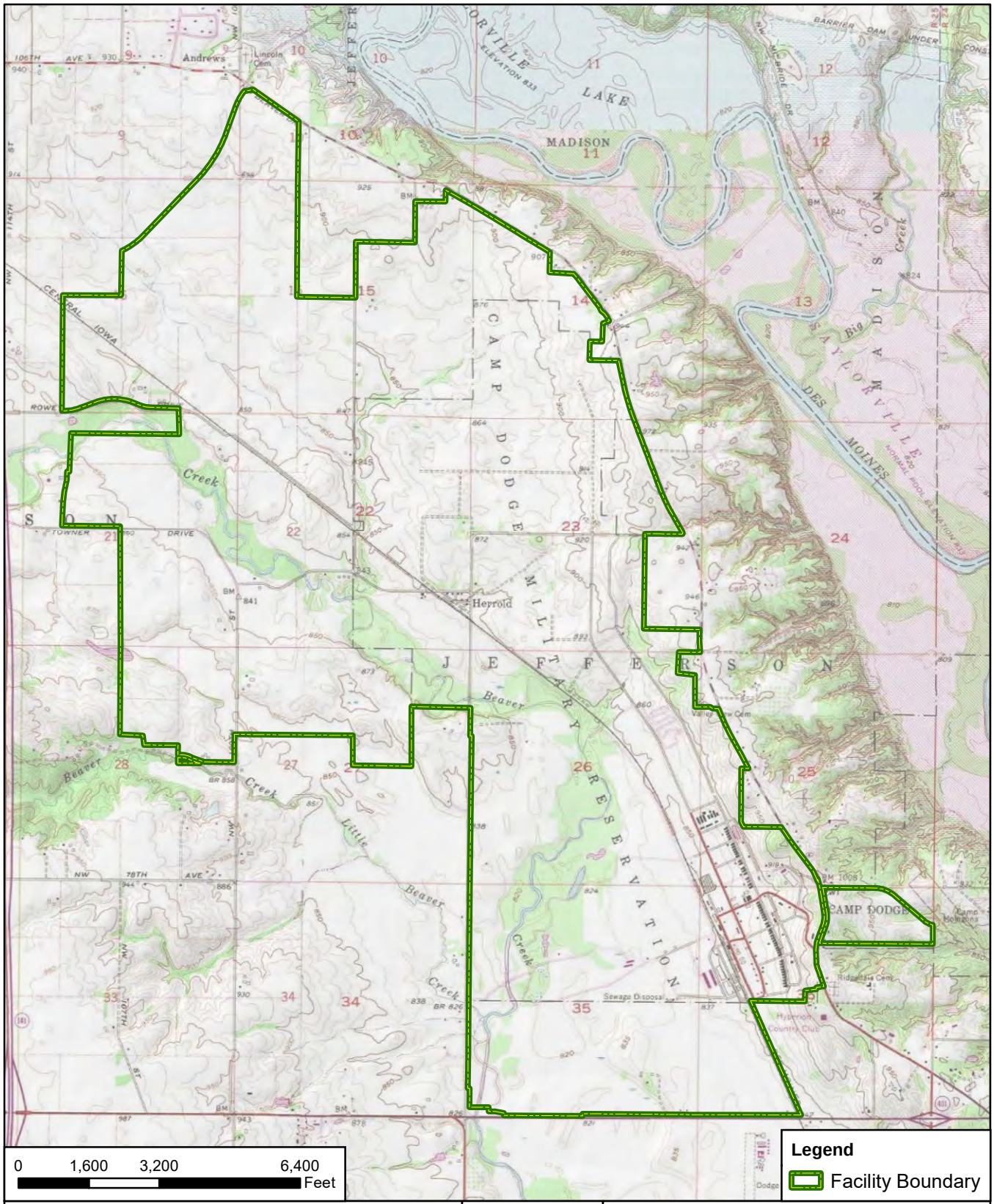

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Base Map: Copyright:© 2013 National Geographic Society, i-cubed		PM	RG	7/22/2020

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Topography

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-2

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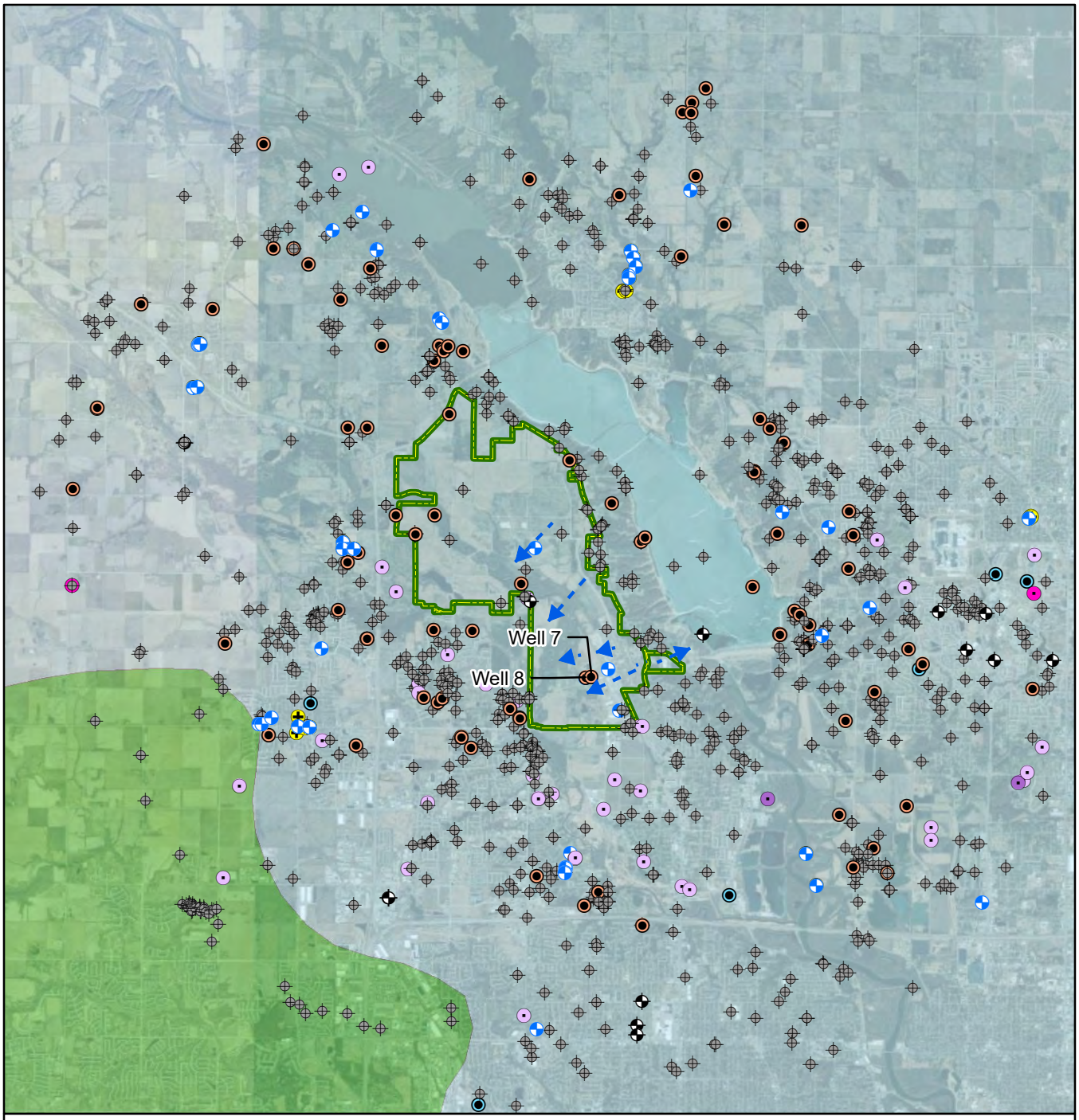

Legend

- Facility Boundary
- Groundwater Flow Direction

Geology

- Cherokee Group
- Marmaton Group

Wells

- Domestic/Household
- Commercial
- Industrial/Commercial
- Irrigation
- Livestock
- Municipal
- Public Water Supply
- Monitoring
- Other/Unknown

0 1 2 4 Miles

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	10/5/2020	GIS BY	MS	10/5/2020
SCALE	1:126,720	CHK BY	JH	10/5/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	10/5/2020

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Groundwater Features

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-3

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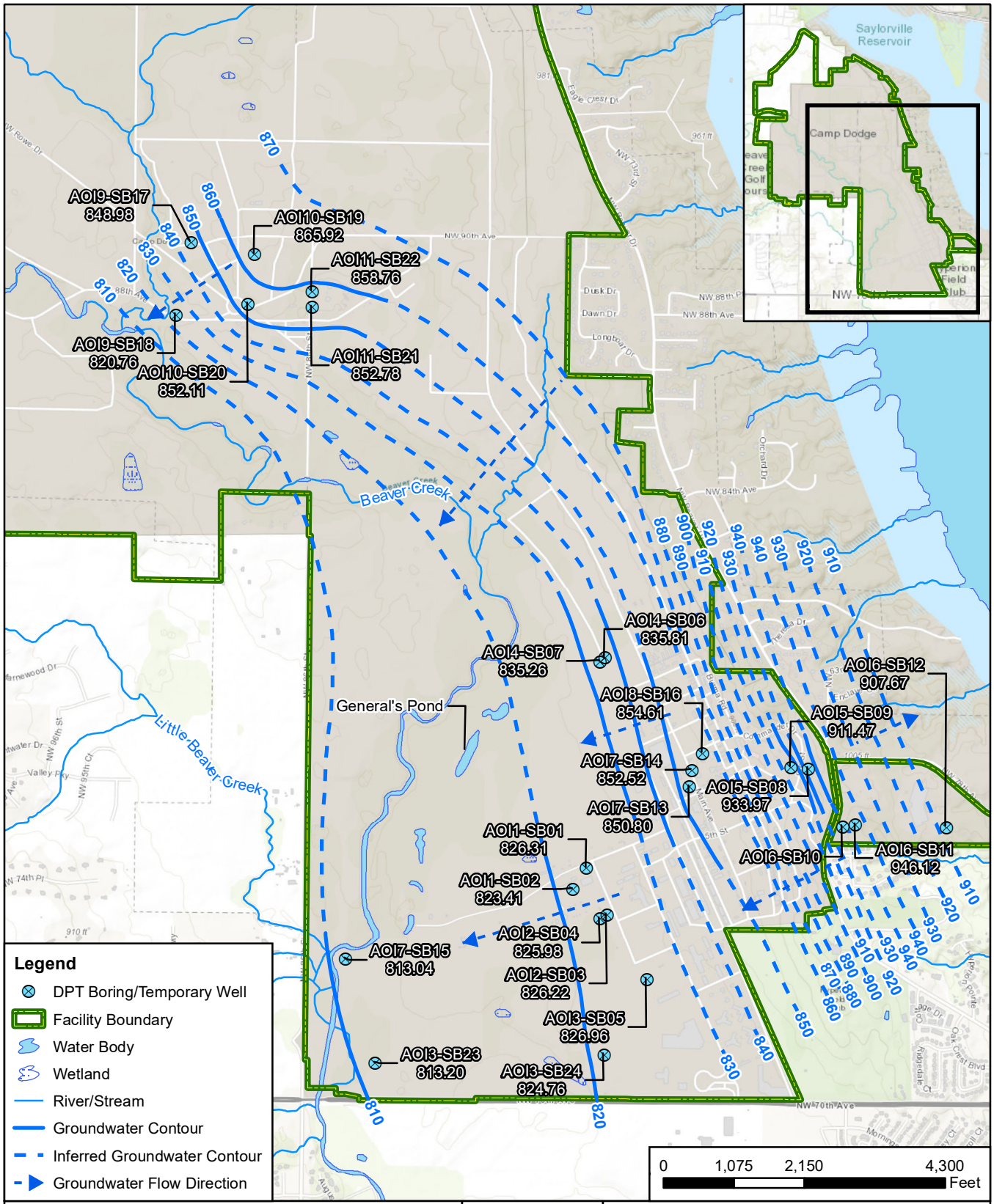

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	1/28/2021	GIS BY	SK	1/28/2021
SCALE	1:25,800	CHK BY	JW	1/28/2021
Base Map: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN,		PM	CM	1/28/2021

Groundwater Elevations, November 2019

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-4

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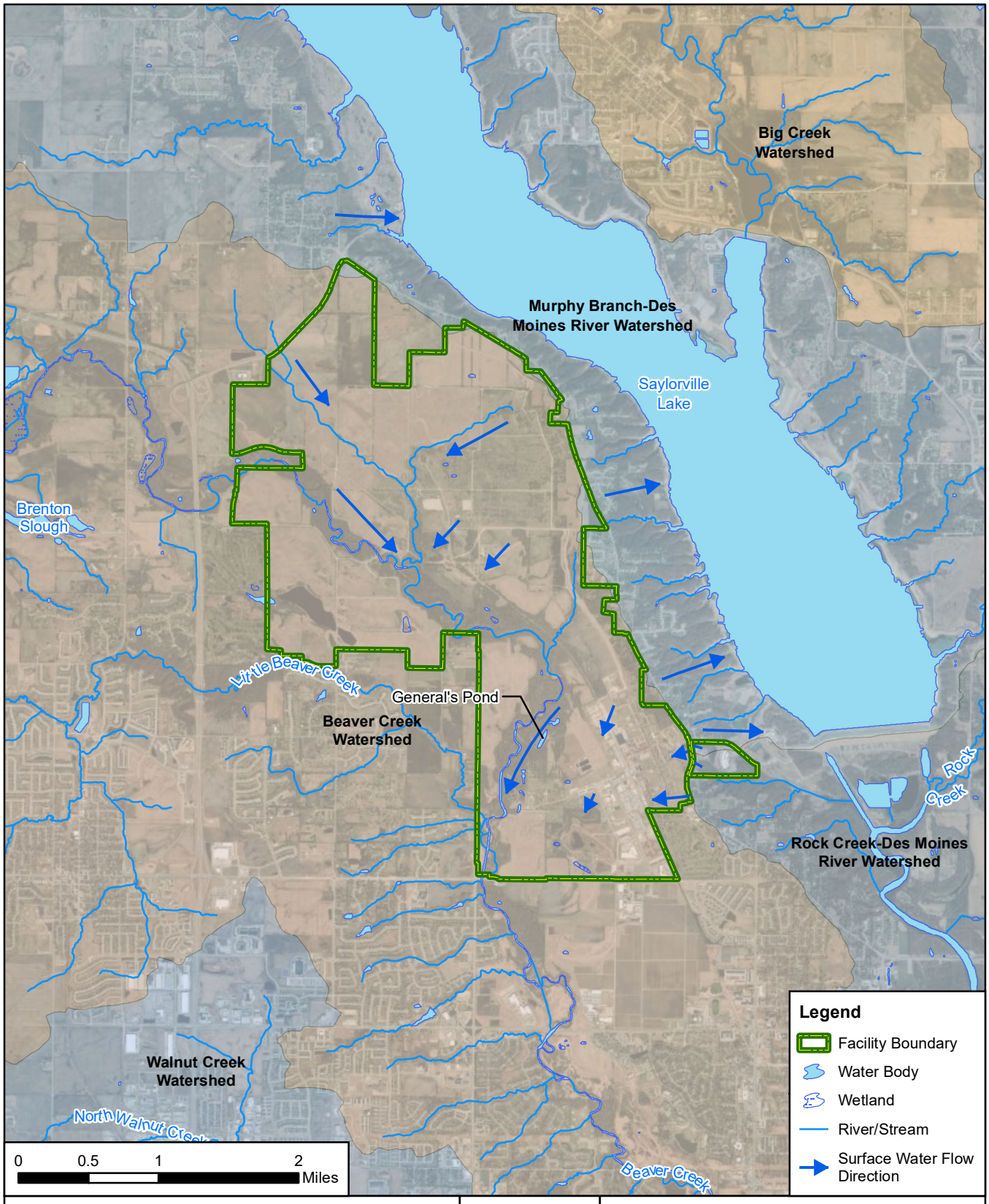

CLIENT	ARNG			
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SCALE	1:63,360	CHK BY	JH	1/28/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	1/28/2021

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Surface Water Features

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 2-5

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3. Summary of Areas of Interest

During the time period of the 1980s to the 1990s, PFAS were potentially released to soil at several locations within the boundary of Camp Dodge. This section presents a summary of each potential PFAS release area by AOI. The potential PFAS release areas were grouped into 11 AOIs based on proximity and direction of groundwater flow (**Figure 3-1** through **3-4**). A summary of each AOI is presented below.

3.1 AOI 1: Conex Fire Training Area

The Conex FTA is approximately 100 feet southeast of Well 7 and 400 feet east of Well 8. (**Figure 3-1**). The Conex FTA consists of a series of Conex containers set up for urban warfare training facility drills. AFFF training was conducted at the Conex FTA during drills three or four times from 2006 until 2012. Approximately 5 to 10 gallons of AFFF concentrate were dispensed at the Conex containers over the course of all training events from 2006 to 2012, and the AFFF was then allowed to dissipate in the grass. No information was available on the type or concentration of AFFF used during the training events; however, Camp Dodge had 3%, 6%, and 3/6% (polar/nonpolar) AFFF available at the time.

3.2 AOI 2: Rail Load Fire Training Area

The Rail Load FTA is a mock rail line used for sling load training and is located west of Maintenance Drive, between Range Road and Division Road (**Figure 3-1**). Since 2012, the Camp Dodge Fire Brigade has used the Rail Load FTA at least once annually for training using AFFF and, after 2016, alcohol resistant (AR)-AFFF. Approximately 5 gallons of 3% AFFF or AR-AFFF concentrate are dispensed per training event. Training with AFFF no longer occurs at this AOI. Following training, the firetruck is washed at the Rail Load FTA. Ephemeral wetlands that retain water for periods after rainfall events exist to the south and southwest of the Rail Load FTA.

3.3 AOI 3: Fuel Point Fire Training Area

The Fuel Point FTA is on the ramp at the Camp Dodge Fuel Point (**Figure 3-1**). Annual training with AFFF was conducted at the Fuel Point FTA from 2007 to 2009. In total, approximately 25 gallons of AFFF concentrate were sprayed on the ramp over the course of the 2 years for training. No information was available on the type or concentration of AFFF used during the training events; however, Camp Dodge had 3%, 6%, and 3/6% (polar/nonpolar) AFFF available at the time. The AFFF used at the Fuel Point FTA flowed into a drain with an oil-water separator. AFFF was then allowed to flow to the sanitary sewer, which discharges to the wastewater treatment plant (WWTP) at the facility (**Figure 3-2**). The WWTP includes two bentonite-lined, aerated lagoons and a finishing cell. Treated water from the WWTP is discharged to the waterbody identified as General's Pond, located west of the cantonment area, with final discharge to Beaver Creek.

3.4 AOI 4: Gravel Fire Training Area

The Gravel FTA is at the northern end of Truck Entrance Road, where the road curves into an unnamed road (**Figure 3-2**). AFFF training was conducted at the Gravel FTA three or four times from 2006 to 2012. Approximately 5 to 10 gallons of AFFF concentrate were dispensed at the Gravel FTA over the course of all training events from 2006 to 2012. No information was available on the type or concentration of AFFF used during the training events; however, Camp Dodge had 3%, 6%, and 3/6% (polar/nonpolar) AFFF available at the time.

3.5 AOI 5: Chapel Fire Training Area

The Chapel at Camp Dodge is at the northeast corner of the intersection of Commander Drive and 7th Street. In 2009, the Camp Dodge Fire Brigade conducted a one-time training event with AFFF in the parking lot of the Chapel (**Figure 3-3**). Camp Dodge estimated that 5 to 10 gallons of AFFF concentrate were used during the training event. No information was available on the type or concentration of AFFF used. Stormwater sewers in this area discharge to the waterbody identified as General's Pond west of the cantonment area, with final discharge to Beaver Creek (**Figure 2-5**).

3.6 AOI 6: Structure Fire

In 2011, an abandoned two-story residence on the east side of NW Beaver Drive was burned as a planned, controlled burn and used for fire training for the IAARNG and municipal fire departments from the surrounding area (**Figure 3-3**). During the controlled burn, AFFF was used in various training evolutions and to extinguish the basement of the structure. In total, approximately 5 gallons of AFFF concentrate were used during the burn. No information was available on the type or concentration of AFFF used during the training events; however, Camp Dodge had 3%, 6%, and 3/6% (polar/nonpolar) AFFF available at the time. The Structure Fire occurred north of the Hyperion Field Club golf course.

3.7 AOI 7: Camp Dodge Fire Station

The Camp Dodge Fire Station (Building B-59) is at the northeast corner of the intersection of Main Avenue and 8th Street (**Figure 3-2**). The Fire Station was constructed in the 1980s as a two bay, stand-alone fire station and was expanded in the early 2000s. AFFF at Camp Dodge is stored at the Fire Station. Prior to 2006, the facility was operated by the 767th Engineer Fire Team. No information was available on this fire unit's usage of AFFF; however, the majority of AFFF acquired by the Fire Station in 2006 came from this fire unit. During the PA, 24 5-gallon containers of 3% Ansulite® AR-AFFF were noted in the fire house along with approximately 20 5-gallon containers of Phos-Chek® Class A foam. The Fire Station has one firetruck with a capacity of 20 gallons of AFFF concentrate. Concentrated AFFF is manually poured into the tank on the firetruck outside of the bay doors of the Fire Station, and occasionally, some of the AFFF spilled onto the concrete during filling of the tank. A north-south stormwater sewer runs along Main Avenue, in front of the Fire Station, including the area where the tanks are filled. The stormwater drainage ditch discharges to the waterbody identified as "General's Pond" west of the cantonment area with final discharge to Beaver Creek. Prior to 2016, the Fire Station ordered 6% AFFF. After 2016, the Fire Station began ordering AR-AFFF due to the presence of ethanol fuel at the post's primary fuel point. No leaking of AFFF from the firetruck or corrosion from AFFF on the fire truck were noted.

Historically, nozzle testing was conducted outside the Fire Station, and the discharge was released into the north-south stormwater drainage ditch (**Figure 3-2**). The amount of AFFF used during the nozzle testing is unknown; however, one interviewee recalled that during a testing event in 2011, the entire contents of the AFFF tank were discharged due to problems adjusting the nozzles. The storm sewer lines in this drainage ditch were repaired in 2015 to alleviate water backup in low lying buildings at Camp Dodge. The soil was returned to the drainage ditch following repair of the sewer lines. Currently, nozzles are tested annually by Emergency Apparatus Maintenance. No information was available regarding the location where the current nozzle testing occurs.

3.8 AOI 8: Trash Dumpster Fire

A Trash Dumpster Fire occurred near the Post Exchange sometime between 2007 and 2012 (**Figure 3-2**). One interviewee recalled that foam was used to extinguish the fire to manage flying

debris; however, it is unknown whether the foam were Class A foam or AFFF. No information was available on the amount of foam used.

3.9 AOI 9: Car Fire Training Area

On 19 September 2007, the Federal Bureau of Alcohol, Tobacco, Firearms, and Explosives sponsored a demonstration at Camp Dodge. The demonstration involved the incineration and open burning of a car on the maneuver training ranges at Camp Dodge east of Northwest 93rd Street and north of Northwest 90th Avenue (**Figure 3-4**). The fire was extinguished with an unknown amount of AR-AFFF. No information was available on the concentration of AFFF used.

3.10 AOI 10: Aggregate Collection Point Fire Training Area

The Aggregate Collection Point FTA is west of Northwest 86th street and south of Northwest 90th Avenue (**Figure 3-4**). The area is a stockpile area for various construction materials, including concrete and wood. Since 2012, the Camp Dodge Fire Brigade has used the Aggregate Collection Point FTA for training using AFFF and, after 2016, AR-AFFF. Approximately 5 gallons of 3% AFFF or AR-AFFF concentrate are dispensed towards a non-functional military tank in the area per training event. Training with AFFF no longer occurs at this AOI. Following training, the firetruck is washed at the Aggregate Collection Point FTA.

3.11 AOI 11: Live-Fire Shoot House Fire

The Live-Fire Shoot House is located in the former town of Herrold, Iowa, which now lies within the current Camp Dodge boundary (**Figure 3-4**). During construction in 2012, some of the materials, including ballistic rubber and recycled tires, caught fire. Approximately 20 to 30 gallons of AFFF concentrate were used to extinguish the fire. No information was available on the concentration of foam used.

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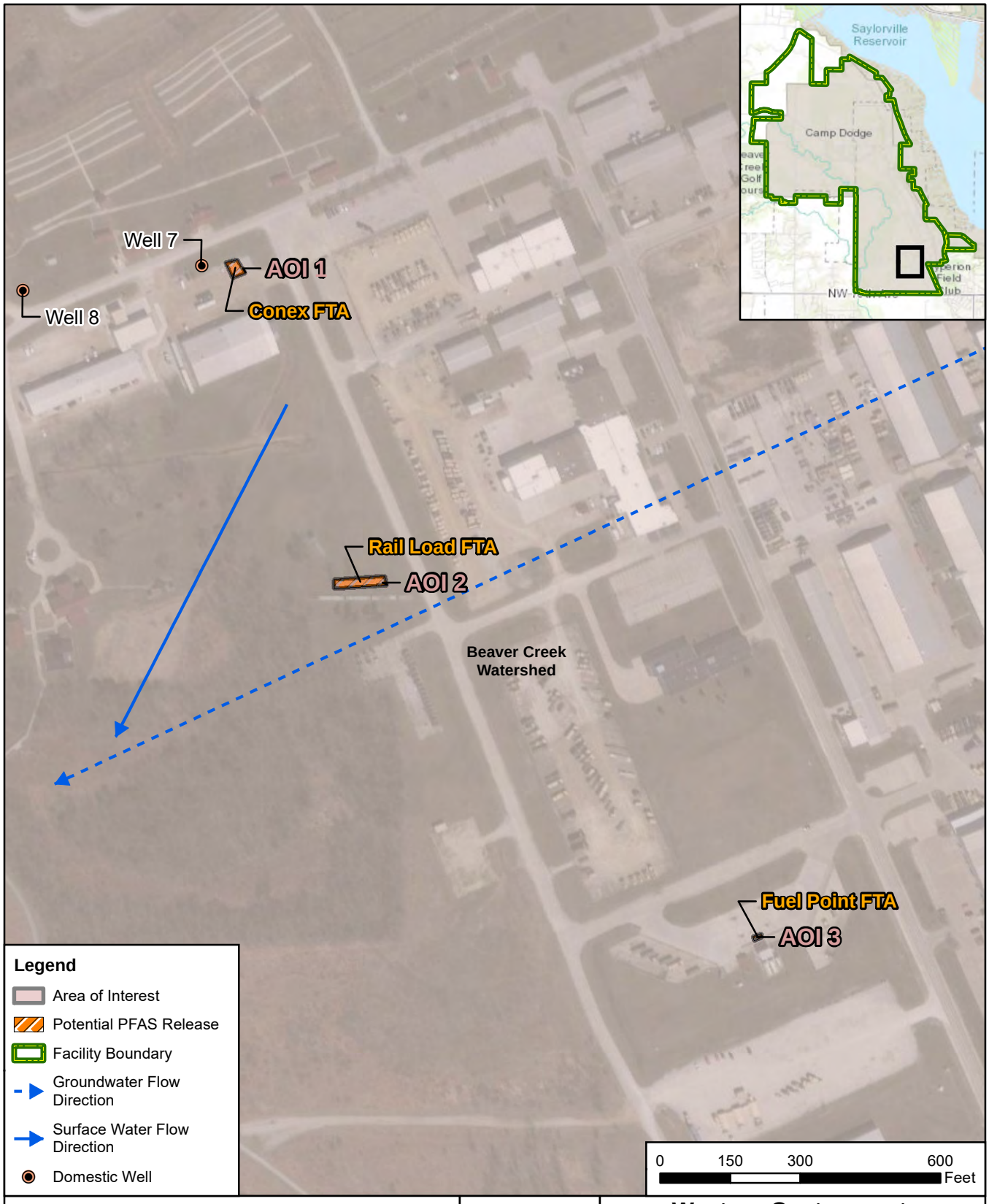

CLIENT	ARNG			
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SCALE	1:3,600	CHK BY	JH	10/1/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	10/1/2020

Western Cantonment Areas of Interest

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 3-1

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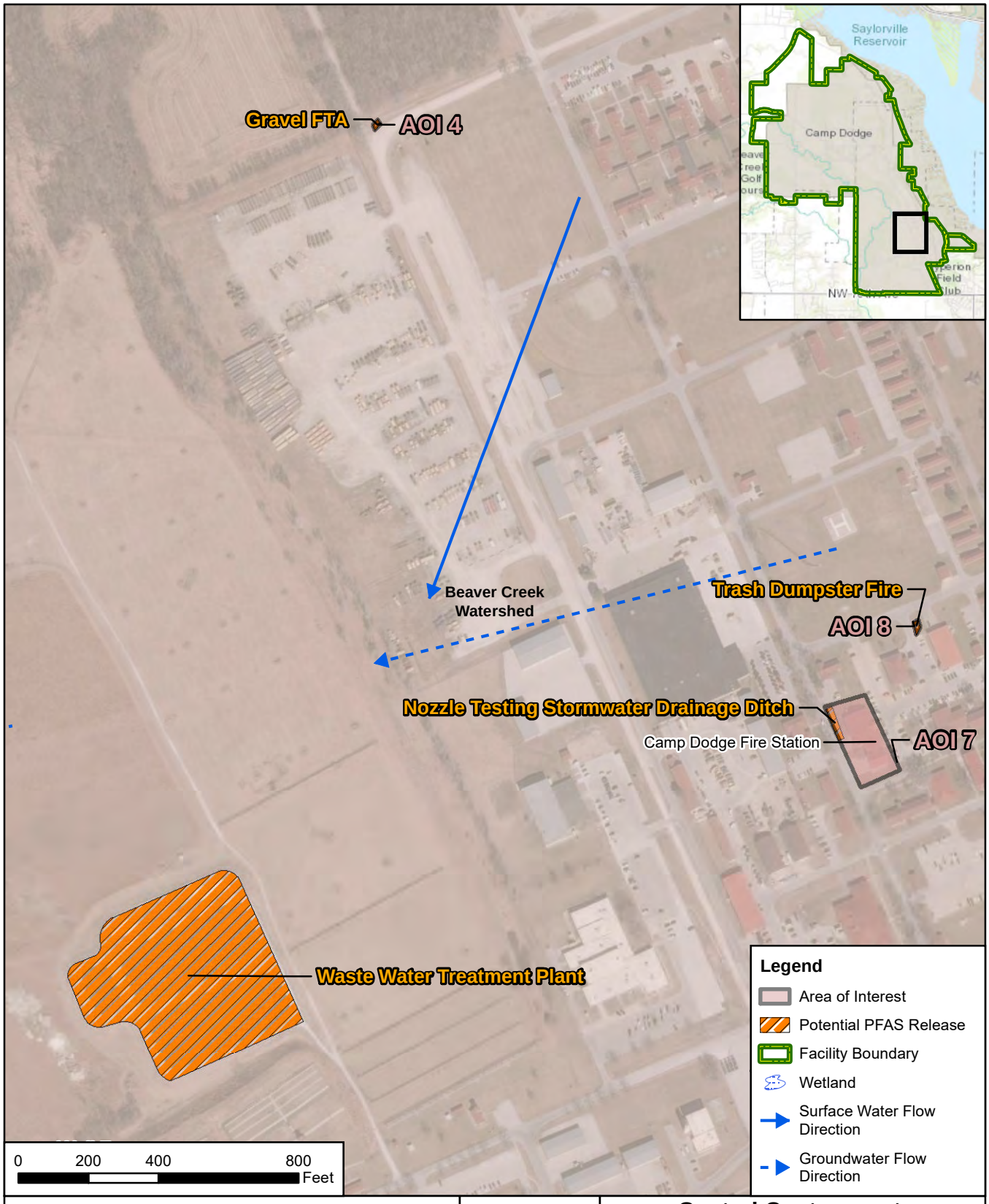

CLIENT	ARNG			
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SCALE	1:4,800	CHK BY	JZ	1/25/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	1/25/2021

Central Cantonment Areas of Interest

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 3-2

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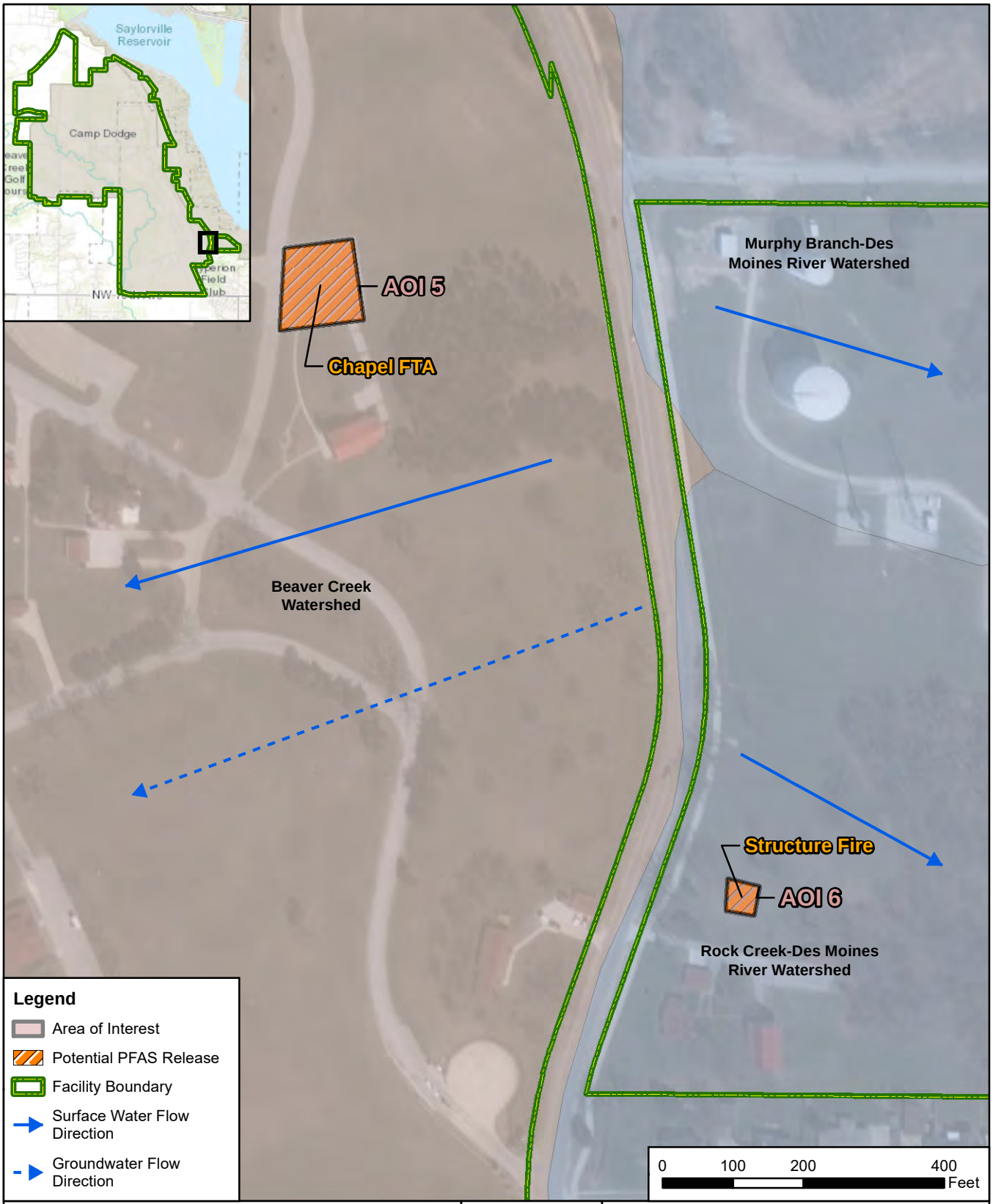

CLIENT	ARNG			
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Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	10/1/2020

Eastern Cantonment Areas of Interest

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Germantown, MD 20876

Figure 3-3

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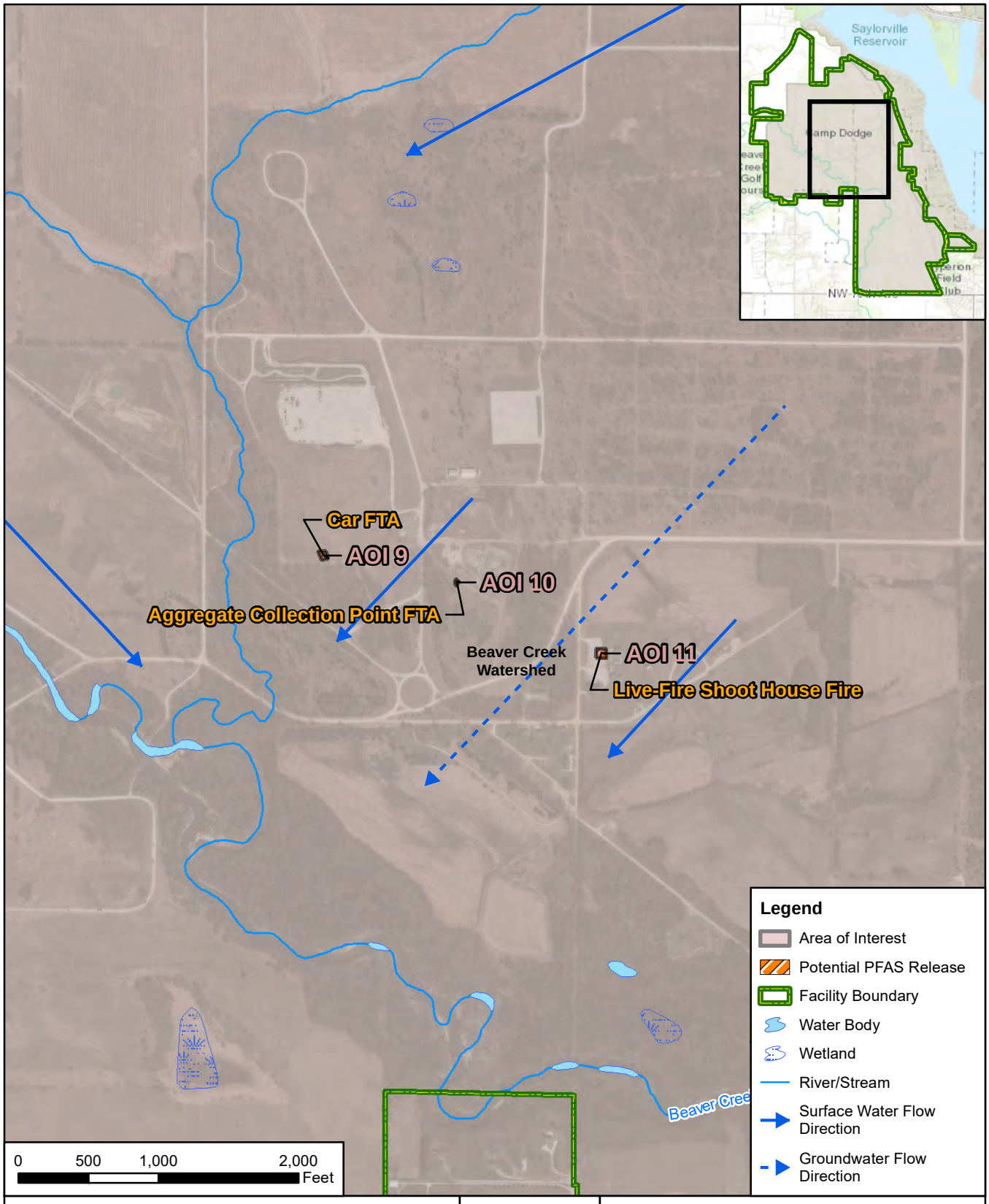

CLIENT	ARNG			
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SCALE	1:12,000	CHK BY	JH	10/1/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	10/1/2020

N

Range Areas of Interest

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 3-4

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4. Project Data Quality Objectives

Project Data Quality Objectives (DQOs) are qualitative and quantitative statements that specify the quality of data and define the level of certainty required to support project decision-making process. The specific DQOs established for this facility are described below. These DQOs were developed in accordance with the USEPA's seven-step iterative process (USEPA, 2006).

4.1 Problem Statement

The following problem statement was developed during project planning:

The presence of PFAS in environmental media at the facility, which may pose a risk to human health or the environment, is currently unknown. PFAS are classified as emerging environmental contaminants that are garnering increased regulatory interest due to their potential risks to human health and the environment. The regulatory framework for managing PFAS at both the federal and state levels continues to evolve.

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 Office of the Secretary of Defense (OSD) dated 15 October 2019 (Assistant Secretary of Defense, 2019). 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 site will proceed to the next phase under CERCLA. The SLs established in the OSD memorandum apply to three compounds: PFOS, PFOA, and PFBS. The SLs are presented in **Section 6.1** of this Report.

The following quotes from the US Department of the Army (DA) policy documents form the basis for this project (DA, 2016; DA, 2018):

- "The Army will research and identify locations where PFOS- and/or PFOA-containing products, such as AFFF, are known or suspected to have been used. Installations shall coordinate with installation/facility fire response or training offices to identify AFFF use or storage locations. The Army will consider FTAs, AFFF storage locations, hangars/buildings with AFFF suppression systems, fire equipment maintenance areas, and areas where emergency response operations required AFFF use as possible source areas. In addition, metal plating operations, which used certain PFOS-containing mist suppressants, shall be considered possible source areas."
- "Based on a review of site records…determine whether a CERCLA PA is appropriate for identifying PFOS/PFOA release sites. If the PA determines a PFOS/PFOA release may have occurred, a CERCLA SI shall be conducted to determine presence/absence of contamination."
- "Identify sites where perfluorinated compounds are known or suspected to have been released, with the priority being those sites within 20 miles of the public systems that tested above USEPA Health Advisory (HA) levels" (USEPA, 2016a; USEPA, 2016b).

4.2 Goals of the Study

The following goals were established for this SI:

1. Determine the presence or absence of PFOA, PFOS, and PFBS at or above SLs.
2. Develop information to potentially eliminate a release from further consideration because it is determined that it poses no significant threat to human health or the environment.

3. Determine the potential need for a removal action.
4. Collect data to better characterize the release areas for more effective and rapid initiation of an RI.
5. Identify within 4 miles of the installation other potential PFAS sources (fire stations, major manufacturers, other DoD facilities) and receptors, including both groundwater and surface water receptors, to determine whether the ARNG is the likely source of PFAS, or whether there is an off-facility source of PFAS responsible for installation detections of PFAS (USEPA, 2005).
6. Determine whether a potentially complete pathway exists between the source and potential receptors and whether ARNG is the likely source of the contamination.

4.3 Information Inputs:

Primary information inputs included the following:

- The PA for Camp Dodge, Johnston, Iowa (AECOM, 2019a);
- Analytical data collected as part of DoD drinking water and environmental sampling efforts at the facility (TetraTech, 2017 and GHD, 2020);
- Analytical data from groundwater, surface water, sediment, and soil samples collected as part of this SI in accordance with the site-specific UFP-QAPP Addendum (AECOM, 2019b); and
- Field data collected during the SI, including groundwater elevation and water quality parameters measured at the time of sampling.

4.4 Study Boundaries

The scope of the SI was bounded by the property limits of the facility (**Figure 2-1**). 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).

4.5 Analytical Approach

Samples were analyzed by Pace Analytical Gulf Coast Laboratory, accredited under the 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 and decision rules as defined in the SI QAPP Addendum (AECOM, 2019b). These rules governed response actions based on the results of the SI sampling effort.

The decision rules described in the **Worksheet #11** of the SI QAPP Addendum identify actions based on the following:

Groundwater:

- Is there a human receptor within 4 miles of the site?
- What is the concentration of PFOA, PFOS, and PFBS at the potential release areas?
- What is the concentration of PFOA, PFOS, and PFBS at the facility boundary upgradient and downgradient of the potential release areas?

- What does the conceptual site model (CSM) suggest in terms of source, pathway and receptor?

Soil:

- What is the concentration of PFOA, PFOS, and PFBS in shallow surface soil (0 to 2 feet bgs)?
- What is the concentration of PFOA, PFOS, and PFBS in deep soil (i.e., capillary fringe)?
- What does the CSM suggest in terms of source, pathway, and receptor?

Soil and groundwater samples were collected from each of the potential release areas. Groundwater was encountered at approximately 7 to 29 feet bgs.

4.6 Data Usability Assessment

The Data Usability Assessment (DUA) 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, 2018a; DoD, 2018b; USEPA, 2017).

Data Quality Indicators (DQIs) (Precision, Accuracy, Representativeness, Comparability, Completeness and Sensitivity) are important components in assessing data usability. These DQIs were evaluated in the subsequent sections and demonstrate that the data presented in this SI report are of high quality. Although the SI data are considered reliable, some degree of uncertainty can be associated with the data collected. Specific factors that may contribute to the uncertainty of the data evaluation are described below. The Data Validation Report (DVR) (**Appendix A**) presents explanations for all qualified data in greater detail.

4.6.1 Precision

Precision is the degree of agreement among repeated measurements of the same characteristic on the same sample or on separate samples collected as close as possible in time and place. Field sampling precision is measured with the field duplicate relative percent differences (RPD); laboratory precision is measured with calibration verification, internal standard recoveries, laboratory control spike (LCS) and matrix spike (MS) duplicate RPD.

Calibration verifications (CCV) were performed routinely to ensure that instrument responses for all calibrated analytes were within established quality control (QC) criteria. All CCVs analyzed at the appropriate frequency are presented in the SI QAPP Addendum (AECOM, 2019b). Calibration verification anomalies were encountered during the data review; however, no field sample results were impacted. Field samples were either non-detect when associated with a positive bias in the CCV, or the field sample results were reported from a different analytical sequence.

LCS/LCS duplicate (LCSD) pairs were prepared by addition of known concentrations of each analyte in a matrix-free media known to be free of target analytes. LCS/LCSD pairs were analyzed for every analytical batch to demonstrate the ability of the laboratory to detect similar concentrations of a known quantity in matrix-free media. Several LCS/LCSD pair results displayed RPD greater than the laboratory QC limit of 30%. No data qualifying action was taken based on these anomalies since either the field sample results were non-detect or the field sample results were qualified due to the LCS/LCSD percent recovery anomaly, which was determined to be the cause of the imprecision.

MS/MS duplicate (MSD) samples were prepared, analyzed, and reported for all preparation batches. MS/MSD samples demonstrated that the analytical system was in control for the matrix being tested. MS/MSD samples were submitted to the laboratory for analysis at a rate of ≥5%. MS pairs performed on sediment, surface soil, surface water, and groundwater displayed RPD outside of control limits for several compounds. These results were associated with recoveries outside the control limits for the target compounds, so the parent sample results were flagged for the accuracy anomaly that was determined to cause the imprecision.

Field duplicate samples were collected at a rate of 10% to assess the overall sampling and measurement precision for this sampling effort. The field duplicate samples were analyzed for PFAS and general chemistry parameters. The field duplicate samples were within the project established precision limits presented in the SI QAPP Addendum (AECOM, 2019b).

4.6.2 Accuracy

Accuracy is a measure of confidence in a measurement. The smaller the difference between the measurement of a parameter and its "true" or expected value, the more accurate the measurement. The more precise or reproducible the result, the more reliable or accurate the result. Accuracy is measured through percent recoveries in the LCS/LCSD, MS/MSD, and extracted internal standard (EIS) recoveries.

EIS were added by the laboratory during sample extraction to measure relative responses of target analytes and used to correct for bias associated with matrix interferences and sample preparation efficiencies, injection volume variances, mass spectrometry ionization efficiencies, and other associated preparation and analytical anomalies. Several field samples displayed EIS area counts less than the QC limit of 50%. The positive field sample results associated with EIS area counts less than the QC limit, but greater than 20%, were qualified “J+”, while non-detects were qualified “UJ”. The qualified results should be considered usable as estimated values with a positive bias. While the National Functional Guidelines (NFG) recommends rejection for non-detects associated with internal standard recoveries less than 20% (which is similar to the DoD Guidance), none of the data were rejected because 1) unlike the gas chromatography/ mass spectrometry (GC/MS) methods discussed in the NFG, PFAS compounds are quantitated based on a normalized 100% internal standard percent recovery for this method and 2) in MS pairs with area counts less than 20%, the target compounds were shown to be able to be recovered. The project team determined the associated results were usable for project purposes and likely true negatives.

LCS/LCSD samples were prepared by addition of known concentrations of each analyte in a matrix-free media known to be free of target analytes. LCS/LCSD samples were analyzed for every analytical batch and demonstrated that the analytical system was in control during sample preparation and analysis. Several LCS/LCSD displayed percent recoveries outside of QC limits. The field sample results associated with negative biases that were non-detect were qualified “UJ” while the positive biases were qualified “J-“. The qualified results should be considered usable as estimated with a negative bias. The positive field sample results associated with positive biases were qualified “J+” unless previously qualified by blank detection. The qualified results should be considered usable as estimated with a positive bias.

MS/MSD samples were prepared, analyzed, and reported at a rate of 5%. MS/MSD samples demonstrated that the analytical system was in control for the matrix being tested, with a limited number of exceptions. MS pairs performed on sediment, surface soil, surface water, and groundwater displayed percent recoveries outside QC limits. The parent sample results associated with positive biases were qualified “J+”. The qualified results should be considered usable as estimated with a positive bias. The parent sample results associated with the negative bias were positive and were qualified “J-“. The qualified results should be considered usable as estimated with a negative bias.

4.6.3 Representativeness

Representativeness qualitatively expresses the degree to which data accurately reflect site conditions. Factors that affect the representativeness of analytical data include appropriate sample population definitions, proper sample collection and preservation techniques, analytical holding times, use of standard analytical methods, and determination of matrix or analyte interferences.

Relating to the use of standard analytical methods, the laboratory followed the method as established in PFAS by liquid chromatography tandem mass spectrometry (LC/MS/MS) Compliant with Quality Systems Manual (QSM) 5.1 Table B-15, including the specific preparation requirements (i.e. ENVI-Carb or equivalent used), mass calibration, spectra, all the ion transitions identified in Table B-15 were monitored, standards that contained both branched and linear isomers when available were used, and isotopically labeled standards were used for quantitation.

Field QC samples were collected to assess the representativeness of the data collected. Field duplicates were collected at a rate of 10% for all field samples, while MS/MSD samples were collected at a rate of 5%. All preservation techniques were followed by the field staff, and all technical and analytical holding times were met by the laboratory. The laboratory used approved standard methods in accordance with the SI QAPP Addendum (AECOM, 2019b) for all analyses.

Instrument blanks and method blanks were prepared by the laboratory in each batch as a negative control. A limited number of PFAS instrument blanks and method blanks displayed detections greater than the detection limit for multiple target analytes. In total, 28 field sample results were qualified “U” during data validation due to a detection in the associated blank. The reported field sample result value was adjusted to be equal to the LOD. In some instances, when the qualified numerical result was greater than the LOD, the LOD would be elevated to the numerical result value. The results are usable as qualified but were considered to be false positives and are treated as non-detects by the project team.

Field blanks, equipment blanks, and source water samples were also collected for groundwater and soil samples. The impacted field samples were qualified as “U”, and where appropriate, lab limits were elevated to detected concentrations due to detections in the field and equipment blanks. The results are considered to be false positives and are treated as non-detects by the project team.

Several field samples were re-prepared after the holding time had expired due to the anomalies discussed in this section. The positive field sample results were qualified “J”, while non-detects were qualified “UJ”. Typically, the two results were similar, and the project team was generally recommended the initial results for data use by the project chemist. One field sample, AOI7-HA09, was not extracted until the 33rd day after sampling. The non-detect field sample results were qualified “UX”, while the positive results were qualified “J”. Sample results that were qualified “X” were retained in the data set since all samples were properly preserved, therefore delayed sample extraction likely did not affect sample results.

Overall, the data are usable for evaluating the presence or absence of PFAS at the facility. Sufficient usable data were obtained to meet the objectives of the SI.

4.6.4 Comparability

Comparability is the extent to which data from one study can be compared directly to either past data from the current project or data from another study. Using standardized sampling and analytical methods, units of reporting, and site selection procedures helps ensure comparability. Standard field sampling and typical laboratory protocols were used during the SI and are considered comparable to ongoing investigations.

4.6.5 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount of data expected under normal conditions. The laboratory provided data meeting system QC acceptance criteria for all samples tested. Project completeness was determined by evaluating the planned versus actual quantities of data. Percent completeness per parameter is as follows:

- PFAS in groundwater by DoD QSM Table B-15 at 100%
- PFAS in soil by DoD QSM Table B-15 at 99.3%
- PFAS in surface water by DoD QSM Table B-15 at 100%
- PFAS in sediment by DoD QSM Table B-15 at 100%

4.6.6 Sensitivity

Sensitivity is the capability of a test method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest. Examples of QC measures for determining sensitivity include laboratory-fortified blanks, a method detection limit (MDL) study, and calibration standards at the LOQ. In order to meet the needs of the data users, project data must meet the measurement performance criteria for sensitivity and project LOQs specified in the SI QAPP Addendum (AECOM, 2019b). The laboratory provided the requested MDL studies and provided applicable calibration standards at the LOQ. In order to achieve the DQOs for sensitivity outlined in the SI QAPP Addendum (AECOM, 2019b), the laboratory reported all field sample results at the lowest possible dilution. Additionally, any analytes detected below the LOQ and above the DL were reported and qualified “J” as estimated values by the laboratory.

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 Preliminary Assessment Report, Camp Dodge, Iowa dated June 2019* (AECOM, 2019a);
- *Final Site Inspection Programmatic Uniform Federal Policy-Quality Assurance Project Plan dated March 2018* (AECOM, 2018a);
- *Final Site Inspection Uniform Federal Policy-Quality Assurance Project Plan Addendum, Camp Dodge, Johnston, Iowa dated October 2019* (AECOM, 2019b);
- *Final Programmatic Accident Prevention Plan dated July 2018* (AECOM, 2018b); and
- *Final Site Safety and Health Plan, Camp Dodge, Johnston, Iowa dated October 2019* (AECOM, 2019c).

SI field activities were conducted from 12 November 2019 to 26 November 2019 and included soil, sediment, surface water, and groundwater grab sampling. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2019b), except as noted in **Section 5.9**.

The following samples were collected during the SI and analyzed for a subset of 18 PFAS by LC/MS/MS compliant with QSM 5.1 Table B-15 to fulfill the project DQOs:

- 72 soil grab samples from 24 boring locations;
- 28 surface soil samples from 14 locations
- 23 groundwater grab samples from 24 temporary well locations; and
- 10 sediment and 10 surface water samples from 10 locations.

Figures 5-1 through **Figure 5-5** 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, which is provided in **Appendix B1**, was completed throughout the SI field activities. Field Change Request documentation is provided in **Appendix B2**, and sampling forms are provided in **Appendix B3**. Additionally, a photographic log of field activities is provided in **Appendix C**.

5.1 Pre-Investigation Activities

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

5.1.1 Technical Project Planning

The USACE TPP Process, Engineers 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 quantitative and qualitative DQOs, and formulating a sampling approach to address the AOIs identified in the PA.

A combined TPP Meeting 1 and 2 was held on 18 September 2019, prior to SI field activities. Meeting minutes are provided in **Appendix D**. TPP meetings 1 and 2 were conducted in general accordance with EM 200-1-2.

The stakeholders for this SI include the ARNG G9, IAARNG, USACE, Iowa Department of Natural Resources (IDNR), 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, 2019b). 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 Dodge Department of Public Works, with input from the AECOM field team. AECOM's drilling subcontractor, Cascade Technical Services, LLC, contacted Iowa 811, the one-call utility clearance contractor, to notify them of intrusive work. Additionally, the first 5 feet of each boring were advanced using hand augering methods to verify utility clearance in shallow subsurface soils where utilities would typically be encountered.

5.1.3 Source Water and PFAS Sampling Equipment Acceptability

The potable water source used for decontamination of drilling equipment was confirmed to be PFAS-free prior to the start of field activities. A sample of the Camp Dodge facility water supply was collected from a wash hose at the Camp Dodge truck wash rack area on 18 September 2019, prior to SI mobilization, and analyzed for PFAS by LC/MS/MS compliant with QSM 5.1 Table B-15. A 500-gallon high-density polyethylene (HDPE) water tote was filled with facility water for use during SI field activities. The results of the potable well sample are provided in **Appendix G**. A discussion of the results is presented in **Section 4.6.3**.

Materials that were used within the sampling zone were confirmed as acceptable for use in the PFAS sampling environment. The checklist of acceptable materials for use in the PFAS sampling environment was provided in the Standard Operating Procedures (SOPs) appendix to the SI QAPP Addendum (AECOM, 2019b). Prior to the start of field work each day, a PFAS Sampling Checklist was completed as an additional layer of control. The checklist served as a daily reminder to each field team member regarding the allowable materials within the sampling environment.

5.2 Soil Borings and Soil Sampling

Soil samples were collected via direct-push technology (DPT) in accordance with the SI QAPP Addendum (AECOM, 2019b). A GeoProbe® 7822DT dual-tube sampling system was used to collect continuous soil cores to the target depth.

Three discrete soil samples were collected from the vadose zone for chemical analysis from each soil boring using DPT. At each soil boring, one subsurface soil sample was collected approximately 1 foot above the groundwater table, one subsurface soil sample was collected at the mid-point between the ground surface and the groundwater table, and one surface soil sample was collected at the surface interval from 0-1 feet bgs.

The soil boring locations are shown on **Figures 5-1** through **Figure 5-5,** and sample depths are provided **Table 5-2**. The soil boring locations were selected based on the AOI information as agreed on through TPP and SI QAPP Addendum (AECOM, 2019b) review.

The soil cores were continuously logged for lithological descriptions by a 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 B3**) 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**.

Lithology observed during the SI was consistent with descriptions from previous investigations at the facility and surrounding area. Borings advanced in the shallow subsurface consisted of sands, silts, and clays. Sand layers varied from brown, yellow, and gray; well- to poorly-sorted; sub-angular to rounded grains. Silt and clay layers were encountered but did not terminate drilling at any locations. Generally, silts and clays intervals are described as dark gray to olive, cohesive, with low to medium plasticity and containing trace to some fine-grained sand.

Each soil 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 Federal Express (FedEx) under standard chain of custody (CoC) procedures to the laboratory and analyzed for PFAS (LC/MS/MS compliant with QSM 5.1 Table B-15), Total Organic Carbon (TOC) (USEPA Method 9060A) and pH (USEPA Method 9045D) in accordance with the SI QAPP Addendum (AECOM, 2019b).

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, 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 4 degrees Celsius (°C) during shipment.

DPT borings were converted to temporary wells, which were subsequently abandoned in accordance with the SI QAPP Addendum (AECOM, 2019b) using bentonite chips at completion of sampling activities. Borings were installed in grass areas to avoid disturbing concrete or asphalt surfaces.

5.3 Temporary Well Installation and Groundwater Grab Sampling

Temporary wells were installed using a GeoProbe® 7822DT dual-tube sampling system. Once the borehole was advanced to the desired depth, wherever conditions allowed, a temporary well was constructed of a 5-foot section of 1-inch Schedule 40 poly-vinyl chloride (PVC) screen with sufficient casing to reach ground surface. New PVC pipe and screen were used at each borehole to avoid cross contamination between locations. The screen intervals for the temporary wells are provided in **Table 5-2**.

At one temporary well location within AOI 6, refusal was encountered prior to groundwater. One off-set attempt was made, which was unsuccessful. No groundwater was collected from sample location AOI6-SB10.

The temporary wells were allowed to recharge and purged for a minimum of five minutes after installation before collection of groundwater samples. After the recharge period, groundwater samples were collected using a peristaltic pump with PFAS-free HDPE tubing. Each sample was collected into laboratory-supplied PFAS-free HDPE bottles and labeled using a PFAS-free marker or pen. The temporary wells were purged at a rate determined in the field to reduce turbidity and draw down prior to sampling. Water quality parameters (e.g., temperature, specific conductance, pH, dissolved oxygen [DO], and oxidation-reduction potential [ORP]) were measured using a water quality meter and recorded on the field sampling form (**Appendix B3**) after each grab sample was collected. Additionally, a subsample of each groundwater sample was collected in a

separate container, and a shaker test was completed to identify if there were any foaming. No foaming was noted in any of the groundwater samples.

Each sample was collected into laboratory-supplied PFAS-free HDPE bottles and labeled using a PFAS-free marker or pen. Samples were packaged on ice and transported via FedEx under standard CoC procedures to the laboratory and analyzed for PFAS by LC/MS/MS Compliant with QSM 5.1 Table B-15 in accordance with the SI QAPP Addendum (AECOM, 2019b).

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. One field reagent blank was collected in accordance with the Programmatic UFP-QAPP (AECOM, 2018a). A temperature blank was placed in each cooler to ensure that samples were preserved at or below 4°C during shipment.

Temporary wells were abandoned in accordance with the SI QAPP Addendum (AECOM, 2019b) by removing the PVC and backfilling the hole with bentonite chips. Temporary wells were installed in grass areas to avoid disturbing concrete or asphalt.

5.4 Surface Water and Sediment Sampling

Surface water and sediment samples were collected from ten locations: five along Beaver Creek, four from seasonal wetlands downgradient of the cantonment area, and one from the General's Pond drainage that flows towards Beaver Creek (**Figure 5-1**).

Sediment samples were co-located with surface water samples and were collected in accordance with the SI QAPP Addendum (AECOM, 2019b). Surface water samples were collected from a single point in the waterbody by dipping the laboratory-supplied bottle into the water, approximately two-thirds up from the bottom of the water body. 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 from the most downstream location upstream to minimize disturbance of bottom sediments and as quickly as possible to ensure a representative sample was collected. Additionally, a subsample of each 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 any of the surface water samples.

After collection of the surface water sample, a sediment coring device (hand auger) was used to collect the sediment sample from the first 1 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 the sediment sample was transferred to a laboratory-supplied container. After collection of the surface water and sediment samples from each location, general water quality parameters (i.e., temperature, pH, conductivity, DO, and ORP) were collected with a water quality meter and recorded on the field sampling form (**Appendix B3**). The surface water and sediment sample locations are shown on **Figure 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 of PFAS (USEPA Method 537 Compliant with QSM 5.1 Table B-15) in accordance with the SI QAPP Addendum (AECOM, 2019b).

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 4 °C during shipment.

5.5 Synoptic Water Level Measurements

Groundwater elevation measurements were collected from each of the temporary groundwater monitoring wells installed during the SI. Water level measurements were taken from the northern side of the well casing. A groundwater flow contour map is provided in **Figure 2-4**. Groundwater elevation data are provided in **Table 5-3**.

5.6 Surveying

The northern side of each abandoned temporary well location was surveyed by Iowa-Licensed land surveyors following guidelines provided in the SOPs provided in the SI QAPP Addendum (AECOM, 2019b). Survey data from the previously installed wells at the facility were collected on 16 December 2019 in the Universal Transverse Mercator Zone 15 projection with World Geodetic System 84 datum. The surveyed well data are provided in **Appendix B4**.

5.7 Investigation-Derived Waste

As of the date of this report, the disposal of PFAS investigation-derived waste (IDW) is not regulated federally. PFAS IDW generated during the SI is considered non-hazardous waste and was managed in accordance with the SI QAPP Addendum (AECOM, 2019b) and with the Army 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 distributed evenly on the ground surface on the downgradient side of the boring. The soil IDW was not sampled and assumes the PFAS characteristics of the associated soil samples collected from that source location.

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

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 F**.

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 a subset of 18 PFAS by LC/MS/MS compliant with QSM 5.1 Table B-15 at Pace Analytical Gulf Coast Laboratory in Baton Rouge, Louisiana, a DoD ELAP and NELAP certified laboratory. The 18 PFAS analyzed as part of the ARNG SI program include the following:

- 6:2 fluorotelomer sulfonate (6:2 FTS)
- 8:2 fluorotelomer sulfonate (8:2 FTS)
- N-ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)
- Perfluorohexanoic acid (PFHxA)
- Perfluorohexanesulfonic acid (PFHxS)
- Perfluorononanoic acid (PFNA)
- Perfluorooctanoic acid (PFOA)
- Perfluorooctanesulfonic acid (PFOS)
- Perfluoropentanoic acid (PFPeA)

- N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)
- Perfluorobutyrate (PFBA)
- Perfluorobutanesulfonic acid (PFBS)
- Perfluorodecanoic acid (PFDA)
- Perfluorododecanoic acid (PFDoA)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorotetradecanoic acid (PFTeDA)
- Perfluorotridecanoic acid (PFTrDA)
- Perfluoroundecanoic acid (PFUdA)

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

5.9 Deviations from SI QAPP Addendum

Derivations from the SI QAPP Addendum (AECOM, 2019b) 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 Request Form (FCR001) (**Appendix B2**):

- The sampling locations for AOI7-SB15, AOI3-SB23, and AOI9-SB18 were relocated due to terrain restrictions at the originally scoped sample locations. These three locations were inaccessible for the DPT rig due to unpaved road conditions and dense forestation. This action was documented in FCR001 provided in **Appendix B2**.
- The sampling location for AOI5-SB09 was relocated due to the presence of a subsurface sprinkler system present in the general vicinity of the original scoped location. This action was documented in FCR001 provided in **Appendix B2**.
- Due to the absence of groundwater at AOI6-SB10, groundwater was only sampled from two of three originally scoped locations in AOI 6: AOI6-SB11 and AOI6-SB12. The DQOs for AOI 6 were satisfied by the collection of surface and subsurface soil at AOI6-SB10, and the collection of soil and groundwater samples at the two downgradient sample locations in AOI 6 (AOI6-SB11, AOI6-SB12). This action was documented in a Non-Conformance Report provided in **Appendix B5**.

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, Camp Dodge

Sample Identification	Sample Collection Date	Sample Depth (feet bgs)	PFAS (LC/MS/MS compliant with QSM 5.1 Table B-15)	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Comments
Soil Samples						
AOI1-SB01-0-1	11/19/2019	0 - 1	x	x	x	
AOI1-SB01-0-1-FD	11/19/2019	0 - 1	x			Field Duplicate
AOI1-SB01-4-5	11/19/2019	4 - 5	x	x	x	
AOI1-SB01-7-8	11/19/2019	7 - 8	x	x	x	
AOI1-SB02-0-1	11/19/2019	0 - 1	x	x	x	
AOI1-SB02-5-6	11/19/2019	5 - 6	x	x	x	
AOI1-SB02-5-6-FD	11/19/2019	5 - 6		x	x	Field Duplicate
AOI1-SB02-7-8	11/21/2019	7 - 8	x	x	x	
AOI2-SB03-0-1	11/21/2019	0 - 1	x	x	x	
AOI2-SB03-3-4	11/21/2019	3 - 4	x	x	x	
AOI2-SB03-3-4-FD	11/21/2019	3 - 4	x			Field Duplicate
AOI2-SB03-6-7	11/21/2019	6 - 7	x	x	x	
AOI2-SB04-0-1	11/21/2019	0 - 1	x	x	x	
AOI2-SB04-0-1-MS	11/21/2019	0 - 1	x			MS/MSD
AOI2-SB04-0-1-MSD	11/21/2019	0 - 1	x			MS/MSD
AOI2-SB04-3-4	11/21/2019	3 - 4	x	x	x	
AOI2-SB04-6-7	11/21/2019	6 - 7	x	x	x	
AOI3-SB05-0-1	11/21/2019	0 - 1	x	x	x	
AOI3-SB05-0-1-FD	11/21/2019	0 - 1		x	x	Field Duplicate
AOI3-SB05-3-4	11/21/2019	3 - 4	x	x	x	
AOI3-SB05-7-8	11/21/2019	7 - 8	x	x	x	
AOI4-SB06-0-1	11/21/2019	0 - 1	x	x	x	
AOI4-SB06-6-7	11/21/2019	6 - 7	x	x	x	
AOI4-SB06-6-7-MS	11/21/2019	6 - 7		x	x	MS/MSD
AOI4-SB06-6-7-MSD	11/21/2019	6 - 7		x	x	MS/MSD
AOI4-SB06-14-15	11/21/2019	14 - 15	x	x	x	
AOI4-SB07-0-1	11/22/2019	0 - 1	x	x	x	
AOI4-SB07-4-5	11/22/2019	4 - 5	x	x	x	
AOI4-SB07-9-10	11/22/2019	9 - 10	x	x	x	
AOI5-SB08-0-1	11/22/2019	0 - 1	x	x	x	
AOI5-SB08-0-1-FD	11/22/2019	0 - 1		x	x	Field Duplicate
AOI5-SB08-15-16	11/22/2019	15 - 16	x	x	x	
AOI5-SB08-24-25	11/22/2019	24 - 25	x	x	x	
AOI5-SB09-0-1	11/22/2019	0 - 1	x	x	x	
AOI5-SB09-17-18	11/22/2019	17 - 18	x	x	x	
AOI5-SB09-28-29	11/22/2019	28 - 29	x	x	x	
AOI6-SB10-0-1	11/24/2019	0 - 1	x	x	x	
AOI6-SB10-13-14	11/24/2019	13 - 14	x	x	x	
AOI6-SB10-13-14-FD	11/24/2019	13 - 14		x	x	Field Duplicate
AOI6-SB10-24-25	11/24/2019	24 - 25	x	x	x	
AOI6-SB11-0-1	11/25/2019	0 - 1	x	x	x	
AOI6-SB11-9-10	11/25/2019	9 - 10	x	x	x	
AOI6-SB11-19-20	11/25/2019	19 - 20	x	x	x	
AOI6-SB12-0-1	11/24/2019	0 - 1	x	x	x	
AOI6-SB12-13-14	11/24/2019	13 - 14	x	x	x	
AOI6-SB12-24-25	11/24/2019	24 - 25	x	x	x	
AOI7-SB13-0-1	11/24/2019	0 - 1	x	x	x	
AOI7-SB13-3-4	11/24/2019	3 - 4	x	x	x	
AOI7-SB13-6-7	11/24/2019	6 - 7	x	x	x	
AOI7-SB14-0-1	11/24/2019	0 - 1	x	x	x	
AOI7-SB14-0-1-FD	11/24/2019	0 - 1		x	x	Field Duplicate
AOI7-SB14-4-5	11/24/2019	4 - 5	x	x	x	
AOI7-SB14-9-10	11/24/2019	9 - 10	x	x	x	
AOI7-SB15-0-1	11/22/2019	0 - 1	x	x	x	
AOI7-SB15-3-4	11/22/2019	3 - 4	x	x	x	
AOI7-SB15-6-7	11/22/2019	6 - 7	x	x	x	
AOI7-SB15-6-7-MS	11/22/2019	6 - 7		x	x	MS/MSD
AOI7-SB15-6-7-MSD	11/22/2019	6 - 7		x	x	MS/MSD
AOI8-SB16-0-1	11/21/2019	0 - 1	x	x	x	
AOI8-SB16-0-1-FD	11/21/2019	0 - 1		x	x	Field Duplicate
AOI8-SB16-3-4	11/21/2019	3 - 4	x	x	x	
AOI8-SB16-7-8	11/21/2019	7 - 8	x	x	x	
AOI9-SB17-0-1	11/23/2019	0 - 1	x	x	x	
AOI9-SB17-4-5	11/23/2019	4 - 5	x	x	x	
AOI9-SB17-9-10	11/23/2019	9 - 10	x	x	x	
AOI9-SB18-0-1	11/23/2019	0 - 1	x	x	x	
AOI9-SB18-14-15	11/23/2019	14 - 15	x	x	x	
AOI9-SB18-29-30	11/23/2019	29 - 30	x	x	x	
AOI9-SB18-29-30-FD	11/23/2019	29 - 30		x	x	Field Duplicate
AOI10-SB19-0-1	11/23/2019	0 - 1	x	x	x	
AOI10-SB19-4-5	11/23/2019	4 - 5	x	x	x	
AOI10-SB19-9-10	11/23/2019	9 - 10	x	x	x	
AOI10-SB20-0-1	11/23/2019	0 - 1	x	x	x	
AOI10-SB20-0-1-MS	11/23/2019	0 - 1		x	x	MS/MSD
AOI10-SB20-0-1-MSD	11/23/2019	0 - 1		x	x	MS/MSD
AOI10-SB20-3-4	11/23/2019	3 - 4	x	x	x	
AOI10-SB20-9-10	11/23/2019	9 - 10	x	x	x	

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, Camp Dodge

Sample Identification	Sample Collection Date	Sample Depth (feet bgs)	PFAS (LC/MS/MS compliant with QSM 5.1 Table B-15)	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Comments
AOI11-SB21-0-1	11/24/2019	0 - 1	x	x	x	
AOI11-SB21-3-4	11/24/2019	3 - 4	x	x	x	
AOI11-SB21-3-4-FD	11/24/2019	3 - 4	x			Field Duplicate
AOI11-SB21-7-8	11/24/2019	7 - 8	x	x	x	
AOI11-SB22-0-1	11/24/2019	0 - 1	x	x	x	
AOI11-SB22-3-4	11/24/2019	3 - 4	x	x	x	
AOI11-SB22-6-7	11/24/2019	6 - 7	x	x	x	
AOI11-SB22-6-7-FD	11/24/2019	6 - 7		x	x	Field Duplicate
AOI3-SB23-0-1	11/23/2019	0 - 1	x	x	x	
AOI3-SB23-4-5	11/23/2019	4 - 5	x	x	x	
AOI3-SB23-9-10-FD	11/23/2019	9 - 10	x			Field Duplicate
AOI3-SB23-9-10	11/23/2019	9 - 10	x	x	x	
AOI3-SB24-0-1	11/21/2019	0 - 1	x	x	x	
AOI3-SB24-4-5	11/21/2019	4 - 5	x	x	x	
AOI3-SB24-7-8	11/21/2019	7 - 8	x	x	x	
AOI3-SB24-7-8-FD	11/21/2019	7 - 8		x	x	Field Duplicate
AOI1-SS01	11/19/2019	0 - 2	x			
AOI1-SS01-FD	11/19/2019	0 - 2	x			Field Duplicate
AOI1-HA01	11/19/2019	2 - 4	x			
AOI2-SS02	11/19/2019	0 - 2	x			
AOI2-HA02	11/19/2019	2 - 4	x			
AOI3-SS03	11/20/2019	0 - 2	x			
AOI3-SS03-FD	11/20/2019	0 - 2	x			Field Duplicate
AOI3-HA03	11/20/2019	2 - 4	x			
AOI4-SS04	11/19/2019	0 - 2	x			
AOI4-SS04-MS	11/19/2019	0 - 2	x			MS/MSD
AOI4-SS04-MSD	11/19/2019	0 - 2	x			MS/MSD
AOI4-HA04	11/19/2019	2 - 4	x			
AOI5-SS05	11/19/2019	0 - 2	x			
AOI5-HA05	11/19/2019	2 - 4	x			
AOI5-HA05-MS	11/19/2019	2 - 4	x			MS/MSD
AOI5-HA05-MSD	11/19/2019	2 - 4	x			MS/MSD
AOI6-SS06	11/20/2019	0 - 2	x			
AOI6-HA06	11/20/2019	2 - 4	x			
AOI6-HA06-FD	11/20/2019	2 - 4	x			Field Duplicate
AOI7-SS07	11/20/2019	0 - 2	x			
AOI7-SS07-FD	11/20/2019	0 - 2	x			Field Duplicate
AOI7-HA07	11/20/2019	2 - 4	x			
AOI7-SS08	11/20/2019	0 - 2	x			
AOI7-HA08	11/20/2019	2 - 4	x			
AOI7-SS09	11/20/2019	0 - 2	x			
AOI7-SS09-FD	11/20/2019	0 - 2	x			Field Duplicate
AOI7-HA09	11/20/2019	2 - 4	x			
AOI7-SS10	11/20/2019	0 - 2	x			
AOI7-HA10	11/20/2019	2 - 4	x			
AOI8-SS11	11/20/2019	0 - 2	x			
AOI8-HA11	11/20/2019	2 - 4	x			
AOI9-SS12	11/21/2019	0 - 2	x			
AOI9-SS12-FD	11/21/2019	0 - 2	x			Field Duplicate
AOI9-HA12	11/21/2019	2 - 4	x			
AOI10-SS13	11/21/2019	0 - 2	x			
AOI10-SS13-MS	11/21/2019	0 - 2	x			MS/MSD
AOI10-SS13-MSD	11/21/2019	0 - 2	x			MS/MSD
AOI10-HA13	11/21/2019	2 - 4	x			
AOI11-SS14	11/21/2019	0 - 2	x			
AOI11-HA14	11/21/2019	2 - 4	x			
Sediment Samples						
SD01	11/21/2019	0 - 0.5	x			
SD02	11/20/2019	0 - 0.5	x			
SD03	11/20/2019	0 - 0.5	x			
SD04	11/20/2019	0 - 0.5	x			
SD04-FD	11/20/2019	0 - 0.5	x			Field Duplicate
SD05	11/20/2019	0 - 0.5	x			
SD06	11/18/2019	0 - 0.5	x			
SD07	11/18/2019	0 - 0.5	x			
SD08	11/18/2019	0 - 0.5	x			
SD09	11/18/2019	0 - 0.5	x			
SD09-MS	11/18/2019	0 - 0.5	x			MS/MSD
SD09-MSD	11/18/2019	0 - 0.5	x			MS/MSD
SD10	11/19/2019	0 - 0.5	x			
Groundwater Samples						
AOI1-GW01	11/19/2019	8 - 13	x			
AOI1-GW02	11/21/2019	5 - 10	x			
AOI2-GW03	11/21/2019	5.5 - 9.5	x			
AOI2-GW03-MS	11/21/2019	5.5 - 9.5	x			MS/MSD
AOI2-GW03-MSD	11/21/2019	5.5 - 9.5	x			MS/MSD
AOI2-GW04	11/21/2019	5 - 10	x			
AOI3-GW05	11/21/2019	5 - 10	x			

Table 5-1
Site Inspection Samples by Medium
Site Inspection Report, Camp Dodge

Sample Identification	Sample Collection Date	Sample Depth (feet bgs)	PFAS (LC/MS/MS compliant with QSM 5.1 Table B-15)	TOC (USEPA Method 9060A)	pH (USEPA Method 9045D)	Comments
AOI4-GW06	11/21/2019	15 - 20	x			
AOI4-GW07	11/22/2019	10 - 15	x			
AOI5-GW08	11/22/2019	25 - 30	x			
AOI5-GW09	11/22/2019	30 - 35	x			
AOI5-GW09-MS	11/22/2019	30 - 35	x			MS/MSD
AOI5-GW09-MSD	11/22/2019	30 - 35	x			MS/MSD
AOI6-GW11	11/25/2019	20 - 25	x			
AOI6-GW12	11/24/2019	25 - 30	x			
AOI7-GW13	11/24/2019	7 - 12	x			
AOI7-GW13-FD	11/24/2019	7 - 12	x			Field Duplicate
AOI7-GW14	11/24/2019	10 - 15	x			
AOI7-GW15	11/23/2019	7 - 12	x			
AOI7-GW15-FD	11/23/2019	7 - 12	x			Field Duplicate
AOI8-GW16	11/21/2019	5 - 10	x			
AOI9-GW17	11/23/2019	6 - 11	x			
AOI9-GW18	11/23/2019	17 - 22	x			
AOI10-GW19	11/24/2019	15 - 20	x			
AOI10-GW20	11/23/2019	8 - 13	x			
AOI11-GW21	11/24/2019	8 - 13	x			
AOI11-GW21-MS	11/24/2019	8 - 13	x			MS/MSD
AOI11-GW21-MSD	11/24/2019	8 - 13	x			MS/MSD
AOI11-GW22	11/24/2019	7 - 12	x			
AOI3-GW23	11/23/2019	8 - 13	x			
AOI3-GW23-FD	11/23/2019	8 - 13	x			Field Duplicate
AOI3-GW24	11/21/2019	8 - 13	x			
Surface Water Samples						
SW01	11/21/2019	0 - 1	x			
SW02	11/20/2019	0 - 1	x			
SW02-MS	11/20/2019	0 - 1	x			MS/MSD
SW02-MSD	11/20/2019	0 - 1	x			MS/MSD
SW03	11/20/2019	0 - 1	x			
SW04	11/20/2019	0 - 1	x			
SW05	11/20/2019	0 - 1	x			
SW06	11/18/2019	0 - 1	x			
SW07	11/18/2019	0 - 1	x			
SW08	11/18/2019	0 - 1	x			
SW09	11/18/2019	0 - 1	x			
SW10	11/19/2019	0 - 1	x			
SW10-FD	11/19/2019	0 - 1	x			Field Duplicate
Blank Samples						
CAMP DODGE DECON	9/18/2019	---	x			Decontamination Water Blank
CD-ERB01	11/19/2019	---	x			Equipment Rinsate Blank
CD-ERB02	11/22/2019	---	x			Equipment Rinsate Blank
CD-ERB03	11/24/2019	---	x			Equipment Rinsate Blank
CD-ERB04	11/20/2019	---	x			Equipment Rinsate Blank
CD-ERB05	11/21/2019	---	x			Equipment Rinsate Blank
CD-ERB06	11/21/2019	---	x			Equipment Rinsate Blank
CD-ERB07	11/25/2019	---	x			Equipment Rinsate Blank
CD-ERB08	11/23/2019	---	x			Equipment Rinsate Blank
CD-ERB09	11/18/2019	---	x			Equipment Rinsate Blank
CD-ERB10	11/21/2019	---	x			Equipment Rinsate Blank
CD-FRB01	11/18/2019	---	x			Field Reagent Blank
FRB-072919	9/18/2019	---	x			Field Reagent Blank

Notes:
ft = feet
MS/MSD = matrix spike/ matrix spike duplicate
PFAS = per- and polyfluoroalkyl substances
pH = potential for hydrogen
TOC = total organic carbon
USEPA = United States Environmental Protection Agency

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Table 5-2
Soil Boring Depths and Temporary Well Screen Intervals
Site Inspection Report, Camp Dodge

Area of Interest	Soil Boring ID	Soil Boring Depth (feet bgs)	Temporary Well Screen Interval (feet bgs)
AOI 1	AOI1-SB01	15	8 - 13
	AOI1-SB02	10	5 - 10
AOI 2	AOI2-SB03	10	5.5 - 9
	AOI2-SB04	10	5 - 10
AOI 4	AOI4-SB06	20	15 - 20
	AOI4-SB07	15	10 - 15
AOI 5	AOI5-SB08	30	25 - 30
	AOI5-SB09	35	30 - 35
AOI 6	AOI6-SB10	30	25 - 30
	AOI6-SB11	25	20 - 25
	AOI6-SB12	30	25 - 30
AOI 7	AOI7-SB13	15	7 - 12
	AOI7-SB14	15	10 - 15
	AOI7-SB15	14	7 - 12
AOI 8	AOI8-SB16	10	5 - 10
AOI 9	AOI9-SB17	30	6 - 11
	AOI9-SB18	30	17 - 22
AOI 10	AOI10-SB19	20	15 - 20
	AOI10-SB20	15	8 - 13
AOI 11	AOI11-SB21	15	8 - 13
	AOI11-SB22	15	7 - 12
AOI 3	AOI3-SB05	10	5 - 10
	AOI3-SB23	15	8 - 13
	AOI3-SB24	15	8 - 13

Notes:
bgs = below ground surface
AOI = area of interest

Table 5-3
Groundwater Elevations at Temporary Groundwater Monitoring Wells
Site Inspection Report, Camp Dodge

Temporary Groundwater Monitoring Well ID	Ground Surface Elevation (ft amsl)	Depth to Water (ft bgs)	Groundwater Elevation (ft amsl)
AOI1-SB01	830.86	4.55	826.31
AOI1-SB02	824.21	0.80	823.41
AOI2-SB03	832.70	6.48	826.22
AOI2-SB04	832.16	6.18	825.98
AOI3-SB05	835.11	8.15	826.96
AOI4-SB06	849.33	13.52	835.81
AOI4-SB07	844.07	8.81	835.26
AOI5-SB08	950.07	16.10	933.97
AOI5-SB09	937.37	25.90	911.47
AOI6-SB10	993.04	Unknown	Unknown
AOI6-SB11	968.72	22.60	946.12
AOI6-SB12	936.31	28.64	907.67
AOI7-SB13	859.30	8.50	850.80
AOI7-SB14	860.54	8.02	852.52
AOI7-SB15	819.91	6.87	813.04
AOI8-SB16	864.51	9.90	854.61
AOI9-SB17	852.98	4.00	848.98
AOI9-SB18	836.10	15.34	820.76
AOI10-SB19	873.32	7.40	865.92
AOI10-SB20	856.21	4.10	852.11
AOI11-SB21	860.48	7.70	852.78
AOI11-SB22	861.31	2.55	858.76
AOI3-SB23	818.76	5.56	813.20
AOI3-SB24	832.21	7.45	824.76

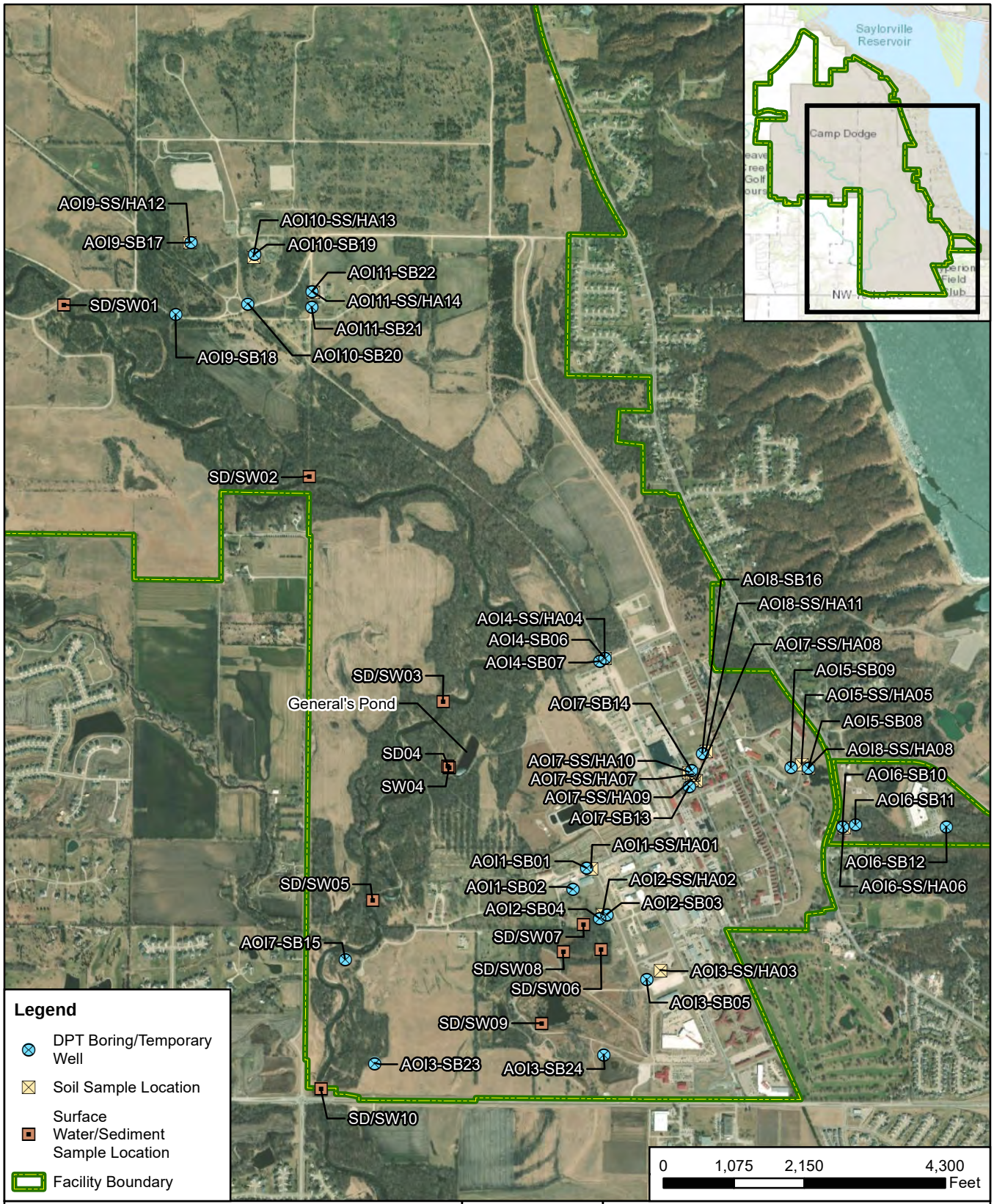
Notes:

amsl = above mean sea level

bgs = below ground surface

ft = feet

ID = identification



CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Camp Dodge, IA			
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SCALE	1:25,800	CHK BY	JH	7/22/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	7/22/2020

Site Inspection Sample Locations

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-1

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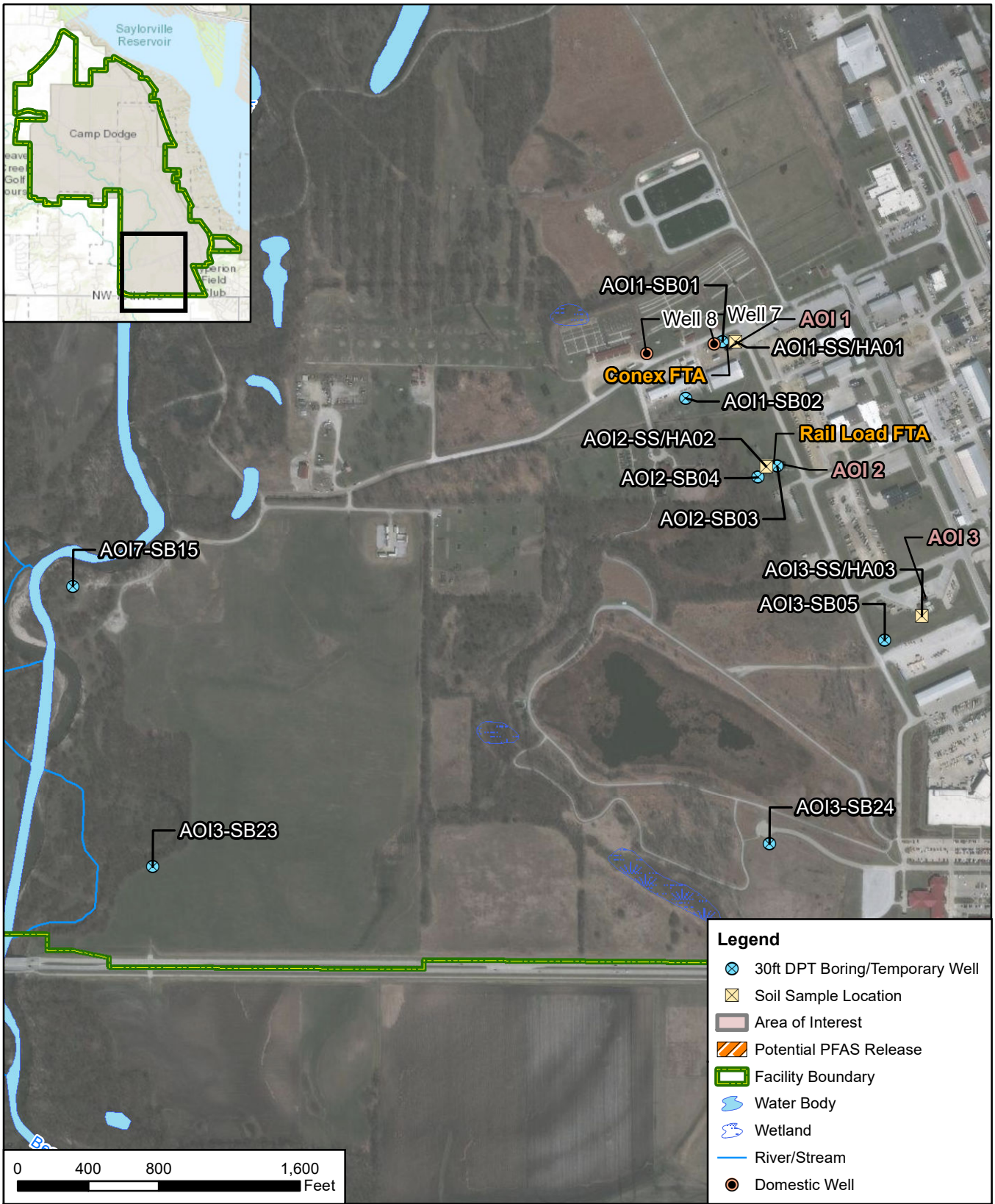

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	10/2/2020	GIS BY	MS	10/2/2020
SCALE	1:9,600	CHK BY	JH	10/2/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	10/2/2020

N

Western Cantonment Site Inspection Sample Locations

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-2

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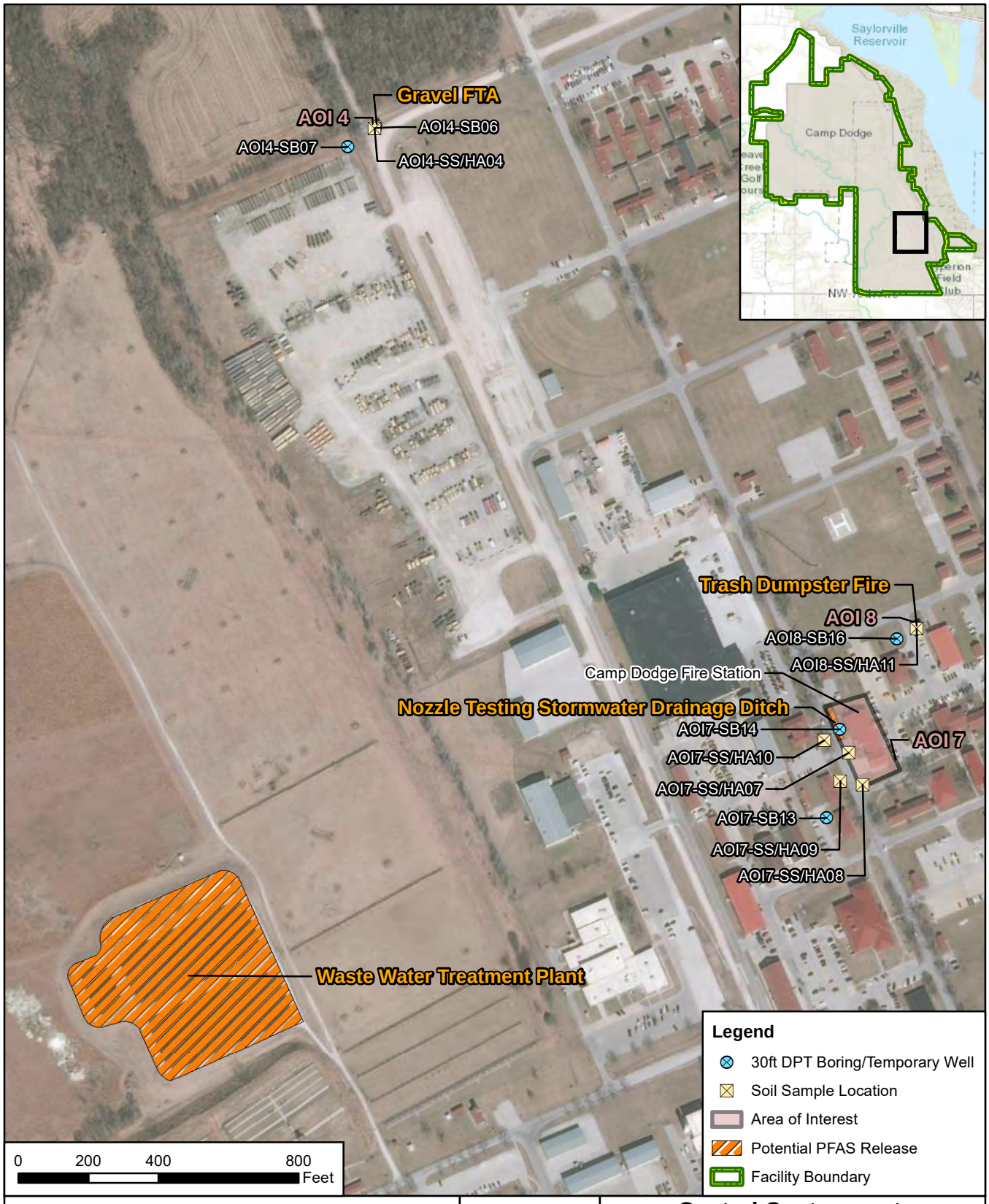

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	1/25/2021	GIS BY	MS	1/25/2021
SCALE	1:4,800	CHK BY	JH	1/25/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	1/25/2021

N

Central Cantonment Site Inspection Sample Locations

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-3

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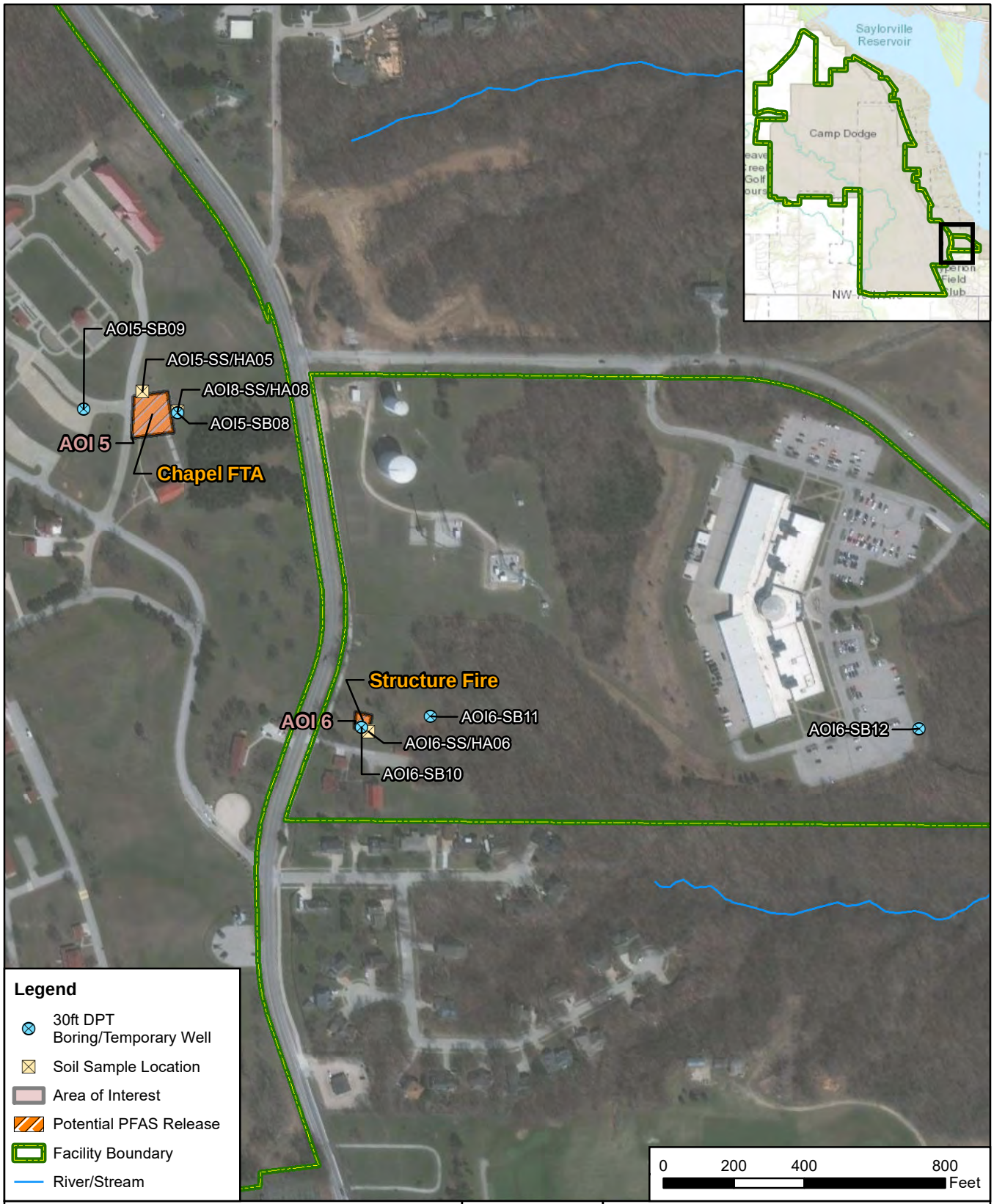

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Camp Dodge, IA			
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SCALE	1:4,800	CHK BY	JH	10/1/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	10/1/2020

Eastern Cantonment Site Inspection Sample Locations

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-4

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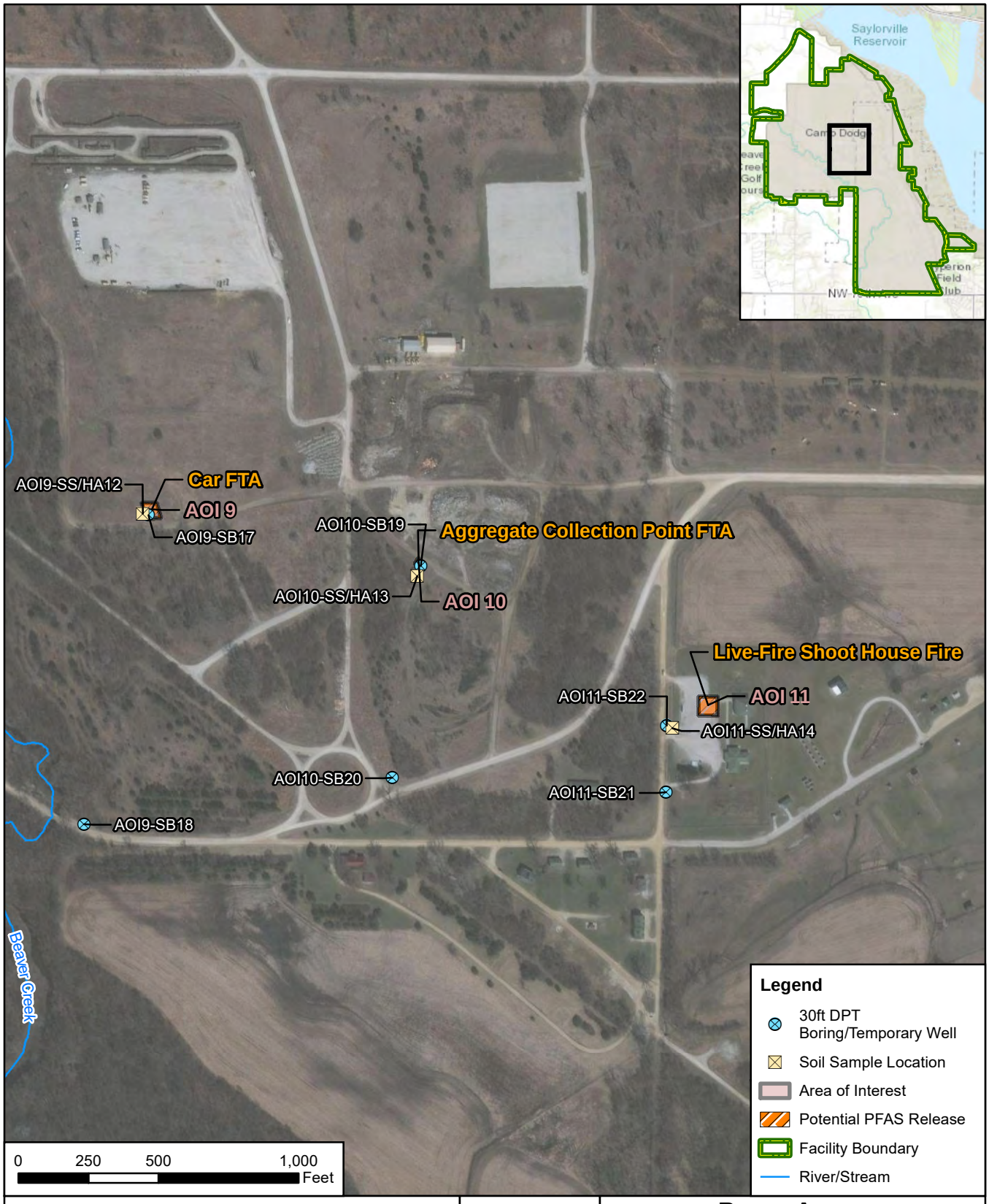

CLIENT	ARNG			
NOTES	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	10/5/2020	GIS BY	MS	10/5/2020
SCALE	1:6,000	CHK BY	JH	10/5/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,		PM	RG	10/5/2020

N

Range Areas
Site Inspection Sample Locations

AECOM
12420 Milestone Center Drive
Germantown, MD 20876

Figure 5-5

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6. Site Inspection Results

This section presents the analytical results of the SI for each AOI. 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 6.14**. **Table 6-2** through **Table 6-6** present PFAS results for samples with detections in surface soil, shallow subsurface soil, groundwater, sediment, and surface water; only constituents detected in one or more samples are included. Tables that contain all results are provided in **Appendix G**, and the laboratory reports are provided in **Appendix H**.

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 15 October 2019 (Assistant Secretary of Defense, 2019). 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 an RI, the next phase under CERCLA. The SLs apply to three compounds, PFOA, PFOS, and PFBS, for both soil and groundwater, as presented in **Table 6-1**.

All other results presented in this report are considered informational in nature and serve as an indication as to whether soil, groundwater, sediment, and surface water contain or do not contain PFAS within the boundaries of the facility.

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

Analyte	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	130	1,600	40
PFOS	130	1,600	40
PFBS	130,000	1,600,000	40,000

Notes:

a.) Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater and Soil using United States Environmental Protection Agency's (USEPA's) Regional Screening Level Calculator. HQ=0.1. 15 October 2019.

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 G** contains the results of the TOC and pH sampling.

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

factors (for example, pH and presence of polyvalent cations) may also affect PFAS sorption to solid phases (ITRC, 2018).

6.3 AOI 1: Conex FTA

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 1, which includes one potential PFAS release area: Conex FTA. The detected compounds in soil and groundwater are summarized in **Table 6-2** through **Table 6-4**. The detections of PFOS and PFOA in soil are presented on **Figure 6-1** and **Figure 6-2**, respectively. The detections of PFOS and PFOA in groundwater are presented in **Figure 6-3**.

6.3.1 AOI 1 Soil Analytical Results

Soil was sampled at AOI 1 from three depth intervals at boring locations AOI1-SB01 and AOI1-SB02: shallow (0 to 1 feet bgs), shallow subsurface (4 to 6 feet bgs), and deep (7 to 8 feet bgs). PFOA was not detected in any soil interval at AOI1-SB01. PFOA was detected in shallow and intermediate soil intervals at AOI1-SB02, with concentrations ranging from 0.282 J micrograms per kilogram (µg/Kg) to 4.78 µg/Kg, but was not detected in the deep soil interval.

PFOS was detected in the shallow and shallow subsurface soil intervals at AOI1-SB01, with concentrations ranging from 0.411 J µg/Kg to 2.53 µg/Kg, but was not detected in the deep soil interval. PFOS was detected in the shallow soil interval at AOI1-SB02, with a concentration of 410 µg/Kg, exceeding the individual SL of 130 µg/Kg. PFOS was also detected in the shallow subsurface interval at 17.0 µg/Kg, and the deep interval at 2.88 µg/Kg.

PFBS was detected at locations AOI1-SB01 and AOI1-SB02 in the shallow and shallow subsurface intervals, with concentrations ranging from 0.238 J µg/Kg to 3.83 µg/Kg. PFBS was not detected in the deep soil interval at either location.

Surface soil and shallow subsurface soil were sampled at two intervals (0 to 2 feet bgs, 2 to 4 feet bgs) from location AOI1-SS/HA01. PFOA, PFOS, and PFBS were not detected in the soil samples collected at this location.

6.3.2 AOI 1 Groundwater Analytical Results

Groundwater samples were collected from two temporary monitoring well locations at AOI 1 during the SI (AOI1-GW01 and AOI1-GW02). The SL of 40 ng/L for PFOS in groundwater was exceeded at AOI1-GW01 and AOI1-GW02, with concentrations of 347 ng/L and 285 ng/L, respectively. PFOA was detected below the SL of 40 ng/L at both AOI1-GW01 and AOI1-GW02, with concentrations ranging from 4.39 J ng/L to 5.52 J ng/L. PFBS was detected below the SL of 40,000 ng/L in both temporary well locations, with concentrations ranging from 112 ng/L ng/L to 117 ng/L.

6.3.3 AOI 1 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFBS were detected in soil and groundwater at AOI 1. The detected concentration of PFOS at AOI1-SB02 in the 0- to 1-foot depth interval exceeded the SL of 130 µg/Kg. Detected concentrations of PFOA and PFBS in soil were below the soil SLs. PFOS was detected in groundwater at concentrations exceeding the SL of 40 ng/L at AOI1-GW01 and AOI1-GW02. The detected concentrations of PFOA and PFBS in groundwater were below the individual SLs. Based on the exceedance of the SLs for PFOS in soil and groundwater, further evaluation at AOI 1 is warranted.

6.4 AOI 2: Rail Load Fire Training Area

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 2, which includes one potential PFAS release area: Rail Load FTA. The detected compounds in soil and groundwater are summarized in **Table 6-2** through **Table 6-4**. The detections of PFOS and PFOA in soil are presented on **Figure 6-1** and **Figure 6-2**, respectively. Detections of PFOS and PFOA in groundwater are presented on **Figure 6-3**.

6.4.1 AOI 2 Soil Analytical Results

Soil was sampled at AOI 2 from three depth intervals at boring locations AOI2-SB03 and AOI2-SB04: shallow (0 to 1 feet bgs), shallow subsurface (3 to 4 feet bgs), and deep (6 to 7 feet bgs). PFOS was detected at both sample locations, with concentrations below the SLs. PFOS was detected in the deep (6 to 7 feet bgs) interval at AOI02-SB03 and the shallow (0 to 1 feet bgs) interval at AOI02-SB04 at 0.549 J µg/Kg and 1.33 J µg/Kg, respectively. PFOA and PFBS were not detected in the soil samples collected at these locations.

Surface soil and shallow subsurface soil were sampled at two intervals (0 to 2 feet bgs, 2 to 4 feet bgs) from location AOI02-SS/HA02. PFOS was detected in the 0 to 2 feet bgs interval at a concentration of 0.495 J µg/Kg. PFOA and PFBS were not detected in the soil samples collected at this location.

6.4.2 AOI 2 Groundwater Analytical Results

Groundwater samples were collected from two temporary monitoring well locations at AOI 2 (AOI2-GW03 and AOI2-GW04). PFOS was detected below the SL of 40 ng/L at AOI2-GW03 and AOI2-GW04, with concentrations ranging from 14.9 ng/L to 17.4 ng/L. PFOA and PFBS were not detected in groundwater at AOI2-GW03 or AOI2-GW04.

6.4.3 AOI 2 Conclusions

Based on the results of the SI, PFOS was detected in soil and groundwater at AOI 2. The detected PFOS concentrations in soil were at least an order of magnitude lower than the soil SLs. PFOS was detected in groundwater at concentrations below the SL of 40 ng/L at both sample locations. Based on the detected concentrations of PFOS in soil and groundwater, no further action at AOI 2 is warranted.

6.5 AOI 3: Fuel Point Fire Training Area

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 3, which includes one potential PFAS release area: Fuel Point FTA. The detected compounds are summarized on **Table 6-2** through **Table 6-4**. The detections of PFOS and PFOA in soil are presented on **Figure 6-1** and **Figure 6-2**, respectively. The detections of PFOS and PFOA in groundwater are presented in **Figure 6-3**.

6.5.1 AOI 3 Soil Analytical Results

Soil was sampled at AOI 3 from three depth intervals at boring locations AOI3-SB05, AOI3-SB23, and AOI3-SB24: shallow (0 to 1 feet bgs), shallow subsurface (3 to 5 feet bgs), and deep (7 to 10 feet bgs). PFOS, PFOA, and PFBS were not detected in the soil samples collected at these locations.

Surface soil and shallow subsurface soil were sampled at two intervals (0 to 2 feet bgs, 2 to 4 feet bgs) at location AOI3-SS/HA03. PFOA, PFOS, and PFBS were not detected in soil samples collected at this location.

6.5.2 AOI 3 Groundwater Analytical Results

Groundwater samples were collected downgradient of AOI 3 from three temporary monitoring well locations (AOI3-GW05, AOI3-GW23, and AOI3-GW24). The SL of 40 ng/L for PFOS in groundwater was exceeded at AOI3-GW05 and AOI3-GW24, at concentrations of 42.4 ng/L and 61.4 ng/L, respectively. PFOA was detected below the SL of 40 ng/L at AOI3-GW05 and AOI3-GW24, with concentrations ranging from 1.86 J ng/L to 2.29 J ng/L. PFBS was detected below the SL of 40,000 ng/L at AOI3-SW05 and AOI3-SW24, with concentrations ranging from 1.49 J ng/L to 4.21 J ng/L. PFOS, PFOA, and PFBS were not detected in groundwater at location AOI3-GW23.

6.5.3 AOI 3 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFBS were not detected in soil at AOI 3. PFOS was detected in groundwater, at concentrations exceeding the SL of 40 ng/L at AOI3-GW05 and AOI3-GW24. PFOA and PFBS were detected in groundwater below the individual SLs. Based on the exceedances of the SL for PFOS in groundwater, further evaluation at AOI 3 is warranted.

6.6 AOI 4: Gravel Fire Training Area

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 4, which includes one potential PFAS release area: Gravel FTA. The detected compounds in soil and groundwater are summarized on **Table 6-2** through **Table 6-4**. The detections of PFOS and PFOA in soil are presented in **Figure 6-4** and **Figure 6-5**, respectively,. The detections of PFOS and PFOA in groundwater are presented on **Figure 6-3**.

6.6.1 AOI 4 Soil Analytical Results

Soil was sampled at AOI 4 from three depth intervals at boring locations AOI4-SB06 and AOI4-SB07: shallow (0 to 1 feet bgs), shallow subsurface (4 to 7 feet bgs), and deep (9 to 15 feet bgs). PFOA and PFBS were not detected in soil at AOI 4. PFOS was detected in the intermediate interval at a concentration of 0.721 J µg/Kg, several orders of magnitude below the SL.

Surface soil and shallow subsurface soil were sampled at two intervals (0 to 2 feet bgs, 2 to 4 feet bgs) at location AOI4-SS/HA04. PFOA, PFOS, and PFBS were not detected in soil samples collected at this location.

6.6.2 AOI 4 Groundwater Analytical Results

Groundwater was sampled from two temporary monitoring wells at AOI 4 (AOI4-GW06 and AOI4-GW07). PFOS was detected below the SL of 40 ng/L at AOI4-GW06 and AOI4-GW07 with concentrations ranging from 12.2 ng/L to 15.1 ng/L. PFBS was detected below the SL of 40,000 ng/L in both temporary well locations with concentrations ranging from 2.45 J ng/L to 3.89 J ng/L. PFOA was not detected in groundwater at AOI 4.

6.6.3 AOI 4 Conclusions

Based on the results of the SI, PFOS and PFBS were detected in soil and groundwater at AOI 4. The detected PFOS concentrations in soil were several orders of magnitude below the SL. PFOS and PFBS were detected in groundwater at concentrations below the individual SLs. Based on

the detected concentrations of and PFOS and PFBS in groundwater and PFOS in soil, no further action at AOI 4 is warranted.

6.7 AOI 5: Chapel Fire Training Area

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 5, which includes one potential PFAS release area: Chapel FTA. The detected compounds in soil and groundwater are summarized on **Table 6-2** through **Table 6-4**. The detections of PFOS and PFOA in soil are presented in **Figure 6-6** and **Figure 6-7**, respectively. The detections of PFOS and PFOA in groundwater are presented on **Figure 6-3**.

6.7.1 AOI 5 Soil Analytical Results

Soil was sampled at AOI 5 from three depth intervals at boring locations AOI5-SB08 and AOI5-SB09: shallow (0 to 1 feet bgs), shallow subsurface (15 to 18 feet bgs), and deep (24 to 29 feet bgs). PFOA and PFBS were not detected in soil at AOI 5. PFOS was detected in the shallow interval at AOI5-SB08 at a concentration of 0.453 J µg/Kg.

Surface soil and shallow subsurface soil were sampled at two intervals (0 to 2 feet bgs, 2 to 4 feet bgs) at location AOI5-SS/HA05. PFOS was detected in 0 to 2 feet bgs interval at a concentration of 0.787 J µg/Kg. PFOA and PFBS were not detected in soil samples collected at this location.

6.7.2 AOI 5 Groundwater Analytical Results

Groundwater samples were collected from two temporary monitoring well locations at AOI 5 during the SI (AOI5-GW08 and AOI5-GW09). PFOS, PFOA, and PFBS were not detected in groundwater collected at temporary monitoring wells AOI5-GW08 and AOI5-GW09.

6.7.3 AOI 5 Conclusions

Based on the results of the SI, PFOS was detected in soil at AOI 5. The detected concentrations in soil were at least two orders of magnitude lower than the soil SL. PFOS, PFOA, and PFBS were not detected in groundwater at AOI 5. Based on detected concentrations of PFOS in soil and non-detects for PFOA, PFOS, and PFBS in groundwater, no further action at AOI 5 is warranted.

6.8 AOI 6: Structure Fire

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 6, which includes one potential PFAS release area: Structure Fire. The detected compounds in soil and groundwater are summarized in **Table 6-2** through **Table 6-4**. The detections of PFOS and PFOA in soil are presented on **Figure 6-6** and **Figure 6-7**, respectively. The detections of PFOS and PFOA in groundwater are presented in **Figure 6-3**.

6.8.1 AOI 6 Soil Analytical Results

Soil was sampled at AOI 6 from three depth intervals at boring locations AOI6-SB10, AOI6-SB11, and AOI6-SB12: shallow (0 to 1 feet bgs), shallow subsurface (9 to 14 feet bgs), and deep (19 to 25 feet bgs). PFOA and PFOS were detected at the shallow interval in soil at AOI6-SB10 at concentrations of 0.298 J µg/Kg and 0.305 J µg/Kg, respectively. PFBS was not detected in soil at these three locations.

Surface soil and shallow subsurface soil were sampled at two intervals (0 to 2 feet bgs, 2 to 4 feet bgs) at location AOI6-SS/HA06. PFOS and PFOA were detected in the 0 to 2 feet bgs interval at

concentrations of 0.411 J µg/Kg and 0.735 J- µg/Kg, respectively. PFBS was not detected in soil samples collected at this location.

6.8.2 AOI 6 Groundwater Analytical Results

Groundwater samples were collected from two temporary monitoring well locations at AOI 6 during the SI (AOI6-GW11 and AOI6-GW12). PFOS and PFBS were detected below the SLs of 40 ng/L and 40,000 ng/L at AOI6-GW11, with concentrations of 18.1 J+ ng/L for PFOS and 2.64 J ng/L for PFBS. PFOA was not detected in groundwater at AOI6-GW11. PFOS, PFOA, and PFBS were not detected in groundwater at AOI6-GW12.

6.8.3 AOI 6 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFBS were detected in soil and groundwater at AOI 6. The detected concentrations of PFOS and PFOA in soil were at least two orders of magnitude lower than the soil SLs. PFOS and PFBS were detected in groundwater at concentrations below the individual SLs. Based on the detected concentrations of PFOS and PFOA in soil and PFOS and PFBS in groundwater, no further evaluation at AOI 6 is warranted.

6.9 AOI 7: Camp Dodge Fire Station

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 7, which includes one potential PFAS release area: Camp Dodge Fire Station. The detected compounds in soil and groundwater are summarized on **Table 6-2** through **Table 6-4**. The detections of PFOS and PFOA in soil are presented in **Figure 6-4** and **Figure 6-5**. The detections of PFOS and PFOA in groundwater are presented on **Figure 6-3**.

6.9.1 AOI 7 Soil Analytical Results

Soil was sampled at AOI 7 from three depth intervals at boring locations AOI7-SB13, AOI7-SB14, and AOI7-SB15: shallow (0 to 1 feet bgs), shallow subsurface (3 to 5 feet bgs), and deep (6 to 10 feet bgs). PFOA, PFOS, and PFBS were detected in soil samples at concentrations below SLs. PFOS was detected in soil at all three depth intervals at concentrations ranging from 0.416 J µg/Kg to 27.7 µg/Kg. PFOA was detected in shallow and shallow subsurface depth intervals at concentrations ranging from 0.212 J+ µg/Kg to 0.693 J µg/Kg. PFBS was also detected in shallow and shallow subsurface depth intervals at concentrations ranging from 0.261 J µg/Kg to 0.415 J µg/Kg.

Surface soil and shallow subsurface soil were sampled at two intervals (0 to 2 feet bgs, 2 to 4 feet bgs) at AOI07-SS/HA07, AOI07-SS/HA08, AOI07-SS/HA09, and AOI07-SS/HA10. PFOS, PFOA, and PFBS were detected in soil at concentrations below SLs. PFOS was detected in the 0 to 2 feet bgs interval at AOI07-SS/HA07, AOI07-SS/HA08, AOI07-SS/HA09, and AOI07-SS/HA10, with concentrations ranging from 3.84 µg/Kg to 13.7 µg/Kg. PFOS was detected in the 2 to 4 feet bgs interval at AOI07-SS/HA07, AOI07-SS/HA09, and AOI07-SS/HA10, with concentrations ranging from 0.607 J µg/Kg to 8.05 µg/Kg. PFOA was detected in the 0 to 2 feet bgs interval at AOI07-SS/HA07, AOI07-SS/HA08, and AOI07-SS/HA10, with concentrations ranging from 0.198 J- µg/Kg to 0.503 J- µg/Kg. PFOA was detected in the 2 to 4 feet bgs interval at AOI07-SS/HA07, with a concentration of 0.346 J- µg/Kg. PFBS was detected in the 0 to 2 feet bgs interval at AOI07-SS/HA10, with a concentration of 0.193 J µg/Kg. PFBS was detected in the in the 2 to 4 feet bgs interval at AOI07-SS/HA10, with a concentration of 0.251 J µg/Kg.

6.9.2 AOI 7 Groundwater Analytical Results

Groundwater samples were collected from three temporary monitoring well locations at AOI 7 during the SI: two near the Camp Dodge Fire Station (AOI7-GW013 and AOI7-GW14), and one downgradient of AOI 7 near Beaver Creek (AOI7-GW15). The SL of 40 ng/L for PFOS in groundwater was exceeded at AOI7-GW14, with a concentration of 90.2 J+ ng/L. PFOS was not detected in groundwater at AOI7-GW13 or AOI7-GW15. PFOA was detected below the SL of 40 ng/L at AOI7-GW13 and AOI7-GW14, with concentrations ranging from 2.25 J ng/L to 4.29 J ng/L. PFOA was not detected in groundwater at AOI7-SB15. PFBS was detected below the SL of 40,000 ng/L at all three temporary well locations, with concentrations ranging from 1.47 J ng/L to 18.8 ng/L.

6.9.3 AOI 7 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFBS were detected in soil and groundwater at AOI 7. The detected concentrations of PFOS, PFOA, and PFBS in soil were at least two orders of magnitude lower than the soil SLs. PFOS was detected in groundwater at a concentration exceeding the SL of 40 ng/L at AOI7-GW14. The detected concentrations of PFOA and PFBS in groundwater were below the individual SLs. Based on the exceedance of the SL for PFOS in groundwater, further evaluation at AOI 7 is warranted.

6.10 AOI 8: Trash Dumpster Fire

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 8, which includes one potential PFAS release area: Trash Dumpster Fire. The detected compounds in soil and groundwater are summarized on **Table 6-2** through **Table 6-4**. The detections of PFOS and PFOA in soil are presented in **Figure 6-4** and **Figure 6-5**. The detections of PFOS and PFOA in groundwater are presented on **Figure 6-3**.

6.10.1 AOI 8 Soil Analytical Results

Soil was sampled at AOI 8 from three depth intervals at boring location AOI8-SB16: shallow (0 to 1 feet bgs), shallow subsurface (3 to 4 feet bgs), and deep (7 to 8 feet bgs). PFOS, PFOA, and PFBS were not detected in soil collected at this location.

Surface soil and shallow subsurface soil were sampled from two intervals (0 to 2 feet bgs, 2 to 4 feet bgs) at location AOI8-SS/HA11. PFOS was detected at a concentration of 0.432 J µg/Kg in the 0 to 2 feet bgs interval. PFOA and PFBS were not detected in soil samples collected at this location.

6.10.2 AOI 8 Groundwater Analytical Results

A groundwater sample was collected from one temporary monitoring well location at AOI 8 during the SI (AOI8-GW16). PFOS and PFOA were detected below the SL of 40 ng/L at AOI8-GW16, with concentrations of 3.04 J ng/L and 2.38 J ng/L, respectively. PFBS was detected below the SL of 40,000 ng/L, with a concentration of 2.99 J ng/L.

6.10.3 AOI 8 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFBS were detected in soil and groundwater at AOI 8. The detected concentration of PFOS in soil was several orders of magnitude lower than the SL. PFOS, PFOA, and PFBS were detected in groundwater at concentrations below the SLs. Based on the detected concentrations of PFOS in soil and PFOS, PFOA, and PFBS in groundwater, no further action at AOI 8 is warranted.

6.11 AOI 9: Car Fire Training Area

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 9, which includes one potential PFAS release area: Car FTA. The detections of PFOS and PFOA in soil are presented in **Figure 6-8** and **Figure 6-9**, respectively. The detections of PFOS and PFOA in groundwater are presented on **Figure 6-3**.

6.11.1 AOI 9 Soil Analytical Results

Soil was sampled at AOI 9 from three depth intervals at boring location AOI9-SB17: shallow (0 to 1 feet bgs), shallow subsurface (4 to 5 feet bgs), and deep (9 to 10 feet bgs). Soil was also sampled from three depth intervals at boring location AOI9-SB18: shallow (0 to 1 feet bgs), shallow subsurface (14 to 15 feet bgs), and deep (29 to 30 feet bgs). PFOS, PFOA, and PFBS were not detected in soil collected from either of these locations.

Surface soil and shallow subsurface soil were sampled at two intervals (0 to 2 feet bgs, 2 to 4 feet bgs) at location AOI9-SS/HA12. PFOS, PFOA, and PFBS were not detected in soil samples collected at this location.

6.11.2 AOI 9 Groundwater Analytical Results

Groundwater samples were collected from two temporary monitoring well locations at AOI 9 during the SI (AOI9-GW17 and AOI9-GW18). PFOS and PFOA were detected below the SL of 40 ng/L at AOI9-GW18, with concentrations of 3.56 J+ ng/L for PFOS and 1.99 J+ ng/L for PFOA. PFOS and PFOA were not detected in groundwater at AOI9-GW17. PFBS was detected below the SL of 40,000 ng/L at AOI9-GW17, with a concentration of 26.8 ng/L. PFBS was not detected in groundwater at AOI9-GW18.

6.11.3 AOI 9 Conclusions

Based on the results of the SI, PFOS, PFOA, and PFBS were not detected in soil at AOI 9. PFOS, PFOA, and PFBS were detected in groundwater at concentrations below the SLs. Based on the detected concentrations of PFOS, PFOA, and PFBS in groundwater, no further action at AOI 9 is warranted.

6.12 AOI 10: Aggregate Collection Point Fire Training Area

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 10, which includes one potential PFAS release area: Aggregate Collection Point FTA. The detected compounds in soil and groundwater are summarized on **Table 6-2** through **Table 6-4**. The detections of PFOS and PFOA in soil are presented in **Figure 6-8** and **Figure 6-9**, respectively. The detections of PFOS and PFOA in groundwater are presented on **Figure 6-3**.

6.12.1 AOI 10 Soil Analytical Results

Soil was sampled at AOI 10 from three depth intervals at boring locations AOI10-SB19 and AOI10-SB20: shallow (0 to 1 feet bgs), shallow subsurface (3 to 5 feet bgs), and deep (9 to 10 feet bgs). PFOS, PFOA, and PFBS were not detected in soil collected at these locations.

Surface soil and shallow subsurface soil were sampled from two intervals (0 to 2 feet bgs, 2 to 4 feet bgs) at location AOI10-SS/HA13. PFOS, PFOA, and PFBS were not detected in soil samples collected at this location.

6.12.2 AOI 10 Groundwater Analytical Results

Groundwater was sampled from two temporary monitoring wells at AOI 10 (AOI10-GW19 and AOI10-GW20). PFOA was detected below the SL of 40 ng/L at AOI10-GW20 with a concentration of 5.18 J ng/L. PFOA was not detected in groundwater at AOI10-GW19. PFOS and PFBS were not detected in groundwater at AOI10-GW19 or AOI10-GW20.

6.12.3 AOI 10 Conclusions

Based on the results of the SI, PFOS, PFOA, and PFBS were not detected in soil at AOI 10. PFOA was detected in groundwater at a concentration below the SL. Based on the detected concentrations of PFOA in groundwater, no further action at AOI 10 is warranted.

6.13 AOI 11: Live Fire Shoot-House Fire

This section presents the analytical results for soil and groundwater in comparison to SLs for AOI 11, which includes one potential PFAS release area: Live Fire Shoot-House Fire. The detected compounds in soil and groundwater are summarized on **Table 6-2** through **Table 6-4**. The detections of PFOS and PFOA in soil are presented in **Figure 6-8** and **Figure 6-9**. The detections of PFOS and PFOA in groundwater are presented on **Figure 6-3**.

6.13.1 AOI 11 Soil Analytical Results

Soil was sampled at AOI 11 from three depth intervals at boring locations AOI11-SB21 and AOI11-SB22: shallow (0 to 1 feet bgs), shallow subsurface (3 to 4 feet bgs), and deep (6 to 8 feet bgs). PFOS, PFOA, and PFBS were not detected in soil collected at these locations.

Surface soil and shallow subsurface soil were sampled at two intervals (0 to 2 feet bgs, 2 to 4 feet bgs) at location AOI10-SS/HA14. PFOS, PFOA, and PFBS were not detected in soil samples collected at this location.

6.13.2 AOI 11 Groundwater Analytical Results

Groundwater samples were collected from two temporary monitoring well locations at AOI 11 during the SI (AOI11-GW21 and AOI11-GW22). PFOS, PFOA, and PFBS were not detected in groundwater collected at temporary monitoring wells AOI11-GW21 and AOI11-GW22.

6.13.3 AOI 11 Conclusions

Based on the results of the SI, PFOA, PFOS, and PFBS was not detected in soil or groundwater at AOI 11. Therefore, no further action at AOI 11 is warranted.

6.14 Sediment and Surface Water Results

This section presents the analytical results for sediment and surface water collected in Beaver Creek and the unnamed wetland and pond located in the southwestern cantonment of Camp Dodge. There are no established SLs for PFOA, PFOS, and PFBS in sediment or surface water; these results are presented for informational purposes only. **Figure 6-10** and **Figure 6-11** present the ranges of detections for PFOS and PFOA in sediment and surface water, respectively. The detected compounds in sediment and surface water are summarized in **Table 6-5** and **Table 6-6**, respectively.

6.14.1 Beaver Creek

Collocated sediment and surface water (SD/SW) samples were collected from six locations along Beaver Creek at Camp Dodge (**Figure 5-1**).

- Samples SD/SW01 were collected upgradient of the Camp Dodge Range Areas and cantonment area.
- Samples SD/SW02 were collected downgradient of AOI 9 Car FTA, AOI 10 Aggregate Collection Point FTA, and AOI 11 Live Fire Shoot-House Fire.
- Samples SD/SW03 were collected downgradient of AOI 4 Gravel FTA.
- Samples SD/SW04 were collected from the General's Pond drainage that flows towards Beaver Creek.
- Sample SD/SW05 were collected downgradient of AOI 5 Chapel FTA, AOI 7 Camp Dodge Fire Station, AOI 8 Trash Dumpster Fire, and the confluence of the General's Pond drainage and Beaver Creek.
- Samples SD/SW10 were collected slightly upgradient of the facility boundary where Beaver Creek flows off Camp Dodge.

PFOS, PFOA, and PFBS were not detected in sediment or surface water collected at SD/SW01, SD/SW02, SD/SW03, and SD/SW10.

PFOS was detected in sediment collected at SD04, with a concentration of 0.502 J µg/Kg. PFOS, PFOA, and PFBS were detected in surface water collected at SW04, with concentrations of 19.9 ng/L, 6.04 J ng/L, and 2.46 J ng/L, respectively.

PFOS was detected in sediment collected at SD05, with a concentration of 1.04 J µg/Kg. PFOS and PFBS were detected in surface water collected at SW05, with concentrations of 2.61 J ng/L and 1.26 J ng/L, respectively. PFOA was not detected in surface water collected at SW05.

6.14.2 Southwestern Cantonment Unnamed Wetlands and Pond

Sediment and surface water samples were collected from four locations in the unnamed wetlands and pond located in the southwestern cantonment of Camp Dodge (**Figure 5-1**).

- Samples SD/SW06, SD/SW07, SD/SW08, and SD/SW09 were collected downgradient of the Camp Dodge central cantonment area, AOI 2 Rail Load FTA, and AOI 3 Fuel Point FTA.

PFOS was detected in sediment collected at SD06, with a concentration of 0.769 J µg/Kg. PFOS and PFBS were detected in surface water collected at SW06, with concentrations of 25 ng/L and 6.74 J ng/L, respectively. PFOA was not detected in surface water collected at SW06.

PFOS was detected in sediment collected at SD07, with a concentration of 0.454 J µg/Kg. PFOS and PFBS were detected in surface water collected at SW07, with concentrations of 2.89 J ng/L and1.92 J ng/L, respectively. PFOA was not detected in surface water collected at SW07.

PFOS and PFBS were detected in sediment collected at SD08, with concentrations of 1.05 J µg/Kg and 0.228 J µg/Kg, respectively. PFOS and PFBS were detected in surface water collected at SW08, with concentrations of 49.4 ng/L and 27.9 ng/L, respectively. PFOA was not detected in surface water collected at SW08.

PFOS, PFOA, and PFBS were not detected in sediment collected at SD09. PFOS and PFBS were detected in surface water collected at SW09, with concentrations of 12.7 ng/L and 3.38 J ng/L, respectively. PFOA was not detected in surface water at SW09.

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Table 6-2
PFAS Detections in Surface Soil
Site Inspection Report
Camp Dodge, Johnston, Iowa

Area of Interest		AOI1										AOI2						AOI3			
Sample ID		AOI1-SB01-0-1		AOI1-SB01-0-1-FD		AOI1-SB02-0-1		AOI1-SS01		AOI1-SS01-FD		AOI2-SB03-0-1		AOI2-SB04-0-1		AOI2-SS02		AOI3-SB05-0-1		AOI3-SB23-0-1	
Sample Date		11/19/2019		11/19/2019		11/19/2019		11/19/2019		11/19/2019		11/21/2019		11/21/2019		11/19/2019		11/21/2019		11/23/2019	
Depth		0 - 1 ft		0 - 1 ft		0 - 1 ft		0 - 2 ft		0 - 2 ft		0 - 1 ft		0 - 1 ft		0 - 2 ft		0 - 1 ft		0 - 1 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, PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (µg/kg)																					
6:2 FTS	-	ND		ND		ND		ND		ND		0.406	J	ND		ND		ND		ND	
PFBA	-	ND		ND		ND		0.227	J	0.197	J	ND		0.286	J	0.383	J	0.171	J	0.216	J
PFBS	130000	ND		ND		3.83		ND		ND		ND		ND		ND		ND		ND	
PFHpA	-	ND		ND		1.59		ND		ND		ND		ND		ND		ND		ND	
PFHxA	-	ND		ND		7.10		ND		ND		ND		ND		ND		ND		ND	
PFHxS	-	0.504	J	0.388	J	50.2		ND		ND		ND		ND		ND		ND		ND	
PFNA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFOA	130	ND		ND		4.78		ND		ND		ND		ND		ND		ND		ND	
PFOS	130	0.842	J	0.411	J	410		ND		ND		ND		1.33	J	0.495	J	ND		ND	
PFPeA	-	ND		ND		2.05		ND		ND		ND		ND		ND		ND		ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 October 2019. Soil screening levels based on residential scenario for direct ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

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

6:2 FTS	6:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
DL	detection limit
FD	field duplicate
ft	feet
HQ	Hazard quotient
LCMSMS	Liquid Chromatography 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
SS	surface soil
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	Not applicable

Table 6-2
PFAS Detections in Surface Soil
Site Inspection Report
Camp Dodge, Johnston, Iowa

Area of Interest		AOI3						AOI4						AOI5						AOI6	
Sample ID		AOI3-SB24-0-1		AOI3-SS03		AOI3-SS03-FD		AOI4-SB06-0-1		AOI4-SB07-0-1		AOI4-SS04		AOI5-SB08-0-1		AOI5-SB09-0-1		AOI5-SS05		AOI6-SB10-0-1	
Sample Date		11/21/2019		11/20/2019		11/20/2019		11/21/2019		11/22/2019		11/19/2019		11/22/2019		11/22/2019		11/19/2019		11/24/2019	
Depth		0 - 1 ft		0 - 2 ft		0 - 2 ft		0 - 1 ft		0 - 1 ft		0 - 2 ft		0 - 1 ft		0 - 1 ft		0 - 2 ft		0 - 1 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, PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (µg/kg)																					
6:2 FTS	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFBA	-	ND		ND		0.169	J	ND		0.191	J	0.180	J	0.190	J	0.246	J	0.181	J	ND	
PFBS	130000	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHpA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHxA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHxS	-	ND		ND		ND		ND		ND		0.180	J	ND		ND		ND		ND	
PFNA	-	ND		ND	UJ	ND	UJ	ND		ND		ND		ND		ND		ND		ND	
PFOA	130	ND		ND	UJ	ND	UJ	ND		ND		ND		ND		ND		ND		0.298	J
PFOS	130	ND		ND		ND		ND		ND		ND		0.453	J	ND		0.787	J	0.305	J
PFPeA	-	ND		ND	UJ	ND	UJ	ND		ND		ND		ND		ND		ND		ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 October 2019. Soil screening levels based on residential scenario for direct ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

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

6:2 FTS	6:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
DL	detection limit
FD	field duplicate
ft	feet
HQ	Hazard quotient
LCMSMS	Liquid Chromatography 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
SS	surface soil
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	Not applicable

Table 6-2
PFAS Detections in Surface Soil
Site Inspection Report
Camp Dodge, Johnston, Iowa

Area of Interest		AOI6						AOI7													
Sample ID		AOI6-SB11-0-1		AOI6-SB12-0-1		AOI6-SS06		AOI7-SB13-0-1		AOI7-SB14-0-1		AOI7-SB15-0-1		AOI7-SS07		AOI7-SS07-FD		AOI7-SS08		AOI7-SS09	
Sample Date		11/25/2019		11/24/2019		11/20/2019		11/24/2019		11/24/2019		11/22/2019		11/20/2019		11/20/2019		11/20/2019		11/20/2019	
Depth		0 - 1 ft		0 - 1 ft		0 - 2 ft		0 - 1 ft		0 - 1 ft		0 - 1 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft		0 - 2 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (µg/kg)																					
6:2 FTS	-	ND		ND		0.218	J	ND	UJ	ND		ND		ND		0.240	J	ND		ND	
PFBA	-	ND		ND		0.239	J	0.469	J+	0.410	J	0.221	J	ND		0.153	J	0.147	J	0.278	J
PFBS	130000	ND		ND		ND		ND	UJ	0.261	J	ND		ND		ND		ND		ND	
PFHpA	-	ND		ND		0.226	J	0.150	J+	0.171	J	ND		0.207	J	0.221	J	ND		ND	
PFHxA	-	ND		ND		0.285	J	ND	UJ	0.399	J	ND		0.208	J	0.216	J	0.253	J	0.354	J
PFHxS	-	ND		ND		ND		ND	UJ	5.61		ND		0.488	J	0.476	J	0.991	J	0.820	J
PFNA	-	ND		ND		0.382	J-	ND	UJ	0.147	J	ND		0.336	J-	0.364	J-	ND	UJ	ND	UJ
PFOA	130	ND		ND		0.735	J-	0.212	J+	0.454	J	ND		0.436	J-	0.503	J-	0.198	J-	ND	UJ
PFOS	130	ND		ND		0.411	J	0.540	J+	19.7		ND		8.75		9.22		3.84		12.3	
PFPeA	-	ND		ND		0.195	J-	0.349	J+	0.394	J	ND		0.265	J-	0.250	J-	0.208	J-	0.193	J-

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 October 2019. Soil screening levels based on residential scenario for direct ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

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

6:2 FTS	6:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
DL	detection limit
FD	field duplicate
ft	feet
HQ	Hazard quotient
LCMSMS	Liquid Chromatography 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
SS	surface soil
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	Not applicable

Table 6-2
PFAS Detections in Surface Soil
Site Inspection Report
Camp Dodge, Johnston, Iowa

Area of Interest		AOI7				AOI8				AOI9								AOI10			
Sample ID		AOI7-SS09-FD		AOI7-SS10		AOI8-SB16-0-1		AOI8-SS11		AOI9-SB17-0-1		AOI9-SB18-0-1		AOI9-SS12		AOI9-SS12-FD		AOI10-SB19-0-1		AOI10-SB20-0-1	
Sample Date		11/20/2019		11/20/2019		11/21/2019		11/20/2019		11/23/2019		11/23/2019		11/21/2019		11/21/2019		11/23/2019		11/23/2019	
Depth		0 - 2 ft		0 - 2 ft		0 - 1 ft		0 - 2 ft		0 - 1 ft		0 - 1 ft		0 - 2 ft		0 - 2 ft		0 - 1 ft		0 - 1 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, PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (µg/kg)																					
6:2 FTS	-	ND		4.21		2.06		ND		ND		ND		0.395	J	0.425	J	ND		ND	
PFBA	-	0.325	J	0.326	J	ND		ND		0.177	J	0.157	J	0.221	J	0.253	J	0.241	J	0.226	J
PFBS	130000	ND		0.193	J	ND		ND		ND		ND		ND		ND		ND		ND	
PFHpA	-	ND		0.349	J	ND		ND		ND		ND		ND		ND		ND		ND	
PFHxA	-	0.326	J	0.468	J	ND		ND		ND		ND		ND		ND		0.210	J	ND	
PFHxS	-	0.590	J	2.03		ND		ND		ND		ND		ND		ND		ND		ND	
PFNA	-	ND	UJ	0.178	J-	ND		ND		ND		ND		ND		ND		ND		ND	
PFOA	130	ND	UJ	0.400	J-	ND		ND		ND		ND		ND		ND		ND		ND	
PFOS	130	13.7		11.5		ND		0.432	J	ND		ND		ND		ND		ND		ND	
PFPeA	-	0.249	J-	0.509	J-	ND		ND		ND		ND		ND		ND		0.243	J	ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 October 2019. Soil screening levels based on residential scenario for direct ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

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

6:2 FTS	6:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
DL	detection limit
FD	field duplicate
ft	feet
HQ	Hazard quotient
LCMSMS	Liquid Chromatography 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
SS	surface soil
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	Not applicable

Table 6-2
PFAS Detections in Surface Soil
Site Inspection Report
Camp Dodge, Johnston, Iowa

	Area of Interest	AOI10		AOI11					
	Sample ID	AOI10-SS13		AOI11-SB21-0-1		AOI11-SB22-0-1		AOI11-SS14	
	Sample Date	11/21/2019		11/24/2019		11/24/2019		11/21/2019	
	Depth	0 - 2 ft		0 - 1 ft		0 - 1 ft		0 - 2 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (µg/kg)									
6:2 FTS	-	ND		ND		ND		0.957	J
PFBA	-	0.286	J	ND		ND		0.193	J
PFBS	130000	ND		ND		ND		ND	
PFHpA	-	ND		ND		ND		ND	
PFHxA	-	ND		ND		ND		ND	
PFHxS	-	ND		ND		ND		ND	
PFNA	-	ND		ND		ND		ND	
PFOA	130	ND		ND		ND		ND	
PFOS	130	ND		ND		ND		ND	
PFPeA	-	0.184	J+	ND		ND		ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 October 2019. Soil screening levels based on residential scenario for direct ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

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

6:2 FTS	6:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
DL	detection limit
FD	field duplicate
ft	feet
HQ	Hazard quotient
LCMSMS	Liquid Chromatography 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
SS	surface soil
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
-	Not applicable

Table 6-3
PFAS Detections in Subsurface Soil
Site Inspection Report
Camp Dodge, Johnston, Iowa

Area of Interest		AOI1										AOI2									
Sample ID		AOI1-SB01-4-5		AOI1-SB01-7-8		AOI1-SB02-5-6		AOI1-SB02-7-8		AOI1-HA01		AOI2-SB03-3-4		AOI2-SB03-3-4-FD		AOI2-SB03-6-7		AOI2-SB04-3-4		AOI2-SB04-6-7	
Sample Date		11/19/2019		11/19/2019		11/19/2019		11/21/2019		11/19/2019		11/21/2019		11/21/2019		11/21/2019		11/21/2019		11/21/2019	
Depth		4 - 5 ft		7 - 8 ft		5 - 6 ft		7 - 8 ft		2 - 4 ft		3 - 4 ft		3 - 4 ft		6 - 7 ft		3 - 4 ft		6 - 7 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, PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (µg/kg)																					
6:2 FTS	-	ND		ND		ND		0.329	J	ND		0.441	J	ND		ND		ND		ND	
PFBA	-	ND		ND		0.363	J	ND		0.204	J	ND		ND		ND		0.171	J	ND	
PFBS	1600000	0.238	J	ND		0.359	J	ND		ND		ND		ND		ND		ND		ND	
PFDA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHpA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHxA	-	0.250	J	ND		0.658	J	ND		ND		ND		ND		ND		ND		ND	
PFHxS	-	3.22		0.186	J	5.33		1.18	J	ND		ND		ND		ND		ND		ND	
PFNA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFOA	1600	ND		ND		0.282	J	ND		ND		ND		ND		ND		ND		ND	
PFOS	1600	2.53		ND		17.0		2.88		ND		ND		ND		0.549	J	ND		ND	
PFPeA	-	ND		ND		0.189	J	ND		ND		ND		ND		ND		ND		ND	
PFUnDA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 October 2019. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

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

6:2 FTS	6:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
FD	Field duplicate
ft	feet
HA	Hand auger
HQ	Hazard quotient
LCMSMS	Liquid Chromatography 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
-	Not applicable

Table 6-3
PFAS Detections in Subsurface Soil
Site Inspection Report
Camp Dodge, Johnston, Iowa

Area of Interest		AOI2		AOI3														AOI4	
Sample ID		AOI2-HA02		AOI3-SB05-3-4		AOI3-SB05-7-8		AOI3-SB23-4-5		AOI3-SB23-9-10		AOI3-SB23-9-10-FD		AOI3-SB24-4-5		AOI3-SB24-7-8		AOI3-HA03		AOI4-SB06-6-7	
Sample Date		11/19/2019		11/21/2019		11/21/2019		11/23/2019		11/23/2019		11/23/2019		11/21/2019		11/21/2019		11/20/2019		11/21/2019	
Depth		2 - 4 ft		3 - 4 ft		7 - 8 ft		4 - 5 ft		9 - 10 ft		9 - 10 ft		4 - 5 ft		7 - 8 ft		2 - 4 ft		6 - 7 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, PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (µg/kg)																					
6:2 FTS	-	ND		ND		ND		ND		ND		ND		ND		ND		0.345	J	0.619	J
PFBA	-	0.229	J	ND		0.158	J	ND		ND		ND		ND		0.164	J	ND		ND	
PFBS	1600000	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFDA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHpA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHxA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHxS	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFNA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFOA	1600	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFOS	1600	ND		ND		ND		ND	UJ	ND		ND		ND		ND		ND		ND	
PFPeA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFUnDA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 October 2019. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

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Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
FD	Field duplicate
ft	feet
HA	Hand auger
HQ	Hazard quotient
LCMSMS	Liquid Chromatography 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
-	Not applicable

Table 6-3
PFAS Detections in Subsurface Soil
Site Inspection Report
Camp Dodge, Johnston, Iowa

	Area of Interest	AOI4								AOI5		AOI6									
	Sample ID	AOI4-SB06-14-15		AOI4-SB07-4-5		AOI4-SB07-9-10		AOI4-HA04		AOI5-HA05		AOI6-SB10-13-14		AOI6-SB11-9-10		AOI6-SB12-13-14		AOI6-HA06		AOI6-HA06-FD	
	Sample Date	11/21/2019		11/22/2019		11/22/2019		11/19/2019		11/19/2019		11/24/2019		11/25/2019		11/24/2019		11/20/2019		11/20/2019	
	Depth	14 - 15 ft		4 - 5 ft		9 - 10 ft		2 - 4 ft		2 - 4 ft		13 - 14 ft		9 - 10 ft		13 - 14 ft		2 - 4 ft		2 - 4 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, PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (µg/kg)																					
6:2 FTS	-	ND		ND		ND		ND		ND		ND		ND		ND		0.334	J	0.817	J
PFBA	-	ND		ND		ND		ND		ND		ND		ND		ND		0.227	J	ND	
PFBS	1600000	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFDA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHpA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHxA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHxS	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFNA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	UJ	ND	UJ
PFOA	1600	ND		ND		ND		ND		ND		ND		ND		ND		ND	UJ	ND	UJ
PFOS	1600	ND		0.721	J	ND		ND		ND		ND		ND		ND		ND		ND	
PFPeA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND	UJ	ND	UJ
PFUnDA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 October 2019. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

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Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
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PFBS	perfluorobutanesulfonic acid
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PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
FD	field duplicate
ft	feet
HA	Hand auger
HQ	Hazard quotient
LCMSMS	Liquid Chromatography 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
-	Not applicable

Table 6-3
PFAS Detections in Subsurface Soil
Site Inspection Report
Camp Dodge, Johnston, Iowa

Area of Interest		AOI7																			
Sample ID		AOI7-SB13-3-4		AOI7-SB13-6-7		AOI7-SB14-4-5		AOI7-SB14-9-10		AOI7-SB15-3-4		AOI7-SB15-6-7		AOI7-HA07		AOI7-HA08		AOI7-HA09		AOI7-HA10	
Sample Date		11/24/2019		11/24/2019		11/24/2019		11/24/2019		11/22/2019		11/22/2019		11/20/2019		11/20/2019		11/20/2019		11/20/2019	
Depth		3 - 4 ft		6 - 7 ft		4 - 5 ft		9 - 10 ft		3 - 4 ft		6 - 7 ft		2 - 4 ft		2 - 4 ft		2 - 4 ft		2 - 4 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, PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (µg/kg)																					
6:2 FTS	-	ND		ND		ND		ND		ND		ND		0.202	J	ND		ND		0.520	J
PFBA	-	ND		ND		0.293	J	ND		0.223	J	ND		0.231	J	ND		0.217	J	0.373	J
PFBS	1600000	ND		ND		0.415	J	ND		ND		ND		ND		ND		ND		0.251	J
PFDA	-	ND		ND		ND		ND		ND		ND		0.306	J	ND		ND		ND	
PFHpA	-	ND		ND		0.229	J	ND		ND		ND		0.193	J	ND		ND		ND	
PFHxA	-	ND		ND		0.549	J	ND		ND		ND		0.188	J	0.190	J	0.176	J	ND	
PFHxS	-	ND		ND		4.88		0.442	J	ND		ND		0.584	J	0.466	J	1.32		3.95	
PFNA	-	ND		ND		0.142	J	ND		ND		ND		0.243	J-	ND		ND		ND	
PFOA	1600	ND		ND		0.693	J	ND		ND		ND		0.346	J-	ND		ND		ND	
PFOS	1600	ND		ND		27.7		0.416	J	ND		ND		8.05		ND		5.07		0.607	J
PFPeA	-	ND		ND		0.485	J	ND		ND		ND		0.238	J-	ND		ND		ND	
PFUnDA	-	ND		ND		ND		ND		ND		ND		0.209	J	ND		ND		ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 October 2019. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

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

6:2 FTS	6:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
FD	field duplicate
ft	feet
HA	Hand auger
HQ	Hazard quotient
LCMSMS	Liquid Chromatography 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
-	Not applicable

Table 6-3
PFAS Detections in Subsurface Soil
Site Inspection Report
Camp Dodge, Johnston, Iowa

	Area of Interest	AOI8						AOI9								AOI10					
	Sample ID	AOI8-SB16-3-4		AOI8-SB16-7-8		AOI8-HA11		AOI9-SB17-4-5		AOI9-SB17-9-10		AOI9-SB18-14-15		AOI9-HA12		AOI10-SB19-4-5		AOI10-SB19-9-10		AOI10-SB20-3-4	
	Sample Date	11/21/2019		11/21/2019		11/20/2019		11/23/2019		11/23/2019		11/23/2019		11/21/2019		11/23/2019		11/23/2019		11/23/2019	
	Depth	3 - 4 ft		7 - 8 ft		2 - 4 ft		4 - 5 ft		9 - 10 ft		14 - 15 ft		2 - 4 ft		4 - 5 ft		9 - 10 ft		3 - 4 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, PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (µg/kg)																					
6:2 FTS	-	ND		ND		ND		ND		ND		ND		0.399	J	ND		ND		ND	
PFBA	-	ND		ND		ND		0.290	J	ND		0.162	J	ND		ND		ND		ND	
PFBS	1600000	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFDA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHpA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHxA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHxS	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFNA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFOA	1600	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFOS	1600	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFPeA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFUnDA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 October 2019. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

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

6:2 FTS	6:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
FD	field duplicate
ft	feet
HA	hand auger
HQ	Hazard quotient
LCMSMS	Liquid Chromatography 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
-	Not applicable

Table 6-3
PFAS Detections in Subsurface Soil
Site Inspection Report
Camp Dodge, Johnston, Iowa

	Area of Interest	AOI10				AOI11											
	Sample ID	AOI10-SB20-9-10		AOI10-HA13		AOI11-SB21-3-4		AOI11-SB21-3-4-FD		AOI11-SB22-3-4		AOI11-SB22-6-7		AOI11-SB21-7-8		AOI11-HA14	
	Sample Date	11/23/2019		11/21/2019		11/24/2019		11/24/2019		11/24/2019		11/24/2019		11/24/2019		11/21/2019	
	Depth	9 - 10 ft		2 - 4 ft		3 - 4 ft		3 - 4 ft		3 - 4 ft		6 - 7 ft		7 - 8 ft		2 - 4 ft	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Soil, PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (µg/kg)																	
6:2 FTS	-	ND		0.331	J	ND		ND		ND		ND		ND		ND	
PFBA	-	ND		0.302	J	ND		ND		0.165	J	ND		ND		0.204	J
PFBS	1600000	ND		ND		ND		ND		ND		ND		ND		ND	
PFDA	-	ND		ND		ND		ND		ND		ND		ND		ND	
PFHpA	-	ND		ND		ND		ND		ND		ND		ND		ND	
PFHxA	-	ND		ND		ND		ND		ND		ND		ND		ND	
PFHxS	-	ND		ND		ND		ND		ND		ND		ND		ND	
PFNA	-	ND		ND		ND		ND		ND		ND		ND		ND	
PFOA	1600	ND		ND		ND		ND		ND		ND		ND		ND	
PFOS	1600	ND		ND		ND		ND		ND		ND		ND		ND	
PFPeA	-	ND		ND		ND		ND		ND		ND		ND		ND	
PFUnDA	-	ND		ND		ND		ND		ND		ND		ND		ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 October 2019. Soil screening levels based on industrial/commercial composite worker scenario for incidental ingestion of contaminated soil.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

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

6:2 FTS	6:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFUnDA	perfluoro-n-undecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
FD	field duplicate
ft	feet
HA	hand auger
HQ	Hazard quotient
LCMSMS	Liquid Chromatography 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
-	Not applicable

Table 6-4
PFAS Detections in Groundwater
Site Inspection Report
Camp Dodge, Johnston, Iowa

Area of Interest		AOI1				AOI2				AOI3								AOI4			
Sample ID		AOI1-GW01		AOI1-GW02		AOI2-GW03		AOI2-GW04		AOI3-GW05		AOI3-GW23		AOI3-GW23-FD		AOI3-GW24		AOI4-GW06		AOI4-GW07	
Sample Date		11/19/2019		11/21/2019		11/21/2019		11/21/2019		11/21/2019		11/23/2019		11/23/2019		11/21/2019		11/21/2019		11/22/2019	
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
Water, PFAS via PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (ng/L)																					
6:2 FTS	-	7.22	J	ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFBA	-	14.5		7.63	J	3.89	J	ND		3.77	J	ND		ND		2.48	J	2.12	J	ND	
PFBS	40000	117		112		ND		ND		1.49	J	ND		ND		4.21	J	2.45	J	3.89	J
PFDoA	-	ND		ND	UJ	ND		ND		ND	UJ	ND	UJ	ND		ND		ND		ND	
PFHpA	-	2.88	J	3.05	J	ND		ND		2.53	J	ND		ND		ND		ND		ND	
PFHxA	-	21.1		18.2		ND		ND		ND		ND		ND		ND		ND		ND	
PFHxS	-	1160		531		1.62	J	1.51	J	6.06	J	ND		ND		53.8		16.7		16.4	
PFOA	40	4.39	J	5.52	J	ND		ND		2.29	J	ND		ND		1.86	J	ND		ND	
PFOS	40	347		285		14.9		17.4		42.4		ND	UJ	ND		61.4		15.1		12.2	
PFPeA	-	7.25	J	5.82	J	5.30	J	ND		6.03	J	ND		ND		ND		ND		ND	
PFTeDA	-	ND		ND	UJ	ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND		ND		ND	UJ

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 October 2019. Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

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.

UX/X = The presence or absence of the analyte cannot be substantiated. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
FD	Duplicate
GW	Groundwater
HQ	Hazard quotient
LOD	Limit of Detection
ND	Analyte not detected above the LOD
OSD	Office of the Secretary of Defense
Qual	Interpreted Qualifier
USEPA	United States Environmental Protection Agency
ng/L	nanogram per liter
-	Not applicable

Table 6-4
PFAS Detections in Groundwater
Site Inspection Report
Camp Dodge, Johnston, Iowa

Area of Interest		AOI5				AOI6				AOI7										AOI8	
Sample ID		AOI5-GW08		AOI5-GW09		AOI6-GW11		AOI6-GW12		AOI7-GW13		AOI7-GW13-FD		AOI7-GW14		AOI7-GW15		AOI7-GW15-FD		AOI8-GW16	
Sample Date		11/22/2019		11/22/2019		11/25/2019		11/24/2019		11/24/2019		11/24/2019		11/24/2019		11/23/2019		11/23/2019		11/21/2019	
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
Water, PFAS via PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (ng/L)																					
6:2 FTS	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFBA	-	ND		ND		3.60	J	6.43	J	3.07	J	3.62	J	ND		ND		ND		3.73	J
PFBS	40000	ND		ND		2.64	J	ND		1.47	J	1.94	J	18.8		1.69	J	1.85	J	2.99	J
PFDoA	-	ND		ND		ND	UJ	ND		ND		ND		ND	UJ	ND		ND		ND	
PFHpA	-	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
PFHxA	-	ND		ND		ND		ND		2.96	J	ND		ND		ND		ND		ND	
PFHxS	-	ND		ND		ND		ND		7.41	J	12.0		53.2		3.84	J	3.66	J	9.95	
PFOA	40	ND		ND		ND		ND		2.30	J	4.29	J	2.25	J	ND		ND		2.38	J
PFOS	40	ND		ND		18.1	J+	ND		ND		ND	UJ	90.2	J+	ND		ND		3.04	J
PFPeA	-	ND		ND		4.98	J	ND		ND		ND		ND		ND		ND		ND	
PFTeDA	-	ND	UJ	ND	UJ	ND	UJ	ND		ND		ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 October 2019. Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

Interpreted Qualifiers

J = Estimated concentration
J+ = Estimated concentration, biased high
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.
UX/X = The presence or absence of the analyte cannot be substantiated. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
FD	Duplicate
GW	Groundwater
HQ	Hazard quotient
LOD	Limit of Detection
ND	Analyte not detected above the LOD
OSD	Office of the Secretary of Defense
Qual	Interpreted Qualifier
USEPA	United States Environmental Protection Agency
ng/L	nanogram per liter
-	Not applicable

Table 6-4
PFAS Detections in Groundwater
Site Inspection Report
Camp Dodge, Johnston, Iowa

Area of Interest		AOI9				AOI10				AOI11			
Sample ID		AOI9-GW17		AOI9-GW18		AOI10-GW19		AOI10-GW20		AOI11-GW21		AOI11-GW22	
Sample Date		11/23/2019		11/23/2019		11/24/2019		11/23/2019		11/24/2019		11/24/2019	
Analyte	OSD Screening Level [a]	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Water, PFAS via PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (ng/L)													
6:2 FTS	-	ND		ND	UJ	ND		ND		ND		ND	
PFBA	-	ND		2.83	J+	2.44	J	ND	UJ	ND		6.50	J
PFBS	40000	26.8		ND	UJ	ND		ND		ND		ND	
PFDoA	-	ND		ND	UJ	ND		4.89	J+	ND		ND	
PFHpA	-	ND		ND	UJ	ND		ND		ND		ND	
PFHxA	-	ND		ND	UJ	ND		ND		ND		ND	
PFHxS	-	71.0		ND	UJ	ND		ND		ND		ND	
PFOA	40	ND		1.99	J+	ND		5.18	J	ND		ND	
PFOS	40	ND		3.56	J+	ND		ND		ND		ND	
PFPeA	-	ND		4.85	J+	2.07	J	ND		ND		ND	
PFTeDA	-	3.23	J+	ND	UJ	2.65	J+	ND	UJ	ND	UJ	ND	

Grey Fill — Detected concentration exceeded OSD Screening Levels

References

a. Assistant Secretary of Defense, 2019. Risk Based Screening Levels Calculated for PFOS, PFOA, PFBS in Groundwater or Soil using USEPA's Regional Screening Level Calculator. HQ=0.1. 15 October 2019. Groundwater screening levels based on residential scenario for direct ingestion of groundwater.

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

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.

UX/X = The presence or absence of the analyte cannot be substantiated. Acceptance or rejection of the data should be decided by the project team, but exclusion of the data is recommended.

Chemical Abbreviations

6:2 FTS	6:2 fluorotelomer sulfonate
PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
FD	Duplicate
GW	Groundwater
HQ	Hazard quotient
LOD	Limit of Detection
ND	Analyte not detected above the LOD
OSD	Office of the Secretary of Defense
Qual	Interpreted Qualifier
USEPA	United States Environmental Protection Agency
ng/L	nanogram per liter
-	Not applicable

Table 6-5
PFAS Detections in Sediment
Site Inspection Report
Camp Dodge, Johnston, Iowa

Sample ID	SD01		SD02		SD03		SD04		SD04-FD		SD05		SD06		SD07		SD08		SD09		SD10	
Sample Date	11/21/2019		11/20/2019		11/20/2019		11/20/2019		11/20/2019		11/20/2019		11/18/2019		11/18/2019		11/18/2019		11/18/2019		11/19/2019	
Depth	0 - 0.5 ft		0 - 0.5 ft		0 - 0.5 ft		0 - 0.5 ft		0 - 0.5 ft		0 - 0.5 ft		0 - 0.5 ft		0 - 0.5 ft		0 - 0.5 ft		0 - 0.5 ft		0 - 0.5 ft	
Analyte	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Sediment, PFAS via PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (ug/Kg)																						
6:2 FTS	ND		ND		5.95		2.25		ND		ND		ND		ND		ND		ND		ND	
PFBA	ND		ND		ND		ND		ND		ND		0.288	J	0.216	J	ND		0.266	J	ND	
PFBS	ND		ND		ND		ND		ND		ND		ND		ND		0.228	J	ND		ND	
PFDA	ND		ND		ND		ND		ND		ND		ND		ND		0.371	J	ND		ND	
PFHpA	ND		ND		ND		ND		ND		ND		0.250	J	ND		ND		ND		ND	
PFHxA	ND		ND		ND		ND		ND		ND		0.509	J	ND		0.327	J	ND		ND	
PFHxS	ND		ND		ND		ND		ND		ND		0.719	J	ND		1.39	J	ND		ND	
PFOS	ND		ND		ND		0.410	J	0.502	J	1.04	J	0.769	J	0.454	J	1.05	J	ND		ND	
PFPeA	ND		ND	UJ	ND		ND		ND		ND		0.414	J	ND		ND		ND		ND	

Interpreted Qualifiers

J = Estimated concentration

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

6:2 FTS	6:2 fluorotelomer sulfonate
PFBA	perfluorobutyrate
PFBS	perfluorobutane sulfonate
PFDA	perfluorodecanoate
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFOS	perfluorooctane sulfonate
PFPeA	perfluoropentanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
FD	Duplicate
ft	feet
LOD	Limit of Detection
ND	Analyte not detected above the LOD
Qual	Interpreted Qualifier
SD	Sediment
µg/Kg	micrograms per Kilogram

Table 6-6
PFAS Detections in Surface Water
Site Inspection Report
Camp Dodge, Johnston, Iowa

Sample ID	SW01		SW02		SW03		SW04		SW05		SW06		SW07		SW08		SW09		SW10		SW10-FD	
Sample Date	11/21/2019		11/20/2019		11/20/2019		11/20/2019		11/20/2019		11/18/2019		11/18/2019		11/18/2019		11/18/2019		11/19/2019		11/19/2019	
Analyte	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
Water, PFAS via PFAS by LCMSMS Compliant with QSM 5.1 Table B-15 (ng/L)																						
PFBA	ND		ND		ND		7.57	J	ND		8.84	J	5.76	J	8.17	J	11.0		ND		ND	
PFBS	ND		ND		ND		2.46	J	1.26	J	6.74	J	1.92	J	27.9		3.38	J	ND		ND	
PFHpA	ND		ND		ND		2.34	J	ND		2.57	J	ND		2.11	J	ND		ND		ND	
PFHxA	ND		ND		ND		28.6		ND		8.81	J	ND		6.81	J	2.71	J	3.57	J	2.84	J
PFHxS	ND		ND		ND		31.5		3.35	J	18.7		2.13	J	52.3		4.82	J	ND		ND	
PFNA	ND		ND		ND		3.53	J	ND		ND		ND		ND		ND		ND		ND	
PFOA	ND		ND		ND		6.04	J	ND		ND		ND		ND		ND		ND		ND	
PFOS	ND		ND		ND		19.9		2.61	J	25.0		2.89	J	49.4		12.7		ND		ND	
PFPeA	ND		ND		ND		ND		ND		13.4		ND		4.65	J	2.70	J	ND		ND	
PFTeDA	ND	UJ	ND	UJ	ND	UJ	4.20	J+	ND	UJ	ND		ND	UJ	ND		ND		ND	UJ	ND	UJ
PFTrDA	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND	UJ	ND		5.38	J+	ND		ND		ND	UJ	ND	UJ

Interpreted Qualifiers

J = Estimated concentration

J+ = Estimated concentration, biased high

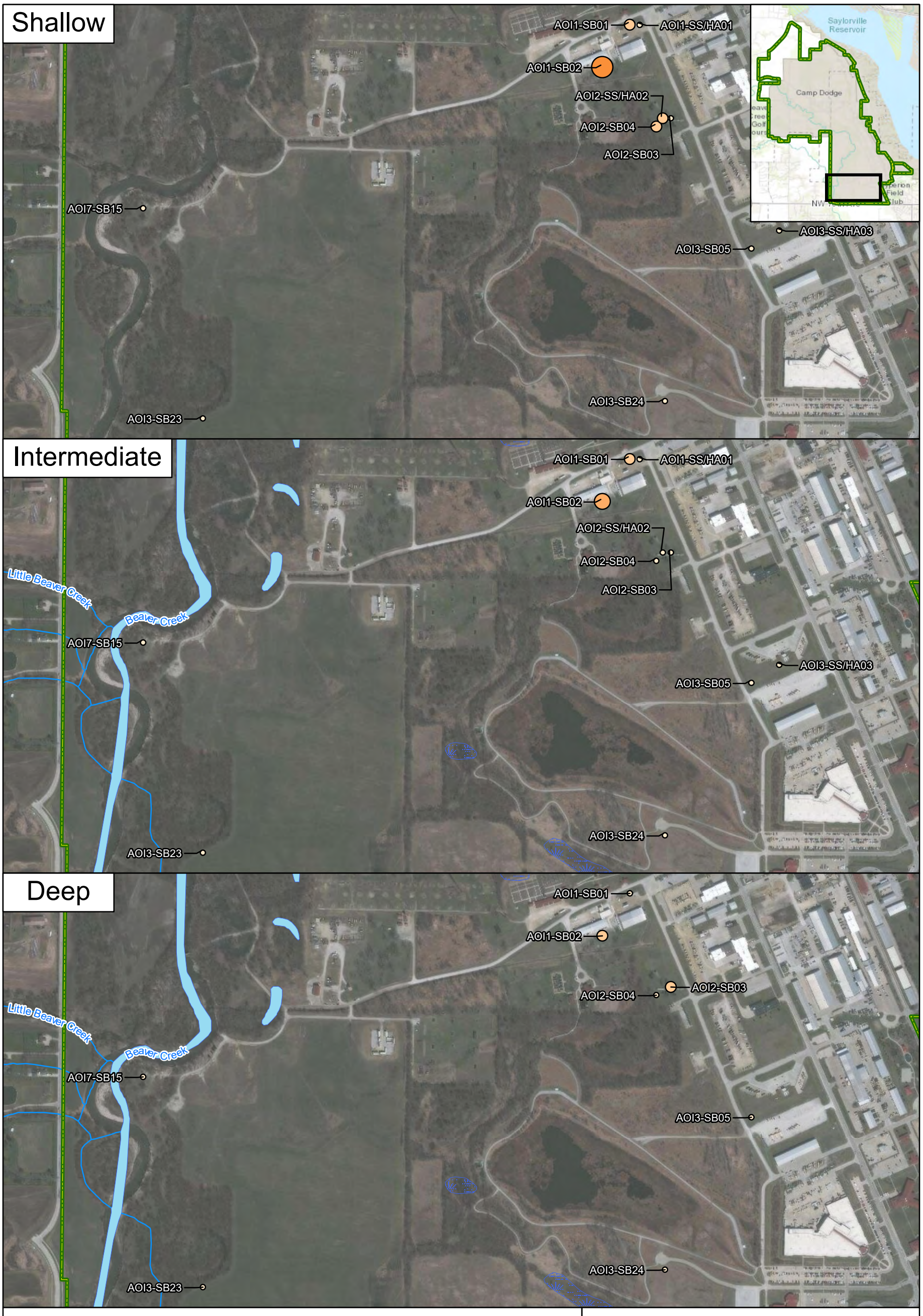
UJ = The analyte was not detected at a level greater than or equal to the adjusted DL. However, the reported adjusted DL is approximate and may be inaccurate or imprecise.

Chemical Abbreviations

PFBA	perfluorobutanoic acid
PFBS	perfluorobutanesulfonic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFPeA	perfluoropentanoic acid
PFTeDA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid

Acronyms and Abbreviations

AOI	Area of Interest
FD	Duplicate
LOD	Limit of Detection
NA	Not applicable
ND	Analyte not detected above the LOD
Qual	Interpreted Qualifier
SW	Surface water
ng/L	nanogram per liter

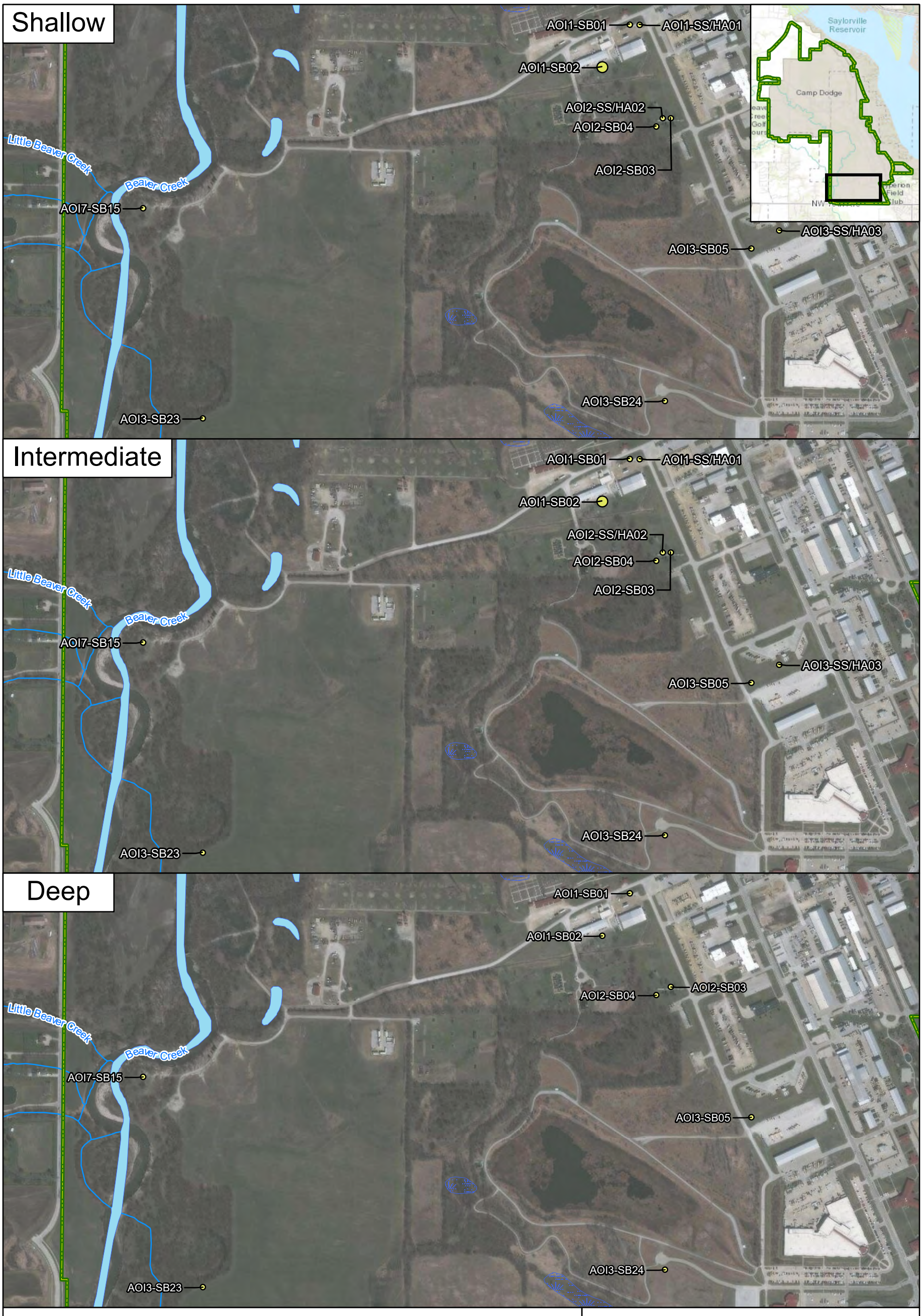


Western Cantonment PFOS Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	10/5/2020	GIS BY	MS	10/5/2020
SCALE	1:8,760	CHK BY	JW	10/5/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN,		PM	RG	10/5/2020

AECOM 12420 Milestone Center Drive Germantown, MD 20876

Figure 6-1



Facility Boundary

PFOA Shallow Results (µg/Kg)

- ND
- >ND - 10
- >10 - 130
- >130 - 1600
- >1600

N

0 365 730 1,460 Feet

Western Cantonment PFOA Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	10/5/2020	GIS BY	MS	10/5/2020
SCALE	1:8,760	CHK BY	JW	10/5/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN,		PM	RG	10/5/2020

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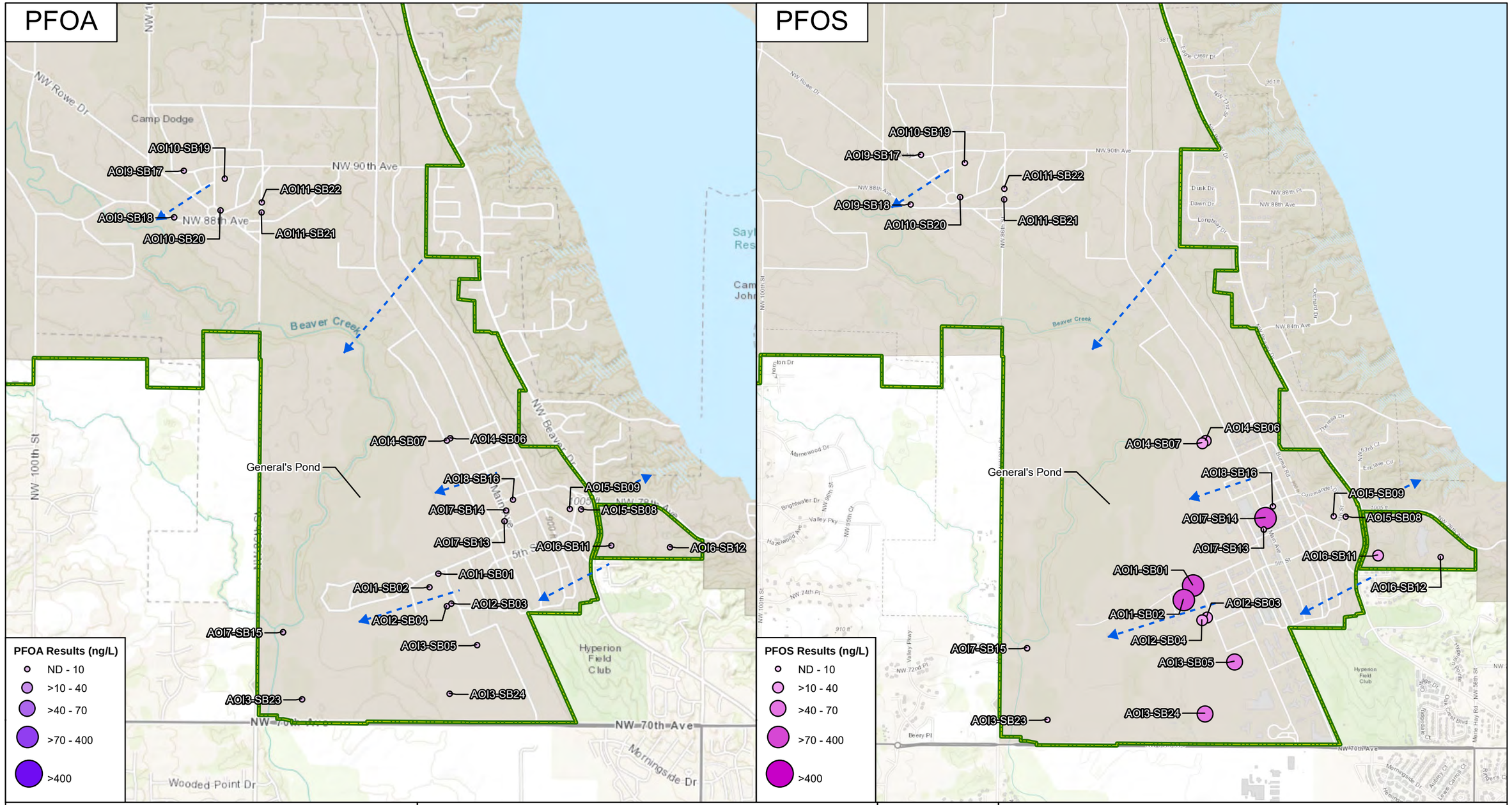
Figure 6-2



CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	3/2/2021	GIS BY	MS	3/2/2021
SCALE	1:27,579	CHK BY	JW	3/2/2021
Base Map: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan,		PM	RG	3/2/2021

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PFOS and PFOA Detections in Groundwater

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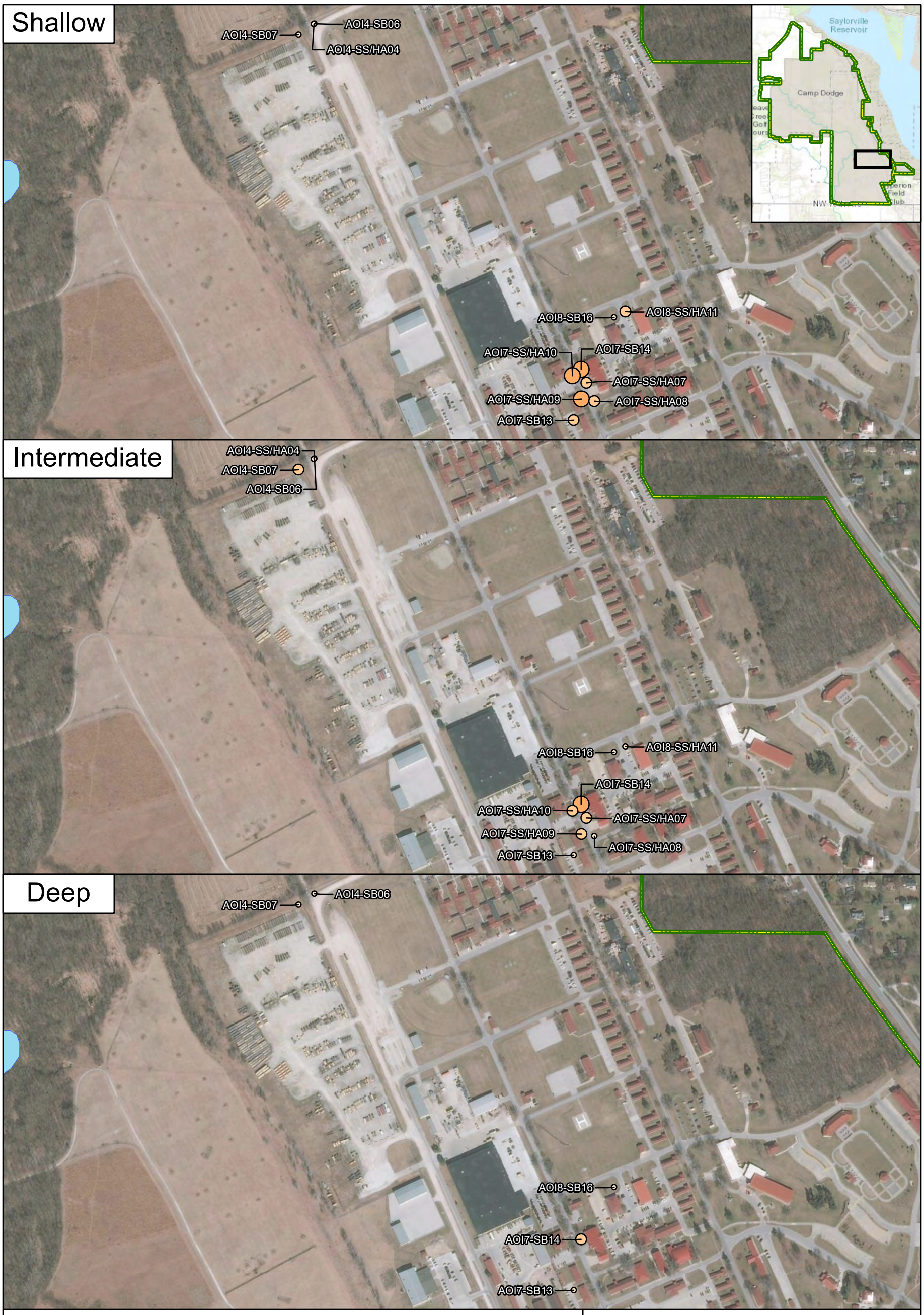
Figure 6-3



Central Cantonment PFOS Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	3/2/2021	GIS BY	MS	3/2/2021
SCALE	1:5,760	CHK BY	JW	3/2/2021
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN,		PM	RG	3/2/2021

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Figure 6-4

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Facility Boundary

PFOA Shallow Results (µg/Kg)

- ND
- >ND - 10
- >10 - 130
- >130 - 1600
- >1600

N

0 240 480 960 Feet

Central Cantonment PFOA Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	10/5/2020	GIS BY	MS	10/5/2020
SCALE	1:5,760	CHK BY	JW	10/5/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN,		PM	RG	10/5/2020

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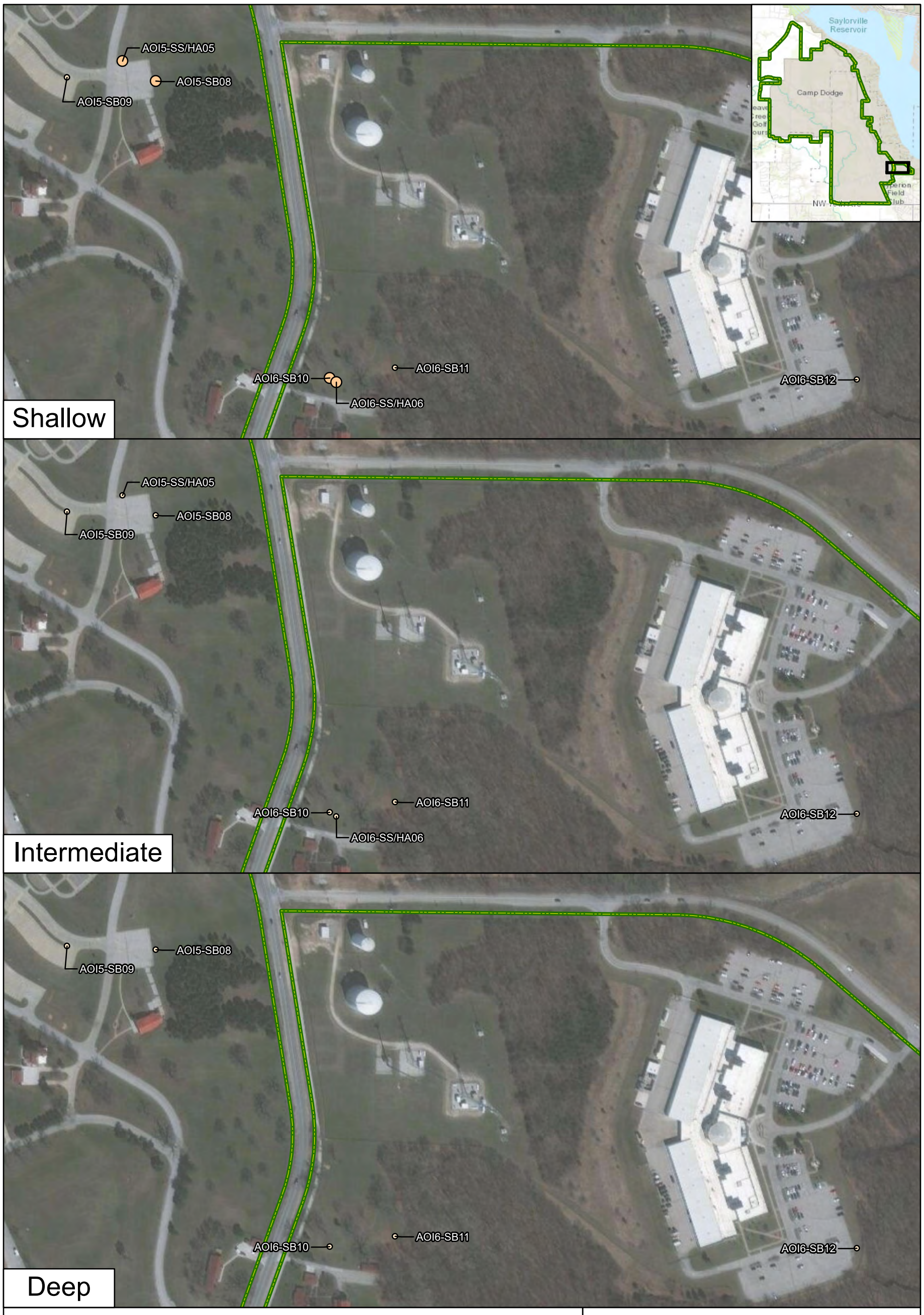
Figure 6-5



Facility Boundary

PFOS Soil Results (µg/Kg)

- ND
- >ND - 10
- >10 - 130
- >130 - 1600
- >1600

N

0 145 290 580 Feet

Eastern Cantonment PFOS Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	10/5/2020	GIS BY	MS	10/5/2020
SCALE	1:3,480	CHK BY	JW	10/5/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN,		PM	RG	10/5/2020

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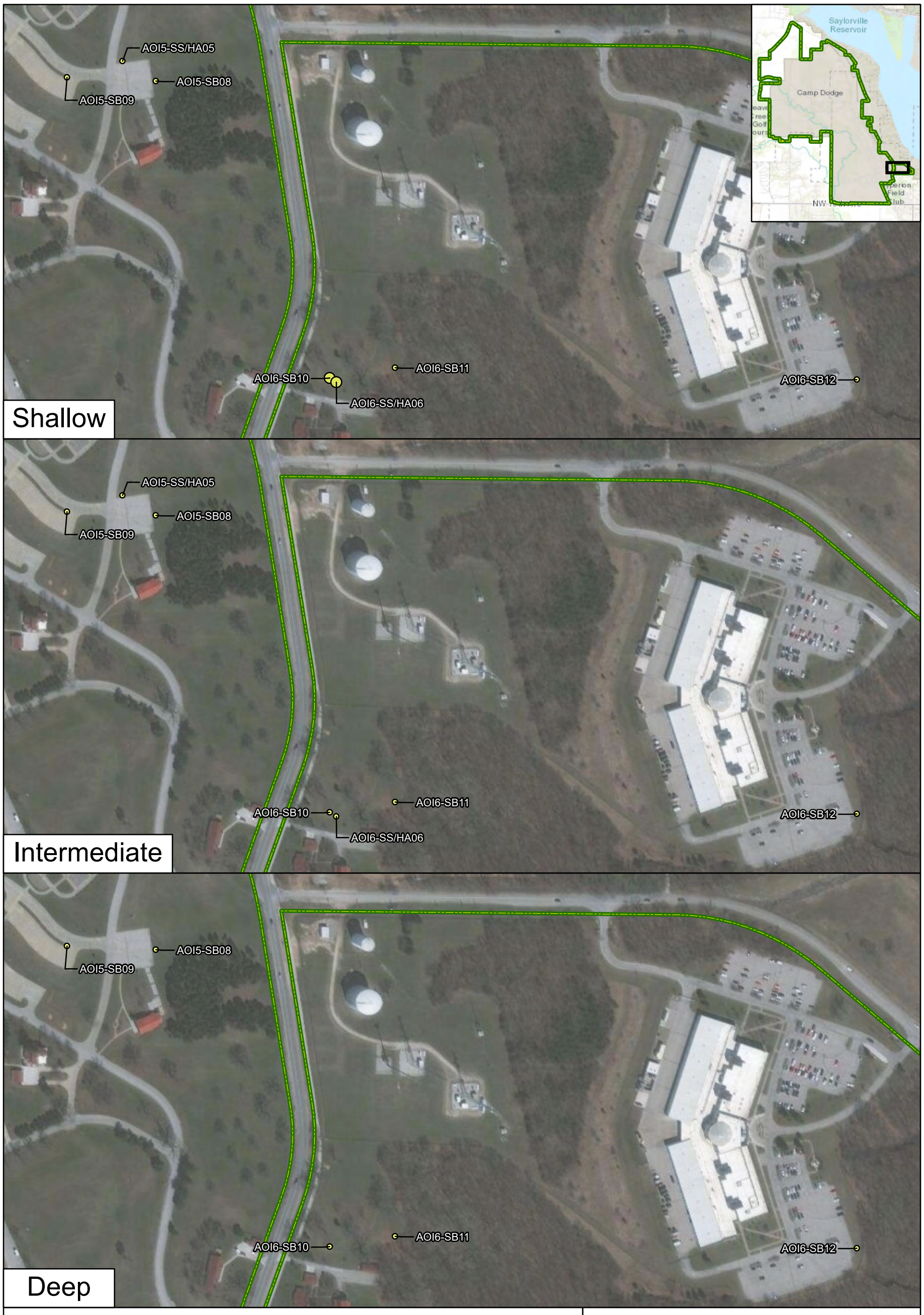
Figure 6-6



Facility Boundary

PFOA Shallow Results (µg/Kg)

- ND
- >ND - 10
- >10 - 130
- >130 - 1600
- >1600

N

0 145 290 580 Feet

Eastern Cantonment PFOA Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	10/5/2020	GIS BY	MS	10/5/2020
SCALE	1:3,480	CHK BY	JW	10/5/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN,		PM	RG	10/5/2020

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Figure 6-7

Facility Boundary

PFOS Soil Results (µg/Kg)

- ND
- >ND - 10
- >10 - 130
- >130 - 1600
- >1600

N

0 145 290 580 Feet

Range Areas
PFOS Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	10/5/2020	GIS BY	MS	10/5/2020
SCALE	1:3,480	CHK BY	JW	10/5/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN,		PM	RG	10/5/2020

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Figure 6-8

Facility Boundary

PFOA Shallow Results (µg/Kg)

- ND
- >ND - 10
- >10 - 130
- >130 - 1600
- >1600

N

0 145 290 580 Feet

Range Areas
PFOA Detections in Soil

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	10/5/2020	GIS BY	MS	10/5/2020
SCALE	1:3,480	CHK BY	JW	10/5/2020
Base Map: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN,		PM	RG	10/5/2020

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Figure 6-9

PFOA

PFOS

SD/SW01
SD/SW02
SD/SW03
General's Pond
SD/SW04
SD/SW05
SD/SW07
SD/SW08
SD/SW06
SD/SW09
SD/SW10

NW Rowe Dr
Camp Dodge
NW 90th Ave
NW 88th Ave
Beaver Creek Golf Course
Beaver Creek
NW 78th Ave
NW 100th St
NW 107th St
Main Ave
5th St
Hyperion Field Club
NW 95th Ct
NW 70th Ave
Wooded Point Dr
Enfield Dr
NW Newgate Dr
Catalina Dr
Morningside Dr

PFOA Results (µg/Kg)

- ND - 0.1
- >0.1 - 1.0
- >1.0 - 10
- >10 - 100
- >100

PFOS Results (µg/Kg)

- ND - 0.1
- >0.1 - 1.0
- >1.0 - 10
- >10 - 100
- >100

Facility Boundary

0 1,075 2,150 4,300 Feet

N

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	10/1/2020	GIS BY	MS	10/1/2020
SCALE	1:31,680	CHK BY	JW	10/1/2020
Base Map: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan,		PM	RG	10/1/2020

PFOS and PFOA Detections in Sediment

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Figure 6-10

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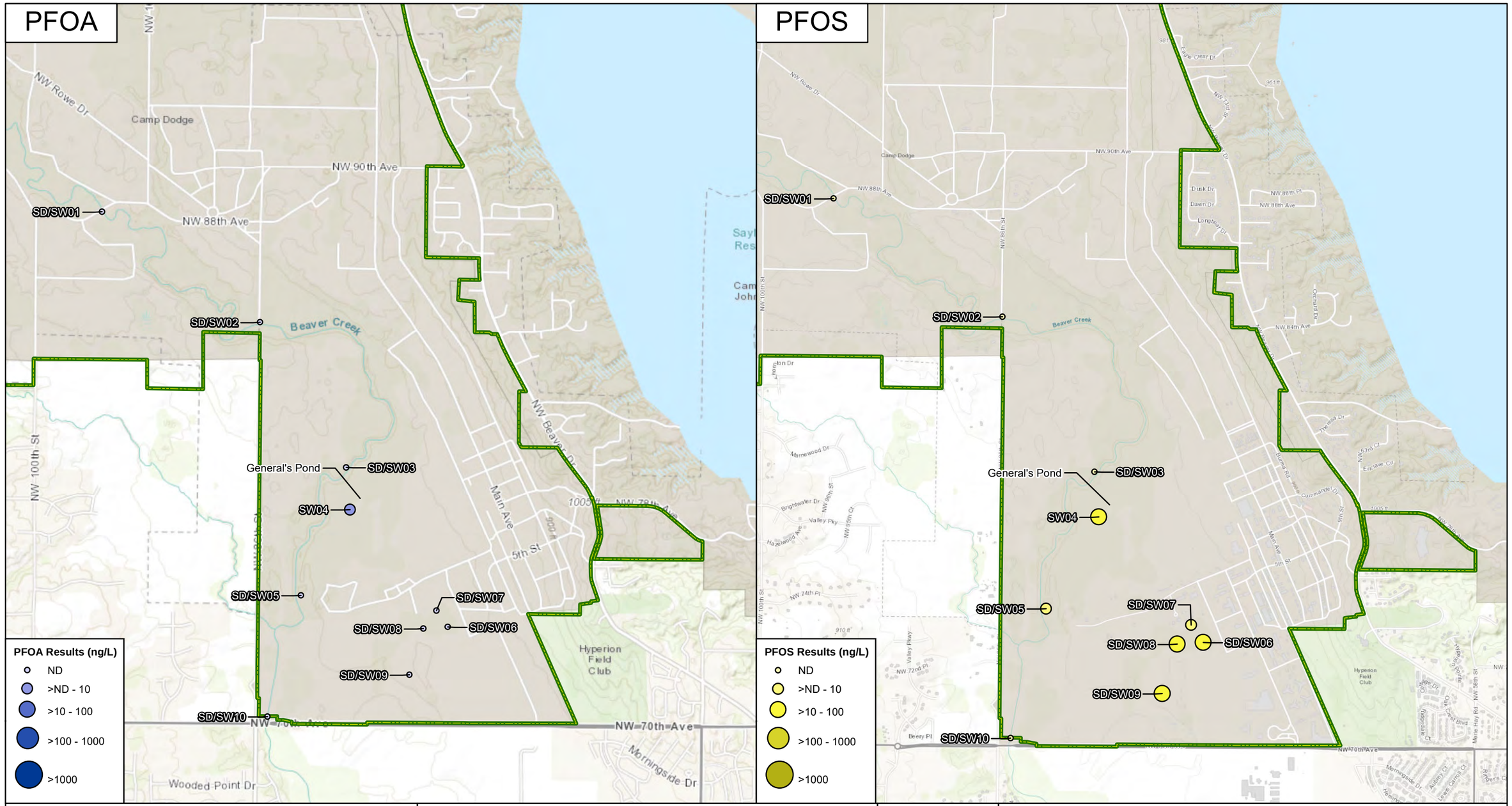

CLIENT	ARNG			
PROJECT	Site Inspection for PFAS at Camp Dodge, IA			
REVISED	10/1/2020	GIS BY	MS	10/1/2020
SCALE	1:27,579	CHK BY	JW	10/1/2020
Base Map: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan,		PM	RG	10/1/2020

Facility Boundary

0 1,075 2,150 4,300 Feet

N

PFOS and PFOA Detections in Surface Water

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Figure 6-11

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7. Exposure Pathways

The CSMs for each AOI, revised based on the SI findings, are presented on **Figure 7-1** through **Figure 7-7**. 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 no identified complete pathway generally warrant no further action. However, the pathway is considered potentially complete if PFOA, PFOS, or PFBS 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 PFOA, PFOS, or PFBS above the SLs. Areas with an identified potentially complete pathway may warrant further investigation.

In general, the potential PFAS exposure pathways 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 PFAS toxicological study. The receptors evaluated are consistent with those listed in USEPA guidance for risk screening (USEPA, 2001). Receptors at the facility include site workers (e.g., facility staff and visiting soldiers), construction workers, trespassers (though unlikely due to restricted access), residents outside the facility boundary, and recreational users outside of the facility boundary.

7.1 Soil Exposure Pathway

The SI results for PFOA, PFOS, and PFBS in soil were used to determine whether a potentially complete pathway exists between the source and potential receptors at each AOI based on the individual soil SLs.

7.1.1 AOI 1: Conex Fire Training Area

The Conex FTA consists of a series of Conex containers set up for urban warfare training facility drills. AFFF training was conducted at the Conex FTA during drills three or four times from 2006 until 2012. PFOA, PFOS, and PFBS were detected in soil at AOI 1 and confirm the release of PFAS to soil in AOI 1. Based on the results of the SI in AOI 1, ground-disturbing activities could potentially result in site worker, future construction worker, and trespasser exposure to PFOA, PFOS, and PFBS via inhalation of dust or incidental ingestion of surface soil, and ground-disturbing activities could potentially result in future construction worker exposure to subsurface soil. No construction is occurring at AOI 1. Additionally, recreational users (i.e., small arms range users) may potentially be exposed to PFOA, PFOS, and PFBS via inhalation of dust caused by ground disturbing activities, although this exposure is likely insignificant. The CSM is presented on **Figure 7-1**.

7.1.2 AOI 2: Rail Load Fire Training Area

Since 2012, the Camp Dodge Fire Brigade has used the Rail Load FTA at least once annually for training using AFFF and, after 2016, AR-AFFF. PFOS was detected in soil at AOI 2, confirming the release of PFAS to soil in AOI 2. Training with AFFF no longer occurs at this AOI. Based on the results of the SI in AOI 2, ground-disturbing activities could potentially result in site worker, future construction worker, and trespasser exposure to PFOS via inhalation of dust or incidental ingestion of surface soil. Ground-disturbing activities could potentially result in future construction worker exposure to subsurface soil. No construction is occurring at AOI 2. The CSM is presented on **Figure 7-2**.

7.1.3 AOI 3: Fuel Point Fire Training Area

Annual training with AFFF was conducted at the Fuel Point FTA from 2007 to 2009. PFOA, PFOS, and PFBS were not detected in soil at AOI 3; therefore, the surface soil and subsurface soil pathways via incidental ingestion and inhalation are incomplete for the site worker, future construction worker, and trespasser. No construction is occurring at AOI 3. The CSM is presented on **Figure 7-3**.

7.1.4 AOI 4: Gravel Fire Training Area

AFFF training was conducted at the Gravel FTA three or four times from 2006 to 2012. PFOS was detected in soil at AOI 4, confirming the release of PFAS to soil in AOI 4. Based on the results of the SI at AOI 4, ground-disturbing activities could potentially result in site worker, future construction worker, and trespasser exposure to PFOS via inhalation of dust or incidental ingestion of surface soil. Ground-disturbing activities to subsurface soil could potentially result in future construction worker exposure. No construction is occurring at AOI 4. The CSM is presented on **Figure 7-2**.

7.1.5 AOI 5: Chapel Fire Training Area

In 2009, the Camp Dodge Fire Brigade conducted a one-time training event with AFFF in the parking lot of the Chapel. PFOS was detected in soil at AOI 5, confirming the release of PFAS to soil in AOI 5. Based on the results of the SI at AOI 5, ground-disturbing activities could potentially result in on-facility resident, site worker, future construction worker, and trespasser exposure to PFOS via inhalation of dust or incidental ingestion of surface soil. Ground-disturbing activities to subsurface soil could potentially result in future construction worker exposure. No construction is occurring at AOI 5. The CSM is presented on **Figure 7-4**.

7.1.6 AOI 6: Structure Fire

In 2011, an abandoned two-story residence on the east side of NW Beaver Drive was burned as a planned, controlled burn and used for fire training for the IAARNG and municipal fire departments from the surrounding area. During the controlled burn, AFFF was used in various training evolutions and to extinguish the basement of the structure. PFOS and PFOA were detected in soil at AOI 6, confirming the release of PFAS to soil in AOI 6. Based on the results of the SI at AOI 6, ground-disturbing activities could potentially result in both on-facility and off-facility resident, site worker, future construction worker, and trespasser exposure to PFOS and PFOA via inhalation of dust or incidental ingestion of surface soil. Ground-disturbing activities to subsurface soil could potentially result in future construction worker exposure. No construction is occurring at AOI 6. The CSM is presented on **Figure 7-5**.

7.1.7 AOI 7: Camp Dodge Fire Station

Historically, nozzle testing was conducted outside the Fire Station, and discharge was released into the north-south stormwater drainage ditch. PFOS, PFOA, and PFBS were detected in soil at AOI 7, confirming the release of PFAS to soil in AOI 7. Based on the results of the SI at AOI 7, ground-disturbing activities could potentially result in resident, site worker, trespasser worker exposure to PFOS, PFOA, and PFBS via inhalation of dust or incidental ingestion of surface soil. Ground-disturbing activities to subsurface soil could potentially result in future construction worker exposure. No construction is occurring at AOI 7. The CSM is presented on **Figure 7-6**.

7.1.8 AOI 8: Trash Dumpster Fire

A trash dumpster fire occurred near the Fire Station sometime between 2007 and 2012. Foam was used to extinguish the fire to manage flying debris; however, it is unknown whether the foam were Class A foam or AFFF. PFOS was detected in soil at AOI 8, confirming the release of PFAS to soil in AOI 8. Based on the results of the SI at AOI 8, ground-disturbing activities could potentially result in resident, site worker, future construction worker, and trespasser exposure to PFOS via inhalation of dust or ingestion of surface soil. Ground-disturbing activities to subsurface soil could potentially result in future construction worker exposure. No construction is occurring at AOI 8. The CSM is presented on **Figure 7-5**.

7.1.9 AOI 9: Car Fire Training Area

On 19 September 2007, the Federal Bureau of Alcohol, Tobacco, Firearms, and Explosives sponsored a demonstration at Camp Dodge. The demonstration involved the incineration and open burning of a car on the maneuver training ranges at Camp Dodge east of Northwest 93rd Street and north of Northwest 90th Avenue. The fire was extinguished with an unknown amount of AR-AFFF. No information was available on the concentration of AFFF used. PFOA, PFOS, and PFBS were not detected in soil at AOI 9. Based on the results of the SI at AOI 9, the surface soil and subsurface soil exposure pathways via incidental ingestion and inhalation are incomplete for the site worker, construction worker, and trespasser. The CSM is presented on **Figure 7-7**.

7.1.10 AOI 10: Aggregate Collection Point Fire Training Area

Since 2012, the Camp Dodge Fire Brigade has used the Aggregate Collection Point FTA for training using AFFF and, after 2016, AR-AFFF. Training with AFFF no longer occurs at this AOI. Following training, the firetruck is washed at the Aggregate Collection Point FTA. PFOA, PFOS, and PFBS were not detected in soil at AOI 10. Based on the results of the SI at AOI 10, the surface soil and subsurface soil exposure pathways via incidental ingestion and inhalation are incomplete for the site worker, construction worker, resident, and trespasser. The CSM is presented on **Figure 7-7**.

7.1.11 AOI 11: Live Fire Shoot-House Fire

During construction in 2012, some of the materials, including ballistic rubber and recycled tires, at the Live Fire Shoot-House caught fire. Approximately 20 to 30 gallons of AFFF concentrate were used to extinguish the fire. PFOA, PFOS, and PFBS were not detected in soil at AOI 11. Based on the results of the SI at AOI 11, the surface soil and subsurface soil exposure pathways via incidental ingestion and inhalation are incomplete for the site worker, construction worker, resident, and trespasser. The CSM is presented on **Figure 7-8**.

7.2 Groundwater Exposure Pathway

Drinking water for Camp Dodge is drawn in alternation from two wells on the post: Well 7 and Well 8, with the exception of two Camp Dodge residences located east of the cantonment area adjacent to NW Beaver Drive that are provided city water. The Beaver Channel aquifer, located within the buried bedrock channel, is the primary source of the drinking water for Well 7 and Well 8 (**Figure 2-3**). Well 7 and Well 8 were sampled and analyzed for PFAS in 2017 and 2020. The results were reported as non-detect for PFOS, PFOA, and PFBS (TetraTech, 2017; GHD, 2020); therefore, the groundwater exposure pathway via ingestion of drinking water is incomplete for the resident, site worker, construction worker, and trespasser. No City of Des Moines drinking water wells are located down gradient of Camp Dodge, and facility boundary wells AOI3-GW23 and AOI6-GW12 were reported non-detect for PFOS, PFOA, and PFBS. Therefore, the groundwater pathway via ingestion of drinking water is incomplete for off-facility residents.

The SI results for PFOA, PFOS, and PFBS in groundwater were used to determine whether a potentially complete pathway exists for incidental groundwater ingestion between the source and the future construction worker at each AOI based on the individual groundwater SLs.

7.2.1 AOI 1: Conex Fire Training Area

PFOA, PFOS, and PFBS were detected in groundwater at AOI 1, confirming the migration of PFAS to groundwater. PFOS exceeded the SL in both temporary monitoring wells. The incidental ingestion exposure pathway is potentially complete for construction workers during trenching activities deep enough to encounter shallow groundwater. The CSM is presented on **Figure 7-1**.

7.2.2 AOI 2: Rail Load Fire Training Area

PFOS was detected in groundwater at AOI 2 below the SL, confirming the migration of PFAS to groundwater. The incidental ingestion exposure pathway is potentially complete for construction workers during trenching activities deep enough to encounter shallow groundwater. The CSM is presented on **Figure 7-2**.

7.2.3 AOI 3: Fuel Point Fire Training Area

PFOA, PFOS, and PFBS were detected in groundwater AOI 3, confirming the migration of PFAS to groundwater. PFOS exceeded the SL in two of three temporary monitoring wells sampled at AOI 3. The incidental ingestion exposure pathway is potentially complete for construction workers during trenching activities deep enough to encounter shallow groundwater. The CSM is presented on **Figure 7-3**.

7.2.4 AOI 4: Gravel Fire Training Area

PFOS and PFBS were detected in groundwater at AOI 4 below the individual SLs, confirming the migration of PFAS to groundwater. The incidental ingestion exposure pathway is potentially complete for construction workers during trenching activities deep enough to encounter shallow groundwater. The CSM is presented on **Figure 7-2**.

7.2.5 AOI 5: Chapel Fire Training Area

PFOS, PFOA, and PFBS were not detected in groundwater at AOI 5; therefore, the groundwater exposure pathway via incidental ingestion is incomplete for the future construction worker. The CSM is presented on **Figure 7-4**.

7.2.6 AOI 6: Structure Fire

PFOS and PFBS were detected in groundwater at AOI 6 below the individual SLs, confirming the migration of PFAS to groundwater. The incidental ingestion exposure pathway is potentially complete for construction workers during trenching activities deep enough to encounter shallow groundwater. The CSM is presented on **Figure 7-5**.

7.2.7 AOI 7: Camp Dodge Fire Station

PFOA, PFOS, and PFBS were detected in groundwater at AOI 7, confirming the migration of PFAS to groundwater. PFOS exceeded the SL in one of three temporary groundwater monitoring wells sampled at AOI 7. The incidental ingestion exposure pathway is potentially complete for construction workers during trenching activities deep enough to encounter shallow groundwater. The CSM is presented on **Figure 7-6**.

7.2.8 AOI 8: Trash Dumpster Fire

PFOS, PFOA, and PFBS were detected in groundwater at AOI 8 below the individual SLs, confirming the migration of PFAS to groundwater. The incidental ingestion exposure pathway is potentially complete for construction workers during trenching activities deep enough to encounter shallow groundwater. The CSM is presented on **Figure 7-5**.

7.2.9 AOI 9: Car Fire Training Area

PFOS, PFOA, and PFBS were detected in groundwater at AOI 9 below the individual SLs, confirming the migration of PFAS to groundwater. The incidental ingestion exposure pathway is potentially complete for construction workers during trenching activities deep enough to encounter shallow groundwater. The CSM is presented on **Figure 7-7**.

7.2.10 AOI 10: Aggregate Collection Point Fire Training Area

PFOA was detected in groundwater at AOI 10 below the individual SL, confirming the migration of PFAS to groundwater. The incidental ingestion exposure pathway is potentially complete for construction workers during trenching activities deep enough to encounter shallow groundwater. The CSM is presented on **Figure 7-7**.

7.2.11 AOI 11: Live Fire Shoot-House Fire

PFOS, PFOA, and PFBS were not detected in groundwater at AOI 11; therefore, the groundwater exposure pathway via incidental ingestion is incomplete for the future construction worker. The CSM is presented on **Figure 7-8**.

7.3 Sediment and Surface Water Exposure Pathway

The SI results for PFOA, PFOS, and PFBS in surface water and sediment were used to determine whether a potentially complete exposure pathway exists between the source and potential receptors at each AOI based on the presence or absence of PFOS, PFOA, and PFBS.

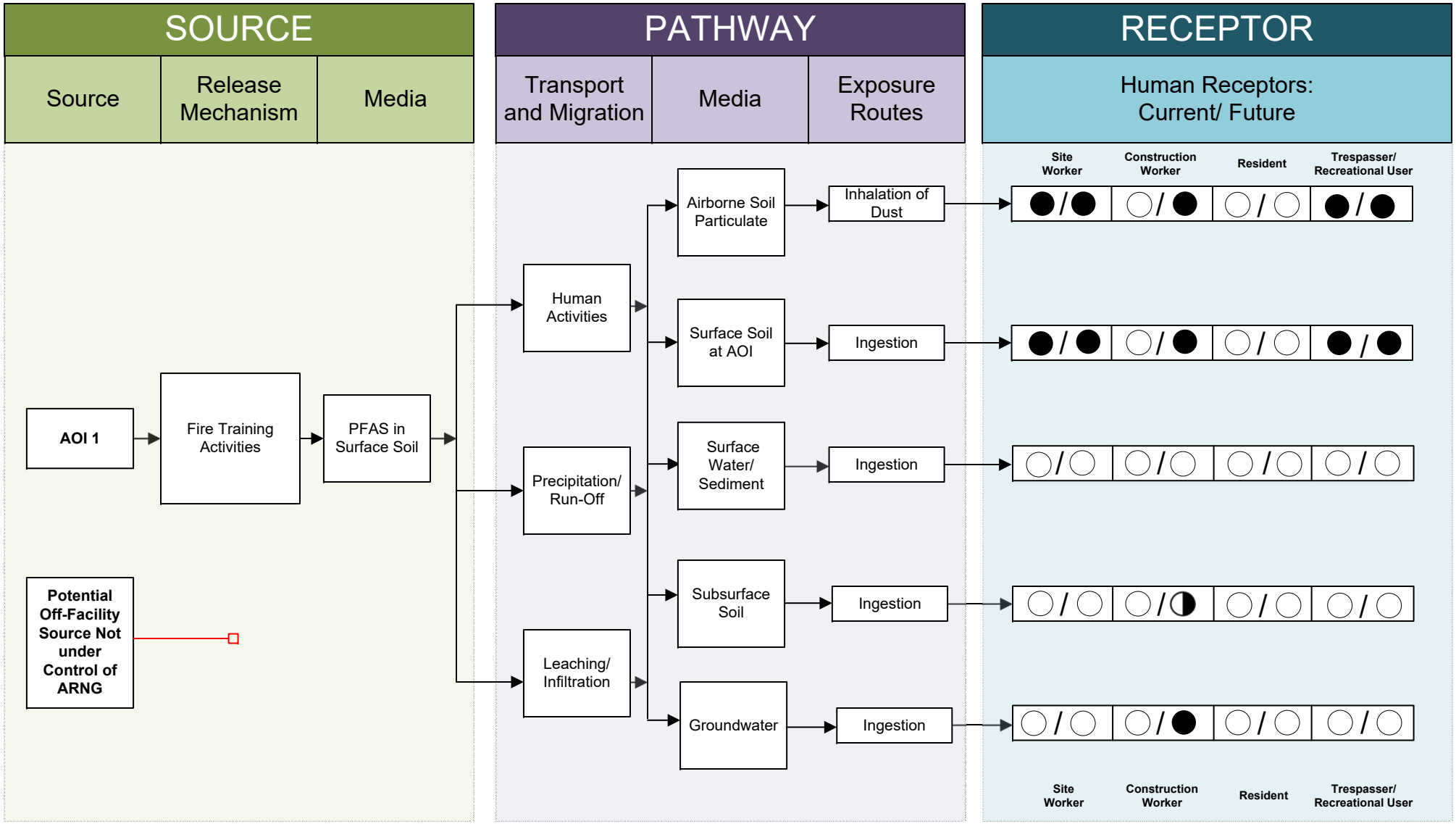
7.3.1 Beaver Creek

PFOS was detected in sediment collected at SD04 and SD05. PFOS, PFOA, and PFBS were detected in surface water collected at SW04. PFOS and PFBS were detected in surface water collected at SW05. Based on the SI results, the incidental ingestion pathway for sediment and

surface water is potentially complete for the site worker, future construction worker, trespassers, and recreational user. The CSM is presented on **Figure 7-9**.

7.3.2 Southwestern Cantonment Unnamed Wetlands and Pond

PFOS was detected in sediment collected at SD06, SD07, and SD08. PFBS was detected in sediment collected at SD08. PFOS and PFBS were detected in surface water collected at SW06, SW07, SW08, and SW09. Based on the SI results, the incidental ingestion pathway for sediment and surface water is potentially complete for the site worker, future construction worker, trespasser, and recreational user. The CSM is presented on **Figure 7-9**.

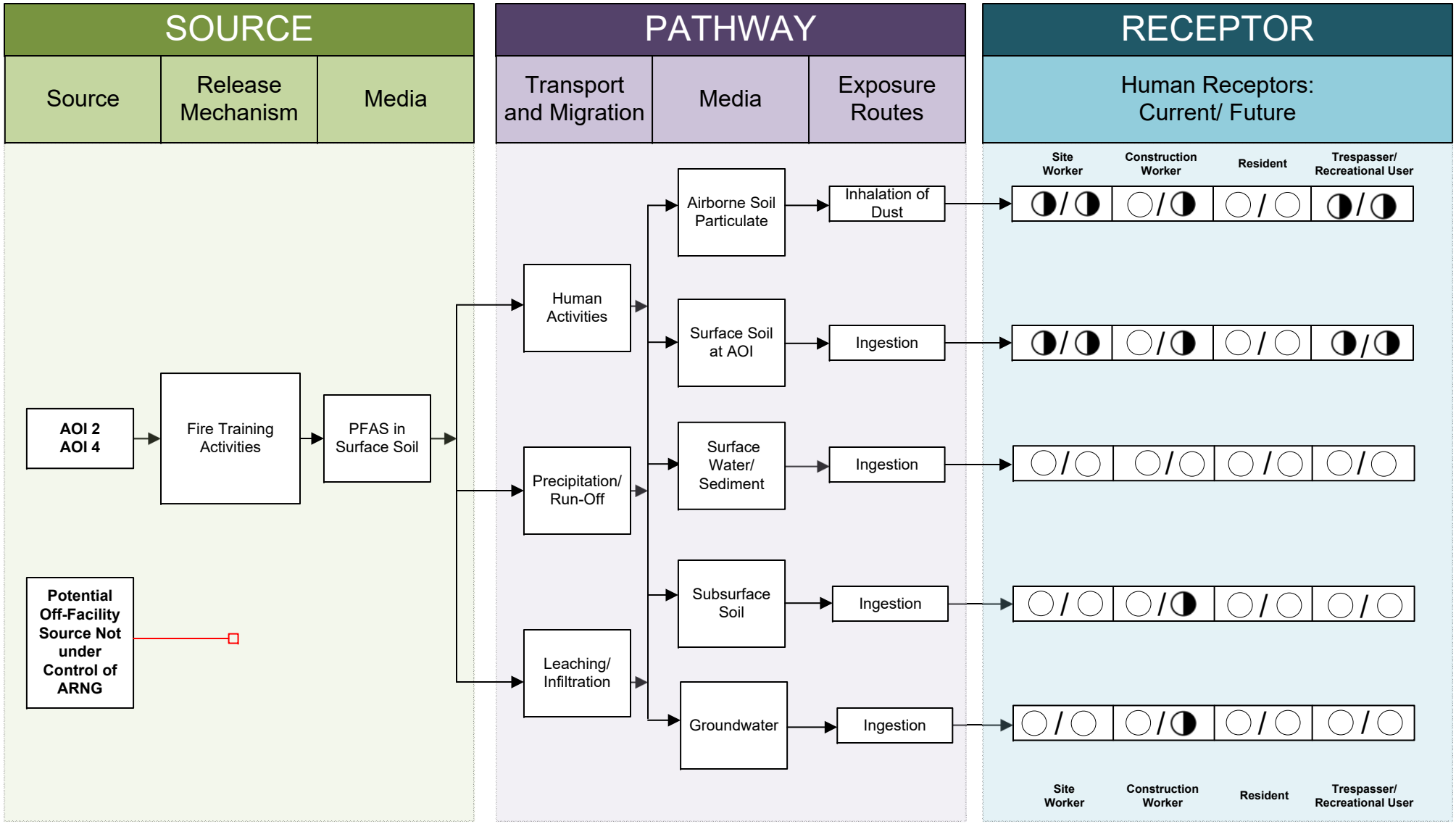


LEGEND

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

Notes:
1. The resident and trespasser/ recreational user receptors refer to on-facility receptors.
2. Dermal contact exposure pathway is incomplete for PFAS.

Figure 7-1
Conceptual Site Model
AOI 1 Conex Fire Training Area
Camp Dodge, Johnston, Iowa

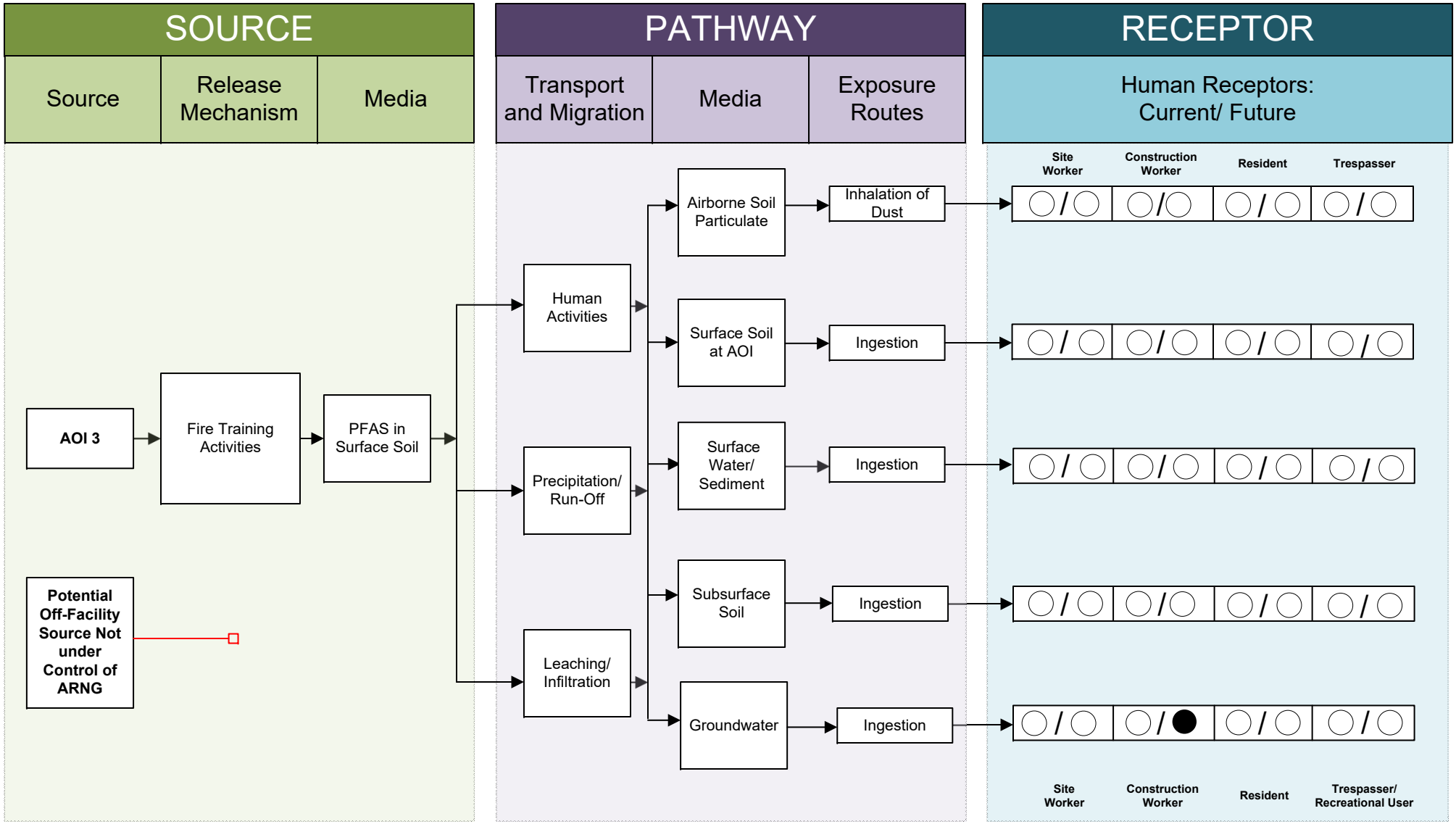


LEGEND

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

Notes:
1. The resident and trespasser receptors refer to on-facility receptors.
2. Dermal contact exposure pathway is incomplete for PFAS.

Figure 7-2
Conceptual Site Model
AOI 2 Rail Load Fire Training Area and AOI 4 Gravel Fire Training Area
Camp Dodge, Johnston, Iowa

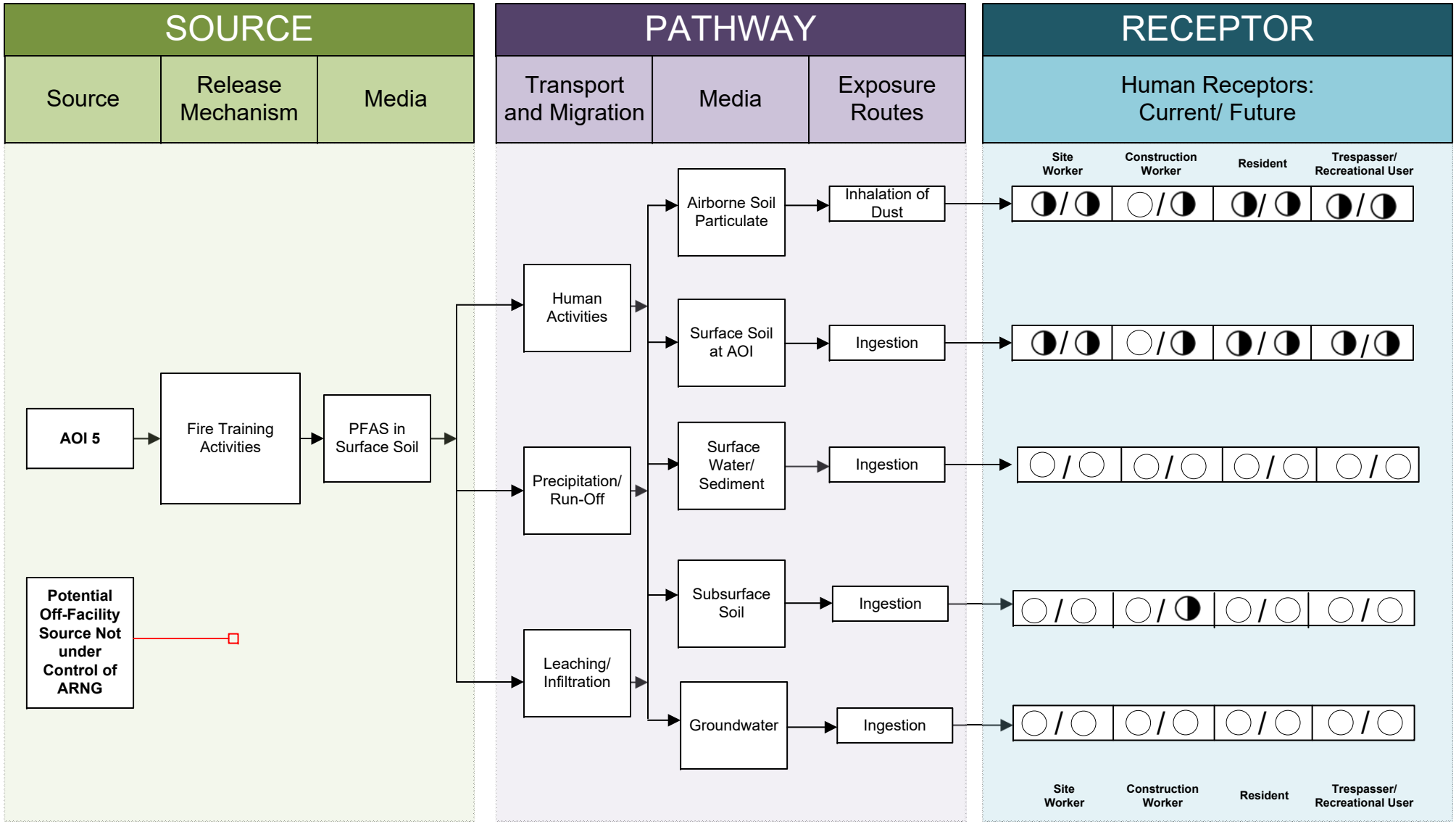


LEGEND

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

Notes:
1. The resident and trespasser receptors refer to on-facility receptors.
2. Dermal contact exposure pathway is incomplete for PFAS.

Figure 7-3
Conceptual Site Model
AOI 3 Fuel Point Fire Training Area
Camp Dodge, Johnston, Iowa

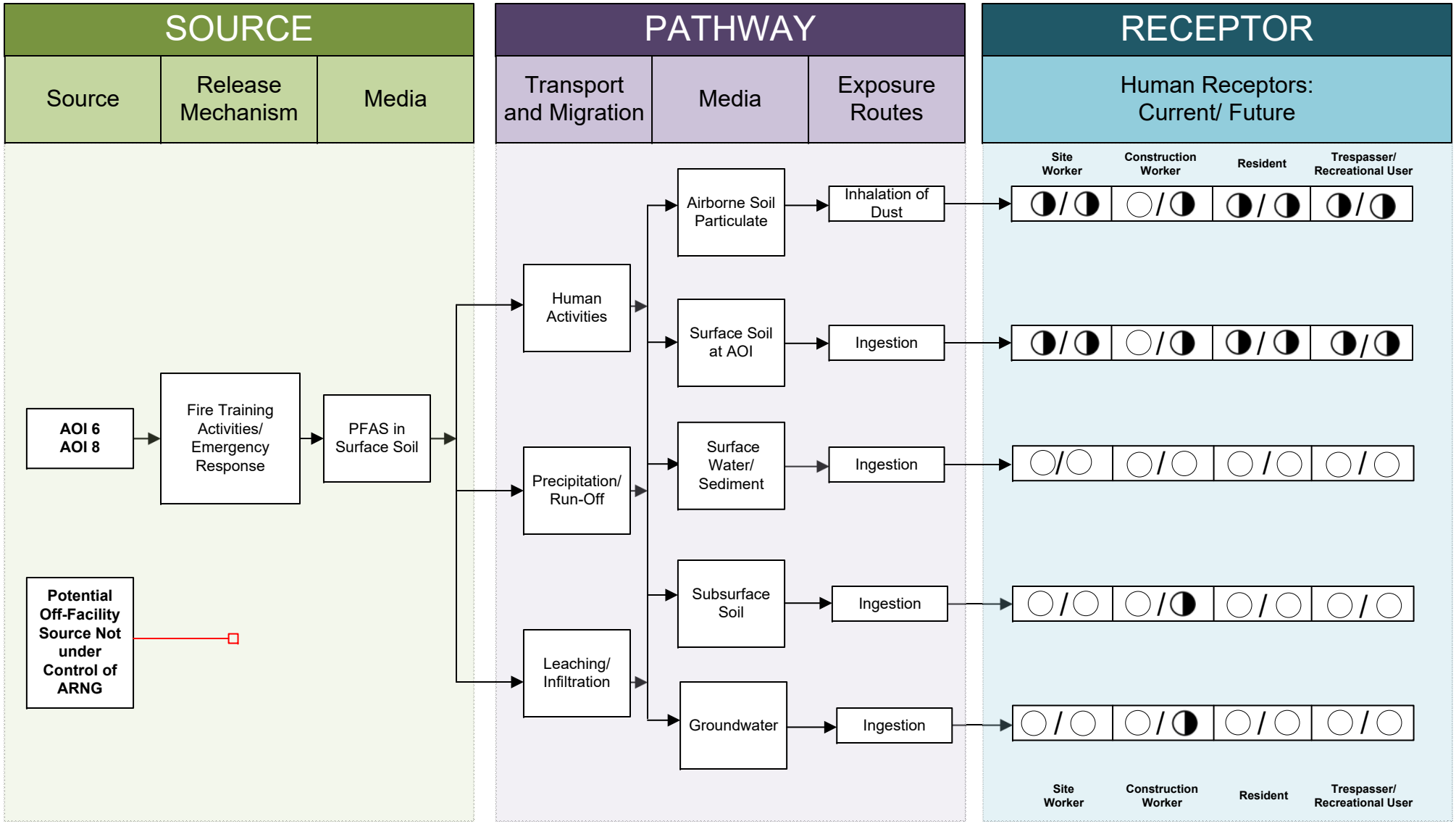


LEGEND

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

Notes:
1. The resident and trespasser receptors refer to on-facility receptors.
2. Dermal contact exposure pathway is incomplete for PFAS.

Figure 7-4
Conceptual Site Model
AOI 5 Chapel Fire Training Area
Camp Dodge, Johnston, Iowa



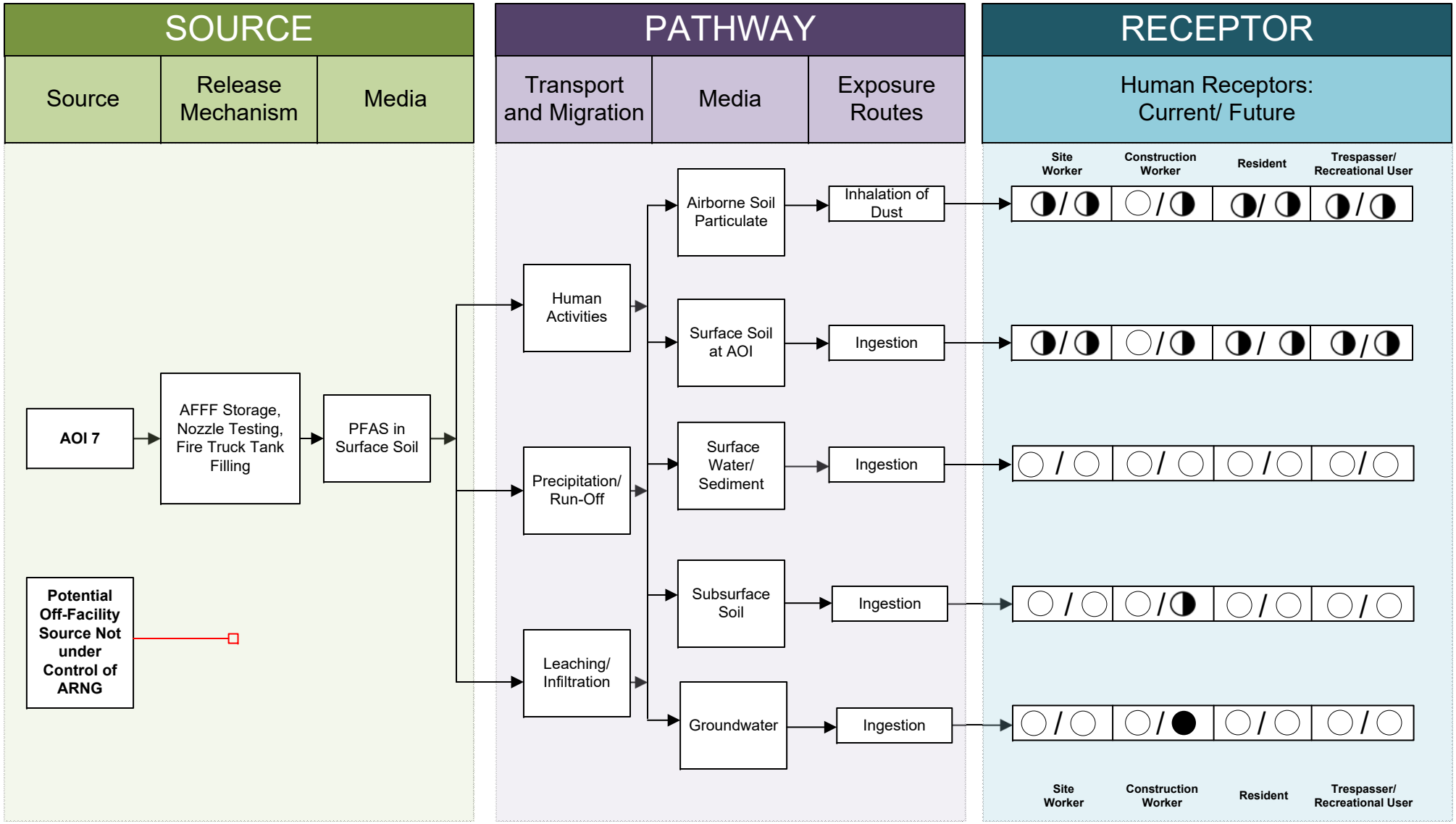
LEGEND

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

Notes:

1. At AOI 6, the resident and trespasser receptors refer to both on-facility and off-facility receptors.
2. At AOI 8, the resident and trespasser receptors refer to on-facility receptors.
3. Dermal contact exposure pathway is incomplete for PFAS.

Figure 7-5
Conceptual Site Model
AOI 6 Structure Fire and AOI 8 Trash Dumpster Fire
Camp Dodge, Johnston, Iowa

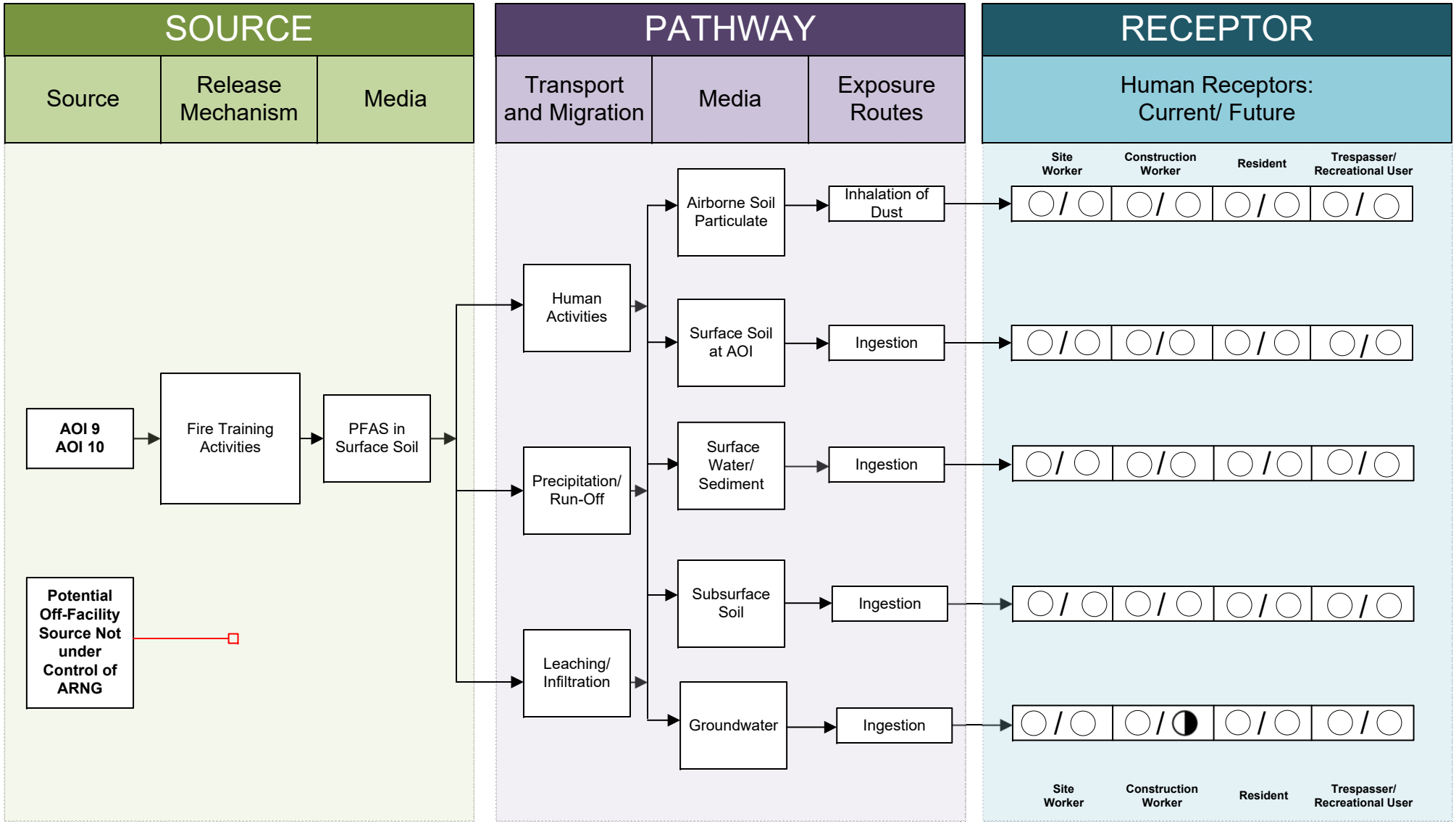


LEGEND

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

Notes:
1. The resident and trespasser receptors refer to on-facility receptors.
2. Dermal contact exposure pathway is incomplete for PFAS.

Figure 7-6
Conceptual Site Model
AOI 7 Camp Dodge Fire Station
Camp Dodge, Johnston, Iowa

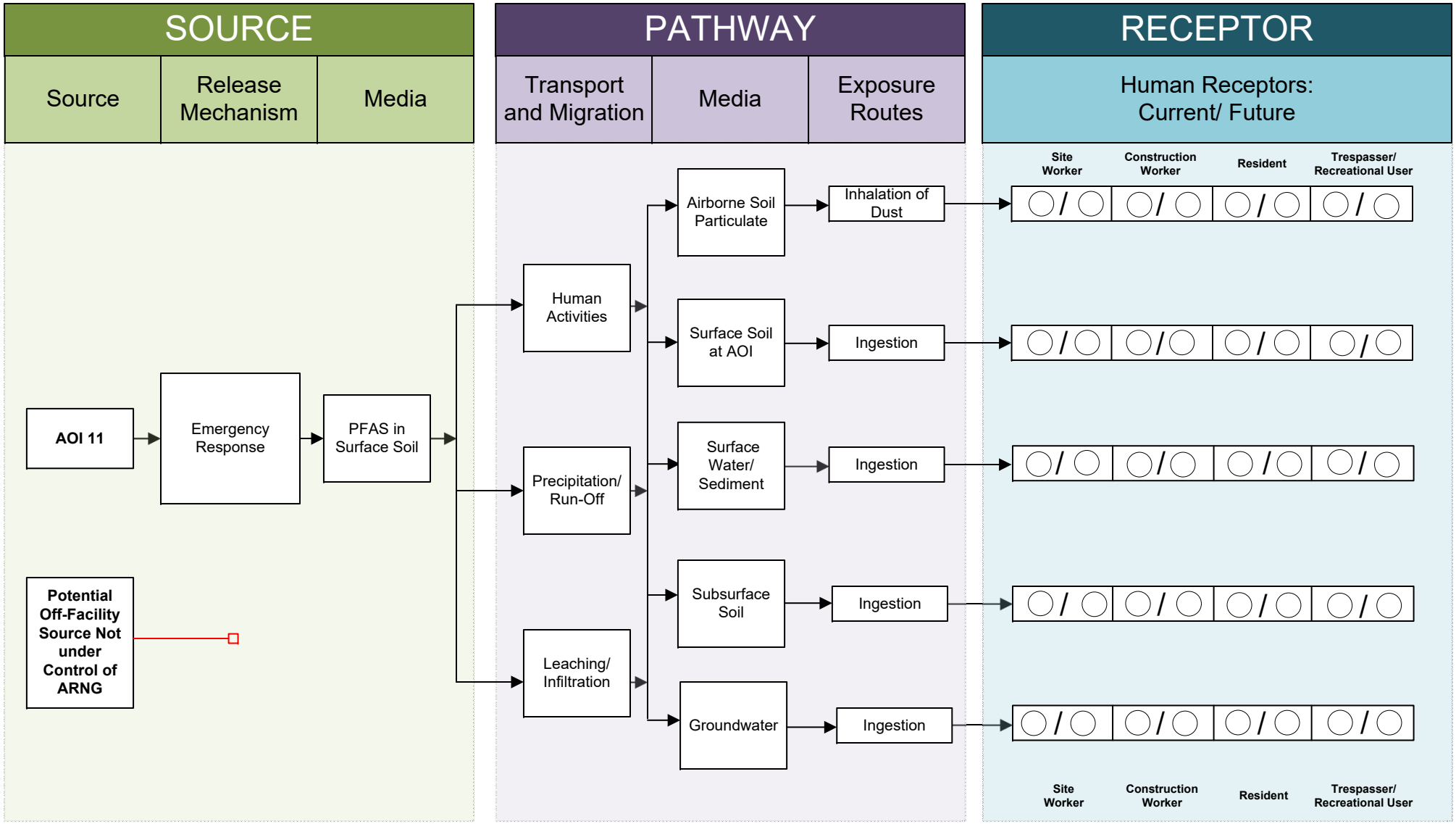


LEGEND

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

Notes:
1. The resident and trespasser receptors refer to on-facility receptors.
2. Dermal contact exposure pathway is incomplete for PFAS.

Figure 7-7
Conceptual Site Model
AOI 9 Car Fire Training Area and
AOI 10 Aggregate Collection Point Fire Training Area
Camp Dodge, Johnston, Iowa

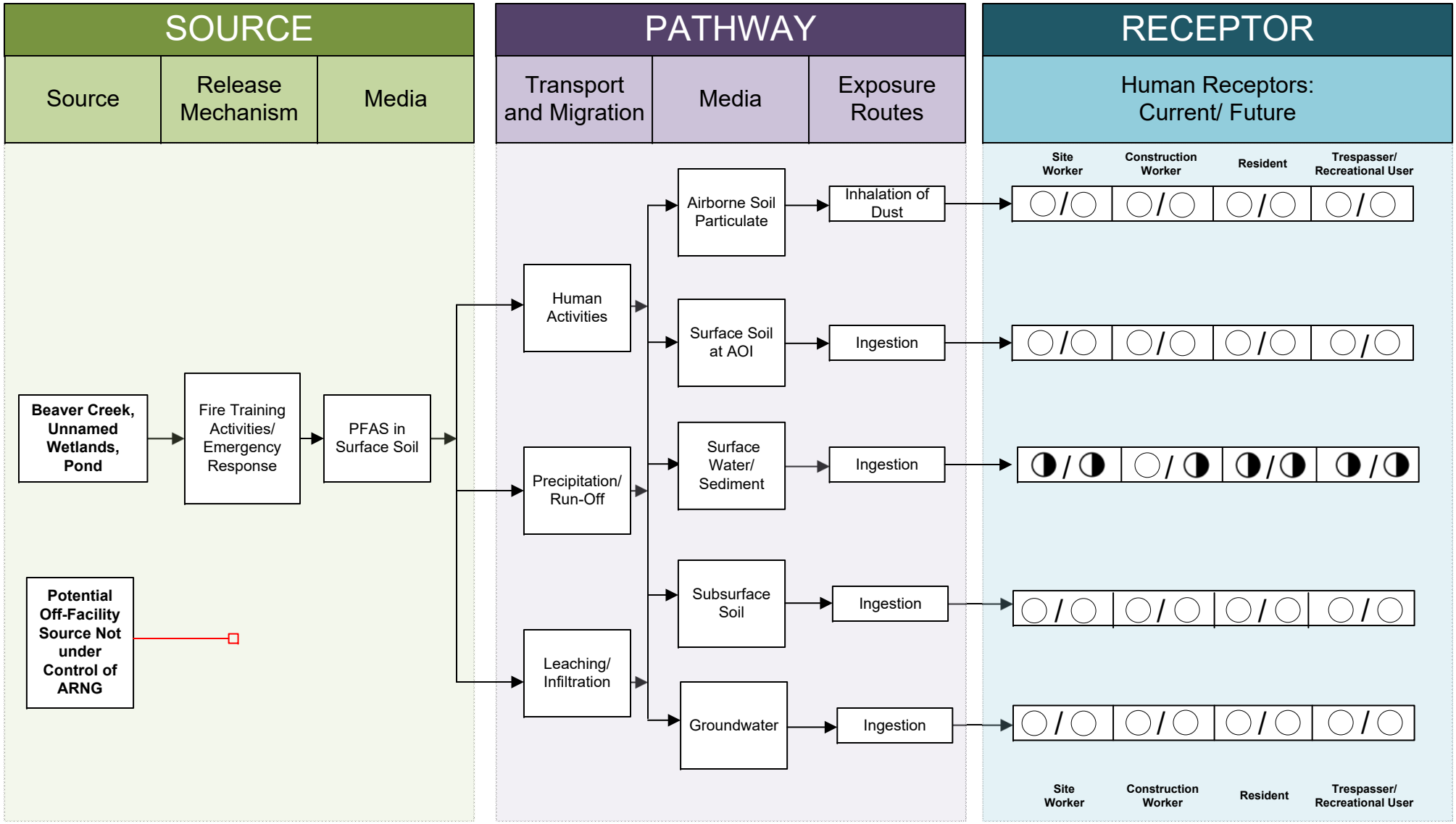


LEGEND

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

Notes:
1. The resident and trespasser receptors refer to on-facility receptors.
2. Dermal contact exposure pathway is incomplete for PFAS.

Figure 7-8
Conceptual Site Model
AOI 11 Live Fire Shoot-House Fire
Camp Dodge, Johnston, Iowa



LEGEND

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

Notes:
1. The resident and recreational user receptors refer to on-facility receptors.
2. Dermal contact exposure pathway is incomplete for PFAS.

Figure 7-9
Conceptual Site Model
Beaver Creek and
Southwestern Cantonment Unnamed Wetlands and Pond
Camp Dodge, Johnston, Iowa

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8. Summary and Outcome

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

8.1 SI Activities

SI field activities included soil, groundwater, sediment, and surface water grab sampling from 12 November through 26 November 2019. Field activities were conducted in accordance with the SI QAPP Addendum (AECOM, 2019b), except as previously noted in **Section 5.9**.

To fulfill the project DQOs set forth in the approved SI QAPP Addendum (AECOM, 2019b), samples were collected and analyzed for a subset of PFAS by LC/MS/MS compliant with QSM Table B-15 as follows. The 18 PFAS analyzed as part of the ARNG SI program are specified in **Section 5.9** of this Report.

- 72 soil grab samples from 24 boring locations;
- 28 surface soil samples from 14 hand auger locations
- 23 groundwater grab samples from 24 temporary well locations,
- 10 sediment and 10 surface water samples from 10 locations; and
- 61 Quality Assurance (QA) samples collected.

The information gathered during this investigation was used to determine if PFOA, PFOS, and/or PFBS were present at or above SLs. Additionally, the CSMs were refined to assess whether a potentially complete pathway exists between the source and potential receptors for potential exposure to PFOA, PFOS, and PFBS at each AOI, Beaver Creek, and the unnamed wetlands and pond in the southwestern cantonment of Camp Dodge as described in **Section 7**.

8.2 SI Goals Evaluation

As described in **Section 4.2**, the SI activities were designed to achieve six main goals or DQOs. This section describes the SI goals and the conclusions that can be made for each based on the data collected during this investigation.

1. *Determine the presence or absence of PFOA, PFOS, and PFBS at or above SLs.*

   PFOA, PFOS, and PFBS were detected at the facility in soil, groundwater, sediment, and surface water. PFOA, PFOS, and PFBS were detected at certain source areas but were not detected at the facility boundary between source areas and potential drinking water receptors. The detected concentrations of PFOS in groundwater at AOI 1 Conex FTA, AOI 3 Fuel Point FTA, and AOI 7 Camp Dodge Fire Station exceeded the individual SL of 40 ng/L for PFOS. The detected concentration of PFOS in surface soil at AOI 1 Conex FTA exceeded the individual SL of 130 µg/Kg for PFOS. The detected concentrations of PFOA and PFBS in soil samples from all AOIs were below the individual SLs.

2. *Develop information to potentially eliminate a release from further consideration because it is determined that it poses no significant threat to human health or the environment.*

   Eight potential PFAS release areas were removed from further consideration based on the groundwater and soil data collected during this SI: AOI 2 Rail Load FTA; AOI 4 Gravel FTA; AOI 5 Chapel FTA; AOI 6 Structure Fire; AOI 8 Trash Dumpster Fire; AOI 9 Car FTA;

AOI 10 Aggregate Collection Point FTA; and AOI 11 Live Fire Shoot-House Fire. PFOA, PFOS, and PFBS were not detected in groundwater and/ or soil above the SLs in any of these areas; therefore, these areas pose no significant threat to human health or the environment.

3. *Determine the potential need for a removal action.*

   Based on the data collected during this SI and Camp Dodge sampling of facility potable wells in 2017 and 2020, there is not a complete exposure pathway between source and drinking water receptors.

4. *Collect data to better characterize the release areas for more effective and rapid initiation of a RI.*

   The geological data collected as part of the SI indicate the lithology observed during the SI was consistent with descriptions from previous investigations at the facility and surrounding area. Borings advanced in the shallow subsurface consisted of sands, silts, and clays. Sand layers varied from brown, yellow, and gray; well- to poorly-sorted; sub-angular to rounded grains. Silt and clay layers were encountered but did not terminate drilling at any locations. Generally, silts and clays intervals are described as dark gray to olive, cohesive, with low to medium plasticity and containing trace to some fine-grained sand.

   Depth to groundwater at the facility ranges from approximately 7 to 29 feet bgs. Groundwater flow direction in the cantonment is west southwest towards Beaver Creek, and groundwater flow at AOI 6 outside the cantonment area is east towards Saylorville Lake. These geologic and hydrogeologic observations inform the technical approach development for the RI.

5. *Identify within 4 miles of the installation other potential PFAS sources (fire stations, major manufacturers, other DoD facilities) and receptors, including both groundwater and surface water receptors, to determine whether the ARNG is the likely source of PFAS, or whether there is an off-facility source of PFAS responsible for installation detections of PFAS (USEPA, 2005).*

   Based upon the evaluation of groundwater and soil results in comparison to SLs, in combination with the groundwater flow direction analysis, the results of the SI indicate that the source of detected concentrations of PFOA, PFOS, and PFBS at the facility is likely attributable to ARNG activities. There were no exceedances of the groundwater SLs at boundary locations within the facility, and there are no known potential off-facility sources of PFAS that could be responsible for detected concentrations of PFOA, PFOS, and PFBS at the facility.

6. *Determine whether a potentially complete pathway exists between the source and potential receptors and whether ARNG is the likely source of the contamination.*

   Detections of PFOS, PFOA, and PFBS in soil at source areas indicate there is a potentially complete pathway to site workers, construction workers, on- and off-facility residents, recreational users, and trespassers. The PFOS SL exceedances in groundwater indicate there is a potentially complete exposure pathway between source and future construction workers. Detections of PFOS and PFBS in sediment and surface water in Beaver Creek, as well as the southwestern cantonment unnamed wetlands and pond, indicate there is a potentially complete exposure pathway to site workers, future construction workers, recreational users, and trespassers.

8.3 Outcome

Based on the CSM developed and revised in light of the SI findings, there is no potential for exposure to residential drinking water receptors caused by DoD activities at or adjacent to the facility. There is potential for exposure to groundwater via incidental ingestion for the future construction worker receptor at AOI 1, AOI 3, and AOI 7 from PFAS sources on-facility resulting from historical DoD activities. Sample chemical analytical concentrations collected during the SI were compared against the project SLs for PFOA, PFOS, and PFBS in soil and groundwater, as described in **Table 6-1**. The following bullets summarize the SI results:

- PFOS in shallow soil and groundwater at AOI 1: PFOS in groundwater at the Conex FTA exceeded the individual SL of 40 ng/L, with detected concentrations of 347 ng/L and 285 ng/L at locations AOI1-GW01 and AOI1-GW02, respectively. PFOS in soil exceeded the individual residential SL of 130 µg/Kg, with a detected concentration of 410 µg/Kg. Based on the results of the SI, further evaluation of AOI 1 is warranted in the RI.
- PFOS in groundwater at AOI 3: PFOS in groundwater at the Fuel Point FTA exceeded the individual SL of 40 ng/L, with detected concentrations of 42.4 ng/L and 61.4 ng/L at locations AOI3-GW05 and AOI3-GW24, respectively. Based on the results of the SI, further evaluation of AOI 3 is warranted in the RI.
- PFOS in groundwater at AOI 7: PFOS in groundwater at the Camp Dodge Fire Station exceeded the SL of 40 ng/L, with a detected concentration of 90.2 J+ ng/L at AOI7-GW14. Based on the results of the SI, further evaluation of AOI 7 is warranted in the RI.
- The detected concentrations of PFOA, PFOS, and PFBS in soil and groundwater samples from the remaining AOIs were below the individual SLs or not detected.

Table 8-1 summarizes the SI results for soil and groundwater. Based on the CSMs developed and revised in light of the SI findings, there is no potential for exposure to residential drinking water receptors caused by DoD activities at or adjacent to the facility.

Table 8-2 summarizes the rationale used to determine if an AOI should be considered for further investigation under CERCLA and undergo a RI. Based on the results of this SI, further evaluation is warranted in the RI for AOI 1: Conex FTA, AOI 3: Fuel Point FTA, and AOI 7: Camp Dodge Fire Station.

Table 8-1: Summary of Site Inspection Findings

AOI	Potential PFAS Release Area	Soil – Source Area	Groundwater – Source Area	Groundwater – Facility Boundary
1	Conex FTA	●	●	N/A
2	Rail Load FTA	◐	◐	N/A
3	Fuel Point FTA	○	●	○
4	Gravel FTA	◐	◐	N/A
5	Chapel FTA	◐	○	N/A
6	Structure Fire	◐	◐	○
7	Camp Dodge Fire Station (Building B-59)	◐	●	N/A
8	Trash Dumpster Fire	◐	◐	N/A
9	Car FTA	○	◐	N/A
10	Aggregate Collection Point FTA	○	◐	N/A
11	Live-Fire Shoot House Fire	○	○	N/A

Legend:

● = detected; exceedance of the screening levels

◐ = detected; no exceedance of the screening levels

○ = not detected

Table 8-2: Site Inspection Recommendations

AOI	Description	Rationale	Future Action
1	Conex FTA	Exceedances of the SLs in soil and groundwater at source area.	Proceed to RI
2	Rail Load FTA	Detections in groundwater but no exceedances of SLs. No exceedances of SLs in soil.	No further action
3	Fuel Point FTA	Exceedances of the SLs in groundwater at source area. No detections in soil.	Proceed to RI
4	Gravel FTA	Detections in groundwater but no exceedances of SLs. No exceedances of SLs in soil.	No further action
5	Chapel FTA	No detections in groundwater. No exceedances of SLs in soil.	No further action
6	Structure Fire	Detections in groundwater but no exceedances of SLs. No exceedances of SLs in soil.	No further action
7	Camp Dodge Fire Station (Building B-59)	Exceedances of the SLs in groundwater at source area. No exceedances of SLs in soil.	Proceed to RI
8	Trash Dumpster Fire	Detections in groundwater but no exceedances of SLs. No exceedances of SLs in soil.	No further action
9	Car FTA	Detections in groundwater but no exceedances of SLs. No exceedances of SLs in soil.	No further action
10	Aggregate Collection Point FTA	Detections in groundwater but no exceedances of SLs. No detections in soil.	No further action
11	Live-Fire Shoot House Fire	No detections in groundwater or in soil.	No further action

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